

Community Support For Local Agriculture:

A Comparative Study for Massachusetts and Iceland

2021 INTERACTIVE QUALIFYING PROJECT / ICELAND PROJECT CENTER



WPI

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Community Support For Local Agriculture:

A Comparative Study for Massachusetts and Iceland

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Iceland Project Center

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This report represents work of WPI undergraduate students submitted to the faculty as evidence of a degree requirement. WPI routinely published these reports on its web site without editorial or peer review. For more information about the projects program at WPI, see <http://www.wpi.edu/Academics/Projects>.

Abstract

Our project goal was to compare community support for local agriculture in Massachusetts and Iceland. We collected data through interviews with farmers and university contacts, as well as online surveys with consumers at universities. Our findings were: older consumers are more likely to participate in local food programs than younger ones, consumers in both locations are likely to buy locally barring a substantial difference in price, farmers understand the importance of affordable prices, and farmers prioritize sustainability and community feedback. Based on our findings, we recommend WPI explore the feasibility of an on-campus community garden, explore opportunities to increase local food consumption on campus, and allow WPI students to use their meal plans to purchase local food.



Executive Summary

Food insecurity is a global problem defined as when a population has minimal access to an adequate amount of nutritious foods due to a lack of resources. Food insecurity can have different causes from government crises to poor education and social inequality (L. C. Smith et al., 2005). One phenomenon that can lead to food insecurity is a food desert, where healthy and nutritious foods are not easily accessible (Carson, 2019). Populations within a food desert may have a sufficient caloric intake but the foods they consume do not provide enough nutrients (Henry, 2017). On college campuses, food insecurity can be a problem because of lack of access, minimal financial means, or lack of energy to prepare healthy meals (Henry, 2017). One way to combat food insecurity is to increase local food production near at-risk locations.

Local food production goes hand-in-hand with sustainability initiatives supported by local communities, universities, states, and countries. Massachusetts has sustainability initiatives to promote more resource-efficient buildings that meet LEED Plus Standard for Massachusetts and a Food System Collaborative (The Collaborative) that created an action plan to help local food production. The Collaborative plans to achieve goals varying from increasing local food production and sales, to creating more jobs within agriculture and increasing the availability of local and healthy foods to residents (Massachusetts Food System Collaborative, 2018).

Likewise, Massachusetts universities, such as Worcester Polytechnic Institute, Clark University, Assumption University, Worcester State University, and College of the Holy Cross, all have sustainability offices that create initiatives to promote the schools' sustainability. Some initiatives include adding sustainability to the curriculums and individual courses, starting food waste programs, and even using local food in dining halls. Iceland and its universities have programs in place to promote sustainability as well, these programs focus on

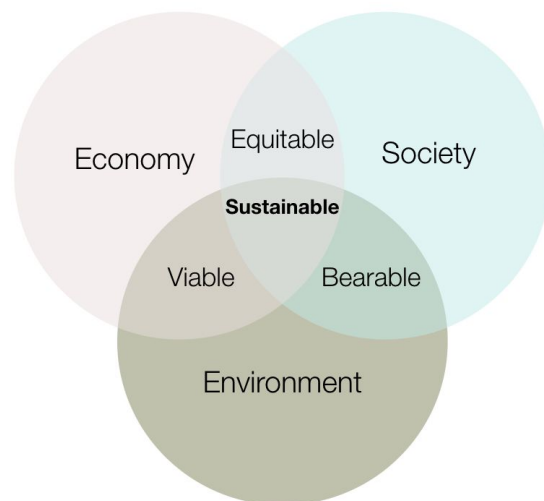


Figure 1. Venn Diagram of Sustainability. Economy, society, and the environment all intertwine to provide a sustainable way of life. Information adapted from Caine, 2017.

utilizing Iceland's natural resources. The country has taken steps to achieve net-zero emissions by reducing emissions and actively removing carbon dioxide from the atmosphere ("Iceland's Innovations to Reach Net-Zero – in Pictures," 2020). Icelandic universities, specifically Reykjavík University and the Agricultural University of Iceland are increasing the number of sustainability courses and topics in their curriculums (Á. Bragadóttir & R. Pórarinsdóttir, personal communication; G. A. Sævarsdóttir, personal communication).

Local food systems promote sustainability, healthy eating, and support local communities. Local food systems are important as they minimize food miles, which is the distance a food item travels from farm to table. Food miles have been used as a measurement of environmental impact and sustainability of food items; the longer the distance traveled, the greater the environmental impact (Schnell, 2013). However, food miles are not always an accurate measurement of sustainability as they do not consider bulk shipment of products. Bulk shipment is efficient because large amounts of food are shipped together so the fuel spent per food item is less, even though the distance traveled from farm to table is substantial. Local food systems provide different avenues to minimize the food miles, but may not decrease the environmental impact if a consumer travels to multiple locations to obtain food (Coley et al., 2009).

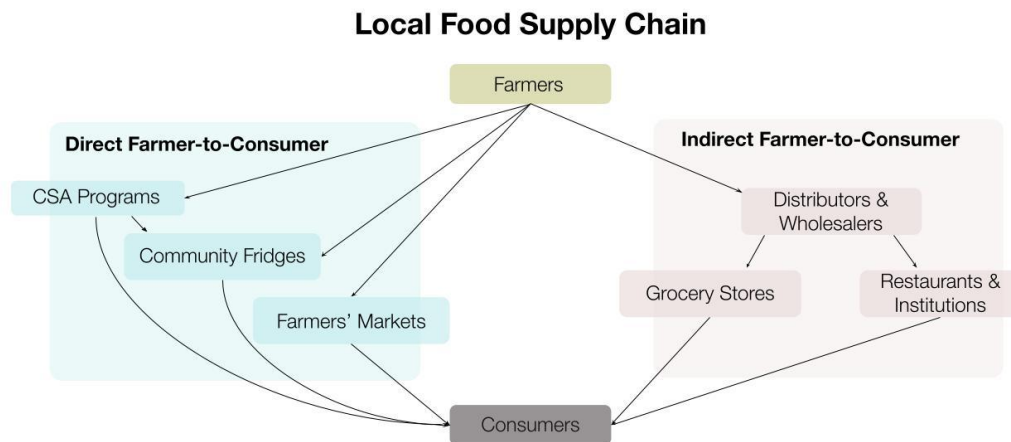


Figure 2. *Supply Chain Flow Chart for Local Food.*
 Farmers can sell their produce directly to consumers or through a third-party institution. The diagram shows the different avenues farmers can distribute their produce to reach consumers.

Our project goal was to compare how communities support local agriculture in Massachusetts and Iceland. We interviewed Massachusetts and Icelandic farmers to understand how both operate and market themselves to their surrounding communities. We interviewed college faculty members in both locations as well to see how universities support local agriculture. We then surveyed Massachusetts and Icelandic communities to gauge interest—we wanted to know if people buy local food and support local agriculture or if they

would in the future.

To assess whether local agriculture is more sustainable than industrialized agriculture, our team needed to understand how local farms grow and sell their products. We were able to identify the methods and marketing strategies that farmers use to sell their products, which was important as it affects who had convenient access to local food. Learning this allowed us to identify reasons why some parts of the community might not know about local food options. We also visited local grocery stores in both locations to evaluate what local produce they sold and what was imported. This helped us to understand if grocery stores provide easy access to local food for the community, and if there is any relationship between grocery stores and local farmers.

We interviewed farms and organizations involved in local agriculture in both Massachusetts and Iceland using semi-structured interviews, which provided more in-depth responses since the farmers were invited to discuss their answers. In-person interviews were conducted when possible, otherwise, email correspondence and virtual interviews were used. Next, we aimed to understand how college campuses support local agriculture in both Massachusetts and Iceland. Using semi-structured interviews with faculty members at various universities, we discussed how our interviewees' institutions support agriculture in their local area. To gauge attitudes towards supporting local food and local agriculture, we surveyed consumers in both Massachusetts and Iceland using an online survey.

To effectively analyze the data that we collected from both Massachusetts and Iceland, we coded our notes from all the interviews, highlighting any commonalities that we saw between responses, as well as making notes of any outliers. This allowed us to see any recurring trends, especially if location had an effect on the answers the interviewees provided. For consumer surveys, we organized the data by age groups, eighteen to twenty-four year-olds, twenty-five to forty-nine year-olds, and those fifty and over. We then used visuals to



Figure 3. Produce in a Krónan Supermarket in Reykjavik. Photo by Marcela Mayor.

help us compare and contrast trends amongst the age groups.

We conducted ten semi-structured interviews with farmers and experts in the field, one survey of 170 Worcester Polytechnic Institute (WPI) students and employees, and one survey of 36 students and employees at Reykjavík University (RU) to assess consumer attitudes. Using the results from our interviews and surveys, we synthesized four main findings:

01 As people age, they become more likely to spend money and time on local food.

When asked if participants actively buy local food, older participants responded ‘Yes’ at a higher rate than younger participants (Figure 4A & 4B). Additionally, when asked about what agricultural activities they had engaged in, more respondents in the eighteen to twenty-four year-old age range stated that they had not participated in any, while older age ranges were more likely to select one or more of the activities on the survey. This provides a strong basis that age correlates with higher levels of participation in local agriculture.

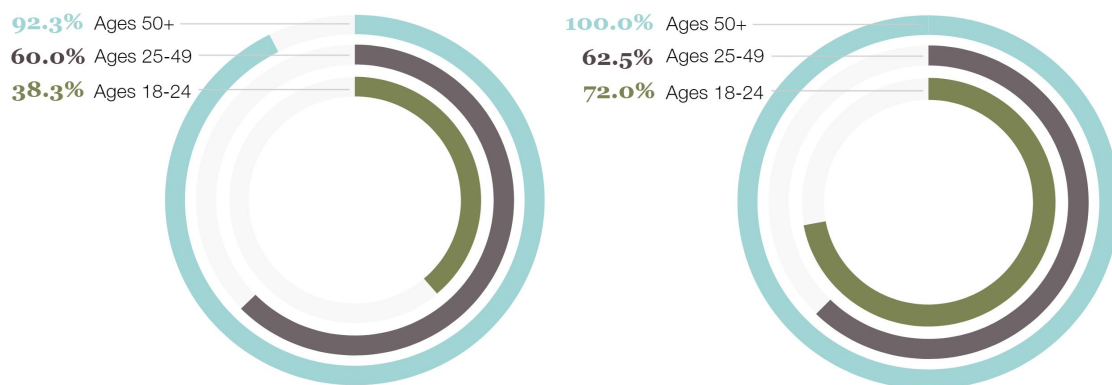


Figure 4A & 4B. Percentage of Respondents who Actively Buy Local Food in Massachusetts (left, 4A). Percentage of Respondents who Actively Buy Local Food in Iceland (right, 4B).

The graphs are separated by age groups, the colored sections represent those who responded “yes” to actively buying local food while the gray sections are those who responded “no”.

02 Consumers in both Massachusetts and Iceland are likely to buy locally if there are no substantial price differences.

One of the objectives of our research was to compare consumer participation in local agriculture between Iceland and Massachusetts. Our data suggests that the attitudes and participation of consumers in both locations are very similar. For example, when asked “What would you say is the biggest factor for you when buying food?”, consumers in both areas ranked “Quality” as the most important factor and “Cost” as the second most important.

Similar trends were prevalent in other questions such as “Do you actively try to buy locally produced food?”

03 Local agricultural organizations understand the importance of making local food affordable.

Jeannie Hannigan from Little Leaf Farms said their organization “strive[s] to be approachable and [they] do that by selling at an affordable price point.” Other farms, both in Iceland and Massachusetts reflected this sentiment; they realize that local food is important to consumers but can be too expensive. Colleges and agricultural organizations in Massachusetts give CSA shares or leftover produce to the Worcester Community Fridge to give more access to consumers who may not be able to purchase local foods other ways.

04 Farmers and distributors promote sustainability and community involvement in local agriculture.

Shon Rainford, director of the Worcester Regional Food Hub, emphasized the organization’s focus on sustainability concerning the farms they work with and how they transport products. Icelandic farms believe they can be leaders in sustainability through their farming methods. In both locations, farms involve the community through activities, tours, and purchasing goods; they use feedback as motivation to help them improve their farms as well.



Figure 6. *Roof of the Friðheimar Farm Greenhouse.* Photo by Marcela Mayor.

Based on our findings, we developed a list of three primary recommendations for WPI. We focused our recommendations towards WPI so that future projects could follow-up on them; these recommendations will increase WPI's support for local agriculture.

01 Determine the feasibility of an on-campus community garden at WPI.

This would promote student involvement and provide easy access to local produce. An IQP or MQP could evaluate the feasibility of this by determining location, funding, and who would be responsible for maintaining it. The garden is part of WPI's sustainability plan for 2020-25 as well, showing additional support for it.

02 Explore opportunities to increase local food consumption on campus at WPI.

We recommend the program take the form of a CSA program, farmers' market, a meal kit program, or having dining services be sourced locally. Some of these programs are already in place at WPI, but are not directed toward students. The involvement of students could help the program by increasing participation. All programs have benefits and drawbacks and would have to be analyzed to determine which would best fit on WPI's campus.

03 Allow students at WPI to use their meal plans to participate in on-campus local food programs.

This would have to follow recommendation two, but is important as it would encourage students to purchase local food since they would not have to pay for it in addition to their meal plan.

Limitations of our research include potential bias in our consumer surveys due to the fact that we surveyed mainly university students and employees. This set of subjects may not be representative of the general population because of occupation. Our findings may have also been biased due to insufficient sample size. Additionally, because the survey questions were in English, there may



Figure 7. *The Central Corridor in Reykjavik University.* Photo by Marcela Mayor.

have been a potential language barrier for some respondents in Iceland. Our Icelandic and Massachusetts surveys did not have the same distribution of age as we used different methods to distribute our surveys in the two locations. At WPI, we utilized mass emails to distribute the surveys to faculty, staff, and students; while at RU we distributed the surveys in-person in the main corridor of their campus.

Acknowledgements

We would like to thank the following people for taking the time to fill out a questionnaire or conduct an interview with us. We learned a lot about farms, local food distribution, and sustainability at schools through these interviews. Each interview helped us make recommendations and even prompted these recommendations through their experiences with their current programs:

Shon Rainford (Worcester Regional Food Hub), Julie Rawson (Many Hands Organic Farm), Jeannie Hannigan (Little Leaf Farms), Grace Silowski (Worcester Regional Environmental Council (REC)), Eliza Lawrence (School Gardens at REC), Arni Stefansson (Horticulturists' Sale Association), Cathy Liebowitz (College of the Holy Cross), Paul Mathisen (Worcester Polytechnic Institute), Rose May, Ryan Fredette, Michelle Smith (University of Massachusetts Medical School), Ragnheiður Inga Pórarinsdóttir (Agricultural University of Iceland), Guðrún Arnbjörg Sævarsdóttir (Reykjavik University), Students & Employees of WPI, and Students & Employees of RU.

We would like to thank the next group of people for connecting us to groups of people to distribute our survey and for connecting us to more people to interview. We appreciate the time they took to reflect on our project and suggest contacts who could provide more help to our project:

Laura Roberts, Renee Gruner-Mitchell, Adam Clayton Powell IV (Worcester Polytechnic Institute), Christopher Mathews (Academic Program International), Laurențiu-Lucian Anton, Eiríkur Sigurðsson (Reykjavík University), Ása L. Aradóttir (Agricultural University of Iceland)

We would like to thank our advisors, Tanja Dominko and Laura Roberts, for their continuous support and helping us work through our multiple project goals and ideas.

Lastly, we are thankful for the opportunity to travel to the Reykjavik project site. Our project was constantly evolving and this allowed us to carefully assess our goals and methods. We hope that our project will make a lasting, meaningful change and that there will be continued research and project work on the subject of community support for local food.

Authorship

We split up our secondary research by specific topic, assigned each group member a topic, and individually researched those topics. Once our individual research was completed, we wrote a summary of each source—including any useful quotes—and presented our findings to the other groupmates. This was an effective strategy for us as it allowed us to optimize our breadth of research while also keeping each team member up to date with the group's collective research.

Each large section of the paper was split up into smaller subsections. Then, these subsections were assigned to individual group members to write a first draft. Once all sections were completed, the whole group would read through the entire section and suggest edits where they felt necessary. Finally, each person would review the comments on their own section and revise based on that. For example, each finding in our results section was initially written by a different group member, then the whole group revised it before and after we received feedback from our advisors.

Acronyms

MA ————— Massachusetts

IS ————— Iceland

WPI ————— Worcester Polytechnic Institute

RU ————— Reykjavík University

UMMS ————— University of Massachusetts Medical School

CSA ————— Community-Supported Agriculture

IQP ————— Interactive Qualifying Project

MQP ————— Major Qualifying Project

REC ————— Regional Environmental Council

Meet the Team



Alexis Compton - Class of 2023 Biomedical Engineering

I have a passion for health and the environment and this project allowed me to explore both more and relate the two together. I enjoyed interviewing farmers and organizations who were enthusiastic about what they did, it made me more excited about the project and to expand my relationship with local agriculture



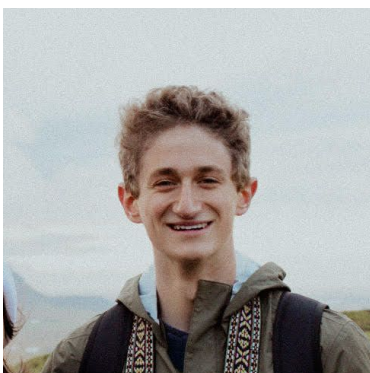
Nathan Demers - Class of 2023 Chemical Engineering, Environmental Concentration

I grew up in a small town in New Hampshire and my family would always grow our own food in our garden. I have a passion for the environment and cooking so I wanted to get involved with this project. I enjoyed exploring local food in Iceland and Massachusetts and meeting so many passionate people supporting their communities.



Marcela Mayor- Class of 2023 Aerospace Engineering

I feel that food is often a reflection and culmination of the land itself, the people, and the community. I grew up cooking and got my love of hands-on work through environmental sustainability projects so I feel very lucky to have been given the opportunity to work with such amazing people on a project that I'm passionate about.



Lucien Wallace - Class of 2023 Mechanical Engineering, Environmental & Sustainability Studies

Growing up in a small town in Maine and gardening has instilled in me a love of environmental work. I chose to work on this project both because of its environmental focus and my love of eating. I loved meeting new people who are devoted to protecting the environment while exploring the landscape of Iceland.

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1

Local Food and Sustainability

Context to Our Project

Iceland imports most of its food—it only produces about 43% of its vegetables and less than one percent of the grains for human consumption (Hafstað, 2021). This prompted our project to focus on local food consumption and production in Iceland to determine how to decrease dependence on imported food. Massachusetts is a leader in direct market sales for the United States, with over \$100 million of agricultural sales coming from direct markets (Inglis, 2017). This shows that a portion of produce sales are not only local but directly from farmers in Massachusetts.

This chapter will introduce food insecurity and the impact it has on college students and communities as a whole. Sustainability practices in Massachusetts, Iceland, and universities in both locations will be discussed. The chapter will conclude with the benefits and definitions surrounding local food to provide some evidence as to why promoting local food consumption is important.



Figure 1. View of a Waterfall and Farmland in Southern Iceland.
Photo by Alexis Compton.

Food Insecurity

Food insecurity is a term that describes minimal access to an adequate amount of nutritious food due to lack of resources or money; this affects nearly every nation on the globe. Of the world's population, about 26.4% of people are affected by food insecurity which impacts the health, social, and economic aspects of a community (Huizar et al., 2021). Since food insecurity can take on different forms, there are multiple different causes: political, social, and economic crises, poverty, poor education and health, and social inequality (L. C. Smith et al., 2005).

One phenomenon that can lead to food insecurity is a food desert. A food desert is an area in which healthy and nutritious food cannot be easily accessed (Carson, 2019).

Even if people can obtain a normal caloric intake, they can still be considered food insecure if that food lacks the necessary nutrition (Henry, 2017). This explains how an area can struggle with obesity and food insecurity at the same time (Figure 2).

Unhealthy and non-nutritious foods are often cheaper and easier to find at places like corner stores, pharmacies, and fast-food restaurants.

Another barrier to nutritious food is lack of education about nutrition and cooking techniques. Many times, people do not

choose the healthier options available at food pantries and grocery stores because they do not know how to prepare them or do not have the time to do so. Having volunteers at the food pantries that teach people about foods and provide them simple recipes can increase the adoption of these healthy foods (Carson, 2019; Holly & Violette, 2012).

In the US in 2015, the estimated number of households experiencing food insecurity was 12.7%. Studies have shown that 14-59% of college students have struggled with food insecurity during college, demonstrating that students also experience food

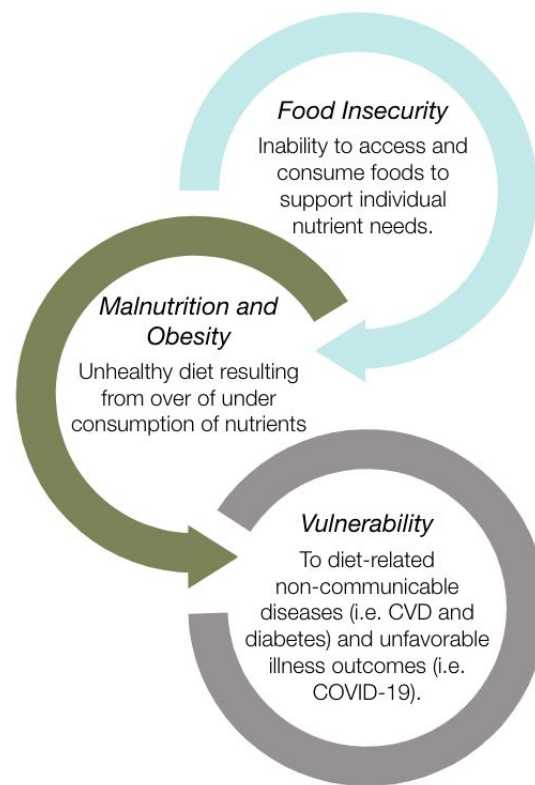


Figure 2. *The Impacts of Food Insecurity*. Information adapted from Huizar et al., 2021.

insecurity at a high rate. Potential causes for this include college students not having access to healthy choices, changing college demographics, increasing costs at universities, decreased funding for financial aid, students not qualifying for financial aid, or students not having enough time or energy to make healthy foods (Henry, 2017). Food insecurity has been found to disrupt the education and social lives of students, while also severely impacting overall health and quality of life.

“Food insecurity, as a potential consequence of the increasing cost of higher education, and its likely impact on student health, learning, and social outcomes should not be considered an accepted aspect of the impoverished student experience, but a major student health priority.”
(Patton-López et al. 2014, p. 209)

One way to combat food insecurity is to increase local production of nutritious foods to provide residents stable access to food.

Sustainability at Colleges and at the State-Level

Sustainability has become an important goal for cities and universities alike; both create plans to achieve sustainability in certain areas over time. The three pillars of sustainability are the economy, environment, and society (Finlay & Massey, 2012). Independently, the pillars are important and have individual standards, but when they overlap, sustainability can be accomplished (Figure 3). There is ambiguity with the definition of sustainability which makes achieving it more difficult. One definition is if the amount of energy consumed during a process is less than or equal to the amount created, then the process is sustainable. Food production needs to

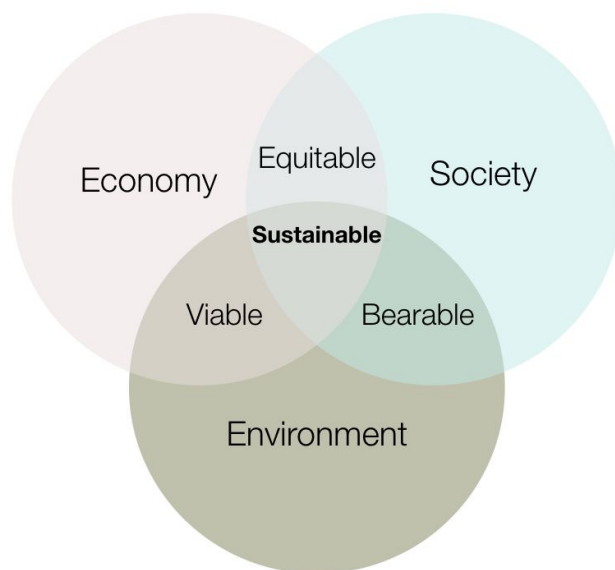


Figure 3. Venn Diagram of Sustainability. Economy, society, and the environment all intertwine to provide a sustainable way of life. Information adapted from Caine, 2017.

improve its environmental and societal sustainability. Local farming and agriculture are more sustainable than conventional global farming methods because they tend to use low-intensive, traditional, or organic farming methods that cause less environmental harm (Stagl, 2002).

In Massachusetts, the government has implemented initiatives to improve sustainability by implementing high-performance buildings that increase resource efficiency and have fewer environmental impacts (Commonwealth of Massachusetts, 2021). With regards to food sustainability, Massachusetts has a Food System Collaborative that adopted an action plan in 2015 to achieve broad goals such as increasing local food production and sales, creating jobs with farms, protecting land and water for agricultural benefit, and increasing the availability of local and healthy foods to residents (MA Food System Collaborative, 2018). By 2018, several organizations within Massachusetts, including Cambridge Food and Fitness Policy Council, Land for Good, City Soil and Greenhouse LLC, and Center for EcoTechnology created initiatives and programs to increase sustainability through food systems (Massachusetts Food System Collaborative, 2018). These programs deal with handling food waste, helping local farmers reduce energy costs, promoting urban agriculture, and increasing energy use efficiency in other areas of food production and storage (MA Food System Collaborative, 2018).

As the importance of sustainable practices has become more widely known, many universities are placing more focus on sustainability. Universities play a leadership role in promoting sustainability in surrounding communities, so it is important to evaluate how they practice sustainability (Finlay & Massey, 2012). Worcester Polytechnic Institute, in Worcester, Massachusetts, has multiple food programs to increase sustainability; it has a program to recycle food waste to local pig farmers for feed and another program to give unused food to local food pantries. The institution has multiple courses about practicing sustainability and most of its student projects revolve around sustainability (Caton, 2021). Other universities in Worcester, including Clark University, Assumption University, and College of the Holy Cross also have sustainability programs in place at their school. All of these colleges source some portion of their food from local organizations and farms. They also incorporate sustainability into their curriculums and have other initiatives to make their buildings and community habits more sustainable.

Similarly, Iceland and its universities have programs and initiatives to increase sustainability that can be achieved through their natural resources. Iceland is uniquely situated

because it faces barriers to food security, such as lack of arable land and a hostile growing climate, yet it boasts natural resources that can be used to overcome these barriers. About 2.5% of Iceland's population faces food insecurity. Even though this number is small, it does not reflect the danger of hunger they face if imports were prevented by a natural disaster or embargo (The Borgen Project, 2020). Ragnheiður Þórarinsdóttir—rector of the Agricultural University of Iceland—echoed this concern: she stated that Iceland faces food insecurity, especially if imports stop, because there will be no oil or fertilizer to grow food. While Iceland's volcanic geography and harsh climate render many traditional methods of local food production impossible, its access to geothermal heat and other natural resources provide ways to achieve food security through less traditional methods. Naturally warmed soil from geothermal activity is used in agriculture; more recent developments have utilized this natural resource to heat greenhouses which provide means for domestic production of food in Iceland (Ragnarrson, 2015).

Worldwide, Iceland is widely considered to be a leader in sustainability initiatives, especially in its innovations in renewable energy usage. The country works hard to take advantage of and utilize its natural resources sustainably. Iceland has taken significant steps in its efforts to achieve net-zero emissions by reducing them and actively removing carbon dioxide from the atmosphere ("Iceland's Innovations to Reach Net-Zero – in Pictures," 2020). Both Reykjavík University and the Agricultural University of Iceland aim to incorporate sustainability more into their curriculums (Á. Bragadóttir & R. Þórarinsdóttir, personal communication, October 5, 2021; G. A. Sævarsdóttir, personal communication, September 30, 2021).



Figure 4. *Steam From a Geyser in Iceland.*
Photo by Marcela Mayor.

While most of their sustainability efforts have been dedicated to renewable energy use, the Government of Iceland released a voluntary national review that cited "End Hunger" among other objectives to be completed by 2030 (Prime Minister's Office, 2019). This objective aims to

achieve food security and improved nutrition while simultaneously promoting sustainable agriculture. The Icelandic Government hopes to improve access to quality food and provide assistance and support for low-income and vulnerable groups. The country emphasizes the need for sustainable food production in light of the climate crisis and the harmful environmental impacts of existing food production systems. In 2021, the Government of Iceland released its first comprehensive Food Policy which outlines goals to ensure food security, sustainability, and efficiency (Government of Iceland, 2021). This policy aims to strengthen local community food consumption, stating that funding will be secured to promote these efforts. The initiatives regarding food, specifically the goals and objectives outlined in both the 2030 Agenda and Iceland's first Food Policy, are important steps toward increasing local food production and alleviating the broader issue of food insecurity.

Local food systems promote sustainability, healthy eating, and support local communities by providing them with locally grown produce. Defining whether or not a product is local can be difficult, as there is no precise definition. In the United States, food grown within 400 miles of the consumer is considered local (Martinez, 2010). Local food programs, like community-supported agriculture (CSAs), allow consumers to directly support local farmers. CSAs are a system where consumers pay farmers at the beginning of the season to relieve some financial burdens from the farmer and receive a share of the goods produced by the farm throughout the season.

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

-Iceland's Implementation of the 2030 Agenda for Sustainable Development



Organically grown foods are becoming increasingly popular amongst consumers. Organic produce has positive health effects for consumers who are willing to pay a premium price to buy it, whether it is from a local farm or otherwise (Huber et. al., 2011). While local does not necessarily mean organic, Berlin et al. found that consumers have a positive association between the two (2009). This stems from the association between small farms and organic produce—in the US, the average organic farm is 29% of the size of the average non-organic farm (Berlin et al., 2009). This means that many people often expect organic produce when they buy from a small, local farm.

Food miles describe how far a food item has traveled from farm to table; they have been used to demonstrate the environmental impact and sustainability of food items. Generally, the longer distance a food item traveled to reach its destination, the greater the environmental impact and the less sustainable that food was (Schnell, 2013). This is not accurate for the shipping of wholesale products as the efficiency of bulk shipment is not considered. Coley et al. compared the sustainability of home delivery of boxed produce to curbside pick-up from a local farm (2009). The study found that it is less sustainable to pick up produce from a local farm if the round-trip is more than 4.2 miles. This study does not provide an analysis of local food systems that offer food distribution and pick-up for local regions.

Our project goal which was to compare how communities support local agriculture in Massachusetts and Iceland. We interviewed Massachusetts and Icelandic farms to understand how both operate and market themselves to their surrounding communities. We interviewed college faculty members in both locations as well to see how universities support local agriculture. We then surveyed Massachusetts and Icelandic communities to gauge interest—we wanted to know if people buy local food and support local agriculture or if they would in the future.



2

Approach

Our project goal was to understand how communities support local agriculture in Massachusetts and Iceland. Our team compared the two locations and used the data we collected to determine recommendations that could be applied to WPI to increase the community's local food consumption. We achieved these goals by completing the objectives outlined below.

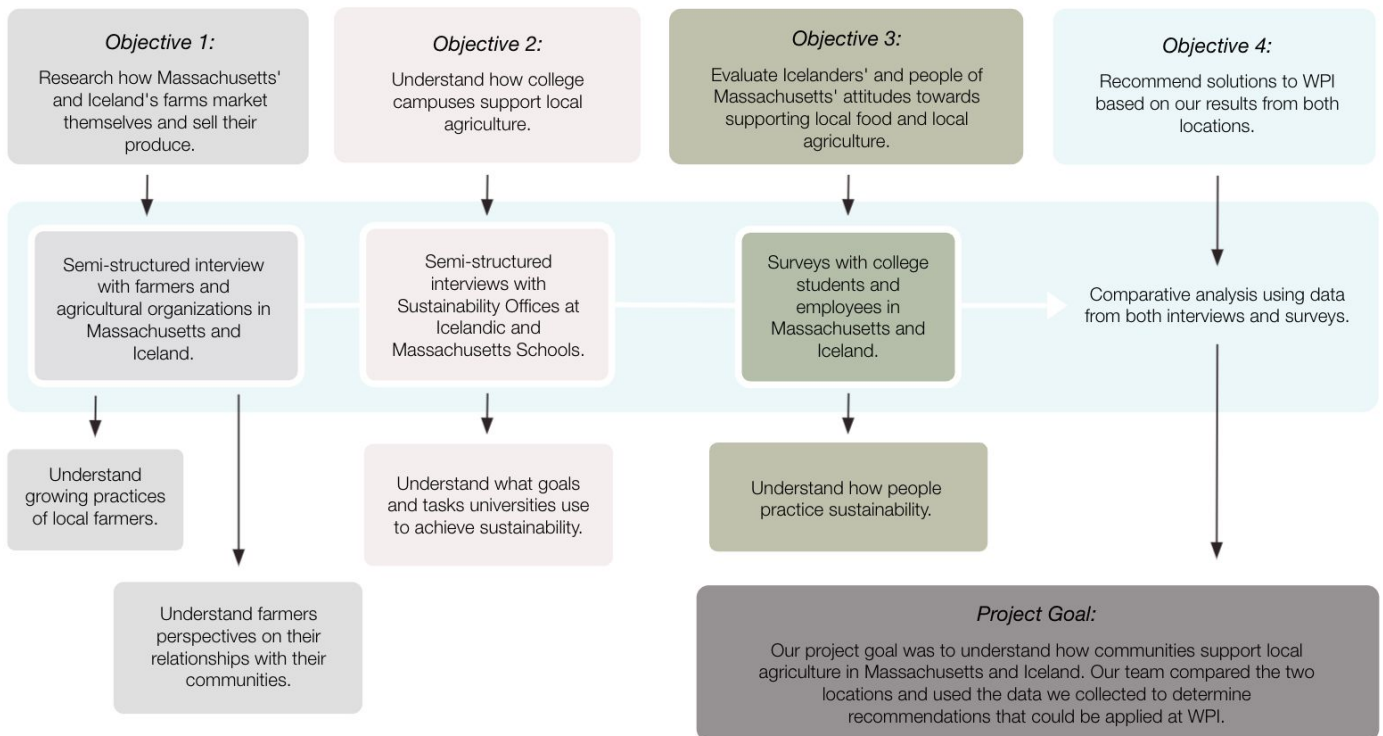
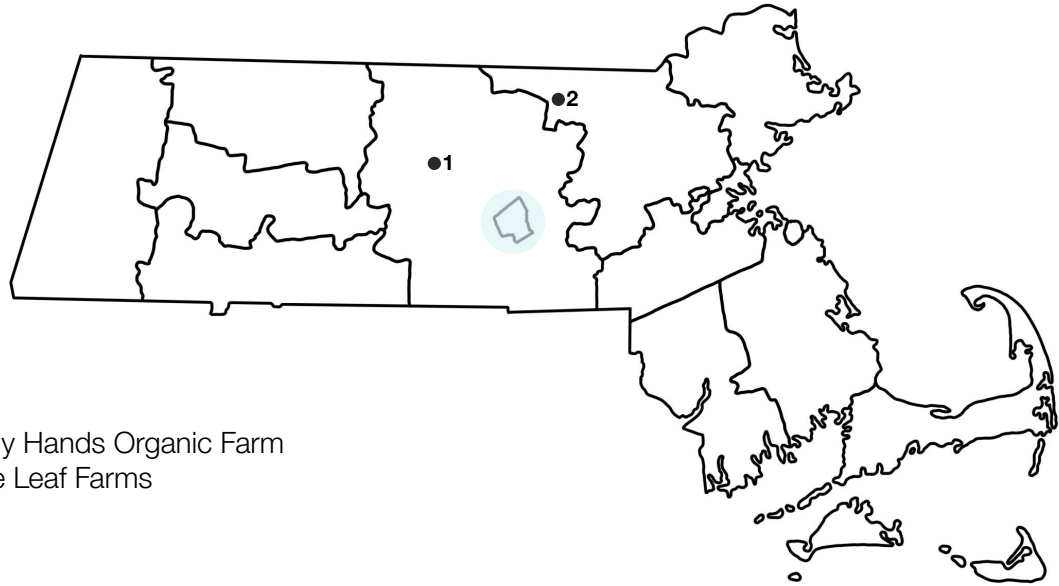


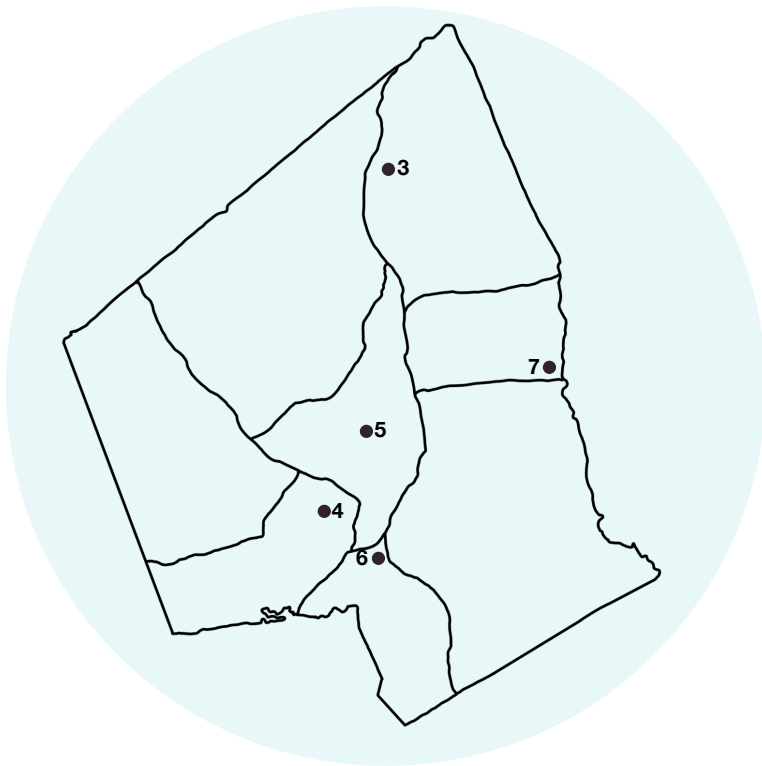
Figure 5. Flowchart of Objectives and Tasks to Complete Our Project Goal.

The flowchart describes the tasks we took to complete our objectives, what we learned, and how we achieved our goal.

Massachusetts / Worcester



- 1 / Many Hands Organic Farm
- 2 / Little Leaf Farms



- 3 / Worcester Regional Food Hub
- 4 / Regional Environmental Council
- 5 / Worcester Polytechnic Institute
- 6 / College of the Holy Cross
- 7 / University of Massachusetts Medical School

Figure 6. *Map of Massachusetts and Worcester with Important Locations Labeled.*

This figure displays seven locations in Massachusetts that we interviewed during our project. A large amount of our research came from the Worcester area and the two farms were in Central Massachusetts.

Our team wanted to understand how local farms operated, specifically how they grow and sell their products. We wanted to assess whether local agriculture is more sustainable and better for the environment than industrialized agriculture. We were able to identify what products are grown in the climates of Massachusetts and Iceland and how they influence consumers' purchasing locally. The methods that farmers use to sell their products are important to study, as they affect who has easy access to the food; an example of this is how farm pick-up programs favor those who have easy access to transportation. We focused on marketing as well because some communities are unaware of the local food options available to them. Learning farms' marketing strategies allowed us to identify reasons why some parts of communities do not know about local agriculture and then make suggestions on how to get them more involved. We also visited local grocery stores—Bónus, Krónan, and 10-11 in Reykjavík and Shaws, Market Basket, and Price Chopper in Worcester—to evaluate what local produce they sold in each location and what countries they sourced from. This helped us understand if grocery stores provide easy access to local food or if they mainly sell imported food.

We interviewed farmers and members of organizations involved in local agriculture in both Massachusetts and Iceland. In



Figures 7-10. Field Research in Krónan Grocery Store in Iceland. Photos by Marcela Mayor



- 1 / Friðheimar Farm
- 2 / Sölufélag Garðyrkjumanna
- 3 / Agricultural University of Iceland
- 4 / Reykjavik University

Figure 11. *Map of Iceland with Important Locations Labeled.*

This figure displays four locations in Iceland that we interviewed or corresponded with during the project to provide geographic context. Sölufélag Garðyrkjumanna is Icelandic for the Horticulturists Sales Association.



Figure 12-15. Produce in Krónan Grocery Store in Iceland.
Photos by Marcela Mayor

Massachusetts, we interviewed the Worcester Regional Food Hub, Little Leaf Farms, Many Hands Organic Farm, and the School Gardens Program—a division of the Regional Environmental Council in Worcester (Figure 6); in Iceland, we interviewed Friðheimar Farm and the Horticulturists Sales Association (Figure 7). We used semi-structured interviews because they promote more dialogue than question-and-answer sessions (Adams, 2015). Our interviews were guided by the questions we wrote ahead of time, but we did not limit ourselves to those questions as we thought of more based on the interviewees' responses. This method provided more in-depth responses than surveys because the farmers were invited to discuss their answers compared to one-word or short answers given in a survey.

We wanted to understand how college campuses support local agriculture in both Massachusetts and Iceland. Most of our research was completed through interviews with sustainability leaders at colleges. We conducted semi-structured interviews with a faculty member at College of the Holy Cross, two graduate students and a staff member from the University of Massachusetts Medical School (UMMS), one faculty member from Worcester Polytechnic Institute (WPI), two faculty members from the Agricultural University of Iceland, and one professor from Reykjavík University. We discussed how our

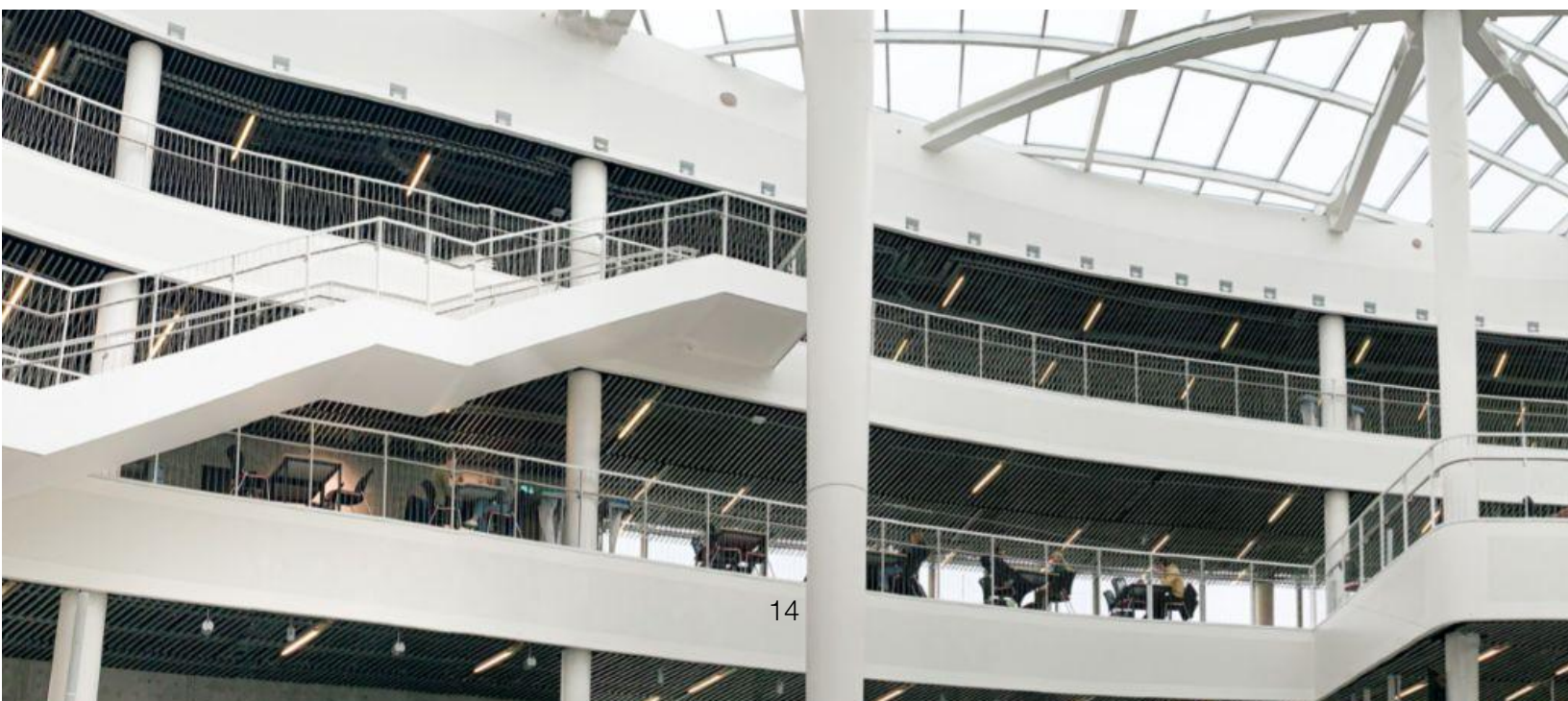
interviewees' institutions support agriculture in their local areas, whether it was through farmers' markets on campus, CSA programs for students, or buying produce directly from farms for meals on campus.

We wanted to understand Icelanders' and people of Massachusetts' attitudes towards supporting local agriculture. We surveyed 170 Massachusetts consumers and 36 Icelandic consumers using an online survey. We asked our advisor to distribute our survey to WPI faculty. We also distributed our survey to WPI students through a subreddit page, a discord server, and sorority

contacts. In Iceland, we had a contact at Reykjavík University's School of Energy who distributed our survey to faculty and students within the department; we also sat at the university and asked people to fill out the survey. Coupled with our research on sustainable food systems, this information helped us understand the gaps between local food producers and consumers within their respective communities. In our surveys, we asked residents in both locations to identify their attitudes towards local food consumption and any barriers that could prevent them from accessing local food.

"The influence and resources that universities can apply to issues of sustainability place them in a unique position to become key leaders in the promotion of sustainable development"

- Finlay & Massey, p.152



“Universities and colleges are important sites of transformation as centres of discourse and vehicles of social change. As world leaders in research, innovation, and education, they are key places to address global issues and foster progressive action within current and future generations”

-Finlay & Massey, p.150

We utilized convenience and snowball sampling types for this subject—our samples consisted mainly of college students and employees from Worcester, Massachusetts, and college students and employees from Reykjavik, Iceland. Our samples are reflective of the academic community in both locations. Since these two locations are so different, in terms of culture and general agriculture logistics, we hope that this can serve to illustrate a variety of attitudes and practices.

To effectively analyze the data that we collected from both Massachusetts and Iceland, we coded our notes from all our interviews. Our paper notes were transcribed into an online format. From there we highlighted any common threads that we saw between interviews, as well as making notes of any outliers and put this information into a summary table. Coding our data allowed us to identify trends, especially whether location had an effect on the answers the interviewees provided. We exported the data from our consumer surveys to Google Sheets and created charts and graphs to visualize the data. Next, we will discuss the results that we obtained from our interviews and surveys and analyze trends in the data.



94/170

25/36

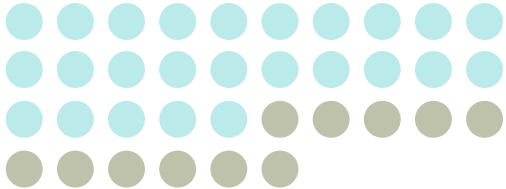
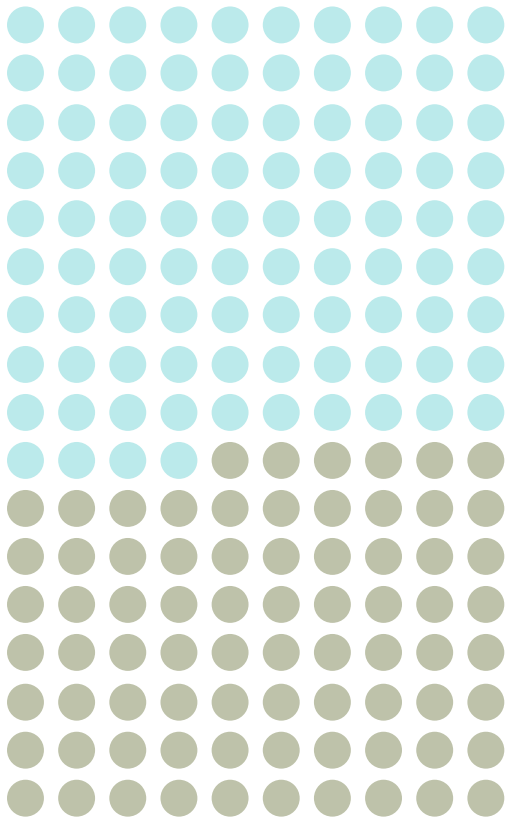


Figure 16. *Sample Size in Massachusetts and Iceland.*

This graphic depicts the size and age breakdown of samples from Massachusetts and Iceland. The blue dots represent respondents aged eighteen to twenty-four years old. The green dots represent respondents aged twenty-five or older. The left side of the graphic displays the Massachusetts samples and the right side describes Icelandic samples.

3

Results & Analysis

To gather results for consumers we sent surveys to employees and students at WPI in Massachusetts and Reykjavík University in Iceland. In Iceland, twenty-five out of thirty-six respondents were students, and in Massachusetts ninety-four out of 170 were students (Figure 16). We interviewed sustainability offices at colleges, farm managers and owners, and local organizations from Iceland and Massachusetts. We then coded and analyzed our interview survey data. We were able to determine four major findings; two pertain to consumers and the other two are for farmers and distributors.

Local Food Supply Chain

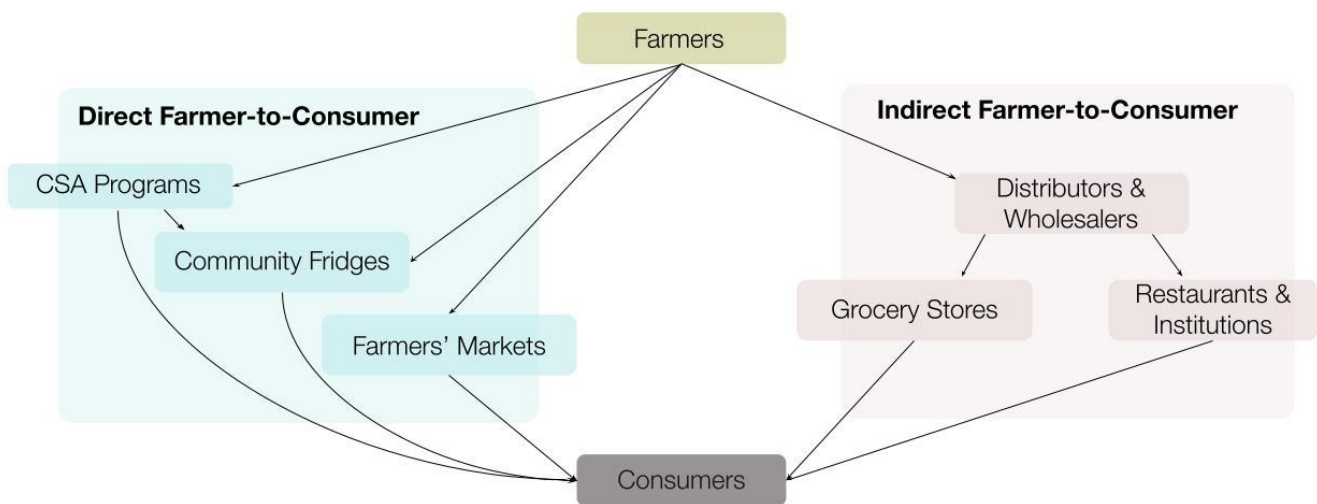


Figure 17. Supply Chain Flow Chart for Local Food.

Farmers can sell their produce directly to consumers or through a third-party institution. The diagram shows the different avenues farmers can distribute their produce to reach consumers.

01

As people age, they become more likely to spend money and time on local food.

Corn mazes, apple picking, and farmers' markets are all activities that demonstrate involvement with local farms—we wanted to determine the popularity of these types of activities through our surveys. The surveys asked participants to select all activities in which they had partaken in the past, including attending farmers' markets, participating in CSAs, visiting local farmers to buy produce or for an activity, or none of the above. In Massachusetts, we found that the older a consumer was, the more likely that they were to have participated in one or more of the listed activities. Among those fifty and older, 75% of them had participated in three or more of those activities. Among twenty-five to forty-nine year-olds, about 77% had participated in three or more activities. On the other hand, only 54% of eighteen to twenty-four year-olds said they had participated in three or more activities. This age range was also the only one that included participants who responded that they had not engaged in any of the listed activities (Figure 18). For Iceland, these results did not show a consistent trend; in all three age groups there were respondents who had not participated in any of the activities (Figure 19). In Iceland, only about 23% of eighteen to twenty-four year-olds had participated in three or more activities. Among twenty-five to forty-nine year-olds, 12% of respondents had participated in three or more activities and no one in the 50 and over group participated in more than one activity.

We also asked consumers if they actively buy local food; the results reflected similar trends found with participation in local farms. 38% of eighteen to twenty-four year-olds in Massachusetts actively buy local, whereas 60% of twenty-five to forty-nine year-olds and over 90% of those

Percent of Respondents vs. Number of Activities Respondents Participated in (Massachusetts)

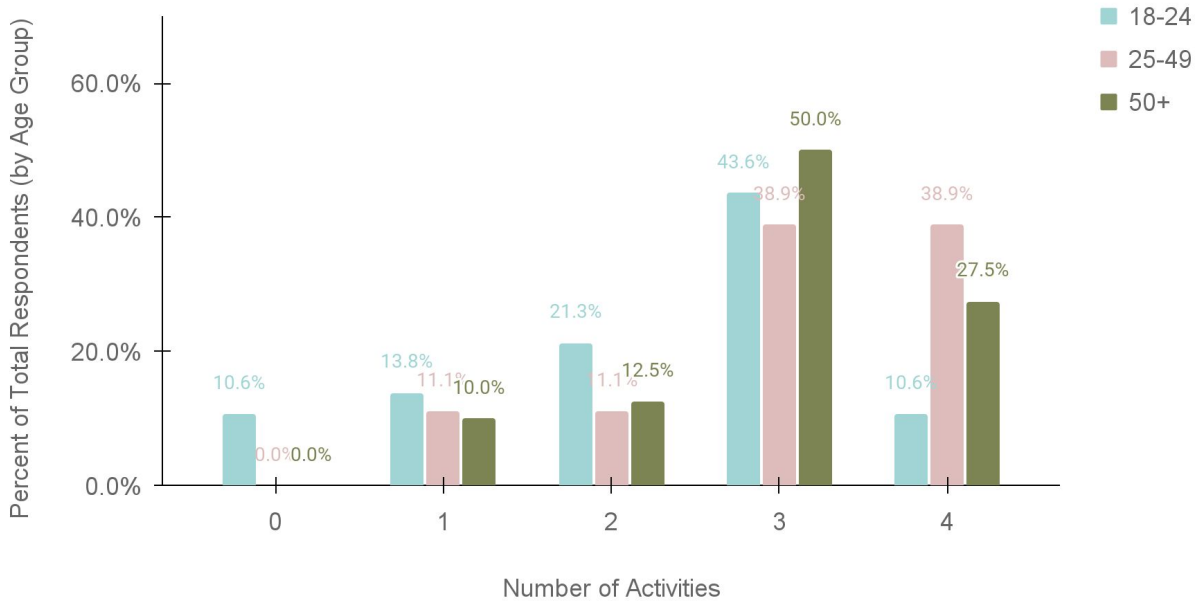


Figure 18. *Percent of Respondents Who Participated in Activities in Massachusetts.* The graphs shows, by age, the percentage of Massachusetts respondents who participated in 0, 1, 2, 3, or 4 activities relating to local farms.

Percent of Respondents vs. Number of Activities Respondents Participated in (Iceland)

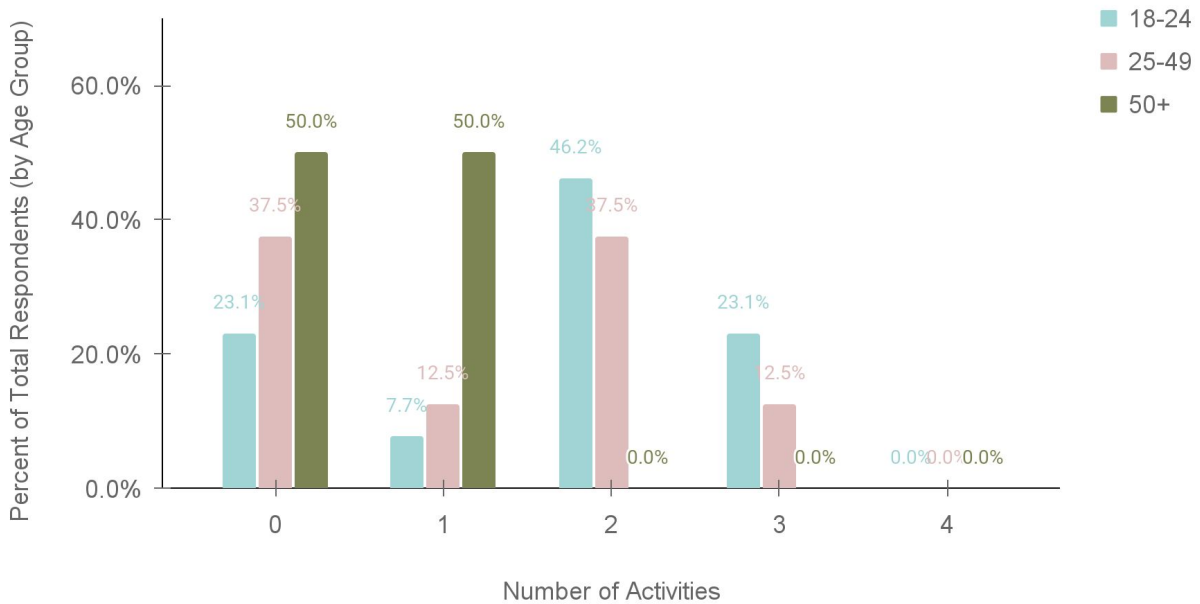


Figure 19. *Percent of Respondents Who Participated in Activities in Iceland.* The graphs shows, by age, the percentage of Iceland respondents who participated in 0, 1, 2, 3, or 4 activities relating to local farms.

“As a college student it is hard to be spending extra money on anything, especially a weekly grocery bill. I do make exception[s] for certain specialty items like getting apples in the fall or berry picking in the summer. I feel like buying local food could be much more feasible once I am no longer a college student.”

- Anonymous Survey Respondent

fifty and older actively buy local (Figure 20). In Iceland, 63% of twenty-five to forty-nine year-olds responded that they actively bought local, about 10% less than the amount of eighteen to twenty-four year-olds (Figure 21). In both locations, the fifty and older age group had the largest percentage of people actively buying local food.

Percent of Respondents Who Actively Buy Locally - Massachusetts

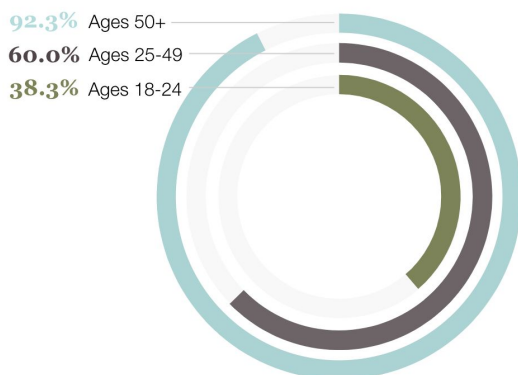


Figure 20. Respondents who Actively Buy Local Food in Massachusetts. The graphs are separated by age groups, the colored sections represent those who responded “yes” to actively buying local food while the gray sections are those who responded “no”.

Percent of Respondents Who Actively Buy Locally - Iceland

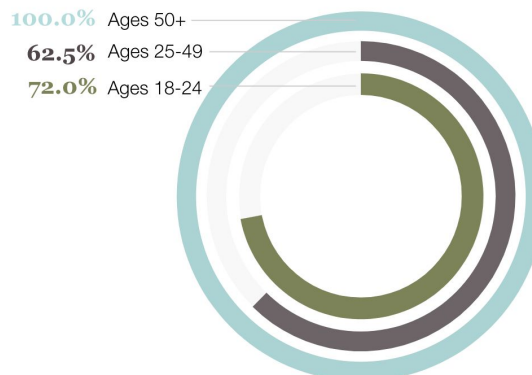


Figure 21. Respondents who Actively Buy Local Food in Iceland. The graphs are separated by age groups, the colored sections represent those who responded “yes” to actively buying local food while the gray sections are those who responded “no”.

02

Consumers in both Massachusetts and Iceland are more likely to buy locally if there are no substantial price differences.

To measure how important price is to consumers, we posed the question “Would you be willing to pay more for local, sustainable food?” In response, 92% of Massachusetts and 86% of Icelandic participants responded either yes or maybe (Figures 22 & 23). People in both locations are interested in purchasing local food even if there is a slight price difference; however, there is a caveat. Many respondents asserted that their budget at the time of purchase was one of the most important factors when buying food. If the price difference between local and conventional foods is too high, respondents implied they would not purchase the local option.

Would you pay more for local food? (Massachusetts)

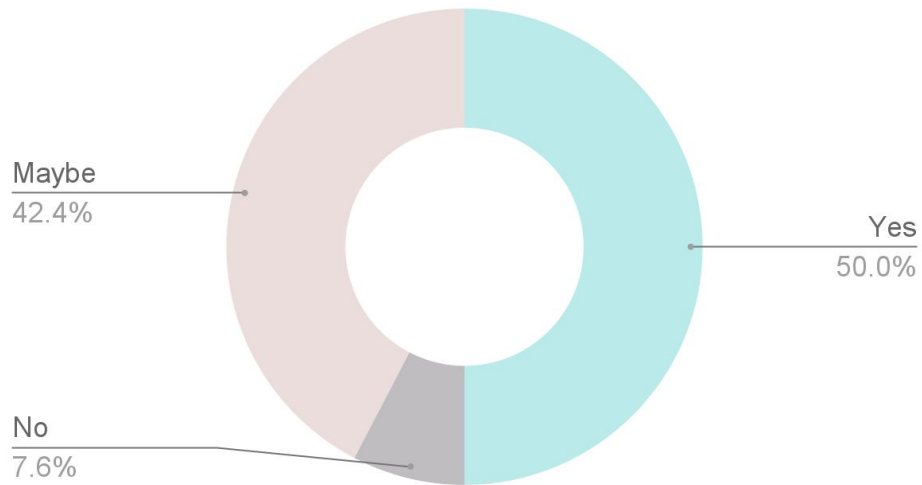


Figure 22. *Percent of Massachusetts Respondents Who Would or Would Not Pay More for Local Food.* The graphs shows the percentage of Massachusetts respondents who would pay more for local food (teal, 50%), who may pay more for local food (pink, 42.4%), and who would not pay more for local food (gray, 7.6%).

Would you pay more for local food? (Iceland)

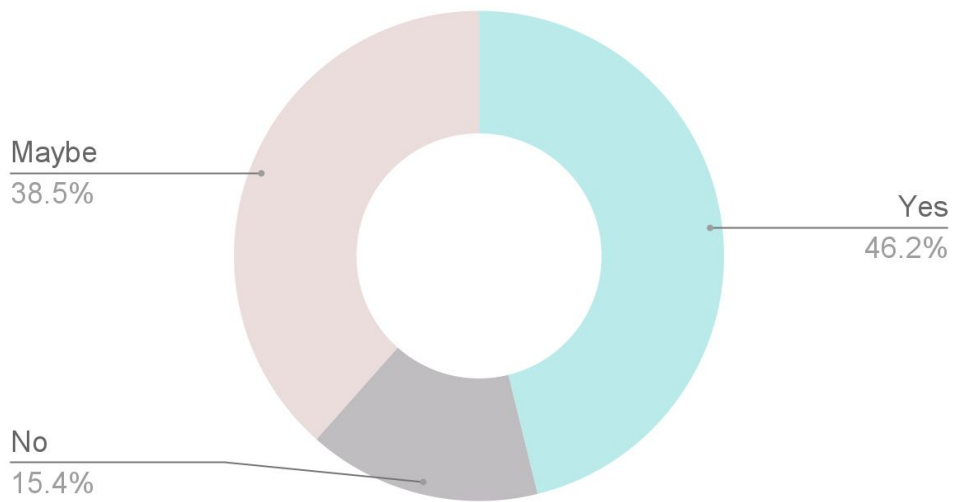


Figure 23. *Percent of Icelandic Respondents Who Would or Would Not Pay More for Local Food.* The graphs shows the percentage of Icelandic respondents who would pay more for local food (teal, 46.2%), who may pay more for local food (pink, 38.5%), and who would not pay more for local food (gray, 15.4%).

In response to the question “What would you say is the biggest factor for you when buying food?”, “Quality” was the most popular answer, reported 43.5% of the time in Massachusetts and 55% of the time in Iceland (Tables 1 & 2). “Cost” was the second most frequent answer, reported 30% of the time in Massachusetts and 25% of the time in Iceland. Contrarily, Massachusetts college-aged respondents had “Cost” as the biggest factor, with a frequency of 45.7%. To most students cost is more important than quality when buying food. This is not reflected in Icelandic respondents, where eighteen to twenty-four year-olds reported quality as biggest factor 57.7% of the time. While price premiums are a barrier in both locations, it seems that high-quality produce from a local farmer is the largest motivator for buying locally. An anonymous Massachusetts respondent perfectly summarized this finding, saying “[c]ost is a huge factor, second only to the quality of the food”.

MA	Cost	Quality	Sustainability	Variety	Time to Prepare	Convenience	Other	Totals
18-24	43 (45.7%)	30 (31.9%)	3 (3.2%)	4 (4.3%)	11 (11.7%)	2 (2.1%)	1 (1.1%)	94 (100%)
25-49	2 (5.4%)	18 (48.6%)	6 (16.2%)	5 (13.5%)	1 (2.7%)	3 (8.1%)	2 (5.4%)	37 (100%)
50+	6 (15.4%)	26 (66.7%)	2 (5.1%)	1 (2.6%)	0 (0%)	2 (5.1%)	2 (5.1%)	39 (100%)
Totals	51 (30%)	74 (43.5%)	11 (6.5%)	10 (5.9%)	12 (7.1%)	7 (4.1%)	5 (3.9%)	170 (100%)

Table 1. *Biggest Factors to Purchasing Local Food in Massachusetts.*
The table shows the frequency of the factors that influence Massachusetts consumers when buying food. Quality was the most frequent overall, followed by cost.

IS	Cost	Quality	Sustainability	Variety	Time to Prepare	Convenience	Other	Totals
18-24	7 (26.9%)	15 (57.7%)	2 (7.7%)	1 (3.8%)	1 (3.8%)	0 (0%)	0 (0%)	26 (100%)
25-49	2 (25%)	3 (37.5%)	1 (12.5%)	0 (0%)	1 (12.5%)	0 (0%)	1 (12.5%)	8 (100%)
50+	0 (0%)	2 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)
Totals	9 (25%)	20 (55.6%)	3 (8.3%)	1 (2.8%)	2 (5.5%)	0 (0%)	1 (2.8%)	36 (100%)

Table 2. *Biggest Factors to Purchasing Local Food in Iceland.*
The table shows the frequency of the factors that influence Icelandic consumers when buying food. Quality was the most frequent overall, followed by cost.

In summary, we found that most consumers in both Massachusetts and Iceland believe that there are benefits to eating local and actively try to buy local food. Over 87% of respondents in both locations agreed that “local agriculture is more sustainable than industrialized and global agriculture practices” (Figure 24).

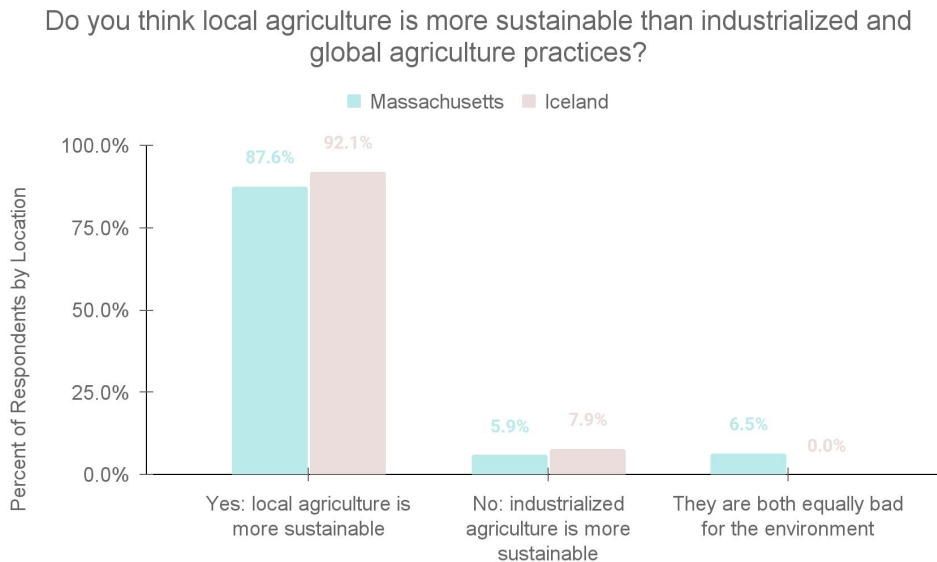


Figure 24. *Opinions on Agriculture Practices and Sustainability.* The graph shows, by location, if people believe local agriculture is more sustainable than globalized agriculture or vice-versa or that they are both unsustainable. Massachusetts respondents are represented in teal and Icelandic respondents in pink.

03

Local agricultural organizations understand the importance of making local food affordable.

One of the largest obstacles to purchasing local food for many people is the premium that can be associated with local foods. Donaher & Lynes found consumers in Ontario paid 23% more on average for local, organic apples than their non-local, non-organic counterparts. The same was true for other produce items; the premiums for lettuce, carrots, and cucumbers were found to be 65%, 95%, and 144%, respectively (2017).

In our interviews, we found that farmers and distributors are aware of this barrier. Jeannie Hannigan, the brand manager of Little Leaf Farms, a lettuce farm in Devens, MA, told us “A lot of people feel that eating

locally is too expensive or otherwise unrealistic for their lifestyle [...] We strive to be approachable and we do that by selling at an affordable price point at all major grocery stores in the Northeast [...] so everyone can make eating local part of their daily routine.” This sentiment is echoed by Julie Rawson, the co-owner of Many Hands Organic Farm, a family farm in Barre, MA; she emphasizes that it is a misconception that “only rich people can pay for organic [food].” Many Hands offers three different sizes of shares with their CSA program, allowing people to purchase smaller, more affordable shares if they wish; this is common amongst CSAs (E. Lawrence, personal communication, October 4, 2021; J. Rawson, personal communication, September 24, 2021).

In our interview with Cathy Liebowitz, the Director of Sustainability at the College of the Holy Cross in Worcester, Massachusetts, she discussed plans to allow students to use dining dollars to participate in the food box delivery services and CSAs that they offer on campus. In addition, Cathy stated that Holy Cross buys food for their meal programs from the Worcester Regional Food Hub if the prices offered are within 15% of the prices offered by their large-scale distributors. Clark University and Assumption University also work with the Worcester Regional Food Hub, according to its director, Shon Rainford. The University of Massachusetts Medical School (UMMS) has a community garden where the produce grown is brought to the Worcester Community Fridge and a fridge on-campus to provide community members easy access to locally grown produce (M. Smith, personal communication, September 30, 2021). These are options that provide students access to local foods without having to pay additional money beyond their institutional meal plans.

04

Farmers and distributors promote sustainability and community involvement in local agriculture.

All the farms and distributors we interviewed in Massachusetts were very enthusiastic about their sustainable practices when it comes to growing and transportation. The Worcester Regional Food Hub is a local organization that distributes food from local farms and helps food entrepreneurs; Shon Rainford works with two other employees to run the operation. The organization works with local, small, and sustainable farms but does not require organic certification (S. Rainford, personal communication, September 8, 2021). The Food Hub practices sustainability in their delivery habits; they deliver to certain regions on certain days and do pick-ups and drop-offs simultaneously to save fuel. Little Leaf Farms uses hydroponics that use “90% less water than field-grown greens” and rainwater that undergoes a sanitation process for watering (J. Hannigan, personal communication, September 15, 2021). Jeannie Hannigan of Little Leaf Farm, asserted that their lettuce has a longer shelf-life because it only spends one day in transit, limiting the



Figure 25. *Tending to Many Hands Organic Farm Produce in a Greenhouse.*
Photo from Local Harvest webpage about Many Hands Organic Farm (2020)

likelihood of food waste. Julie Rawson told us about the carbon-sequestering methods that Many Hands Organic Farm uses to remove carbon dioxide from the atmosphere and place it back into the soil; this promotes a better symbiotic relationship between the plants and microbes, resulting in healthier plants and produce (J. Rawson, personal communication, September 24, 2021).

In Iceland, farms discussed sustainability through the use of their natural resources. Friðheimar Farm in Reykholt, Iceland grows tomatoes for about 55% of the domestic needs of Iceland. They utilize geothermal energy and water to grow the plants, both of which are natural, renewable sources. Hot water from the earth is used to heat the greenhouses, usually entering at just below boiling temperature. This water disinfects the soil and provides heat to the greenhouses; the glass forming Friðheimar's greenhouses is only four millimeters thick, so a lot of heat is needed to maintain growing temperatures (Friðheimar Farm, 2020). The farm creates compost with old tomato plants and gives it to a local cucumber farm because they cannot use it for their own plants. Friðheimar uses biological pesticides to protect their plants rather than chemicals as well as watering at only the base of the plants to maintain dryness and discourage fungal growth. VAXA, a farm that utilizes vertical farming in Reykjavik, grows microgreens, lettuce, and herbs. Similar to the hydroponics used at Little Leaf Farms, vertical farming uses only 10% of the water needed in similar outdoor operations. Vertical farming provides a controlled environment, allowing farmers to grow lettuce all-year long without the need for



Figure 26. *Vertical Farming for VAXA.*

Photo from The Guardian displaying VAXA, a vertical farm in Iceland (2020)

pesticides. The owner of VAXA was also quoted in Iceland Review that he wants to see Iceland independent of imports and realize its potential to be a leader in sustainability (Ćirić & Einarsdóttir, 2021). Arni Stefansson from the Horticulturists' Sales Organization of Iceland says they promote the use of clean water and green energy amongst the farms they represent.

In both Iceland and Massachusetts, farms and organizations rely on community feedback and support to expand. Shon Rainford is expanding the Worcester Regional Food Hub's operation to open up a storefront so that the Worcester area can have more places to buy local food. Little Leaf Farm fosters relationships with consumers to receive feedback about new ideas and products to make sure they stay authentic to their brand (J. Hannigan, personal communication, September 15, 2021). Many Hands Organic Farm lets volunteers receive a CSA share after a certain amount of hours of volunteering; they also have programs for migrant farmers and individuals with prior justice system involvement to provide them work and help them gain experience. The farm recently pooled money together through its CSA members to provide ten CSA shares to the Worcester Community Fridge, expanding their reach and increasing access to local food (J. Rawson, personal communication, September 24, 2021). Icelandic labor laws prevent volunteer programs within certain companies, which prevents the Horticulturists' Sales Organization from having one. Friðheimar farm wants to be able to provide for 100% of the domestic need for tomatoes in Iceland; they have a restaurant where they tell people about their farm and promote local food production before dining. Massachusetts and Icelandic farms are eager to share their organizations with local communities; whether it be through volunteer programs, farm-oriented activities, or tours.

4 Recommendations & Conclusions

Our goal for this project was to compare how communities support local agriculture in Massachusetts and Iceland; we were able to achieve this by gathering data from farmers and consumers in both locations. From this, we were able to develop recommendations that could be implemented at WPI to support students, employees, and local agriculture.

01

Determine the feasibility of an on-campus community garden at WPI.

Community gardens are a great way to get students involved in local agriculture. In our interview with UMMS students Rose May and Ryan Fredette, they discussed the community garden that they have on campus and their involvement in it. They mentioned a number of programs that work with their garden, including food donations to the Worcester Community Fridge and a community fridge on campus for students. The garden at UMMS is primarily run by students—this is a great model if students are willing to run it, though a faculty advisor would likely be needed to keep the program going long-term at WPI and help with maintenance. The garden would provide fresh local food for students and staff as well as opportunities to get outside and learn about gardening for anyone that is interested.



Figure 27. *UMMS Community Garden Promotional Video*.
Photo from University of Massachusetts Medical School (2019)

As demonstrated by the School Gardens program at the Regional Environmental Council in Worcester, gardens have more benefits than just food production. School Gardens promotes other uses for gardens such as mindfulness, sensory calmness, herbalism, and incorporation into school curriculums. In addition, the extra produce from the school gardens is sent to Worcester Community Fridges as the school gardens do at UMMS, which increases community involvement (E. Lawrence, personal communication, October 4, 2021; M. Smith, personal communication, September 30, 2021).

The implementation of a community garden on campus would require the consideration of a number of factors: location on campus, management by students or faculty, funding, and other considerations. We recommend a future project such as an IQP or MQP to determine the feasibility of a garden on campus based on these factors. The implementation of a community garden is part of WPI's Sustainability Plan for 2020-25; however, they put responsibility in the hands of Dining Services and the Facilities Department (Office of Sustainability, 2020). If the garden was a student club or organization's responsibility it may promote more participation among students as they would be the ones involved.

02

Explore opportunities to increase local food consumption on campus at WPI.

This recommendation stems from the information we learned about local food programs at College of the Holy Cross and UMMS. We recommend that WPI increase its access to local food on campus to improve student relations, health, and involvement. The program could take the form of a CSA program, more frequent farmers' markets, meal kits, or having WPI dining services use local produce. The Worcester Community Project Center or Sustainability Center at WPI could evaluate the possibilities of each program to see which would best fit WPI's needs.

College of the Holy Cross, Assumption College, and Clark University—all in Worcester, Massachusetts—use the Worcester Regional Food Hub to source food for their dining halls. This provides students with access to local food without paying more in addition to their dining plans. Communications with the former colleges could aid in the transition for WPI.



Figure 28. A Stillman's Farm CSA Share Advertised by UMMS.
Photo adopted from University of Massachusetts Medical School (2021)

Some schools in Massachusetts have implemented CSA programs on their campuses to provide faculty and students access to local food. The CSAs tend to have larger numbers of faculty participants than students. At most school CSAs, the school is a pick-up location and people can typically sign up through the farm's website for their shares. This is only applicable if there is enough interest at the college for the farm to have sufficient shares to make it a drop-off location. This can be seen at UMMS where they purchase about eighty shares between employees and students; the farm they work with has a program where they use workplaces as drop-off locations if there are enough shares. WPI has had a CSA program in the past; however, it was only available to employees and graduate students. Our recommendation is to open the CSA to all members of the WPI community. The current CSA did not have enough participation to have an on-campus pick-up location so opening it to students may increase the number of shares. Shares that are not picked up are given to Chartwells to use in the dining halls.

WPI has had a farmers' market in the past; however, it was once or twice a year. In the future, WPI could have a more frequent farmers' market, whether it be every weekend in A-term, every two weeks over the fall semester, or a different schedule. Farmers' markets allow students more flexibility in choosing what produce they want and how much they want to spend. Another option could be a meal kit program similar to a CSA share but directed towards making a meal rather than simply a collection of produce.



03

Allow students at WPI to use their meal plans to participate in on-campus local food programs.

One method for increasing student participation in local food programs is allowing students to purchase produce with alternative forms of payment. Many universities utilize a form of “dining dollars”, like GoatBucks and Bonus Points at WPI; these can be used at campus locations and are usually included with meal plans. Cathy Liebowitz at College of the Holy Cross identified allowing alternative payment strategies for local food as an area of improvement for the school’s food programs. This could be beneficial at WPI; allowing students to spend their GoatBucks and Bonus Points for on-campus local food programs would encourage them to purchase local, fresh food.

In order to accomplish this at WPI, one would need to work with Chartwells, local food program managers, and local farms to coordinate payment plans and get them approved. This would also need to follow recommendation two because that would create the programs which students could use their dining dollars for. This could be accomplished through a student project such as an IQP or MQP.



Conclusions

Comparing the two locations provided a unique perspective on what made a community-driven agricultural system successful in two very different locations. The similarities we found within the data can be applied to a significantly broader scope than just Massachusetts and Iceland because of how different these two environments are.

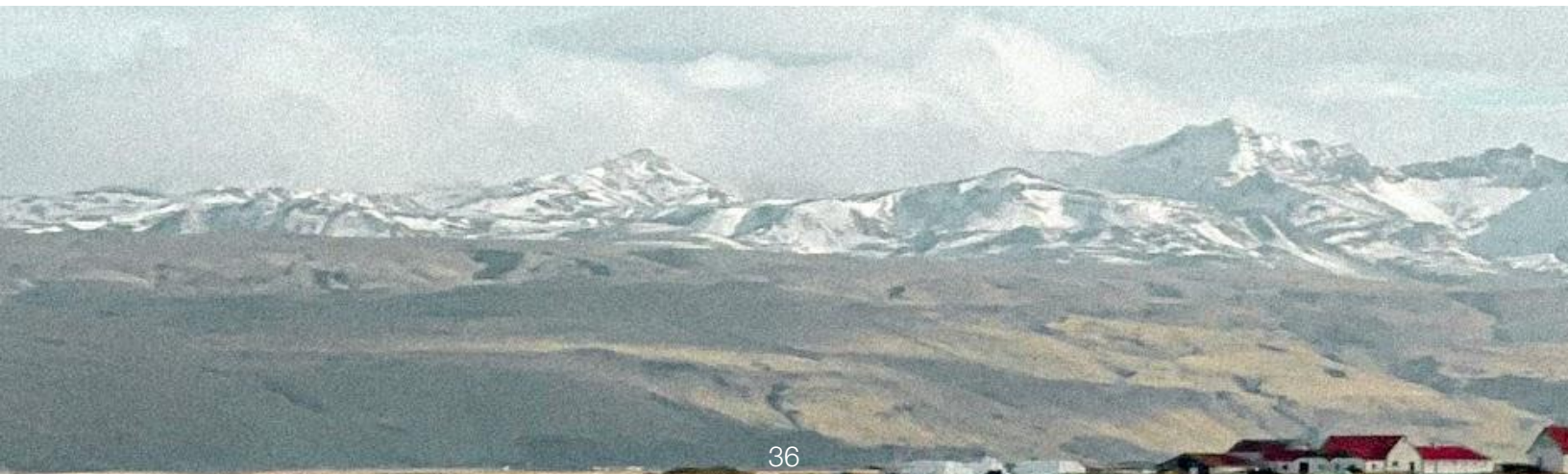
When interviewing local organizations and farms, it became clear that an emphasis on sustainability was at the forefront of successful community-driven agricultural systems. In addition, producers were receptive to consumers' feedback and understood the importance of making local food both accessible and affordable. We found that older consumers were more likely to participate in local food practices than younger, college-aged consumers.

We felt that we could have the largest impact if we directed our recommendations towards the WPI community because of our close connections at WPI. Our first recommendation is to begin research into building a community garden at WPI. This would provide students and faculty with opportunities to grow and obtain fresh, local produce. Our second recommendation was to explore opportunities to increase local food consumption at WPI. These opportunities could be in the form of a CSA, farmers' market, meal kit program, or having dining services source local food. Our third recommendation was to allow students at WPI to use their meal plans to participate in on-campus local food programs. This would have to follow our second recommendation but would allow students to obtain local foods without having to spend more money out-of-pocket.

5

Limitations

This section will discuss the potential biases and limitations of the data that was collected to gain insight into the attitudes and activities of subjects. The sampling methods that we used could have introduced bias, beginning with the surveys. We sent our Massachusetts consumer surveys primarily to students and employees at WPI to gain the largest number of responses within a short time. For our consumer surveys in Iceland, we surveyed primarily students at Reykjavík University. Most of our survey population was university students and employees, rather than the general population. This may alter some results as the majority of people participating in Community-Supported



Agriculture in the United States are educated at a secondary level or higher (Birtalan et al., 2020).

Sample size is another component that may have introduced bias in our data. In Massachusetts, we were able to survey 170 employees and students but in Iceland we were only able to survey about thirty-six employees and students. These sample sizes are small compared to the whole population of the schools and may not be representative of the general populations in Iceland or Massachusetts.

The consumer surveys were distributed in English for both Icelandic and Massachusetts populations; this could have introduced bias if any of the participants were not fluent and could not fully understand the meaning of the questions and answers. In addition, the wording of the questions on the surveys may have introduced a bias towards some

responses. The options we provided may have introduced bias, but also better evaluated attitudes towards local foods. Terminology may be a barrier as well, since CSAs and farmers' markets may have different connotations or meanings in Iceland than in Massachusetts.

At WPI, we distributed our survey through email and online platforms but at Reykjavík University we had minimal responses when we distributed it through email, so we distributed our survey in-person. The in-person distribution contained more students because we conducted our survey in an area where there were more students than employees. This is counterbalanced by the fact that the platforms we used to distribute our survey for WPI were aimed at more student populations than employees.



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Image References

Figure 25

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Figure 27

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Appendix A

The following is a list of Icelandic contacts that provided us assistance during our project.

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Appendix B

The following is a list of Massachusetts contacts that provided us assistance during our project.

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