

How Fresh is FRESH?

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ENVS494301: Spring 2021 Environmental Seminar

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29 April 2021

Abstract

Colleges and universities throughout the United States are pushing for a more equitable food system through initiatives such as FRESH to Table, Boston College's premier dining program. The FRESH program seeks to incorporate Fairly Traded, Regional, Equitable, Sustainable, and Healthy food items into the diets of undergraduate students. In order for a food item to earn the FRESH label it must satisfy two out of the five requirements included in the name. The greatest challenge presented by such a comprehensive label is that it often obscures details about how the individual food products are produced. A product labeled as FRESH might satisfy two of the five requirements; however, there is no way of knowing which ones. A further complication is that Boston College Dining Services (BCDS) does not publicize information about how they decide which food suppliers qualify for the FRESH program. The goal of this study is to fill these knowledge gaps by addressing the equitability, sustainability, and cultural impact of the FRESH label within the Boston College food system. Research Question One sought to understand how BCDS determined which food suppliers qualified for the "E", Equitable, in the FRESH label, and to evaluate whether the suppliers currently listed as equitable hold up to a standardized definition of a fair labor company. Findings for Question One indicate that BCDS does not currently have a standardized system for reaching these decisions, and it is recommended that they develop and implement one. The second research question aimed to analyze the environmental impact of the "R", Regional, and "S", Sustainable, categories by quantifying the sustainability and location of BCDS's vendors, as well as the environmental costs of food transportation to the school from distributors. Results suggested that while regional sustainable vendors have less of an environmental impact than non-regional, not sustainable vendors, the difference between regional sustainable and non regional sustainable vendors is not as clear. Question Three looked to determine how students on campus engage with the FRESH program in terms of their own understanding of healthy eating habits and their own, practiced eating habits. Survey data shows an ambivalent engagement level with FRESH programs and indicates that there is a disparity between professed knowledge of healthy eating habits and actual eating habits amongst seniors at Boston College. Some barriers explaining this disparity are price, time, convenience, stress, and social/gendered protocols for eating.

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Introduction

The movement to make our food system more sustainable, equitable, and healthy cannot move forward without the substantial investment of large institutions, including colleges and universities. In his book *Fair Food*, Oran Hesterman notes that he cannot think of a single movement that did not involve leadership from college students. Reforming the food system is no exception: “As the interest of college students in the fair food movement strengthens, there are now at least three hundred institutions that have college farms, fair trade initiatives, or farm-to-cafeteria programs, and the number is growing rapidly” (Hesterman, O. B., 2012). One program that has garnered the involvement of thousands of college students across the United States is called the Real Food Challenge, which aspired to shift 1\$ billion in college dining purchases towards “Real Food,” local and sustainable food, in order to change the food system.

Boston College is among these pioneering institutions working to make the college food system more sustainable and socially just. BC’s most recent effort to reform its food system, “FRESH to Table,” was implemented in the fall of 2017 with a generous grant from the Henry P. Kendall Foundation with the goal of increasing the production and consumption of local, sustainable food options in New England, with a focus on community awareness and education about the importance of regional, sustainable, healthy food. The Kendall Foundation has a goal of “50 by 60” – making 50 percent of New England’s food sourced regionally by 2060 (*Kendall Foundation Our Work*). Through the FRESH initiative, Boston College Dining Services (BCDS) seeks to meet the nexus of health, community resilience, equitable access, and environmental sustainability. For a food product to earn the FRESH label in the Boston College dining halls it must meet two of five parameters:

1. **Fairly Traded** = “Choose fair trade certified products which empower workers and their communities while supporting sustainable farming practices which minimize our carbon footprint.”
2. **Regional** = “Prioritize food from New England farmers and food producers whenever possible. Support the local food economy and serve better tasting fresher foods.”

3. **Equitable** = “Support food producers which practice fair labor practices, are cooperatively owned or majority women- or minority- owned. Support farms with humane animal welfare practices.”
4. **Sustainable** = “Prioritize companies which minimize their environmental impact on the land. Water and natural resources like crop rotations and green manures. Strive for menus which do the same.”
5. **Healthy** = “Encourage healthy and balanced eating habits. Educate and empower students to make informed choices about their diets.”

An institution as large and influential as Boston College has the potential to make a significant impact on the New England food system through its purchasing decisions, and sourcing food products that meet the five goals listed above is an excellent way to start. Yet how exactly does BCDS decide which producers fall under each category? What criteria does a farm need to meet in order to be included in this program? The FRESH label, comprehensive as it appears, obscures a lot of details about what exactly goes into each of its marketed products.

As agriculture has become industrialized and production has been increasingly scaled up, many growers in the United States have been forced to adopt harmful labor practices in order to maintain profits. Small farms have been particularly hard-hit, as large corporations have bought up farmland and converted it to monocrop machines at an alarming rate. This trend in farming has been devastating to the natural environment, but the devastation has also extended to local communities and economies. According to a 2010 NRC report, “Observers have linked the process of farm consolidation, increased specialization and mechanization, and growing vertical integration to the slow erosion of traditional rural community life and the decline of farm-dependent community economies” (National Research Council, 2010). The food system has changed, alienating consumers from the production process and obscuring human rights abuses behind the guise of normalcy. Farm work is among the lowest-paid and least-secure jobs in the country, and the agricultural workforce is disproportionately made up of immigrants without the protection of official documents. Some progress for farmworkers rights have been made, for example in California undocumented laborers have the same wage and hour rights as documented workers, yet for the most part these workers are vulnerable to rights violations and

must live off of low wages. One of the most important steps in moving towards an equitable food system is to support businesses that have a strong commitment to workers rights and community health, which the FRESH label seeks to do through its “F” and “E” categories.

Central to BCDS’s FRESH to Table initiative holds that purchasing from vendors who qualify for the FRESH label translates to a reduced environmental impact by the department. To come to such a conclusion, the impact of the regional and sustainable categories on food supply chains is necessary. In this supply chain, agricultural production accounts for 21%, processing 16%, packaging 7%, and pre-retail transportation 9% of a food item’s environmental impact (Heller, 2017). These figures, coupled with research suggesting that food being close by on its own is not a good indicator of environmental impact, suggests that the regional category may not be as essential to environmental sustainability (Edwards-Jones et al., 2008). This is due to the complexity and variability of food systems at different organizational levels that have to be accounted for, as a study found that “diverting consumption local goods only reduces global emissions when undertaken in regions with relatively low emissions” and varies by food type (Avetisyan, Hertel & Sampson, 2014). Nonetheless, since BCDS considers regional food environmentally important for reducing CO₂ emissions from transportation, reducing waste, and improving biodiversity, analyzing the impacts of regional and sustainable food vendors is an important metric of the FRESH program’s progress (BC Dining 2019, p. 28-29). In terms of sustainability, BCDS has conducted significant documentation of the various reasons they consider certain vendors sustainable that includes certifications, sustainable agriculture practices, renewable energy plans, waste reduction initiatives, and many more vendor specific plans for the future. These plans enrich the local food systems where they are located hence the idea behind having sustainable vendors in New England as a support to the local environment. For these regional vendors however, being close by does not necessarily mean that they have inherently lower environmental shipping costs, as the true impact is also based on the frequency of transportation, type of transportation, and the effect on the local environment, especially when considering that growing non-native foods in a region requires additional infrastructure. For example, one study found that New Zealand food products “compare favourably with lower energy and emissions per tonne of product delivered to the UK compared to other UK sources”, and another that UK food self-sufficiency would lead to more emissions than the current food system, especially when you factor in the environmental costs of switching food systems

(Saunders, Barber & Taylor, 2006; Edwards-Jones, 2010). On the other hand, another study suggested that even though local food does not always translate to lower emissions, “in general the consumption of local foods, produced in ways adapted to the local environment using technologies with an ecological basis, is something beneficial and salutary for the environment, economy and society” (Coelho, Coelho & Egerer, 2018). It is clear therefore that the effectiveness of local, sustainable food will inherently vary in different regions around the world, but due to the initiative of BCDS and other New England organizations, like the New England Food Vision, an analysis specific to this region is warranted.

Though BCDS provides a definition of Healthy, healthy eating can be defined broadly and, often, erroneously. Generally, healthy eating can be described as such: Trans fats are unhealthy for a variety of reasons and are associated with increased risk of heart disease, type 2 diabetes, gall-stones, dementia, and weight gain. Moderate intake of saturated fats (8% or less of daily calories) is ok. Monounsaturated, polyunsaturated, and polyunsaturated omega-3 fatty-acids are important parts of a healthy diet. Carbohydrates are an important part of a healthy diet; however, there are some caveats. Generally speaking, consuming less-processed carbs is more healthy than consuming more-processed carbs. This is because processing “removes fiber, healthful fats, and an array of vitamins, minerals and polynutrients” (Skerrett, 2012). Carbs can also be judged by their glycemic index. Carbs with a higher glycemic index trigger a more rapid and higher volume release of blood sugar and insulin levels than carbs with lower glycemic indexes. Carbs which possess a lower glycemic index are preferable to those with higher indexes because diets with a high glycemic load are associated with increased risk of type 2 diabetes and coronary heart disease. For the record: refined/processed carbs have a higher glycemic index than unrefined/minimally processed carbs. Protein gets more complicated. Protein is healthy as long as it comes with the requisite amino acids. Still, what often accompanies protein in food can be problematic. As a result, most governing bodies suggest getting more protein from beans, nuts, seeds, etc. while cutting back on protein from red meat. Fruits and vegetables are all good. Fruits and vegetables provide fiber, good carbs, vitamins and minerals, are associated with protection from cardiovascular disease, vision problems, bowel function, and potentially stave off certain types of cancer. The recommended five servings a day is a minimum and, while more is better, only 1 in 4 people in the US meet this guideline. The body also needs water to function and the best beverage for this is: water. Tea and coffee do not have any immediately deleterious

health effects; however, sugary drinks and alcohol do. Sugary drinks such as soda provide a lot of empty calories which can lead to weight gain and associated health risks. Alcohol has connections to increased cancer risk. Of course, at the end of the day, individuals must also manage weight through calorie intake and engage in exercise regularly (Skerrett and Willett). Interestingly, many college students appear to understand the basics of this healthy eating framework (Skerrett, 2012).

Unfortunately, there is a divide between what college students purport to know and what they practice. Common barriers to healthy eating can include time constraints, snacking on convenient high-calorie food, stress, high-cost of healthy food, and ease of access to unhealthy food. Alternatively, healthy eating habits were cultivated by improving food knowledge, meal planning, involvement in food preparation, and being physically active. The period after high school (whether as college or something else) is a space where young adults are challenged by a variety of new experiences and expectations and it is often a time when eating habits first become individual decisions apart from the family. As such, students towards the end of their college careers are ideal for study because they are furthest removed from this influence. College students point towards a variety of factors to explain the gap between their own knowledge of what constitutes healthy eating and their own (generally unhealthy by their own acknowledgement) eating habits. Snacking is considered unhealthy because it is associated with unhealthy, processed foods and overeating. Healthy eating habits are also precluded by a lack of time and a propensity to modify mood with unhealthy food even though most participants admit feeling better when eating healthier food. There is also a contrast between the idea that eating healthy is expensive and acknowledging that cooking meals (which students also suggest is healthier) is cheaper than going out. Regardless, these eating habits are heavily informed by what social circles an individual is in. Students also note that the environment of the college attended has an effect on how they eat and that the open access to food which a dining hall provides increases the risk of choosing unhealthy foods and overeating. Implied by this data is that, if universities want to promote healthy eating habits they should specifically target the college demographic. Further, these programs should ensure the availability of healthy food choices in dining halls with price-reductions for high-cost foods. Further, dining areas should feature details which highlight healthy eating and make it more appealing than other options. Finally, food

education and preparation classes, to help with health knowledge and meal preparation, would not hurt (Sogari, et al, 2018).

Outside of the long-term benefits/consequences of healthy eating, healthy eating habits have more immediate impacts on academic performance for university students. Multiple studies have found a positive correlation between GPA and healthy eating habits and a corresponding negative correlation between GPA and eating fast food. Still, the negative correlation between GPA and fast food consumption was only for respondents who reported having fast food at least seven times in the past week. Interestingly, the positive correlation between GPA and healthy eating habits was less strongly correlated to fruit and vegetable consumption and more strongly correlated to milk consumption and consistently eating breakfast (Reuter, et al, 2020).

The next three sections will address three separate research questions respectively. Question One will assess the environmental sustainability of food sources for the FRESH program, Question Two will assess the equitability of food suppliers for the FRESH program, and Question Three will address how BS seniors engage with the FRESH program in terms of their own eating habits and perceptions of healthy eating habits.

Question One: Assessing The Equitability of the FRESH Label

The purpose of this research is to understand how Boston College Dining Services (BCDS) identifies farms, producers, and processors as “Equitable” producers for the “E” in the FRESH label, and whether the businesses they have labeled as having fair labor practices are in fact equitable. One of the biggest challenges for this study was that BCDS did not provide a standardized system or clear criteria for the decision as to which businesses qualify as having fair labor practices. Each company included on their list had its own individual reasoning behind it, reasoning which was often vague and confusing. The “F” in FRESH, Fairly-Traded, is far more straightforward to assess than the “E” for Equitable. Fairly-Traded businesses must meet rigorous standards to earn the coveted Fair Trade label, which makes it easy for the consumer to know that they are supporting a socially responsible company. These standards “drive income sustainability, community and individual well-being, empowerment, and environmental stewardship. They include requirements around worker’s rights, fair labor practices, and

responsible land management” (Fair Trade FAQ - Fair Trade Questions). General equitability in farming and food production, however, is much less straightforward to assess. There is no standardized “fair labor” label with enforced requirements for labor rights and community wellbeing behind it to signal to customers that they are buying an equitable product. Instead, if a company isn’t Fair Trade certified one must really dig into the company’s specific information to determine for oneself whether they are equitable.

Methods

The best way to understand how BCDS selects producers for the FRESH program is to go straight to the source: BCDS FRESH excel spreadsheet reports. One of BC Dining’s Sustainability Interns generously provided unpublished data on the supply side of the FRESH program. These spreadsheets were the primary source for this research and were used to analyze the labor practices of producers. One report included all 72 farms, producers, and processors which BCDS has already classified as having fair labor practices along with their reasoning for classifying them as such.

The research for this study consisted of reading the reasoning cited by BCDS for why they designated each business as having fair labor practices and cross-referencing it with publicly-available information about each producer. Company websites, social responsibility commitments, certifications, company reports, and relevant news stories were all helpful in assessing the working conditions and labor practices of each company, as were Indeed reviews by former employees. When the reasoning cited by BCDS was clear, for example the company meets rigorous certification requirements or maintains complete transparency about employee treatment, little to no additional research was required. However, when the reasoning cited by BCDS was vague, such as “variety of advancement opportunities?” or “Claim to provide safe and healthy work environment” then further research was required.

For the purposes of this study, equitable employment is defined as a job that provides the following: stable employment, benefits, safe working conditions, and a living wage. All of the businesses with clear certifications (such as Fair Trade Certified companies, like PEETS Coffee) were automatically included as being Equitable organizations, considering that the certification process for labels such as Fair Trade is already rigorous and enforced. These businesses are

indicated within the “YES” Portion of Figure 3 (see Results and Discussion). Businesses that were included in BCDS’s list under vague or confusing reasoning were verified through additional research. Those that did in fact meet the above criteria for an ethical business were added to the “YES” section of Figure 3. Those that did not provide clear information on their websites or publish company reports, but seemed to provide good working conditions and fair payment (good reviews by former employees, high employee retention rates, etc.) were listed as “UNSURE” in Figure 3, and those that did not appear to meet the criteria for an ethical business were listed under “NO” in Figure 3.

Results and Discussion

The data provided by BCDS included a list of 72 businesses that have been identified as having fair labor practices, qualifying them for at least the “E” (equitable) in the FRESH label. Of these businesses, 13 (18.1%) were farms, 10 (13.9%) were processors, and 49 (68.1%) were producers (see figure 1). Farm refers to the grower of a food item, producer refers to the maker of a food item (i.e. baker, manufacturer, etc.) and processor refers to the packager or distributor of the food item.

Figure 1: Fair Labor Producers by Business Impact

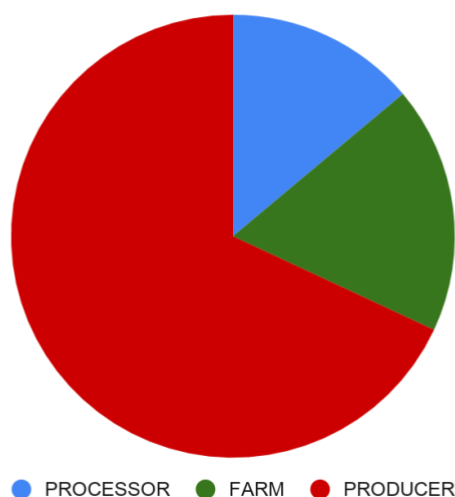


Figure 1: Fair labor producers by business impact

BCDS divided the fair labor companies into four categories based on ownership structure: (1) Independent/Cooperative/Small/Family, (2) Women/Minority, (3) Both, and (4) Public/Corporate (neither). Of the 72 businesses, 39 (54.2%) were listed as Independent/Cooperative/Small/Family owned, 2 (2.8%) were Women/Minority owned, 5 (6.9%) were listed as Both, and 26 (36.1%) were Public/Corporate (neither) (Figure 2).

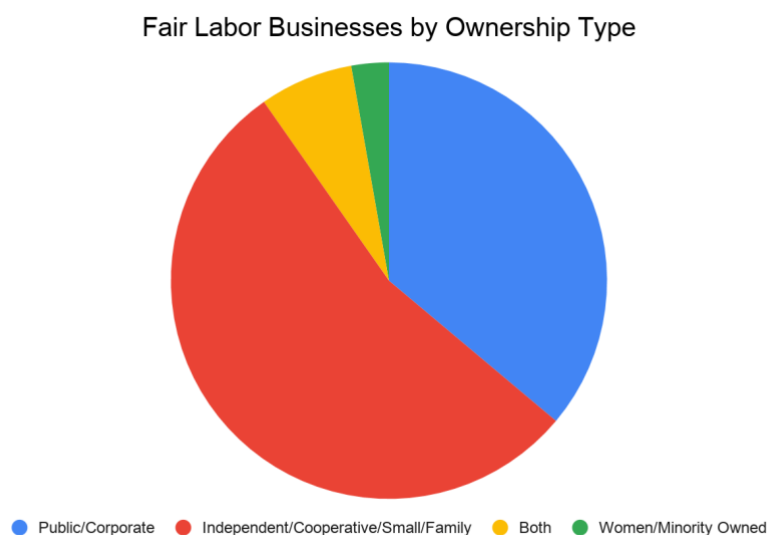


Figure 2: Fair labor businesses organized by their ownership type

Findings of this study largely confirm that the companies BCDS identified as Equitable do in fact have fair labor practices, with one notable exception. Hillandale Farms, one of the largest egg suppliers in the United States, was included on BCDS's list of fair labor producers, but further research indicates that this may have been a mistake. The reason cited on BCDS's spreadsheet was simply "Family operated." After looking into Hillandale Farms, several concerning reports immediately surfaced. An ABC News article from 2015 covers the release of disturbing footage from inside a Hillandale chicken house. A Humane Society investigator went undercover as a day laborer and documented video evidence of animal rights violations, as well as uncleanliness, leading to concerns about food safety. David Acheson, an independent food safety consultant, put it this way: "when you see evidence that some of those carcasses from the dead birds had been there for what would appear many days, if not weeks, then that clearly raises concern. ... If I was a buyer of eggs from a facility and saw those conditions, I'd think twice" (Wright, D. et al, 2015). The Humane Society used the footage to argue that massive chicken coop facilities like the ones at Hillandale are not only cruel to the animals but, given the

unsanitary conditions in the video, the poultry products they generate could be dangerous for human consumption as well. This also raises concerns about the working conditions the employees are subjected to.

A socially just and equitable company must consider its impact on its environment, employees, and larger communities. In 2020, as the COVID-19 pandemic was beginning to wreak havoc on the United States and the world, anxious consumers began buying up staple products (including eggs) in bulk. In response, Hillandale Farms began gouging their consumers by jacking up their egg prices. As the average individual entered a period of economic hardship and uncertainty, Hillandale Farms raked in \$4 million by illegally doubling, tripling, and even quadrupling egg prices, leading to a New York lawsuit against the company (Gibson, K., 2020).

As far as actual working conditions, most of the businesses on BCDS's list could be easily verified through a few google searches. DOT Foods Inc, for example, proudly claims on their website that "We haven't laid off a single employee in our company's 60-year history—even during the COVID-19 pandemic" (*Careers at Dot*). This is even more appreciable when one learns that the company boasts 6,400 employees across 14 locations. Biery Cheese Co. was also listed as a fair labor business by BCDC, and, like Hillandale Farms, the only reasoning cited was "family-owned 4th gen." Unlike Hillandale Farms, Biery Cheese Co.'s website lists comprehensive benefits for employees including full healthcare, a 401 (k) and career training, and paid holidays along with generous compensation (*Biery Cheese Company Career and Employment Opportunities*). These are just a couple of the companies that were verified as having fair labor practices in this study, out of a total of 67.

Overall, the vast majority of the food sourcing partners on BCDS's list did meet the specification of this study to be considered an equitable company. Of the 72 businesses in this study, 67 (93.1%) were verified as having fair labor practices. Research was inconclusive for 4 businesses (5.6%), and they were put in the UNSURE category. Only 1 business did not meet the fair labor standards outlined in this study (Figure 3).

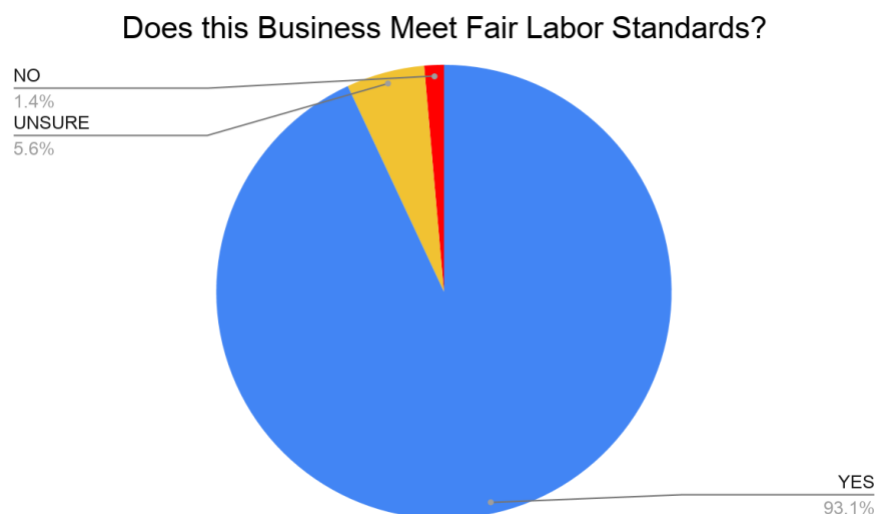


Figure 3: Do the businesses on BCDS's list match this study's criteria for an ethical business

Figure 2 includes two businesses that are labeled as Women/Minority owned and five businesses that are both Women/Minority owned and Independent/Cooperative/Small/Family operations. After looking into these seven businesses, it was found that only one of them (Meal Mantra, an indian curry producer based in Boston) is minority owned. The rest are owned and operated by women. It is slightly misleading to include the categories of women and minorities together, because it obscures the fact that virtually every business on this list is owned by white people. Equitable sourcing includes sourcing from diverse groups, particularly those who have historically been barred from land ownership and positions of power such as Black and Indigenous people. Without a commitment to seeking out and purchasing from Black and Indigenous owned businesses, one could argue that BCDS is falling short on its commitment to equitable sourcing for the FRESH program.

As for the actual labor practices of these businesses, for the most part they are equitable and just. The majority are independent, small, family owned, or cooperative style businesses that have a longstanding commitment to workers rights and social responsibility. Of the many publicly traded corporations on this list, most are either certified by a third party or have clear verifiable rules and regulations regarding working conditions, employee benefits, and fair compensation. The best testament to the working conditions in these facilities is to look to the employees themselves. Out of 431 reviews on Indeed, former employees of DOT Foods Inc. give it an average of four stars, writing that the company has great pay, a safe working environment,

and an overall positive company culture. This lends weight to the values the company writes about itself on its own career information website. DOT Foods Inc. was selected for further research because the only reasoning given by BCDS was “Variety of D&I initiatives,” which doesn’t say much about the actual practices of the company, but after reading about the company it is clear that BCDS was correct to include them on this list.

Other businesses that required further research included Bake N Joy, which was included for reasons of “variety of advancement opportunities?”, Catania Spagna Corp, listed as “family-owned 4th gen, traceable sourcing”, and Divina Food Match, included for its “respectful work culture; fosters communication and collaboration.” These businesses and others were verified as equitable after further research. BCDS must have looked into these companies before including them in the FRESH program, but their data does not reflect the relevant information for their inclusion. Before this data is made public it should be updated to reflect the true labor practices and ethics of the organizations on the list, so that student consumers have a clear understanding of how their dining dollars are supporting equitable business partners.

Some businesses did not pass the investigation in this study. For example, WADA Farms, a public/corporate farm, is included on the list of ethical companies provided by BCDS, yet for their reasoning they wrote only “Claim to provide safe and healthy work environment.” This wording seems vague, and research into the company's values only added to this uncertainty. The company is “family owned” though it is a large commercial operation, and they do not boast any information whatsoever regarding workers rights or commitments to social responsibility. A search on Indeed reveals a former employee rating of 3.5 stars, and complaints about long hours, grueling labor, and less than adequate pay. Some former employees claim that WADA employs undocumented workers for lower wages and does not provide benefits. Other reviews claim “not a good place to work,” “not advised,” and “hated it.” While many former employees give much higher reviews, they all indicate that the hours are long and the work is dirty. These reviews and the lack of information provided directly from the company are why WADA Farms was listed as “UNSURE” in Figure 3. There was not enough conclusive evidence to disqualify them from being an equitable employer, but there was also no strong evidence to support their inclusion in the “YES” category. The four businesses listed as UNSURE in Figure 3 merit more in-depth research.

As stated earlier, the only business on the list that definitively did not hold up to the scrutiny of this research was Hillandale Farms. Hillandale Farms, another commercial family operation, seems to care much more about making a profit than about the welfare of its employees or customers. While Hillandale Farms insists that they adhere to rigorous safety standards, the undercover footage collected by the Humane Society says otherwise. Of the video, Hillandale executive Jeff Martin said “that’s not our operation. That is not what you see, that the video doesn’t-- isn’t a true representation of our program. We have the safest food safety program in the industry. And the industry as a whole is improved” (Wright, D. et al, 2015). This may be true, but an average former employee rating of 3.1 stars on Indeed does not help the case that Hillandale is an equitable employer. In fact, of the 38 reviews on Indeed 14 of them are 1 star. This almost equals their 5 star reviews. They are rated low in all five categories of work-life balance, pay and benefits, job security and advancement, management, and culture. With the recent New York State lawsuit accusing Hillandale of price gouging during a deadly and economically disastrous pandemic, it is impossible to call this mega corporation an equitable or socially responsible business partner.

Recommendations

Based on the findings of this report, it is recommended that Boston College Dining remove Hillandale Farms from its list of fair labor businesses for the FRESH program. It is also recommended that BCDS refine their data before making it publicly available, so that there is no room for uncertainty as to how each decision was reached. The primary recommendation from this report is for BCDS to create a standardized system for assessing which food suppliers have equitable business practices, including a definition of equitable practices regarding worker rights and community health. Overall, the vast majority of businesses that received the “E” (equitable) and are supported by the FRESH program do have fair labor practices and are making conscious efforts to have a positive impact on the food system as a whole. By choosing to support these businesses over others, Boston College is both improving the social responsibility of its own food system and putting pressure on other businesses to adopt these same fair and just practices. This institutional change will have the largest impact on the overall food system.

Question 2: Assessing The Sustainability of the FRESH Label

Methods

All data used for question 2 was taken from the Fall 2019 semester, chosen because both Spring 2020 and Fall 2020, due to the COVID-19 pandemic, had non-regular dining availability.

Sustainability of regional and non-regional Vendors

Analyzing the environmental impact of the FRESH program first involves describing the vendors that qualify for the label. In accordance with BCDS's guidelines, regional vendors are those that are located in New England. With this distinction, vendors were compared based on their sustainability practices as businesses, as adequately vetted by BCDS and their student sustainability interns. Therefore this analysis assumes that BCDS's conclusions of their vendors' sustainability are accurate. Though most of vendors considered sustainable have a reasoning listed, a few do not, and these are still considered sustainable, as sustainability interns pointed out this is due to the large amount of data still being analyzed. Furthermore, BCDS did not have enough information on some vendors to have made a determination, and are categorized as unknown. Since some of these vendors may be considered sustainable at a later time following further research, they are kept separate from those determined to not be sustainable in the analysis.

Distance of Vendors

The distance vendors are from BC serves as a base metric of how 'local' various food items are. In this analysis the distance between vendors and BC is calculated as the crow flies (i.e. the shortest and most direct path between the two), using their coordinates and the haversine formula. BC's coordinates (42.3361186, -71.1692165) were determined from the address 140 Commonwealth Avenue, Chestnut Hill, MA 02467. The coordinates of the vendors were determined from the zip code BCDS has for each of them. Note however, that depending on the size of various vendors, this zip code can vary from being the location of a specific farm to a vendor's headquarters. As such, the location of a vendor may not correspond with where every item BC purchases from them was grown, made, or otherwise prepared. This becomes especially clear with international vendors, as many of these places have national and regional headquarters. When BCDS has region and country information, but not zip code, as was the case with a few international vendors, the specificity of their location was based on what could be found online, and as a result some had exact addresses while others just had city names. Due to the distances of these vendors from BC, however, this difference in specificity has likely very

little impact on the analysis. The locations of one regional vendor and eleven non-regional vendors were not available and excluded from this analysis. In addition, the location of one regional vendor (Meatball Obsession) was on BC (as it was a stand on campus), and thus was not included in the calculations.

Environmental Costs of Shipping from Distributors

The environmental costs of shipping were based on the distance a truck has to travel and the frequency of shipping from distributors to BC. TruckRouter was used to calculate the distance of the optimal paths from the distributors to BC for commercial trucks, which may be faced with bridge weight and height restrictions. One of the distributors, Costa Fruit & Produce uses straight trucks to deliver to BC, so a route accounting for a truck with a height of 12 ft (3.66 m), width of 8 ft (2.44 m), length of 15 ft (4.57 m), and weight of 30,000 lbs (13607.77 kg) was found. For the other three distributors it was assumed that they use semi-trucks, with a height of 13.5 ft (4.11 m), width of 8.5 ft (2.59 m), length of 72 ft (21.95 m), and a weight of 80,000 lbs (36287.39 kg). The environmental costs of shipping were calculated by determining the carbon dioxide emissions of each trip throughout the Fall 2019 semester. Emissions were calculated by multiplying the distance shipments traveled, the weight of the shipments, and the emissions factor of freight trucks (Mathers et al., 2014, p. 8). This equation was used as opposed to just the emissions from the trucks, due to the likelihood of them having products for multiple places not just BC. The available data provided products in either weight or volume, yet all were converted to weight for this calculation. Items measured in volume were treated as pure water at 4° C to allow for the easy conversion of 1.0 L = 1.0 kg, which means the calculated weight of most of these items is less than their actual weight (especially more dense food products). Items that did not have any reported weight or volume, and those that were returned back to the distributor were not included in this analysis. The emissions factor for freight trucks is 143.838344 gCO₂ per tonne km, though it is important to note that trucks also emit NO_x and particulates which were not factored in for this analysis (*SmartWay Shipper Company Partner Tool*, 2020, p. 25). This value is an average of different classes of freight trucks, so true emissions factors may be different based on the type of truck and if it has refrigeration (since food is being shipped). Lastly, this analysis assumes the trucks come straight to BC and do not have other stops beforehand (as they almost certainly do), and as such is only one way (from distributor to BC).

Results

BCDS received products from 108 regional and 301 non-regional vendors, with 61% of regional and 42% of non-regional being considered environmentally sustainable (Figure 4). The average distance of the 106 regional vendors with determined locations from BC is 91.03 ± 94.01 km, with a median distance of 51.79 km. The closest regional vendor is located in Newton, MA (Finagle a Bagel), and the farthest is in Linneus, ME (Aurora Mills & Farm). The combined total distance of the regional vendors from BC is 9,648.85 km. The average distance of the 290 non-regional vendors with determined locations from BC was $2,185.23 \pm 2,015.07$ km, with a median distance of 1493.13 km. The closest non-regional vendor is located in Saratoga Springs, NY (Saratoga Spring Water Company), and the farthest is in Nakhon Pathom, Thailand (Maesri). The combined total distance of the non-regional vendors from BC is 633,717.85 km. The range of the various vendors around the world is visualized in Figure 5 and quantified in Figure 6. The average shipment from distributors to BC emitted 26.09 ± 46.88 kgCO₂, with total emissions of 11,507.37 kgCO₂ and a total weight of 1263.86 tne for the semester. Of these, products from regional vendors made up 30.39% of emissions and 37.08% of the total weight. Emissions throughout the semester are visualized in Figure 7.

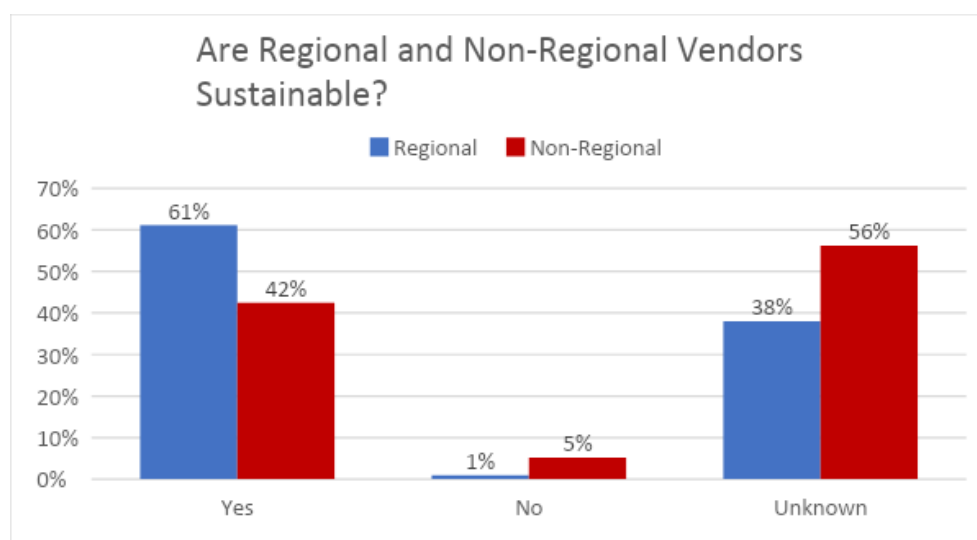


Figure 4. Sustainability of regional and non-regional vendors. ‘Yes’ indicates a vendor is considered sustainable, ‘No’ indicates not sustainable, and ‘Unknown’ indicates not yet determined.

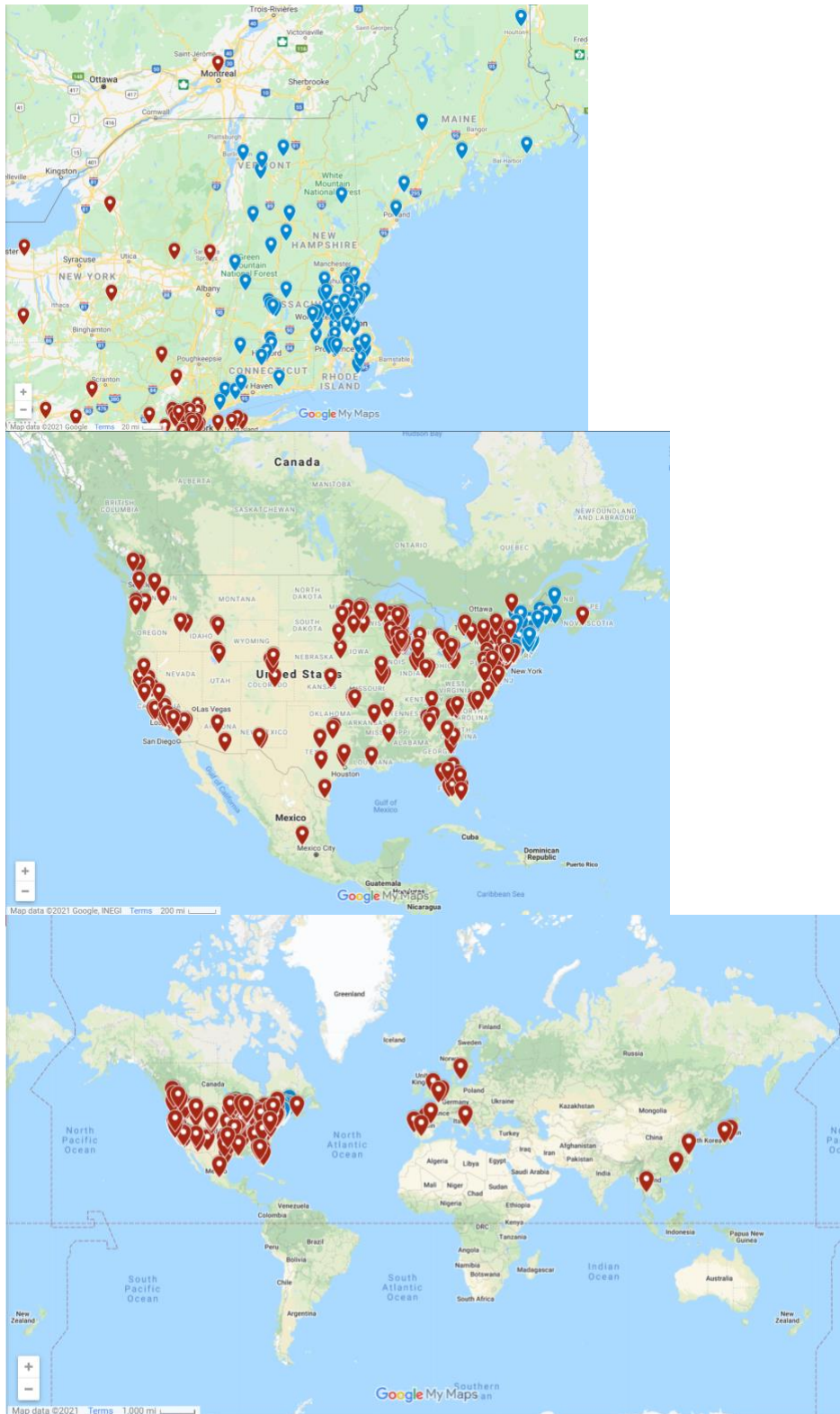


Figure 5. Maps of vendor locations in New England (top), North America (middle), and worldwide (bottom).

Interactive map available at:

<https://www.google.com/maps/d/viewer?mid=1PGbKkfXr1QGwaF0IKUwOn528q8njtwqW&ll=45.27726551193285%2C-22.77890623250687&z=2>.

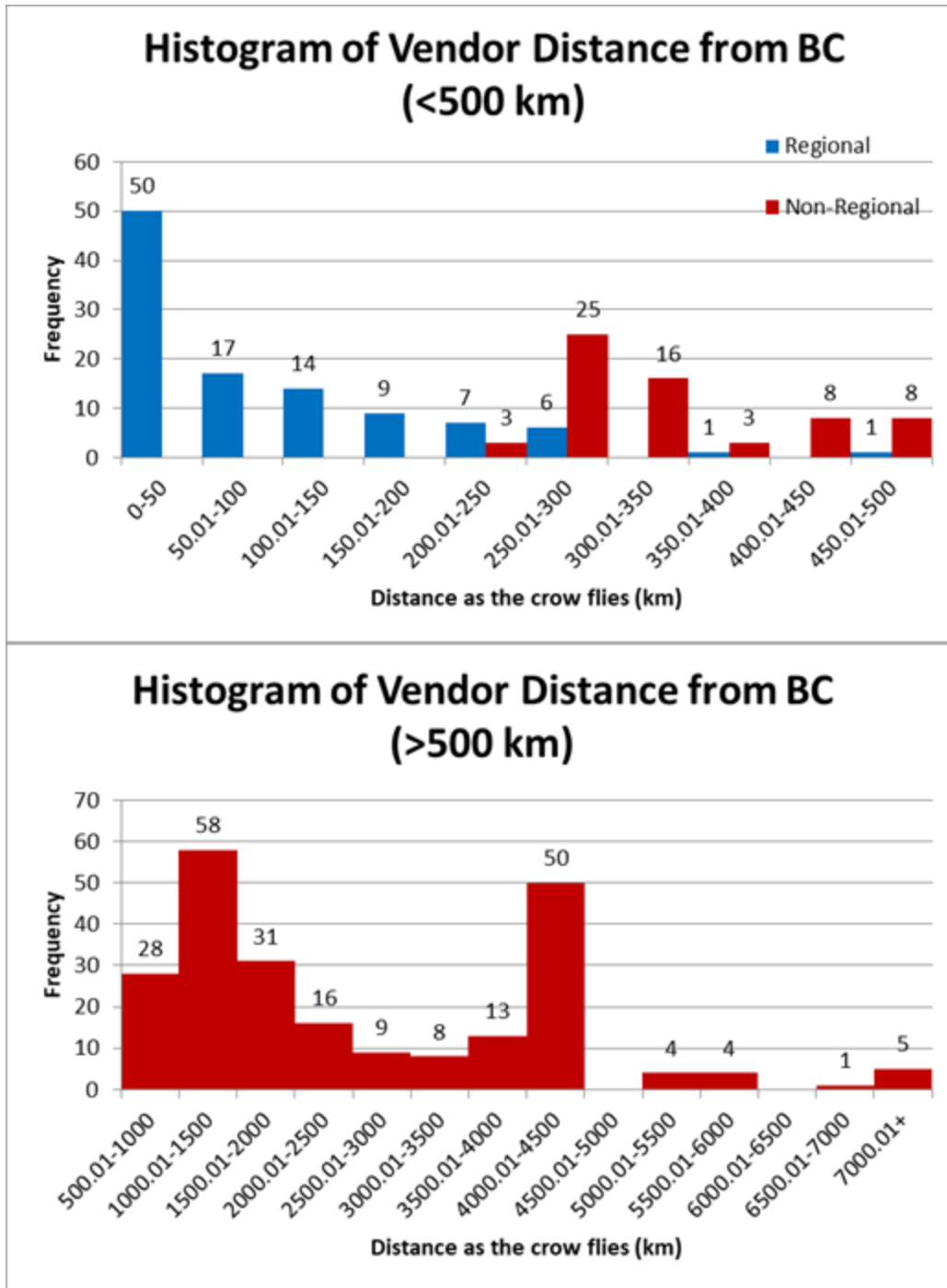


Figure 6. Histograms of Vendor Distance from BC for those less 500 km away (top) and those more than 500 km away (bottom).

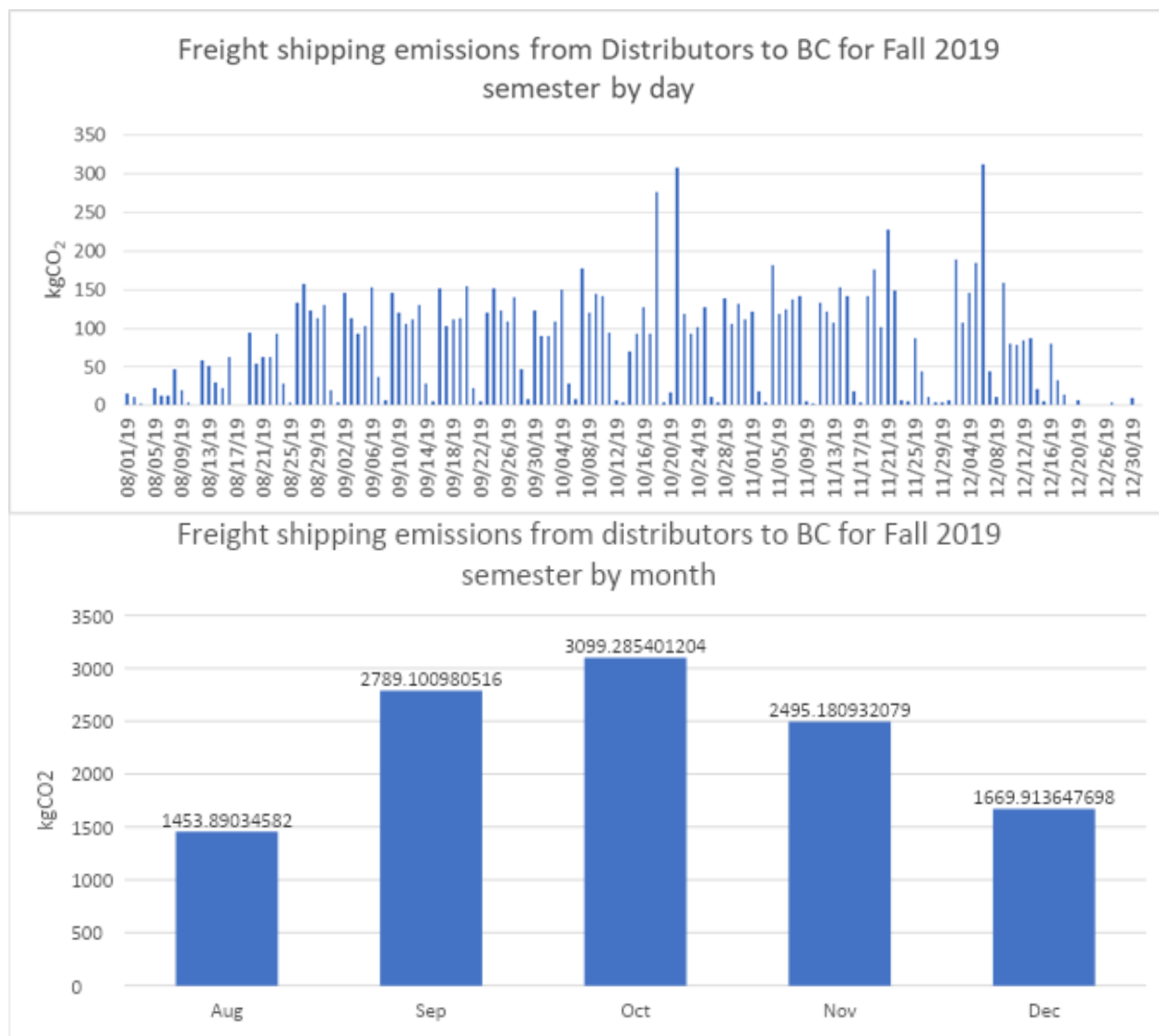


Figure 7. CO₂ emissions of freight shipping for the Fall 2019 semester in kgCO₂ by day (top) and by month (bottom). Emissions are quantified as the CO₂ released for the transport of goods being brought to BC from the distributors on their trucks, and therefore present not how many trips distributors are making but how much is in those trips. Emissions calculated assume trucks coming to BC took the quickest path with no prior stops or detours.

Discussion

While results suggest that there are more regional vendors than non-regional vendors that are considered environmental sustainable businesses by BCDS, a substantial percentage of both regional and non-regional vendors had undetermined sustainability (Figure 4). Those unknown vendors could alter the results, once BCDS finds enough information on them to determine their sustainability, especially since more non-regional vendors are ‘unknown’ than not sustainable. Future results could reaffirm current findings, but they could very well lead to the determination that both categories have an equal amount of sustainable vendors or that the non-regional has

more sustainable. These findings, while promising, are only part of the picture, as only 12.5% of total food purchases came from these sustainable vendors in Fiscal Year 2019, so having a lot of sustainable vendors does not mean much if they are not utilized (BC Dining, 2019, p. 34-35). On the other hand, results suggest a clearer case for regional vendor sustainability in terms of location relative to BC, as the differences in distances from the school between the two categories is substantial. As expected, the regional vendor frequency declines with distance from BC, as most vendors are located in Massachusetts, with less in the other New England states (Figure 5 and 6). Non-regional vendors do not entirely follow this trend however. Of note, the vendors in the 1,000 to 1,500 km range correspond to those in the Midwest, those in the 1,500 to 2,000 km range correspond to Midwest and Florida, and those in the 4,000 to 4,500 km range correspond to those in California and Oregon (Figure 5 and 6). Considering centers of food production in the US, an abundance of non-regional vendors in the Midwest and West Coast makes sense. The locations of these vendors could also offer interesting choices to further improve the number of regional vendors. Of course some vendors are providing items that cannot be grown in the New England region so non-regional vendors will likely still be needed. In addition, many of these vendors (especially the non-regional ones) are large national and multinational companies, whose food items are not all made in the city, state or even country of their headquarters, which further necessitates the need for regional vendors whose individual products can be traced near their location. On the other hand, it must be noted that regional was not always closer, due to some parts of New England being farther away from BC than places considered non-regional like parts of New York, suggesting that something regional is not inherently closer (Figure 5 and 6). This brings up an important discussion about what can be considered 'local', because definitions not based on exact distances will have some ambiguity. Shrinking the 'regional' definition to Massachusetts would ignore many of the similarities of the New England region, yet expanding it to the North East starts to expand the distance from BC and diminish the regional category's relevance. Furthermore, the distance a vendor is from BC is not the only factor in determining its impact on the environment, as frequency of freight sent to the school plays a large factor. For example, purchasing from a vendor 500 km away once a month may not necessarily be worse for the environment than purchasing from a vendor 100 km 10 times a month, so only focusing on having regional vendors doesn't necessarily mean better for the environment. Especially when economies of scale and different forms of transportation

are considered, that may lower the individual environmental impact of goods coming from further away. Unfortunately, such analysis requires knowing how each vendor sends its goods to the distributors BCDS utilizes (not to mention the likely presence of different levels of distributors sending items between themselves), which was not available. Then there is the environmental shipping costs many vendors have of bringing together various ingredients from different places to make some of their products, adding yet another layer of complexity. The data that was available to analyze, however, included the dates that items were delivered to BC, which when consolidated provided the days various distributors sent over trucks. This analysis revealed predicted trends, such as less deliveries (in terms of weight and emissions) occurring on weekends and the largest emissions occurring in the middle of the semester (Figure 7). While results suggest that regional vendors account for a lower percentage of the distributor to school emissions, this is expected and not indicative of less emissions per capita, as regional and non-regional items are coming on the same trucks. Therefore what these results suggest is that more of the regional items are shipped from closer distributors (though it should be noted that all four distributors BCDS utilizes are in Massachusetts), but this may not be something that can be easily changed as distributors likely have different contracts with specific brands, so BCDS would not be able to get everything from the closest distributor.

Overall, the data suggests that FRESH foods are more sustainable than non-FRESH non-regional foods. Yet the findings present the fact that some sustainable non-regional vendors could be sustainable to a similar degree, though this is not conclusive without more data. The sustainability of agricultural production and food processing is substantially more impactful on the environment than transportation. Therefore continuing an analysis into the vendors BC utilizes (i.e. reducing the number of ‘unknowns’ from Figure 4) is an essential avenue of future research. Once this is complete, the vendors could be further analyzed on the extent of their practices, as different vendors have varying levels of commitment and progress toward sustainability. Such research could be further spurred on by analyzing the individual impacts of different food items purchased, which may provide suggestions of specific food items BC purchases that have high environmental impacts, and may point to other vendors that make a certain item more sustainably. In addition, further data could allow for an analysis that could find the trade-off point where distance from BC becomes a significant factor to sustainability to further refine the ‘regional’ definition. Ideally, an analysis comparing sustainable vendors and

emissions from shipping prior to and following the start of the FRESH program could provide valuable insights, but, according to BCDS sustainability interns, pre-FRESH data is no longer available. Unfortunately, of the available data, two of the semesters occurred during the COVID-19 pandemic and therefore could not be fairly compared to prior years, but the aftermath of the pandemic does pose an interesting opportunity to see if supply chains are altered. The FRESH program is only in its infancy having been started in 2017, and it is likely that more data will be available and analyzed as it progresses that will further flush out the program's sustainability.

Question 3: Assessing the Impact of the FRESH Label

Methods

Data was collected from April 12 to April 29 2021 using an anonymous online survey created through Google Forms and administered through a Boston College C/o '21 Facebook page. As a result, the participant group entirely consisted of seniors attending Boston College. The group was evenly split between self-identified men and women. The first section of the survey featured an informed consent form and it was made clear that participation was voluntary and that participants could stop the survey at any time.

The survey consisted of two sections. The first being a quantitative section meant to gauge familiarity with the FRESH program and associated healthy eating habits as well as actual eating habits and the second being a qualitative, short response section meant to determine more personal definitions of what healthy and unhealthy eating habits mean to the participants as well as underlying motivations for such behavior. In the quantitative section, questions or incomplete sentences were posed and participants could answer/complete the sentence on a scale of one to five with one being least often/least important and five being most often/most important. Of the nineteen quantitative, scaled questions, seven dealt with how often stereotypically healthy foods are chosen, five dealt with valuations of different attributes of FRESH eating, and seven dealt with choosing to eat FRESH while in college. The qualitative section asked participants to define healthy versus unhealthy eating, qualify why one would eat FRESH, and describe how their eating habits have changed since coming to college.

Results

The online survey was completed by 52 students. Each was a senior at Boston College and all participants were above the age of 18. The group was evenly split between 26 males and 26 females. Of the respondents, 57.1% said they had not engaged with FRESH directives or activities, 28.6% said yes, and 14.3% said maybe. Similarly, 57.1% said they did not consider themselves to be FRESH eaters while 42.9% said they did consider themselves FRESH eaters. (See Figure 8). There was a wide range of demonstrated familiarity with the FRESH program; however, the average level of familiarity with the program was 3.07 out of 5.

On a scale of one to five, with one being never and five being weekly, respondents demonstrated a lack of adherence to FRESH principles. Eating locally had an average score of 2.93. Shopping at farmer's markets had an average score of just 2. Organic food choice scored an average of 2.64. Free range/cage free meat choice garnered a 2.5 average. Hormone/antibiotic free meat choice averaged 2.57. Fair trade/certified organic food choice scored an average of 3. (See figure 9).

On a scale of one to five, with one being "not at all" and five being "very," respondents answered questions regarding motivations for and barriers against eating FRESH. Expense garnered a 4.31. Protecting the planet scored a 3.69. Interestingly, difficulty scored a 2.79. Eating minimal amounts of processed foods for health received a 4.36 while pride in helping the planet received a 3.29. (See figure 10)

In different situations, students are also more or less likely to pursue fresh eating habits. On a scale from one to five, with one being never and five being always, students demonstrated that typical school stressors stand as barriers to eating FRESH. When busy, respondents scored eating FRESH at 2.07. When stressed, respondents scored eating FRESH at a 2.07. While at school, respondents eat FRESH half the time at 2.5; however, while at home, respondents gave their FRESH eating frequency a 3.64. Interestingly, inconvenience scored a 3. When respondents go out they rate their FRESH eating frequency at a 2.43 which, surprisingly, is higher than the 2.36 they reported for eating in the dining halls. (See Figure 11.)

On a scale of one to five, with one being "nothing has changed" and five being "everything has changed," respondents also scored the changes in their cooking and eating habits at a 3.93 and a 3.29 respectively.

In the qualitative section, respondents were asked to define healthy eating, unhealthy eating, “why eat FRESH?,” and how perceptions of healthy eating have changed since coming to college. In defining healthy eating, 44% of respondents mentioned balance or variety. 33% mentioned fruits and/or vegetables. 44% mentioned minimally or unprocessed foods. 11% mentioned the word organic. 11% mentioned healthy fats and/or vitamins. In terms of defining unhealthy eating: 11% mentioned calorie surplus. 11% mentioned a lack of variety. 22% mentioned sugar or fat. 67% mentioned processed foods. As for why to eat FRESH, respondents were more taciturn. Statements similar to “I don’t know” and “I don’t” made up 22% of responses. 55% mentioned health. Similarly, 44% mentioned the planet/environment. 80% of answers mentioning health also mentioned the environment/planet. 22% of responses solely focused on sustainability and/or food sourcing. When asked about how perceptions of healthy eating have changed since coming to campus responses were ambivalent. 33% stated that perceptions haven’t changed while 22% stated that perceptions have changed while personal practices have not. 11% mentioned realizing the true difficulty of eating well away from home and 22% reported a better perception of healthy eating or feeling more pressure to eat healthy.

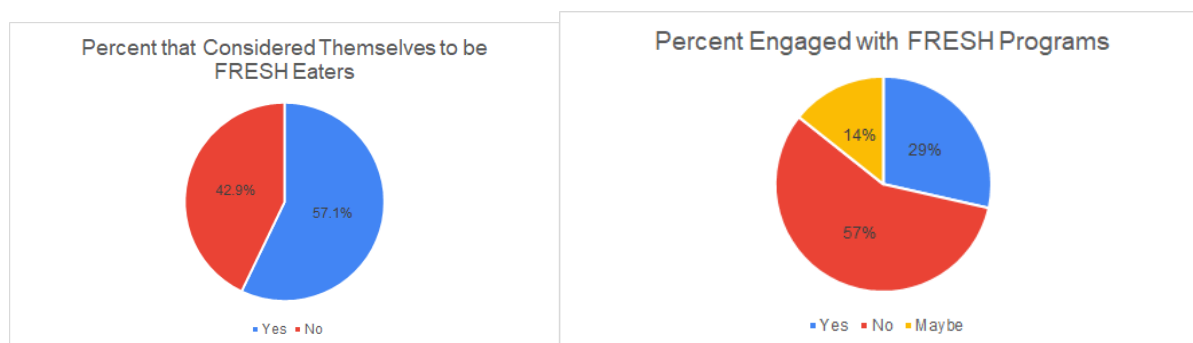


Figure 8. Pie Chart of self-proclaimed “FRESH” status versus pie chart of self-proclaimed engagement with FRESH programs

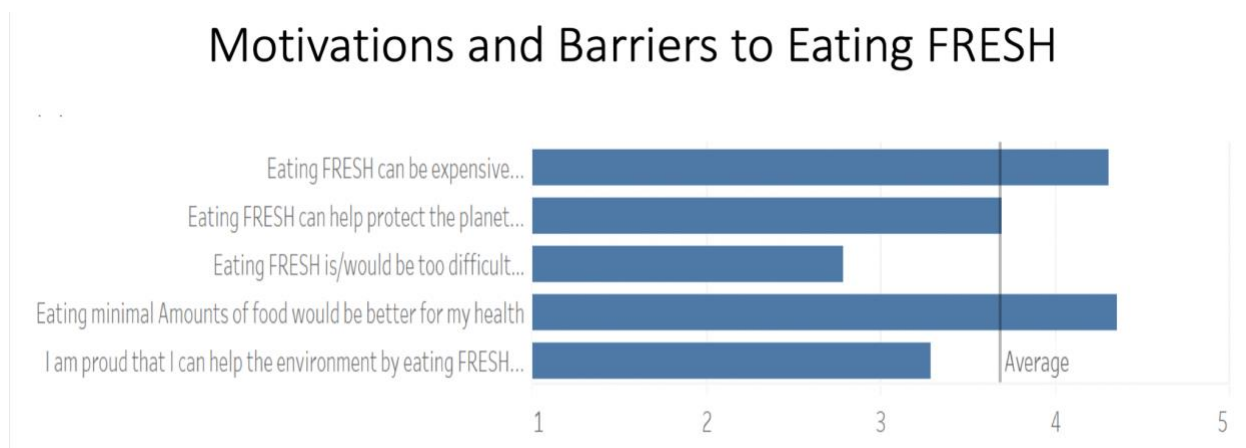


Figure 9. Chart depicting motivations and barriers to eating FRESH in which 1 completes the statement with “Totally Disagree” and 5 completes the statement with “Totally Agree.”

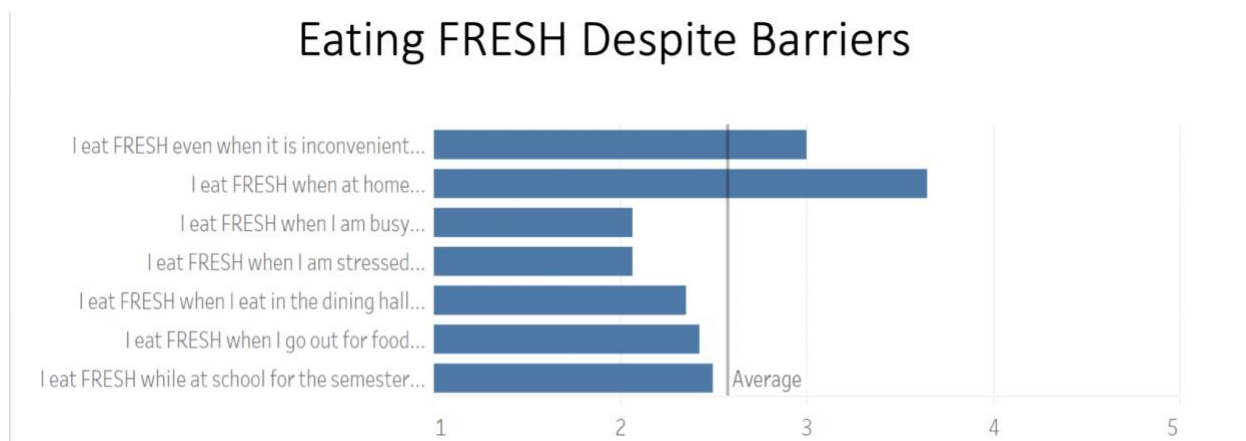


Figure 10. Chart depicting FRESH tendencies despite barriers where 1 is “Never” and 5 is “Always”

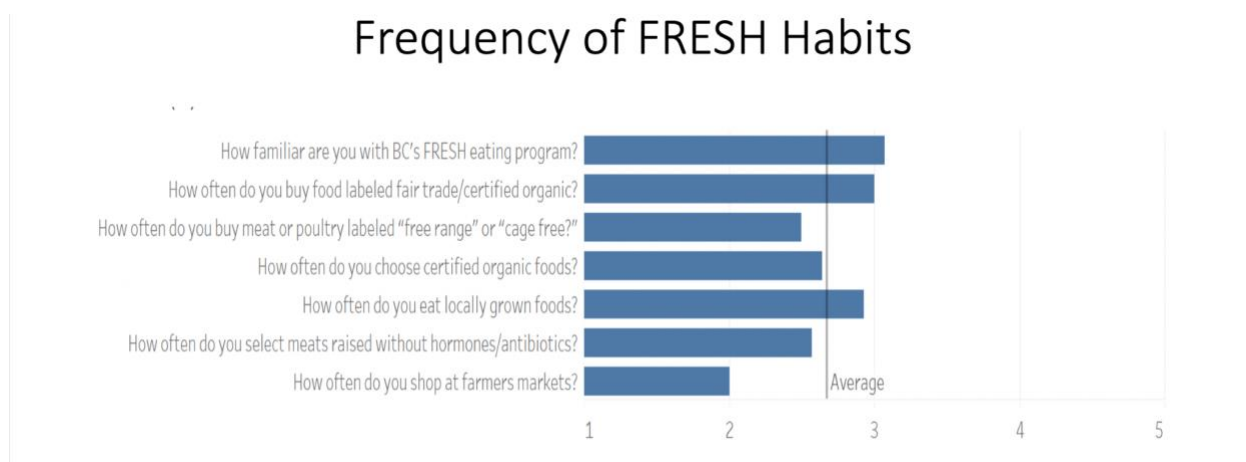


Figure 11. Chart depicting frequency of FRESH associated habits where 1 is “Never” and 5 is “Weekly”

Discussion

To start, it is important to note that more responses would have created a sample which would potentially be more indicative of the senior class as a whole. Still, the data reveals some interesting trends. First, respondents showed an apparent lack of interaction with FRESH programs but still demonstrated knowledge of FRESH tenets. There is only a slight distinction between FRESH tenets and generally accepted principles of healthy eating so there is some ambiguity over how much this has to do with the FRESH Program and how much of this has to do with a general, societal conscientiousness of healthy eating habits. There is also a disparity between knowledge and practice of healthy eating habits on campus in that most respondents demonstrate a knowledge of what healthy eating consists of while simultaneously acknowledging that they themselves do not practice these habits. Significant barriers to FRESH eating which explain this dissonance are price, time, convenience, and stress. While this particular survey did not examine the connection between these barriers, they do mirror the barriers expressed in past studies where a connection has been drawn relating these barriers to one another. Regardless, the data shows that while the FRESH program may or may not be improving understanding surrounding healthy eating habits, seniors at Boston College demonstrate a lack of personal healthy eating habits in relation to their knowledge of said eating habits. Still, it seems a large part of this stems from effort (due to time or stress) and cost rather than a lack of desire to or awareness surrounding FRESH programs/tenets on campus. Still, this could be due to negative or overly-critical perceptions of individual healthy eating habits. Additionally, it seems a large part of this disparity stems from effort (due to time or stress) and cost rather than a lack of desire to or awareness surrounding FRESH programs/tenets on campus. This is partially demonstrated by gendered trends in the data. Female respondents routinely placed more importance on eating FRESH while also ranking the barriers to FRESH eating as being less detrimental than the male respondents did. Though the survey did not inquire into gendered motivations for certain eating habits, these distinctions strongly hint at additional, social motivations for or against eating healthily.

As such, the major barriers to healthy/FRESH eating on campus come down to price, time, convenience, stress, and social/gendered protocols for eating. Based on the data, actual knowledge of FRESH tenets as they pertain to healthy eating are well known on campus and so

need less attention. Price, as the most self-proclaimed important barrier deserves special attention. There are two options here. The first is to simply subsidize/encourage healthy eating in such a way as to make it cheaper for students to eat healthy. This could be done by cutting into profits or by creating a rewards program to encourage consistent “FRESH” choices without explicitly making healthy options cheaper. The second is to either show or convince students that healthy eating options are not more expensive than classically unhealthy options or to convince them that the healthy options are not prohibitively more expensive than the classically unhealthy options. Time and convenience should be dealt with together. For students eating in the dining hall, this is a nonissue. Still, for seniors who are less likely to be on a meal plan, this is a difficult issue which the CSA Farm Share program works towards alleviating. By providing fresh produce to students, the FRESH program saves students from going to the grocery store to buy food. Often, when putting off going to the grocery store, students are more likely to order out and make less healthy eating choices. If this farm share program was coupled with a week-day cooking pamphlet which detailed quick, easy recipes which made use of healthy ingredients, students could be persuaded that healthy eating does not require too much time or inconvenience. Stress is another difficult topic because the ensuing diet change could point to multiple issues. On one hand, stress could potentially be tied to a lack of time and need for convenience surrounding end of semester projects or other collegiate activities and so can be assuaged in the same way that time and convenience are. On the other hand, a change in diet as a result of stress could be the result of attempting to modify mood with comfort food. If this is the case, then the FRESH program could partner with the Institute for Wellness Coaching (specifically the Nourishwell department) and create programs/information which highlights the important connection between healthy diet and mental health as well as providing those who desire mental health support the opportunity to do so.

Conclusion

The primary recommendation following this study is for BCDS to further analyze existing data to obtain a more complete picture of the sustainability and equitability of the food items under the FRESH label. This data could inform future analyses by identifying areas for improvement across the five categories within the label. In terms of the regional and sustainable

categories, further refining their parameters and analyzing the different levels of the supply chain is necessary in order to provide more concrete evidence of FRESH to Table's effectiveness at reducing the environmental impact of BCDS. In order to pursue a socially just food system, BCDS should develop and implement a standardized system for determining how a business can qualify as a fair labor food supplier. This system could be used to easily identify equitable partners and would greatly reduce confusion about the label.

All in all, seniors at Boston College know how to practice healthy eating habits; however, there are barriers such as price, time, convenience, stress, and social/gendered protocols for eating which stand in their way. BCDS can address these barriers by setting up a variety of programs to deal with these specific barriers.

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