Swette Center for Sustainable Food Systems
Arizona State University

Evaluating "Food Miles" as a Sustainability Metric for Hotel Restaurants

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Swette Center for Sustainable Food Systems, Arizona State University
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Mike Myers, Chef-Tournant, Fairmont Scottsdale Princess
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Table of Contents

Executive Summary

The journey of diverse foods produced and transported over great distances has caused concern for society's ability to meet carbon neutrality goals in the frameworks set forth by The Paris Agreement. One growing concern is food miles – the distance foods must travel from production to their place of consumption, and the energy expended within that distance based on the mode of transportation. Carbon footprint assessments for the global trade of food are limited, making it difficult to gauge the importance of food miles as a sustainability metric. The idea of ‘‘an average item of food’’ is problematic, and the data to compute figures at a more geographically specific scale simply do not exist or are inaccessible. Advancing metrics to evaluate the total food system emissions during transport can be effective for transitioning food-centric businesses towards a sustainable model.

One such business category is full-service restaurants, of which there are about 34,000 in the United States. Many of these are located in “higher end” hotels and resorts. The Fairmont Scottsdale Princess (FSP), a 750-room AAA five-diamond resort that was acquired in 1987 as part of the Accor portfolio of hotels, has made a concerted effort to operate with a more sustainable model at many of its restaurants. This study, conducted in partnership with the FSP, aims to understand what sustainability metrics exist to measure food miles and how they are accounted for from producer to the plate. The research team assessed how sustainability metrics should be ranked, weighed, and communicated by gathering insights from the Fairmont Scottsdale Princess and other informed sources in the hotel restaurant industry. We employed mixed quantitative and qualitative methods involving surveys and in-depth interviews with a variety of restaurant chefs and managers about their awareness of this concept to gain a robust perspective on the sustainability metrics for hotel restaurants.

Overall, the research project surveyed 24 industry professionals to understand their perceptions and attitudes of food miles' impact on sustainability. Professional sous chefs and managers of the Fairmont Scottsdale Princess restaurants and professionals from the Culinary Institute of America (CIA) were invited by email to participate in this project. The findings of the data collection reveal common themes about the expansion of local sourcing, food waste reduction, customer awareness/concern about sustainability during consumption, and how food miles affect the sustainability of a restaurant's daily operations.

This report contains an analysis of the data collected using these instruments and our recommendations for sustainability metrics for hotel restaurants.

Introduction

In the last 50 years, the scope of the food industry expanded dramatically. Agricultural practices in food production, processing, and transportation are still changing rapidly to meet population growth and increasing consumer demands for greater quality, quantity, and diversity of foods. Over the last two decades, we have also been confronted with a rise in global average temperatures and corresponding challenges to reduce greenhouse gas (GHG) emissions to avoid a catastrophic global climate breakdown according to the Intergovernmental Panel on Climate Change (IPCC, SR15, 2018).

Warnings to decrease our global average individual carbon footprint from 6.3 tons in 2020 to 2.1 tons in 2030, motivated more coherent thinking about where our food comes from and the distance between where it was produced and eaten. Restaurants are a major contributor to greenhouse gas emissions due to food transportation and food waste and are focusing on reducing their carbon footprint. Although the precise numbers vary from study to study, according to the UN the food sector accounts for about 30% of the world's total energy consumption and at least 22% of total greenhouse gas emissions. Restaurants can include sustainable practices to decrease their carbon footprint and improve human health and the environmental air quality.

The objectives of this research are to understand (1) the context in which “food miles” are defined and their environmental impact (energy use) on the transportation of food, and (2) if hotel-based restaurants that focus on sustainability have a clear preference on rank, weight, and communications about this attribute relative to other sustainability measures.

What are Food Miles?

Food miles are a derived calculation based on the distance food items travel from production to consumers' plates. The energy use or emissions from that travel indicate the environmental impact. The famous phrase “farm to table” has emerged not just as a culinary style and social movement, but also as a food miles statistic. It can be measured yearly as tonne-kilometers (tkm), the transportation of 1 tonne of food over 1 km, or the distance traveled multiplied by the mass of the transported food item (Smith et al., 2005). The term food miles was coined in the U.K. in the early 1990s by Professor Tim Lang, at the Sustainable Agriculture Food and Environment (SAFE) Alliance, an organization-led campaign responsible for the launch of the "The Food Miles Report: The Dangers of Long-Distance Food Transport” by Angela Paxton illustrating the social and environmental implications of the dangers of long-distance food transport.

Debates over a universal definition of food miles can be complex due to environmental, social, and economic contexts. Definitions of food miles can vary between restaurateur, chef, purveyor, and producer. Studies suggest there are several important factors associated with the new focus on food miles: (1) a steady increase in trade imports and exports, particularly of fresh fruits and vegetables, (2) increased consumer demand and consumption has intensified production, processing, and packaging, (3) the mode of transportation has been changing - for example, “imported highly perishable produce is often shipped by air freight, which can cause 47 times more emissions than ocean freight.” Despite their small GHG emissions impact compared to other emissions from food production, farm practices, land use and packaging global food miles still generate nearly 20% of all CO^2 emissions from food (Li et al., 2022).

Our researchers were actively engaged with the Fairmont Scottsdale Princess, an iconic Scottsdale luxury resort located in Scottsdale, Arizona. FSP’s parent company is Accor Hotels, whose stated environmental and social plan is to reduce carbon emissions by 2030, in line with UN Sustainable Development Goals. FSP is home to five sophisticated restaurants featuring seasonally inspired menus and dining experiences to cater to its customers: Bourbon Steak, an upscale, contemporary American steakhouse; La Hacienda, a traditional upscale Mexican fare; Toro Latin Restaurant & Rum Bar, an innovative fusion of Asian and Latin flavors of South America with Chinese-Peruvian influences; Ironwood American Kitchen, an artisanal “locavore” destination; and the Plaza Bar including signature craft cocktails and wines by the glass. FSP caters to 750 guests daily providing dining experiences that appeal to their clientele. The resort has aggressively pursued ways to improve its environmental impact by seeking solutions to reduce its carbon footprint, which could include a focus on food miles.

This report includes a data analysis that examines what tools exist or are under development to measure food miles. We used survey and interview methods to collect data from professionals in the hotel restaurant industry and assessed their perceptions about food miles and how to best improve their overall sustainability efforts. Among the tactics cited by participants were procuring locally sourced ingredients for their menus, adopting food waste audits, and utilizing composting initiatives - all familiar sustainability measures outside of tracking food miles. Out of 20 responses, our population representative of the hotel restaurant industry included 50% female, and 50% male participants. 55% of the respondents ranged between 26-35 years old and 90% had worked in the food industry for 11 or more years.

Overall, we found that most industry professionals understand the correlation between food practices and sustainability initiatives but have only a vague understanding of food miles and its impacts on environmental sustainability compared to other sustainability

metrics. To date, no research has established a standard universal sustainability metric for evaluating food miles or reducing GHG carbon emissions.

Literature Review

Climate change is associated with carbon emissions released into the atmosphere when we grow, produce, and transport food. Many foods travel a great distance throughout the food chain from the producer (growers, manufacturers) to the middlemen (distributors, supermarkets, or farmers' markets) to be sold to the customer. That distance can be expressed as food miles, and it often requires a lot of fuel and energy relative to regionally or locally grown/produced foods. Through heightened awareness, sustainability proponents aim for as few miles as possible by choosing foods with lower greenhouse gas emissions and an efficient mode of transportation to help keep climate change in check.

In this literature review, we aim to understand what has been previously reported about existing methods or those in development for measuring food miles and how to measure the carbon footprint associated with the transportation of food. In it, we compile different perspectives, identifying the Life Cycle Assessment (LCA) as the best available quantitative framework for estimating the total energy and water use for the production, storage, and transportation of goods.

Food miles, and the associated idea of local food, is a common theme discussed among sustainable food advocates and consumers. As noted, the concept originated in the U.K. in the early 1990s.

While food miles was originally intended as a metric for assessing environmental impact, debates persist regarding its adequacy in capturing the full scope of sustainability considerations in food systems (Van Passel, 2013). Recent studies have underscored the significant carbon footprint associated with long-distance food transportation, challenging assumptions about the relatively greater importance of production compared to transportation emissions (Carbon Brief, 2020). This review aims to determine how large of an impact the concept of food miles has and if this is where the sustainability focus should be from both a food system and consumer standpoint.

Accounting Methods and Results from Food Miles Analysis

Christopher L. Weber and H. Scott Matthews investigated the environmental implications of food choices in their 2008 study titled "Food-Miles and the Relative Climate Impacts of Food Choices in the United States." The study confronted the concept of food miles and evaluated its relevance in determining the climate impact of food choices. Weber and Matthews employed a comprehensive life cycle assessment approach to analyze the level of greenhouse gas emissions associated with different

food products across their entire life cycle from production, through transportation, processing, packaging, and waste management. This research emphasized that transportation can account for a relatively small portion of the total GHG emissions from food products compared to other stages such as production and processing.

In a large UK study, Alison Smith et al. found that “air transport has a very high climate change impact per tonne, whereas sea transport is relatively efficient” (Smith, 2005). It was determined GHG emissions from transportation are a small amount of the total emissions from food, accounting for less than 11%, and even smaller depending on the food produced (Weber & Matthews, 2008). Fruits and vegetables would have a smaller carbon footprint compared to meats and dairy. Different food groups have a range of GHG intensity based on the food type referred to (**Figure 1**). Overall, animal-based foods tend to have a higher carbon footprint than plant-based.

Food-Miles and the Relative Climate Impacts of Food Choices in the United States

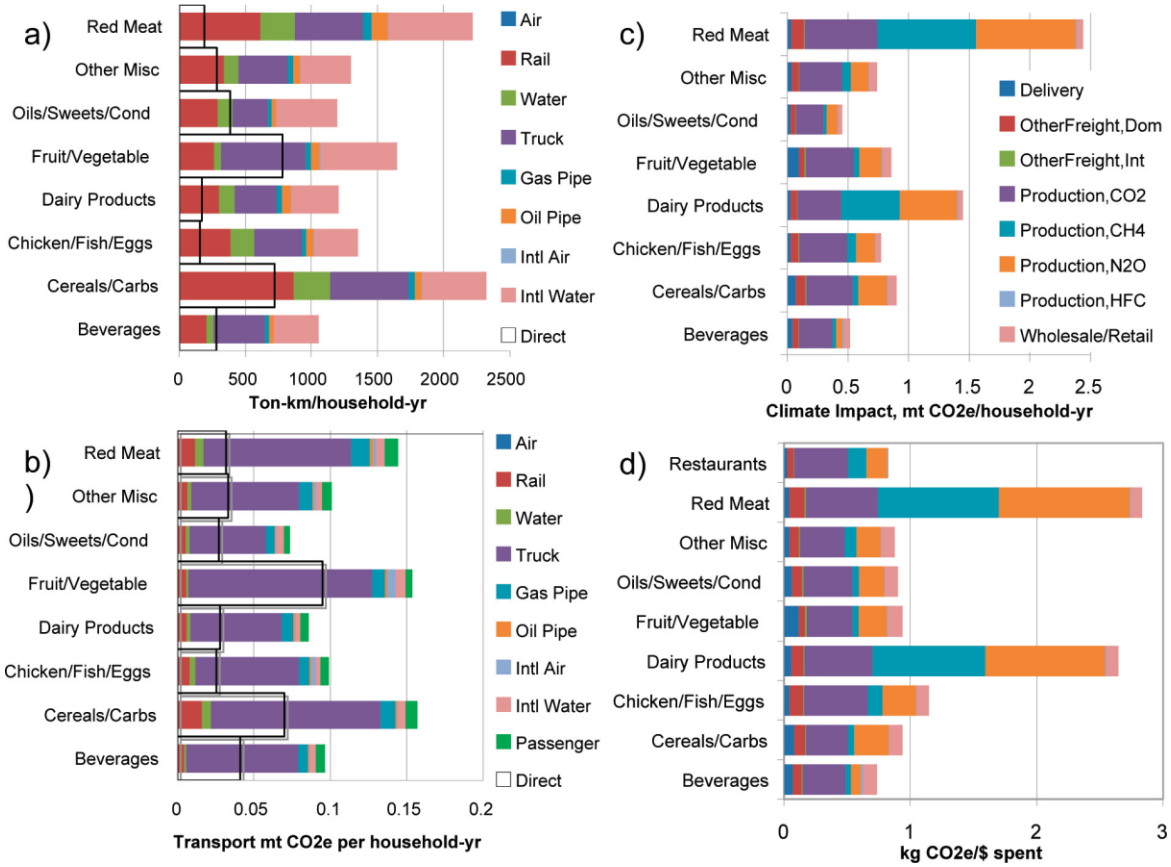


Figure 1: Total t-km of freight by mode per year per household (a), transport-related GHG emissions by mode (b), total GHG emissions by supply chain tier (c) associated with household food consumption in the United States, and comparative climate impacts of different food groups (d). The clear boxes (direct in panes a and b) represent the final delivery portion of the transport chain. Food groups are aggregates of 50 commodities (Weber & Matthews, 2008).

Weber and Matthews concluded production of red meat was 150% more GHG intensive than chicken or fish. The total life cycle of GHG emissions across the food supply chain is attributed to land use, food production, packaging, transportation, and distribution of food using the input-output life cycle assessment (IO-LCA) compared to one single aggregate. Overall, there is a common thread in existing literature that suggests food transportation accounts for roughly up to 11% of emissions. In contrast, food production of dairy, meat, and eggs account for 83% of emissions of those categories.

A few studies compared food production to food miles and suggested that “a dietary shift from red meat and dairy to chicken, fish or a vegetable-based diet can be a more effective means of lowering an average household's food-related climate footprint than buying locally sourced food” (Weber & Matthews, 2008). Secondly, a shift in diets and minimization of certain food items would appear more efficient and achieve greater GHG reduction than tracking food miles.

How Consumers View Food Miles

The very idea of how food travels to the plate is complex due to the mode of transportation and increased energy use leading to higher emissions. Experts have demonstrated that all food miles are not created equally. Secondarily, many authors have noted they’re not a good measure of the food’s environmental impact. One topic that fuels debate is ultimately driven by consumption: whether the metric of food miles is more impactful than unsustainable farming practices for food production. The use of land requires space, energy, and water pre- and post-farming and can vary in use based on the crop. The amount of resources such as water, energy and waste produced to make our food have major environmental impacts (Tukker & Jansen, 2006).

Other results suggested everything from decision-making in farm production to consumer behavior can have the greatest impact on reducing our carbon footprint. There is an increasing demand for diversified food choices, which in turn increase food consumption significantly. Another contributor is food systems. The largest meta-analysis of global food systems published in *Science* by J. Poore & T. Nemecek (2018), provided a stunning visualization of how unsustainable farming practices and improper land use have more impact on the carbon footprint associated with the production of food. The study depicted 29 food products from beef to nuts to demonstrate where these emissions originate throughout the supply chain (**Figure 2**).

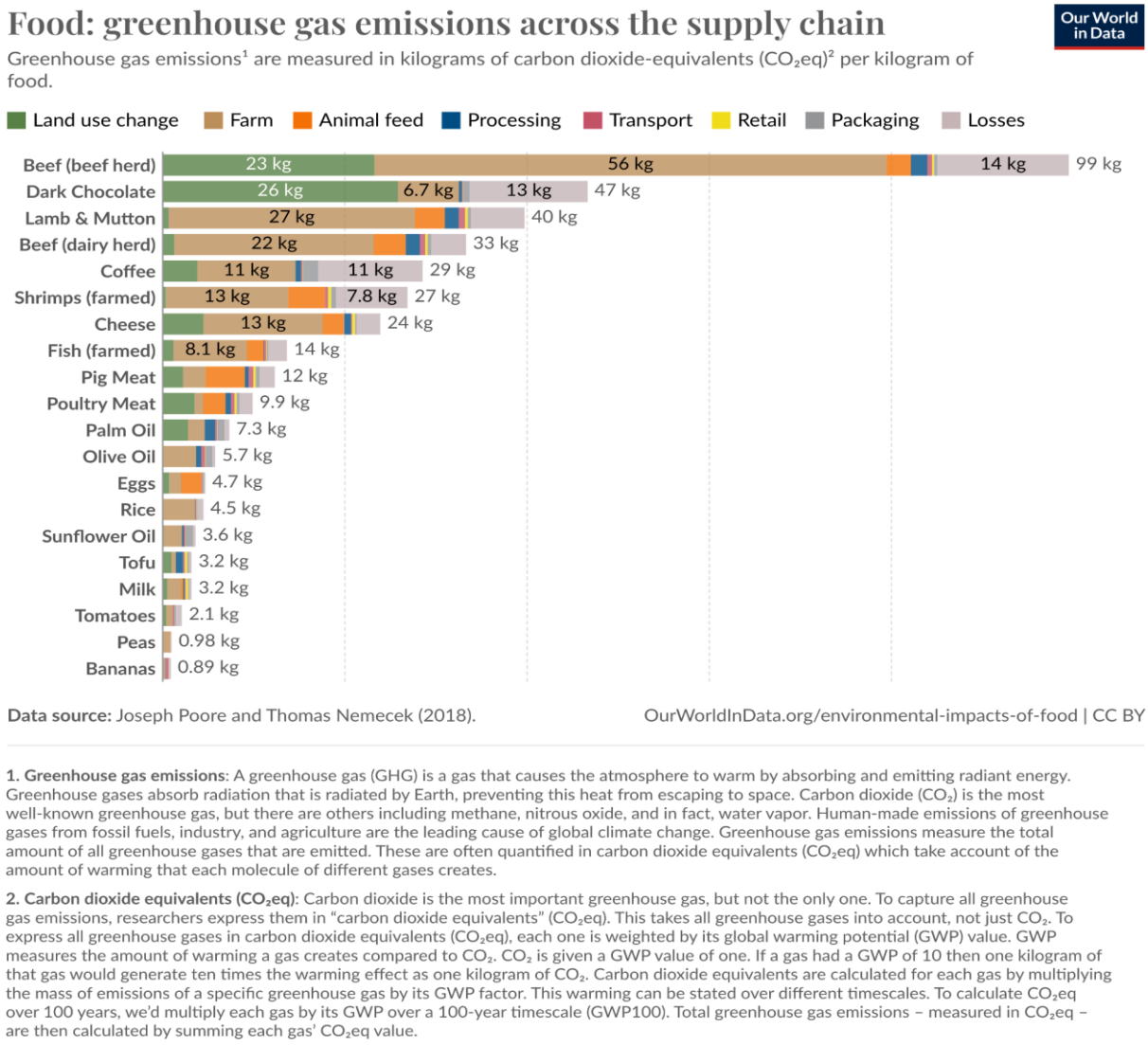


Figure 2: Food: greenhouse gas emissions across the supply chain (Poore & Nemecek, 2018)

Another study noted that buying locally sourced food is more prevalent among local food consumers who intend to foster a different way of thinking about food and a consciousness of its origins (Schnell, 2013). It is a common theme seen globally, expanding its reach from households to varying regions. Yet, the term "local" is vague and can have different meanings to different people based on the social context. For some, the primary benefit of buying locally is that it minimizes the carbon footprint and strengthens economic opportunities for local growers in urban and rural communities. Consumers benefit from the quality in taste and texture of local foods that are readily available. Yet for others, motivations for prioritizing local foods are associated with the multifaceted concept of place and not distance.

V. Caputo et al. employed a stated choice experiment to elicit consumer preferences for different labeling schemes related to food transport footprint. Participants were presented with hypothetical food choices labeled with either food miles or carbon emissions information and asked to indicate their preferences based on environmental concerns and other factors. They defined food miles as the distance food travels from production to consumption, while carbon emissions quantified the environmental impact associated with transportation. Their research found that consumers typically prefer labels that indicate carbon emissions over food miles. This suggests that consumers might perceive carbon emissions as a more tangible measure of environmental impact compared to food miles, which can be a more abstract concept. The study also identified factors that influence consumer preferences for transportation footprint labeling, such as concern for climate change, environmental awareness, and willingness to pay for environmentally friendly products, influencing consumer choices. This indicates a demand for transparent labeling driven by a growing segment of environmentally conscious consumers.

Where Food Miles Lands in Sustainable Food Systems

Many of these articles discussed the limitations of focusing solely on food miles as a metric for assessing sustainability, highlighting the need for integrated approaches that consider broader environmental and socioeconomic factors across the entire food supply chain. Central to the discussion is the notion that reducing the carbon footprint of food involves more than just measuring the distance it travels. Hannah Ritchie (2020) emphasized this point by highlighting that while transportation contributes to emissions, the lion's share of greenhouse gas (GHG) emissions in food production arises from land use change and farm-stage activities such as fertilizer use and methane production from livestock (Ritchie, 2020).

Ritchie's insights challenge the simplistic view of food miles by pointing out that focusing solely on transportation distances overlooks critical factors like production methods and their associated emissions. This holistic perspective is echoed by AJ Stein and F. Santini (2022), who argue that larger-scale transportation modes, such as cargo ships and trains, can be more carbon-efficient per unit of food transported compared to smaller-scale, local transportation options (Stein & Santini, 2022). Contrary to popular belief, the environmental superiority of local food systems is not always straightforward. For instance, research cited by the National Center for Appropriate Technology (NCAT) suggests that local food systems may sometimes consume more energy and emit more CO^2 due to less efficient transportation and the energy-intensive nature of local production methods like heated greenhouses in colder climates (NCAT, n.d.).

Despite a focus on economic development and expansion in local communities, some experts have concluded that prioritizing local foods to decrease our carbon footprint is meaningless if transportation emissions account for only 5-11%, an insignificant effect. In contrast, local producers who threaten our climate with the use of harmful fertilizers and agrochemicals and use unsustainable farming practices have far more detrimental impacts. According to Ritchie (2020), the type of food produced, the use of land practices, and how much is consumed are far more significant factors than where it traveled from. A savings of 0.3 tCO2eq can occur if households replace red meat and dairy with chicken, fish, or eggs one day a week. This saving increases if they replace red meat with plant-based alternatives, to 0.46 tCO2eq.

Review Summary

This research emphasizes that transportation can account for a relatively small portion of the total GHG emissions from food products compared to other stages such as production and processing. This challenges the notion that food miles alone determine the environmental impact of food choices. Weber and Matthews found significant variability in emissions across different food categories. For example, meat and dairy production generally leads to higher GHG emissions compared to plant-based foods due to factors such as methane emissions from livestock. That study addresses regional variations in food production and transportation efficiencies that affect the overall carbon footprint of foods. Choosing to source locally can reduce transportation-related emissions, but it does not necessarily guarantee lower overall emissions if production practices are more carbon-intensive.

Weber and Matthews advocated for a holistic approach to sustainable food choices that considers not only food miles but also broader factors such as agricultural practices, land use, water consumption, and biodiversity impacts. Their research challenges simplistic narratives surrounding food miles and underscores the complexity of assessing and mitigating the environmental impacts of food production and consumption.

In conclusion, the debate over food miles necessitates a nuanced approach that considers the entire lifecycle of food production and distribution. Standardizing metrics and methodologies for defining food miles will be essential for policymakers and researchers to develop effective strategies for reducing the environmental impact of food systems. The strengths of using food miles as a sustainability metric lie in their ability to raise awareness about environmental impacts and inform decision-making across the food supply chain. However, limitations include oversimplification of sustainability metrics, variability in transport efficiency, and potential trade-offs between

environmental benefits and economic viability (Carbon Brief, 2020; Van Passel, 2013). What we do as consumers and producers may have far more impact on greenhouse gas emissions than the food miles. Additionally, eating locally would only have a significant impact if transportation created a large portion of the carbon footprint. Selecting more plant-based products and reducing red meat to less GHG-intensive foods is recommended, according to a major report by the UN's Intergovernmental Panel on Climate Change (IPCC), which says the West's high consumption of meat and dairy is fueling global warming. If we want to reduce the carbon footprint of our food, we might want to consider the GHG emissions of different foods by choosing from the lowest emitters and avoiding foods that are air-freighted, which tend to emit high GHGs.

Methodology

The purpose of this study is to understand what sorts of tools exist or are in development to measure food miles in preparation for building a database that could later be used to evaluate the sustainability of restaurant menus, possibly using AI or a web-based app. We assessed how sustainability metrics should be ranked, weighed, and communicated by focusing on sustainable hotel restaurants. For example, how do hotel restaurant purchasing and procurement staff think about food miles vs. serving size, food waste, packaging, or natural/organic food when they are building menus and talking about sustainability to their guests? To establish a deep context for the concept of food miles, our team utilized two methods of data collection: survey and interview.

Data Collection: Surveys

For the surveys, the research team compiled a 10–15-minute survey using Qualtrics for data collection. The survey consisted of 14 questions: one consent, three ranking, and ten multiple-choice questions (see Appendix C). Prospective participants were selected by the client partner at Fairmont Scottsdale Princess Hotel, and other industry professionals and educators were identified as experts by members of the research team. The partner connected the research team with these Arizona-based participants via recruitment email (see Appendix A). Another identical copy of the survey was administered to our selected industry professionals, a significant portion of which are instructors and professors from the Culinary Institute of America in Hyde Park, NY, which educates culinary professionals and serves as a major contributor to innovation in the food industry such as in hotel restaurants. Prospective participants received a brief survey description and were prompted with a consent form before being redirected to the survey page (see Appendix B). This survey asked respondents to report on sustainable food purchasing experiences and behaviors and to identify their restaurants' food practices that are associated with environmental responsibility, land conservation, and food waste. Participation was voluntary. Data was only collected from consenting adults 18 or older who hold positions in food service, restaurants, ingredient procurement, and staff employed at hotel restaurants.

Data Collection: Interviews

Some prospective interview participants were selected by the client partner at Fairmont Scottsdale Princess Hotel, who allowed the research team to connect with these participants. The other participants were selected by our research team as industry professionals. Prospective participants received a brief description of the interview

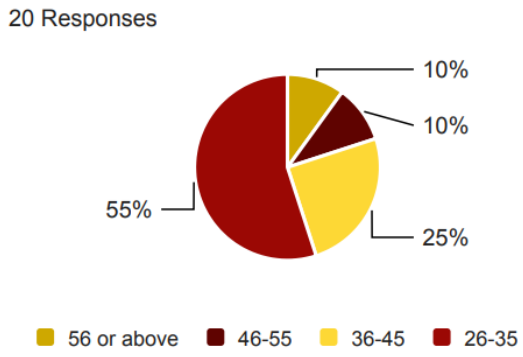
process and an introduction to the interview lead from the research team, Jessica Cox (see Appendices D-E). Interviews were between 15-25 minutes long, conducted via Microsoft Teams or Google Meet, and were both transcribed and recorded upon consent from the interviewee for later analysis by the research team. Interviews followed the approved script with some creative freedom to ask additional questions that would provide key information to the research team (see Appendix F). Participation was voluntary, and data was collected from consenting adults who work in food service, restaurants, ingredient procurement, and staff employed at hotel restaurants.

Survey Results

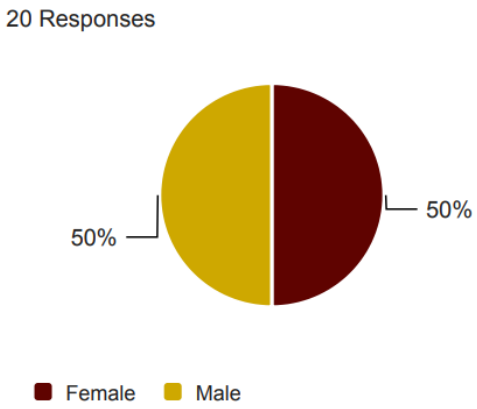
Data Analysis from Food Miles Survey

All questions are reviewed here with the abbreviated version such as Q1, Q2, etc. The analysis will cover each question that was presented. The results provided do not show statistically significant findings but further help to show the limited awareness of industry workers alongside research articles to provide a general consensus about food miles. Please note that Q1 was for consent and will not be listed with a visual aid. Q2-Q4 are to establish who the participants are and how long they have been in the industry.

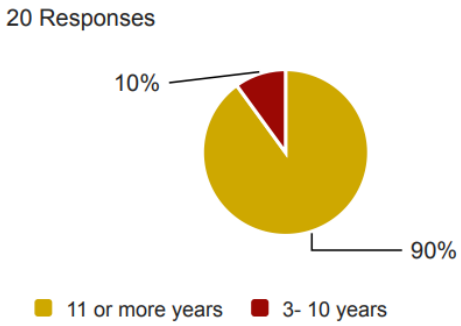
Q2 – Demographics: Select your age bracket



Q3 – Select your gender



Q4 – How long have you worked in the food industry?

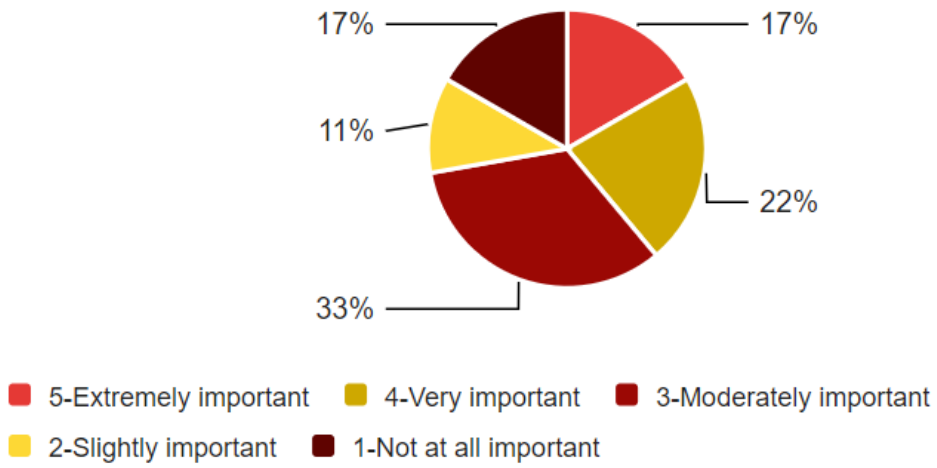


Q2 results revealed that 55% of the respondents were 26-35 years old, 25% were in the age group of 36-45, and there was a tie at 10% for those that were 46-55 and 56 or above.

Q3 results showed an even split between females and males.

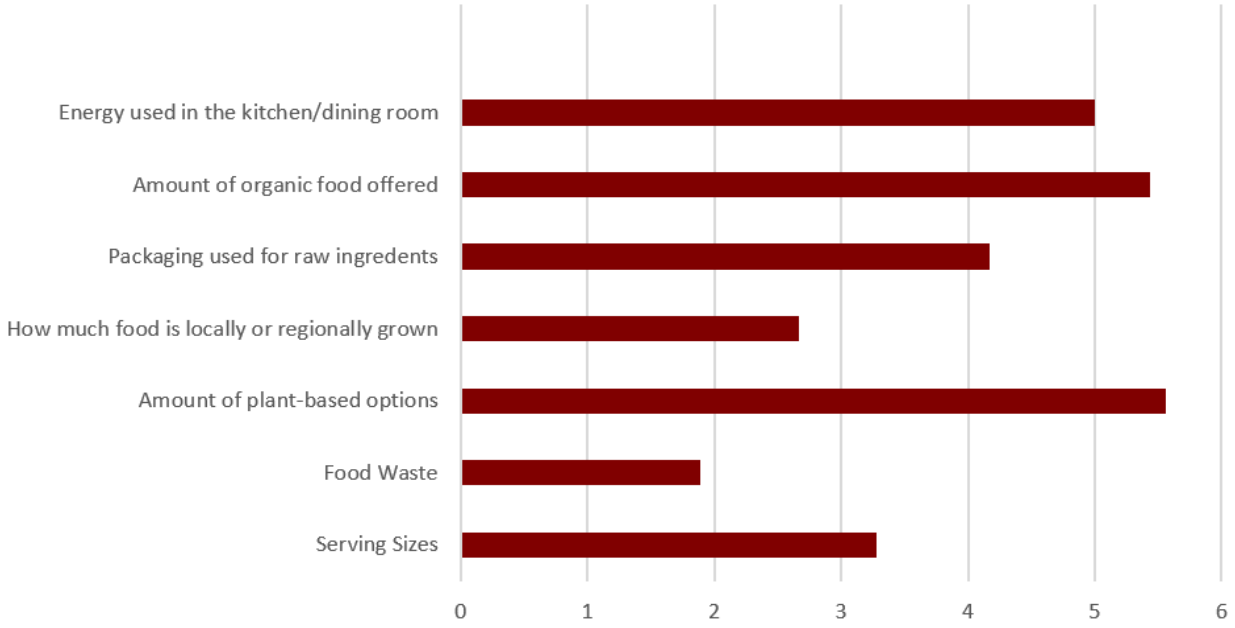
From Q4 we learned that 90% had worked in the food industry for 11 or more years and only 10% had been employed for 3-10 years. This indicates that our participants have a large amount of experience and varying demographics. From this we inferred that our pool of respondents likely has sufficient experience and knowledge of sustainability trends in their industry, allowing them to offer informed opinions.

Q5 – Importance of Sustainability: On a scale of 1 (low) to 5 (high), how important is sustainability to the current success of your restaurant/catering operation?



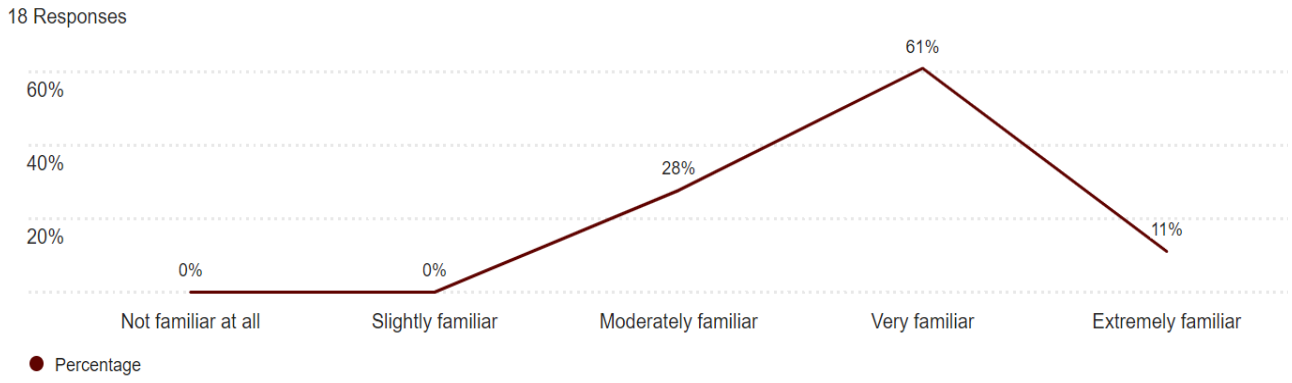
Q5 shows that 72% of respondents think that sustainability is equal to or greater than moderately important, while the remaining 28% thought it was slightly important or not at all. While there is no baseline for comparison, this struck the research team as a high number and an indication that concerns over sustainability have made headway in an industry that has traditionally been focused primarily on consumer-centric attributes such as flavor, quality, cost, and aesthetics.

Q6 - Listed below are several components of food sustainability for a restaurant. Rank them from first to last (1-7) in terms of their importance to creating a more sustainable restaurant/catering operation.



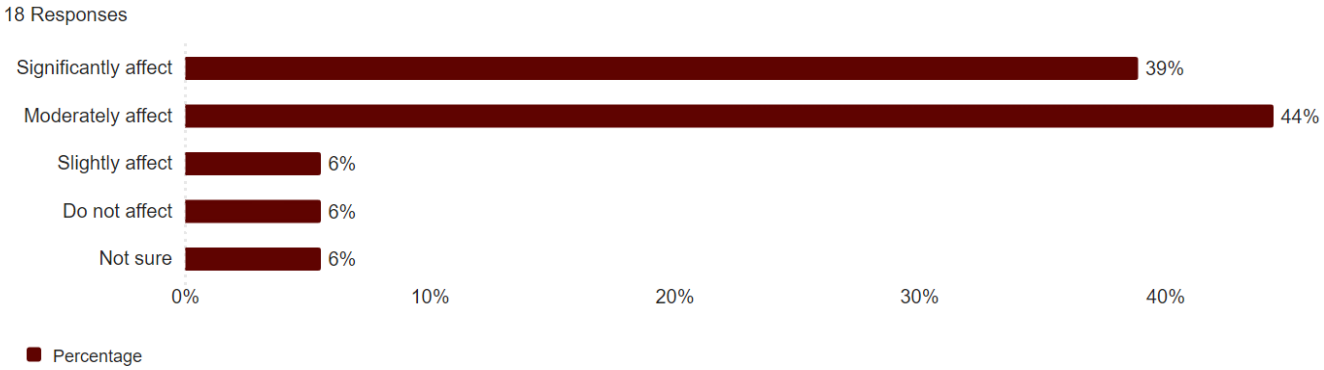
Q6 results are the average of each numerical value divided by the number of respondents to get a general ranking for each option. The results indicate that the lowest number value is the highest ranked response on average - making food waste the highest concern for a food industry worker to try and create a more sustainable restaurant. The lowest level of concern is the number of plant-based options closely, followed by the amount of organic food offered.

Q7 - Understanding Food Miles: How familiar are you with the concept of food miles?



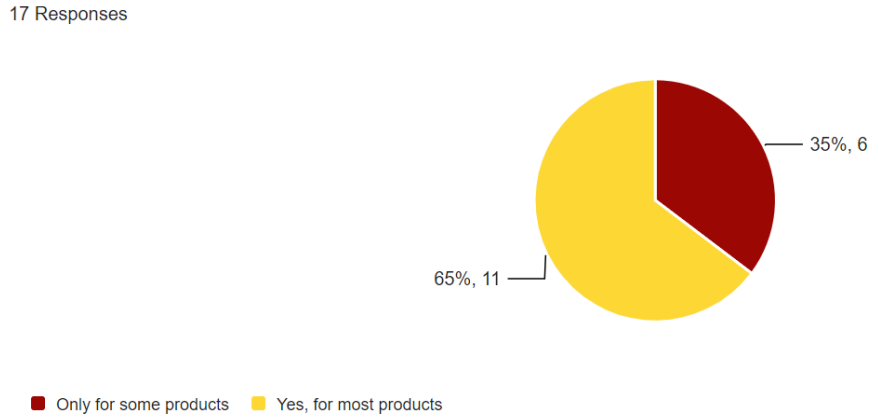
Q7 results show that 100% of the participants had at least some knowledge of the term food miles. This result is surprising as it is not a common phrase or trending marketing campaign.

Q8 – Impact on Sustainability: In your opinion, how to food miles affect the sustainability of your operations?



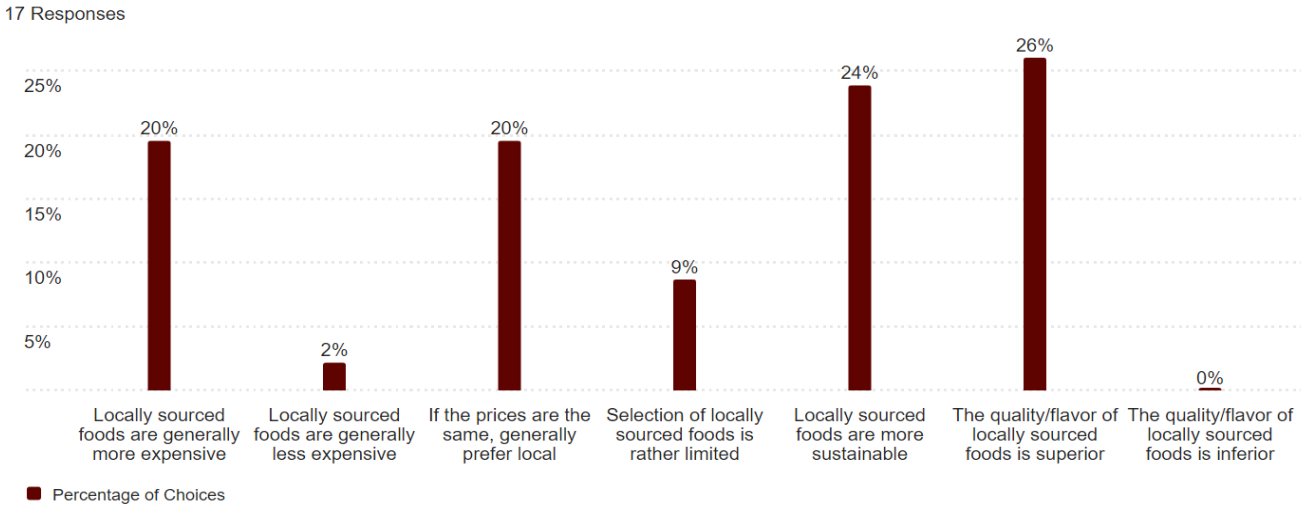
Q8 results indicated that 82% of the participants felt the restaurants were moderately or significantly affected by food miles regarding the restaurant's sustainability operations. 18% felt the impacts were slight or negligible.

Q9 – Origin of Food: To what extent do you know the place of origin (e.g. region, state, or country) for the food products that you serve?



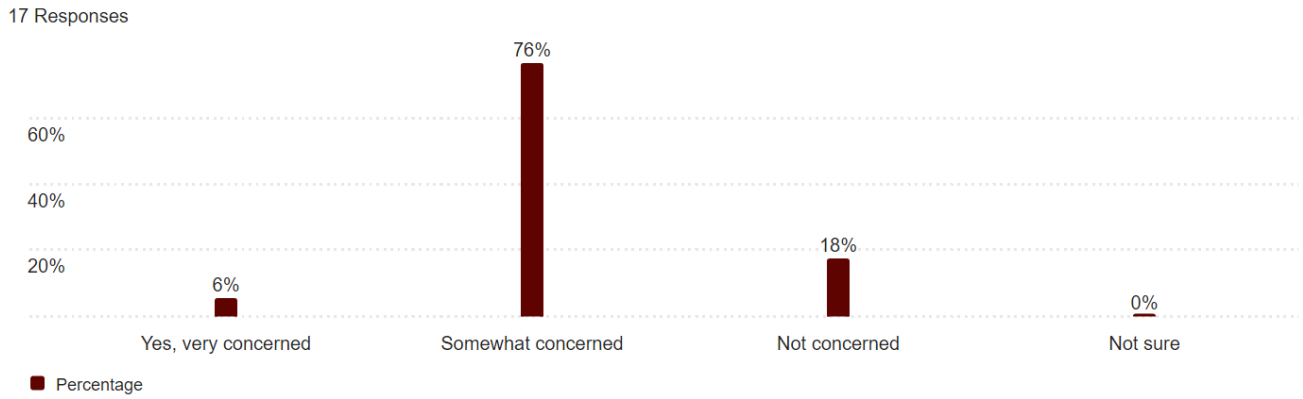
Q9 results showed that 65% knew the place of origin for the food served at their establishment. This indicates that these businesses may have locally sourced food, products with country of origin labeling (COOL) requirements, or have established training from procurement. As noted, all of the respondents were industry workers, yet 35% were unaware of where their food comes from regarding sourcing for the restaurant.

Q10 – Which of the following statements best represent your views about locally sourced foods (check all that apply)?



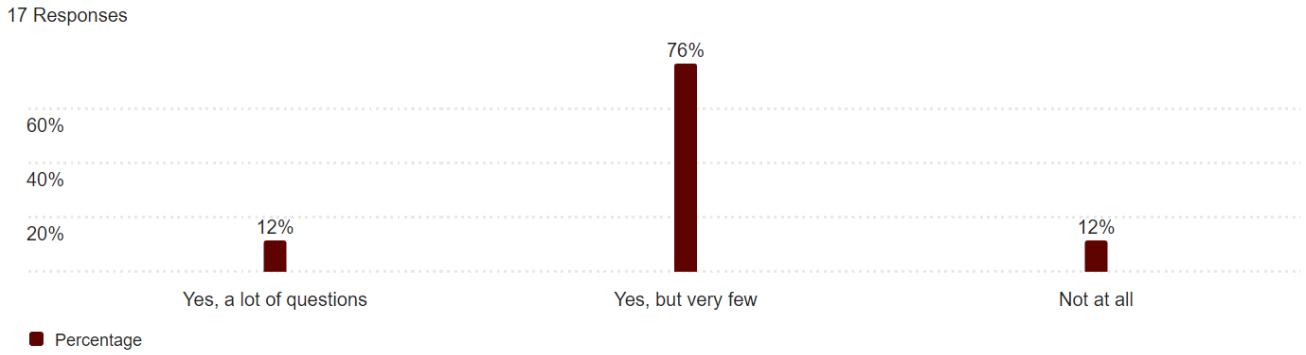
Local food is a common term that implies shorter food transportation/fewer food miles, and was used here to help provide better understanding for participants of what food miles means. This term, however, is not all encompassing. The results indicate that sourcing local foods is believed to increase the quality and flavor of the food, is more sustainable, and that participants will choose local if prices are the same. However, locally sourced food is generally more expensive and may be limited due to availability or time of year, making it challenging to source this way.

Q11 – Customer Awareness: Do you believe your customers are concerned about the sustainability of the food they consume?



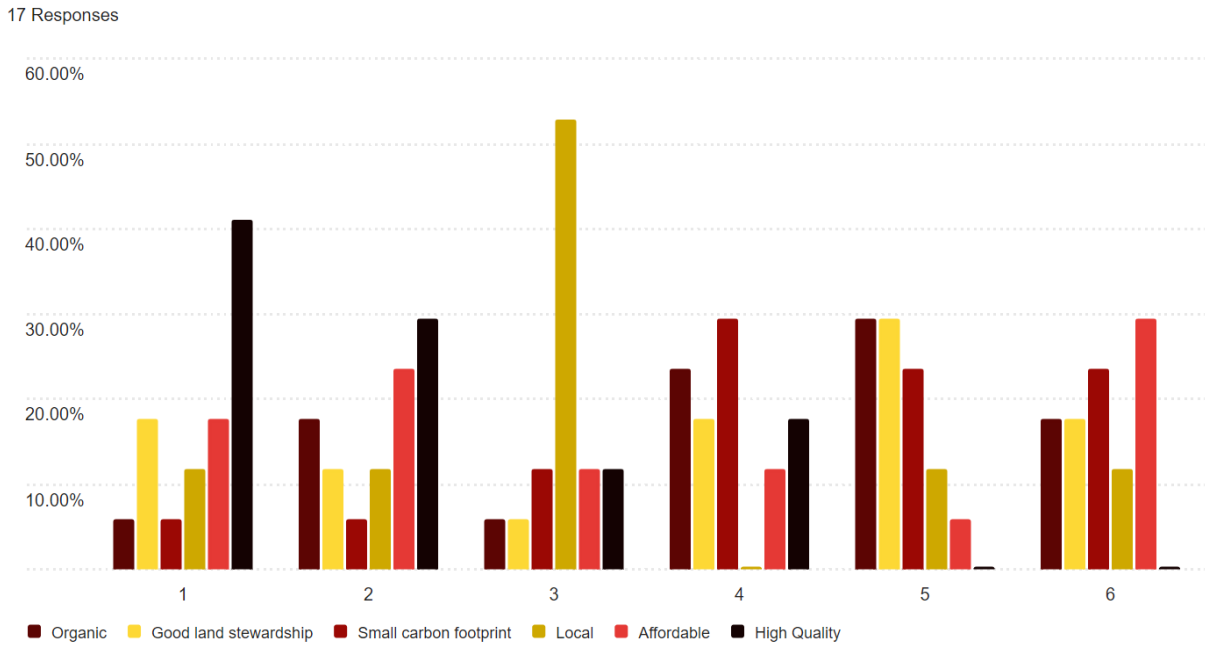
From Q11 we learned that 82% of respondents believe their restaurant patrons are somewhat or very concerned about how sustainable their food source is. It indicates that participants are sensitive to their customers' increased concern for the environmental, economic, and social aspects of their food choices, and believe that their customers may have even more interest in these ideas than they do themselves (see results of Question 8).

Q12 – Have customers voiced questions/concerns about if your food is locally sourced?



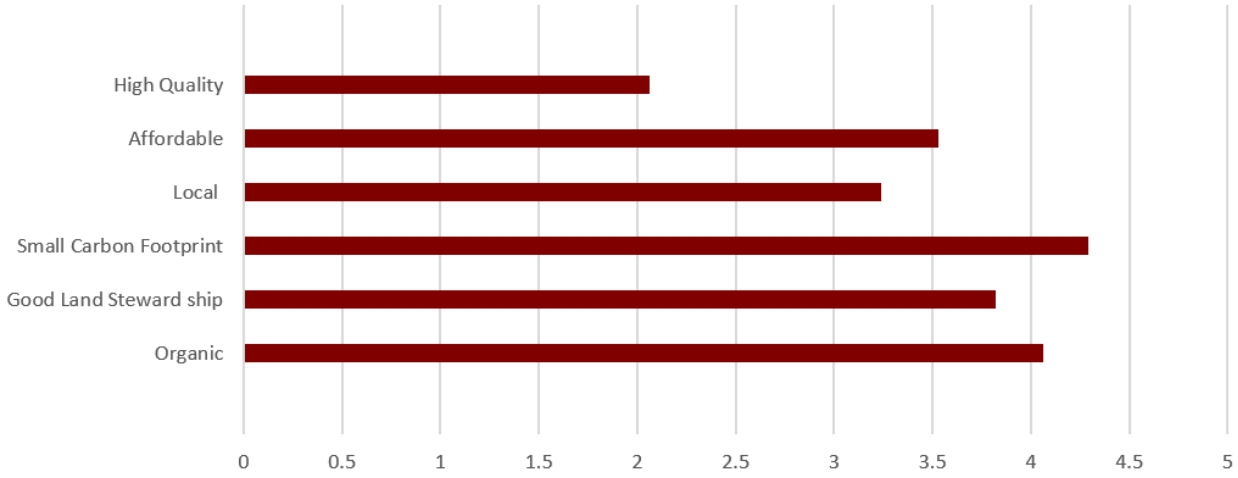
88% of respondents had customers who asked about locally sourced items from the menu, but mostly very few such customers. This likely indicates that customers are generally increasing their awareness of, and perhaps preference for, this attribute.

Q13 – Please rank the level of importance of the following to YOU when sourcing food products from 1-6, with 1 being the most important and 6 being the least important.



Q13 results indicate that when the participant is sourcing food, high quality is the top priority. It is important to note the variance in answers, with every option receiving a high ranking from at least one participant. The number 1 and 2 ranking spots in particular show a large discrepancy in participants' values, so by conjoining the percentage of these two rankings we can estimate the priority or ranking value of the participants. High Quality (41.18+ 29.41= 71.59 %) is the largest concern followed by, Affordable (23.53+ 11.76 = 41.18%), Good Land Stewardship (17.65 + 11.76 = 29.41%), Organic (5.88 + 17.65= 23.53%), Local (11.76+ 11.76= 23.52%), and with Small Carbon Footprint (5.88 +5.88%= 11.76%) as the least concern overall. High Quality also was not voted for by any participant as a ranking lower then 4, making it the highest priority across the board from every participant.

Q14 – Please rank the level of importance of the following to YOUR CUSTOMERS when sourcing food products from 1-6, with 1 being the most important and 6 being the least important. Please assign each number only once.



Q14 results are based on an averaged ranking system, meaning the lowest value was the highest ranked in regards to sustainability importance to the restaurant workers' customers. The results indicated that most felt their customers held the highest regard for the quality of the ingredients with a concern for local following as the second ranking. The least concern was for small carbon footprint and organic.

Survey Findings

Although the survey had a limited number of participants (17-20 responses), it provides valuable insight into the general food worker's knowledge and opinions on sustainability. Questions 5–10 focused on the general awareness and perception of sustainability in the food industry and indicated that knowledge is relatively high within the sector. 72% of respondents reported that sustainability is a moderate or higher concern, with food waste identified as the top priority. Weber and Matthews (2008) found that 83% of GHG emissions stem from food production, far surpassing those from transportation, suggesting that reducing production waste could yield better sustainability outcomes—aligned with the survey's findings. However, plant-based food and organic production were of the least concern to participants, contradicting many current studies that emphasize the importance of sourcing practices. The IPCC supports the idea that plant-based diets can significantly reduce GHG emissions, underscoring a potential gap in understanding around the environmental impact of food sourcing among workers (IPCC 2019).

The survey revealed that 82% of respondents are familiar with the concept of food miles, yet only 65% know where their food originates. This suggests that while education about food miles exists, there are still barriers to sourcing locally and sharing where food comes from. Participants expressed a preference for local food due to its perceived higher quality, but they also found it more expensive and harder to obtain. Similarly, Schnell (2013) found that consumers associate local foods with superior taste and quality, though logistical challenges can deter businesses from prioritizing them. Overall, both the survey and supporting research indicate that local sourcing is not always feasible and, when available, it may not be a sustainable choice for restaurants due to financial and operational constraints.

Questions 11–14 explored consumer perspectives on sustainability and food choices. 82% of respondents believe customers care about food sustainability, but they noted that customers rarely ask questions about sourcing or environmental impact, highlighting a disconnect between intent and action. Caputo et al. (2020) found that consumers tend to prefer carbon emissions labeling over food miles, as emissions are seen as a more tangible and understandable measure of environmental impact. This might explain the inconsistency: while some customers express sustainability concerns, the variety of sustainability labels and metrics can create confusion or inaction. Respondents identified quality and freshness as their top priorities for sourcing decisions, with land stewardship and organic production receiving the least interest. This aligns with Van Passel (2013), who argued that simplistic labels like "organic" or

"local" fail to reflect the broader complexities of sustainability, such as land use practices and supply chain efficiencies.

Despite high awareness of the concept of food miles, the survey highlights the challenges of balancing sustainability goals with economic realities. The cost and limited availability of local food remain significant barriers, even though participants expressed a preference for local sourcing. Ritchie (2020) warns against focusing solely on transportation emissions, emphasizing that land use and production practices have a much greater environmental impact. A shift toward plant-based diets or more sustainable production methods would be more effective at reducing GHG emissions than simply cutting food miles. The survey results reflect the practical challenges faced by restaurant workers. Although local food is considered superior, economic pressures and customer expectations of high quality make it difficult for businesses to prioritize sustainability over practical needs like affordability and consistency.

Interview Summaries

Mike Myers, Chef-Tournant, Fairmont Scottsdale Princess

In a discussion with Mike Myers from the Fairmont Scottsdale Princess, he provides insight into the hotel's sustainability efforts and food ordering practices. Myers, who has been with the Fairmont for nearly 12 years, currently serves as a chef-tournant and handles culinary analytics and sustainability initiatives across multiple channels. The Fairmont's approach to food ordering is decentralized, with individual chefs managing their supplies directly from purveyors rather than using a central storeroom.

Sustainability efforts include composting and exploring food waste reduction strategies, although comprehensive measures are still under development. He notes the attention to food loss and waste that has been administered in the last year is due in part to another project by sustainability graduate students at Arizona State University.

Myers highlights a growing trend toward local sourcing and plant-based diets but notes the practical challenges of maintaining affordability while adopting sustainable practices, particularly in large operations with high volume demands. He is passionate about sustainably sourced high-quality meats and feels that paying attention to where your protein is coming from is more realistic than completely removing meat from the American diet. Myers notes how buying local proteins, and processing them locally, can positively impact food miles reduction. He mentions the potential benefits of utilizing technology to better connect chefs with local farmers and streamline the sourcing process. When discussing how important sustainability is to his clientele, Myers adds that, "I would like to say that I think people do care. And people care more about getting something really high quality, fresh and local than they do if it were produced in a more sustainable way."

Overall, while Fairmont has made commendable strides in sustainability, Myers emphasizes the need for improved systems and resources to further enhance their initiatives. He advocates for better technology to connect chefs with local farmers, ultimately highlighting that while sustainability is crucial, clients prioritize high-quality, fresh, and local ingredients. He stresses the time constraints that sourcing locally has on restaurant operations, and suggests more streamlined procurement methods between farms and restaurants as the best method for reducing food miles.

Rebecca Obaza, Pastry Sous Chef, Fairmont Scottsdale Princess

Rebecca Obaza, a pastry sous chef at the Fairmont Scottsdale Princess, highlights the challenges and strategies in managing sustainability in a high-volume pastry kitchen, including minimizing food waste, improving ingredient sourcing, and balancing cost and environmental impact.

Obaza emphasizes the significance of local sourcing and efficient waste management (“If you really don't have an understanding of what you're throwing away, you can't really improve”), and also notes that while sourcing local ingredients can be cost-prohibitive, they are crucial for reducing the carbon footprint. She points out that large-scale purchasing programs often limit the ability to incorporate local suppliers. She notes the importance of cross-utilizing ingredients and careful menu planning to minimize food waste. Rebecca highlights the challenge of sourcing sustainable ingredients, particularly in pastry, where bulk purchases of items such as flour and sugar are often less environmentally friendly. She also stresses the need for better tracking and data collection on waste and sustainability practices to improve outcomes.

She suggests that overcoming barriers to local sourcing, such as integrating local purveyors into existing purchasing programs, could significantly enhance sustainability measurements like food miles. Additionally, Rebecca points out the importance of tracking waste and maintaining detailed records of food production and disposal to measure progress toward sustainability goals. “And I think the other thing is just education, right? That letting all employees, not just the ones who are dealing with the food, as in creating the food, but education for everybody, and how important it is and how impactful it is and making it easy for people to do the right thing.” She advocates for increased staff education on sustainability practices to ensure everyone understands and supports these initiatives, and suggests exploring ways to manage packaging waste more effectively to mitigate waste in catering and high-volume operations.

Collaboration with local suppliers and careful planning are key strategies that not only enhance sustainability but also enrich the culinary experience for Rebecca’s guests at the Fairmont Scottsdale Princess. Her commitment to reducing food waste and sourcing responsibly sets a precedent for the industry for years to come.

Ja’Toria Harper, Executive Sous Chef, the Plaza Hotel, Fairmont by Accor

Ja'Toria Harper, the Executive Sous Chef at the Plaza on Fifth Avenue in New York City, a Fairmont Hotel by Accor, highlights the challenges and strategies of integrating

sustainability into a luxury restaurant setting. Harper discusses the sophisticated ordering system at the Plaza, which consolidates various suppliers through the procurement application Birch Street, allowing for streamlined ordering. She emphasizes the luxury brand's commitment to sustainability through rigorous practices, including the use of a digital food waste tracking system that measures and reports on waste to improve efficiency. Additionally, the Plaza adheres to strict policies against single-use plastics, opting instead for both sustainable and aesthetically pleasing packaging.

While she is familiar with the concept of food miles, she emphasizes that her focus extends beyond just measuring the distance food travels to include other sustainable practices. She highlights local sourcing as an imperative way to reduce our carbon footprint. “You want it to be as local as possible, hyper local. I want to be able to put the farmer's name on things.” She emphasizes that hyper local sourcing is a sustainable industry trend that her clientele are looking to see in every menu. Ja'Toria also addresses the balance between local sourcing and cost, noting that the luxury market affords her greater flexibility in using high-quality, local ingredients compared to other restaurants. She mentions the importance of partnering with local producers for their superior products and personal connections.

As a New York City resident, Ja’Toria acknowledges the gaps in access to local foods that a typical resident has compared to large hotel and restaurants. Large food distribution companies can be beneficial in connecting small farms to the city. Looking forward, Harper predicts continued interest in plant-based diets and nostalgic food trends. She suggests that a centralized resource or "store of sustainability" could greatly benefit the industry by simplifying access to sustainable products and practices across various operational aspects, from food procurement to waste management.

Hector Babilonia, Sous Chef, Innis Resort & Hotel

Hector Babilonia, Sous Chef at Innis, a luxury resort and hotel in Accord, New York, discusses the concept of food miles and its relevance to sustainable food systems. Hector explained that while he is familiar with the general idea of tracking how far food travels from source to plate, it is not a primary focus in his daily operations in a boutique hotel restaurant in the bountiful Hudson Valley. Instead, his approach emphasizes the use of local and seasonal ingredients. He utilizes multiple suppliers, including local farms, to procure fresh produce and high-quality meats and produce. This preference for local sourcing aims to reduce food miles and support regional agriculture, enhancing both sustainability and product quality. Hector noted that managing food miles is part of a broader sustainability effort. He highlighted the challenges and benefits of local

sourcing, such as the difficulty in finding a middleman to bridge the gap between local farms and restaurants, and the need for better advertising of farm products to improve accessibility.

Despite these challenges, Hector remains committed to sustainability through local partnerships and efficient practices. He also mentioned trends like increased interest in preservation techniques and high-quality, locally sourced meats, which align with his restaurant's values of quality and environmental responsibility. “I think I'm going to say dried goods are starting to make a slight comeback. Not necessarily like packaged goods, but like ways to heighten flavors. So I'm kind of excited to see what comes from that because I feel like a lot of people don't appreciate enough of preservation techniques and such.”

Babilonia emphasizes the importance of local and seasonal ingredients over the strict tracking of food miles in his work. While he acknowledges the concept's relevance to sustainable food systems, his focus is on building relationships with local farms to enhance both sustainability and product quality. Despite challenges like the need for better connections between local producers and restaurants, Hector is committed to sustainable practices, reflecting his dedication to environmental responsibility and culinary excellence.

Alice Bruns Chalmers, Founder, Local Food Connection

Noting the recurring theme of difficulties sourcing locally in restaurant operations, the research team reached out to Alice Chalmers, the founder of a regional food hub and consultant in local food systems to discuss her journey and insights into sustainable food sourcing.

Her career transitioned from finance to local food system advocacy after witnessing the decline of local farms near urban areas. In response, she established Local Food Connection, a food hub that bridges the gap between local farms and institutional buyers such as restaurants, schools, and universities. This hub aimed to streamline the procurement process for these institutions by handling logistics and sourcing, thereby alleviating the burden on both chefs and farmers.

Chalmers emphasized the importance of planning and commitment to making local sourcing feasible, especially for larger institutions like universities, which can benefit from pre-planned contracts to ensure a steady supply of local produce. “So that was exactly why I started working with big distributors: because your chefs are overworked, underpaid. Farmers overworked, underpaid. You've got to take the burden of the marketing and the logistics off their plate, handle that. So what does that mean from a

chef perspective? It means meeting them where they are and they order from Sysco every day. Asking them to go on another platform to do just local, or even to go to individual farmers, you really have to be committed, have extra time to do that. So in my mind, the future of local comes with meeting folks where they are."

Chalmers also highlighted the challenges faced in tracking food miles and maintaining affordability. She pointed out that while hotels and restaurants have made strides in local sourcing through partnerships with food hubs, the broader industry struggles with the logistical and financial implications of shifting to local supply chains. Chalmers underscored the need for increased consumer awareness about the true costs of industrial versus sustainable food production. She advocated for greater educational efforts to help consumers understand the externalities associated with food production, arguing that this awareness could drive more support for local and sustainable food systems. She suggested that consumer pressure, institutional leadership, and policy advocacy are crucial for advancing these systems and making them more widely accessible.

Interview Findings

A central theme across these interviews is the discussion of the difficulty of integrating local sourcing into food procurement while balancing cost, efficiency, and sustainability. For these participants, food miles are viewed synonymously with local sourcing. They recognize tracking food miles for its benefits, including reducing carbon emissions and supporting regional agriculture. However, several barriers complicate its implementation, and the term itself is not popular enough to gain traction in their respective lines of work.

Local ingredients often come with a higher price tag compared to bulk-purchased, commodity options. This can be especially challenging in high-volume operations or luxury settings where maintaining cost-efficiency is crucial. Procuring local ingredients can be hampered by logistical issues such as inconsistent supply and limited availability. These constraints can make local sourcing less practical, particularly in large-scale operations or for specific types of ingredients like bulk flour and sugar. The time required to source locally and manage procurement can strain operational efficiency. Streamlining procurement processes and improving connections between local producers and buyers are seen as necessary steps to mitigate these challenges.

Several trends seem to be shaping the future of sustainability in hotel restaurants:

- There is a growing emphasis on using seasonal and local ingredients to reduce food miles and support regional agriculture. This trend reflects a commitment to environmental responsibility and aligns with broader sustainability goals.

- The shift towards plant-based diets is seen as a way to reduce the environmental impact of food production, but neither the only nor best way. While challenging to implement universally but seemingly more cost-effective, plant-based options are increasingly integrated into menus and culinary practices.

- Effective waste management, including tracking food waste and implementing composting programs, is becoming a major component of sustainability efforts. Reducing food waste helps decrease the overall food system carbon footprint.

- Technological advancements are vital for improving sustainability in food sourcing and reducing food miles. Technologies like digital ordering platforms and food waste tracking systems can help streamline procurement and monitor sustainability metrics. These tools can enhance efficiency, reduce waste, and improve the integration of local ingredient procurement.

- Establishing food hubs or intermediary organizations that handle logistics can address some of the challenges of sourcing local ingredients. These hubs simplify the supply chain for both buyers and producers, making local sourcing more feasible in restaurant operations often affected by time constraints. Creating centralized resources or "stores of sustainability" could provide better access to sustainable products and practices, making it easier for restaurants to adopt and maintain sustainable sourcing strategies.

- Education and policy are crucial for advancing sustainability and making local sourcing more viable. Educating kitchen staff and management about sustainability practices is essential for effective implementation and support. Training programs can help staff understand the importance of reducing waste, local sourcing, and other sustainability metrics. With the increasing consumer awareness about the environmental impacts of food production and the benefits of sustainable practices, demand for local and sustainable products is rapidly increasing. Educating consumers about the true costs of industrial production and conventional agriculture versus sustainable food production can support the broader adaptation of sustainable food systems. Institutional leadership and supportive governmental policies can also play a significant role in promoting sustainable practices. Policy advocacy can help address financial and logistical barriers, making sustainable food systems more accessible and effective in the future.

These interviews showcase the complexity of integrating sustainability into food systems when focusing on the challenges of local sourcing, keeping up with emerging trends, the role of technology and systemic solutions, and the importance of education and advocacy. Addressing them involves overcoming logistical and financial barriers, leveraging technological advancements, educating consumers, and advocating for supportive policies. Together, these efforts can drive progress towards more sustainable food practices and reduce food miles, regardless of the terminology being used to describe the sustainability metric.

Conclusion

Food miles are best defined as the distance foods must travel from production to their place of consumption, and the energy expended within that distance based on the mode of transportation. Studies report food transport has increased significantly over the last decades due to expansive procurement of foods globally and increasing demands of food items. The environments, social and economic impacts are complex, and involve many trade-offs between different factors. Therefore, a single indicator based on total food distance is described as an inadequate indicator of sustainability. Further investigation of a true way to track food miles is required for a valid indicator due to the social and economic impacts.

Food transport is correlated with food miles as one measure of the environmental impact of food, and potentially a metric that can be used by businesses that seek to be more sustainable in their operations. Our research shows that the term food miles may not be the most important metric of ranking, weighing, and communicating about sustainability, yet 82% of participants were familiar with the concept. The increased emphasis on local sourcing, reducing food waste, and focus on consuming smaller amounts of high-quality proteins ultimately reduces food miles, even if the term is not considered to be as important.

Survey results acknowledged customer interest in sustainability (82%), but noted that customers rarely inquire about sourcing practices. This disconnect, along with the confusion around various sustainability labels, complicates the adoption of sustainable practices. The survey results show the economic challenges of prioritizing sustainability in restaurants, as cost and availability of local food often overshadow sustainability goals. The interviews highlighted the difficulties in integrating local sourcing into food procurement while balancing cost, efficiency, and sustainability. These industry professionals view food miles synonymously with local sourcing, highlighting the importance of an integrated approach to sustainable initiatives in food service operations.

While food miles serve as a useful metric for assessing the environmental impact of food, our research indicates that they may not be the most significant factor in driving sustainable practices within the food industry. The focus on local sourcing, reducing food waste, and prioritizing high-quality proteins ultimately contributes to sustainability, sometimes decreasing food miles in the process. Despite strong customer interest in sustainability, a disconnect exists between consumer awareness and the inquiry into sourcing practices, which complicates the implementation of effective sustainable

strategies. More research is needed to assess which sustainability metrics are the most impactful.

Recommendations

Current industry trends and consumer preferences prioritize supporting local and seasonal foods, while restaurant professionals call for better access to sourcing locally. Restaurants are also becoming increasingly aware of their food waste, and acknowledge more tools for data collection are needed for further improvements. Based on our findings, there are several areas that a hotel restaurant or other food service operation can focus on to improve existing sustainable initiatives and implement new technologies, ultimately reducing food miles.

1. **Streamline local food procurement processes** and develop efficient systems for sourcing local ingredients by creating partnerships with local and regional farms and producers. Utilize existing larger procurement suppliers that prioritize sustainability, and hold companies accountable for publishing their metrics and data for local purchasing. The Food Traceability Rule (FSMA 204) is scheduled to go into effect on January 6, 2025 in the United States and will help to ensure procurement agencies begin collecting and prioritizing these concerns. Consider using technology, such as digital ordering platforms, to simplify procurement. Seek partnerships with local food hubs that have existing relationships with farms to effectively manage a chef's most in-demand resource: time.

2. **Use smaller amounts of high-quality animal proteins** and find creative ways to utilize plant-based proteins. Integrating plant-based menu items reduces reliance on resource-intensive ingredients. Chefs can use nose-to-tail cooking techniques that utilize non-traditional cuts of meat and offal. They can source high quality meats in smaller portions. They can also add menu descriptions that include specific farms or ranches their products come from to connect consumers to their food. This can be both cost-effective and appealing to a growing demographic interested in sustainability.

3. **Consumer education at the individual level**
   As the world increases in population, the social and economic costs may have far more impact on greenhouse gas emissions than the food miles. A growing demand for sustainable and locally sourced food is an untapped opportunity where restaurants can leverage customers' sustainability concerns. According to a survey in 2022 conducted by the National Restaurant Association, of adult consumers polled "38% said they're more likely to choose a restaurant that offers locally-sourced foods over one that doesn't. Another 30% said they'd likely choose a restaurant offering food grown in an environmentally friendly way or raised organically over one that doesn't" (National Restaurant Association, 2022).

This demonstrates sustainability is a deciding factor in consumers' dining decisions; here is where restaurants can enhance their reputation by aligning with sustainable goals and providing added value.

4. **Staff education** on sustainable food systems is imperative. Managers and industry professionals should develop training programs for kitchen staff on sustainable practices, local sourcing, and waste reduction. Measuring food waste creates staff awareness and encourages kitchens to repurpose leftovers and imperfect produce. It is also important to educate consumers about the benefits of sustainable food choices to foster support and increase demand for local products. Menu labeling and including purveyors in food descriptions increases awareness and product recognition. Chefs should use their knowledge to get consumers excited about sustainably sourced foods.

Other studies report consumers and producers have far more impact on greenhouse gas emissions than the food miles. They proposed selecting more plant-based products and reducing red meat to less GHG-intensive foods. If we want to reduce the carbon footprint of our food we might want to consider the GHG emissions of different foods by choosing from the lowest emitters and avoid foods that are air-freighted which tend to emit high GHGs.

Buying locally sourced food is more prevalent amongst local food consumers who intend to foster a different way of thinking about food and a consciousness of its origins. It is a common theme rendered globally expanding its reach from households to between state regions. For some, buying locally minimizes the carbon footprint and strengthens economic opportunities for local growers, in urban and rural communities. Consumers benefit from the quality in taste and texture of local foods that are readily available. Yet for others, motivations for local foods are associated with the multifaceted concept of place and not distance.

The policy framework that encompasses food miles, food waste, and traceability currently in the United States involves a combination of federal, state, and local regulations. Food miles does not have a specific federal regulation, however the USDA encourages local food systems to serve consumers through programs like the Farmers Market Promotion Program and the Local Food, Local Places initiative which aim to reduce transportation miles. Food waste legislation currently is being held at the state level such as California’s SB 1383 law that mandates organics recycling, including food waste. The USDA and the EPA have launched the United States Food Waste Challenge to reduce waste by 50% by 2030. It involves other food recovery organizations, educational campaigns, and partnerships with food solutions innovators.

The Food Traceability Rule or FSMA 204 is part of the Food Safety Modernization Act that is aimed to improve food safety through traceability requirements. The rule primarily targets high-risk foods such as fruits, vegetables, seafood, and certain processed foods. Businesses will have to keep records of where the products are grown, processed, and distributed. The information provided may give a clearer path on food miles as well give insight to consumers. While there are no cohesive metrics, weights, or national policies on these initiatives, multiple levels of government are addressing these issues.

Appendices

Appendix A: Direct Email Recruitment Script for Survey

I am part of a team of master's students under the direction of Professor Joe Dobrow, in the Swette Center for Sustainable Food Systems at Arizona State University. We are conducting a research study to understand what sorts of tools exist or are in development to measure "food miles" - the carbon footprint associated with the transportation of food and how hotel restaurants that are focusing on sustainable food should rank, weigh, and communicate about this attribute relative to other measures of sustainability. We are conducting this study in partnership with Michael Ortiz, Regional Process Improvement and Sustainability Manager at the Fairmont Scottsdale Princess, an ACCOR Hotel.

We are recruiting individuals 18 and older to complete an online questionnaire that aims to understand their perceptions of food miles and how restaurants are focusing on this and other sustainable practices, which will take up to 15 minutes.

We have obtained your contact information from Michael Ortiz with the hope that you will agree to participate. Your participation in this study is voluntary, and your responses will only be reported in the aggregate and/or anonymously (e.g. "One survey respondent reported…"), unless you voluntarily choose to add your name to the survey so that we can attribute any quotes to you. No information that is proprietary to ACCOR will be included in the published research.

If you are willing to participate in this important research, which will help ACCOR and other restaurants to articulate and refine strategies to measure and improve their sustainable food practices, please review the attached consent form, fill in your name as a digital signature, and return it to me at [redacted]. I will then follow up with an email that contains a link to the questionnaire.

If you have any questions concerning the research study, please call me at [redacted].

Thank you in advance for your willingness to assist.

Appendix B: Consent form to take part in research-Survey

Title of Study: Evaluating Food Miles as a Sustainability Metric

I am part of a team of master's students under the direction of Professor Joe Dobrow, in the Swette Center for Sustainable Food Systems at Arizona State University. We are conducting a research study to understand what sorts of tools exist or are in development to measure "food miles" - the carbon footprint associated with the transportation of food and how hotel-based restaurants that are focusing on sustainable food should rank, weight, and communicate about this attribute relative to other measures of sustainability. We are conducting this study in partnership with Michael Ortiz, Regional Process Improvement and Sustainability Manager at the Fairmount Scottsdale Princess, an ACCOR Hotel.

We are inviting your participation, which will involve a one-time online survey (a/k/a "questionnaire") of open-ended and rating/ranking questions. This questionnaire will take up to 15 minutes to complete. You have the right not to answer any question, and to stop participation at any time.

You must be 18 or older to participate. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

Although there are no direct benefits to you for taking part in this research study, you will be contributing knowledge about different strategies to measure and improve the sustainable food practices of restaurants. There are no foreseeable risks or discomforts to your participation.

The information we seek is about your attitudes, opinions, and behaviors regarding the relative importance of sustainability in ordering food for, and operating, hotel restaurants and catering operations; there are no "right" or "wrong" answers. No information that is proprietary to ACCOR will be included in the published research. Your responses will be reported in the aggregate and/or anonymously (e.g. - "One survey respondent reported…"); however, you will also have the option to consent to have your name used in the study if you so choose.

The following means will be used to keep your questionnaire responses confidential, although total confidentiality cannot be guaranteed:

- We will use survey software to collect your responses. While this software might initially collect IP addresses, that data will be deleted.

- We will download your responses to a secure file that requires a password to access. Only study staff will have access to the password. The de-identified data you provide will eventually be made openly available in a public data repository, the Open Science Framework, for access by other researchers for up to 5 years. Again, there will not be identifying information included in this shared data. Although the results of this study

may be used in reports, presentations, or publications, no information that can identify you will appear in any of these unless you have so consented.

- We will ask you to include your place of employment when you complete the survey. This information will not be stored with your questionnaire responses, and will not be retained once the study has been electronically published. Instead, this information will be stored separately from your responses in a password-encrypted file accessible only by members of the research team.

If you have any questions concerning the research study, you can contact the Principal Investigator:

Joe Dobrow, Professor of Practice
Swette Center for Sustainable Food Systems

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let us know if you wish to be part of the study

By filling in your name checking the “agree” box below, and returning this Consent form, you are agreeing to be part of the study.

If you also agree to be identified by name indicate so below:

☐ I agree to take part in the study.

Name: _____

Date:_____

☐ I agree to take part in the study and to be identified by name.

Signature (or retype name as a digital signature):

_____

Date:_____

Appendix C: Participant Survey Questionnaire

Food miles survey questionnaire designed for a distribution center/production site or chef to understand their awareness and practices regarding food miles and sustainability.

Food Miles Survey Questionnaire

Introduction: Thank you for taking the time to complete this survey. Your responses will help us understand awareness and practices regarding food miles and sustainability. This survey should take approximately 5-10 minutes to complete.

Questions:

1. **Demographics**
    - Select your age bracket
        - 18-25
        - 26-35
        - 36-45
        - 46-55
        - 56 or above
    - Select your gender
        - Female
        - Male
        - Unidentified
        - Prefer not to answer
    - How long have you worked in the food industry
        - Under a year
        - 1 year - 3 years
        - 3 years - 10 years
        - 10 plus years
2. **Importance of Sustainability**
    - On a scale of 1 (low) to 5 (high) how important is sustainability to the current success of your restaurant/catering operation?
        - 1 (Not important)
        - 2 (Semi-important)
        - 3 (Important)
        - 4 (Very important)
        - 5 (Most Important)
    - Listed below are several components of food sustainability for a restaurant. Rank them from first to last (1-7) in terms of their importance to creating a more sustainable restaurant/catering operation:

        - Serving sizes
        - Food waste
        - Amount of plant-based options
        - How much food is locally or regionally grown
        - Packaging used for the raw ingredients
        - Amount of organic food offered
        - Energy used in the kitchen/dining room
3. **Understanding Food Miles**
    - How familiar are you with the concept of food miles?
        - Very familiar
        - Somewhat familiar
        - Familiar
        - Semi-familiar
        - Not familiar at all
4. **Impact on Sustainability**
    - In your opinion, how do food miles affect the sustainability of your operations?
        - Significantly affect
        - Moderately affect
        - Slightly affect
        - Do not affect
        - Not sure
5. **Origin of Food**
    - “To what extent do you know the place of origin (e.g. – region, state, or country) for the food products that you serve?
        - Yes, for all products
        - Yes, for most products
        - Only for some products
        - Not at all
    - Which of the following statements best represent your views about locally sourced foods (check all that apply)?
        - Locally sourced foods are generally more expensive than what we order from our distributors
        - Locally sourced foods are generally less expensive than what we order from our distributors
        - If the prices are the same, our patrons generally prefer locally sourced-foods
        - Our selection of locally sourced foods is rather limited
        - Locally sourced foods are more sustainable
        - The quality/flavor of locally sourced foods is generally superior

        - The quality/flavor of locally sourced foods is generally inferior
6. **Customer Awareness**
    - Do you believe your customers are concerned about the sustainability of the food they consume?
        - Yes, very concerned
        - Somewhat concerned
        - Not concerned
        - Not sure
    - Have customers voiced questions/concerns about if your food is locally sourced?
        - Yes, a lot of questions
        - Yes, but very few
        - Not at all
7. **Importance and Support**
    - Please rank the level of importance of the following to YOU when sourcing food products from 1-5, with 1 being the most important and 5 being the least important. Please assign each number only once.
        a. Organic
        b. Good land stewardship
        c. Small carbon footprint
        d. Local
        e. Affordable
        f. High Quality
    - Please rank the level of importance of the following to YOUR CUSTOMERS when sourcing food products from 1-5, with 1 being the most important and 5 being the least important. Please assign each number only once.
        a. Organic
        b. Good land stewardship
        c. Small carbon footprint
        d. Local
        e. Affordable
        f. High Quality

Conclusion: Thank you for completing this survey. Your feedback is invaluable in helping us promote more sustainable practices within the food industry. If you have any additional comments or suggestions, please provide them below.

Appendix D: Direct Email Recruitment Script for Interview

I am part of a team of master's students under the direction of Professor Joe Dobrow, in the Swette Center for Sustainable Food Systems at Arizona State University. We are conducting a research study to understand what sorts of tools exist or are in development to measure "food miles" - the carbon footprint associated with the transportation of food and how hotel restaurants that are focusing on sustainable food should rank weight and communicate about this attribute relative to other measures of sustainability. We are conducting this study in partnership with Michael Ortiz, Regional Process Improvement and Sustainability Manager at the Fairmont Scottsdale Princess, an ACCOR Hotel.

We are recruiting individuals 18 and older to partake in an interview discussion. If you choose to participate you will be asked open-ended questions that aim to understand your perceptions of food miles and how restaurants are focusing on this and other sustainable practices. The interview discussion will take 30-60 minutes.

We have obtained your contact information from Michael Ortiz with the hope that you will agree to participate. Your participation in this study is voluntary, and your responses will only be reported in the aggregate and/or anonymously (e.g. "One survey respondent reported…") **unless** you sign the optional section at the bottom of the attached consent form that would allow us to use your name for attribution of quotes. No information that is proprietary to ACCOR will be included in the published research.

If you are willing to participate in this important research, which will help ACCOR and other restaurants to articulate and refine strategies to measure and improve their sustainable food practices, please review the attached consent form, fill in your name as a digital signature, and return it to me at [redacted]. I will then follow up with an email to arrange an appropriate time and date for the interview discussion. If you have any questions concerning the research study, please call me at [redacted].

Thank you in advance for your willingness to assist.

Jessica Cox

Appendix E: Interview Discussion Guide

Title of Study: Evaluating Food Miles as a Sustainability Metric

I am part of a team of master's students under the direction of Professor Joe Dobrow, in the Swette Center for Sustainable Food Systems at Arizona State University. We are conducting a research study to understand what sorts of tools exist or are in development to measure "food miles" the carbon footprint associated with the transportation of food and how hotel-based restaurants that are focusing on sustainable food should rank weight, and communicate about this attribute relative to other measures of sustainability. We are conducting this study in partnership with Michael Ortiz, Regional Process Improvement and Sustainability Manager at the Fairmont Scottsdale Princess, an ACCOR Hotel.

We are inviting your participation, which will involve a one-time interview discussion of open-ended questions. You will be contacted by phone for the interview. The call will be recorded for auto-transcription purposes and will be deleted after the completion of this study. During this interview, you can indicate if you would prefer to use or withhold your name and position from this study. This interview will take 30-60 minutes to complete.

You must be 18 or older to participate. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

Although there are no direct benefits to you for taking part in this research study, you will be contributing knowledge about different strategies to measure and improve the sustainable food practices of restaurants. There are no foreseeable risks or discomforts to your participation.

The information we seek is about your attitudes, opinions, and behaviors regarding the relative importance of sustainability in ordering food for, and operating, hotel restaurants and catering operations; there are no "right" or "wrong" answers. No information that is proprietary to ACCOR will be included in the published research. Your responses will be reported in the aggregate and/or anonymously (e.g. – "One interviewee reported…"); however, you also have the option to consent to have your name used in the study by indicating this in the signature area below. During the interview, you can choose to change your mind and have your responses remain anonymous, in which case we will also ask you to send a follow-up email to confirm this.

The following means will be used to keep your interview responses confidential, although total confidentiality cannot be guaranteed:

- After transcribing, we will delete the recording. We will save the transcribed responses to a secure file that requires a password to access. Only study staff will have access to the password. Although the results of this study may be used in reports, presentations, or publications, no information that can identify you will appear in any of these unless you have so consented.

- We will ask you to include your place of employment when you complete the interview. This information will not be stored with your interview responses, and will not be retained once the study has been electronically published. Instead, this information will be stored separately from your responses in a password-encrypted file accessible only by members of the research team. If you have any questions concerning the research study, you can contact the Principal Investigator:

Joe Dobrow, Professor of Practice,
Swette Center for Sustainable Food Systems

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let us know if you wish to be part of the study

By filling in your name checking the “agree” box below, and returning this Consent form, you are agreeing to be part of the study.

If you also agree to be identified by name indicate so below:

☐ I agree to take part in the study.

Name: _____
Date:_____

☐ Preliminarily, I also agree to have my name potentially used in the study so that you can attribute quotes to me.

Signature (or retype name as a digital signature):
_____
Date:_____

Please email this form back to [redacted] as quickly as possible.

Appendix F: Interview Discussion Guide

Thank you so much for taking the time to meet with us and answer our questions. This call will be recorded for auto-transcription purposes. The recording will be deleted after the completion of this project.
Please indicate if you prefer your name, company, and position withheld from our project.

(No-continue on with questions.)
(Yes-Certainly. We will redact any personal information from our transcription.)

Introductions

1. Group/interviewer introductions. (*Name/location/job.)*
2. *(Briefly discuss the purpose of the project.)*
3. Please introduce yourself and explain your role.
    a. If part of the procurement industry/ordering process ask them to explain the process to get a better understanding of the technology and constraints of the field.

Sustainability

4. What steps toward sustainability have you taken in your role? What about the steps the restaurant has taken? (if applicable)
    a. (if needed for prompting) Are there efforts to source locally, reduce food waste, or incorporate plant-based foods?
5. Have you ever heard of tracking food miles? Do you think this is possible given the current technologies in place?
6. Do you think food miles are important, or are there other sustainability measurements that should be the focus instead?

Sourcing

7. I know how important managing food costs is in this industry. With the rising costs of ingredients and inflation, how do you balance affordability and sustainability?
8. Are purveyors becoming more transparent with where they are sourcing their foods? And are they offering more affordable or more readily available sustainable options such as local produce, plant-based products, or ethically sourced animal products?

Trends & Future of Food

9. A common theme in our studies is that consumers drive demand. Do you see your guests requesting sustainably sourced foods, or is it just a passing trend (like the next chocolate fountain or grazing table)?

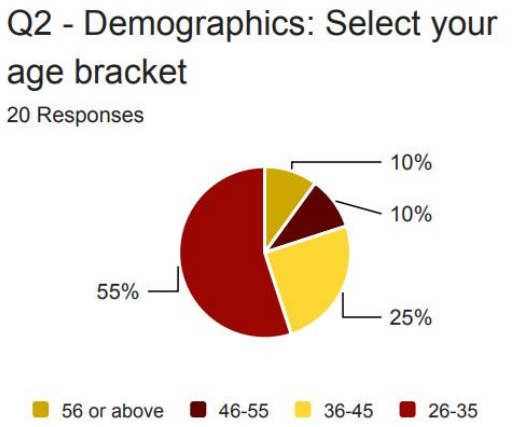
10. What support or resources would help you reduce food miles and improve sustainability practices?

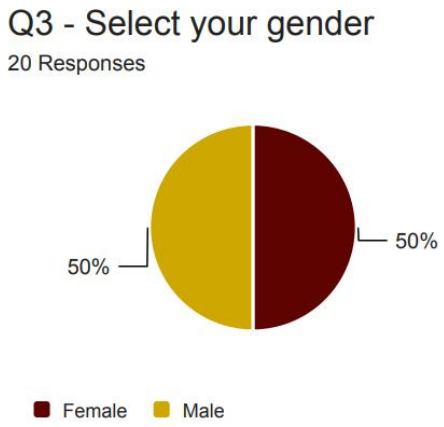
Conclusion

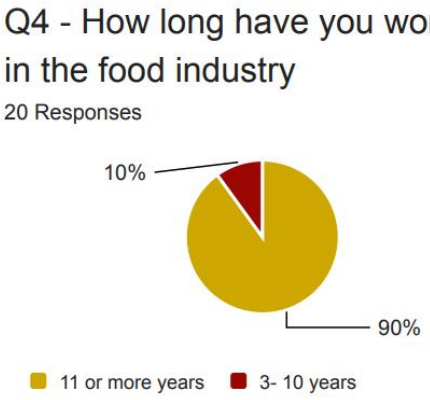
11. Is there anything else you would like us to know?

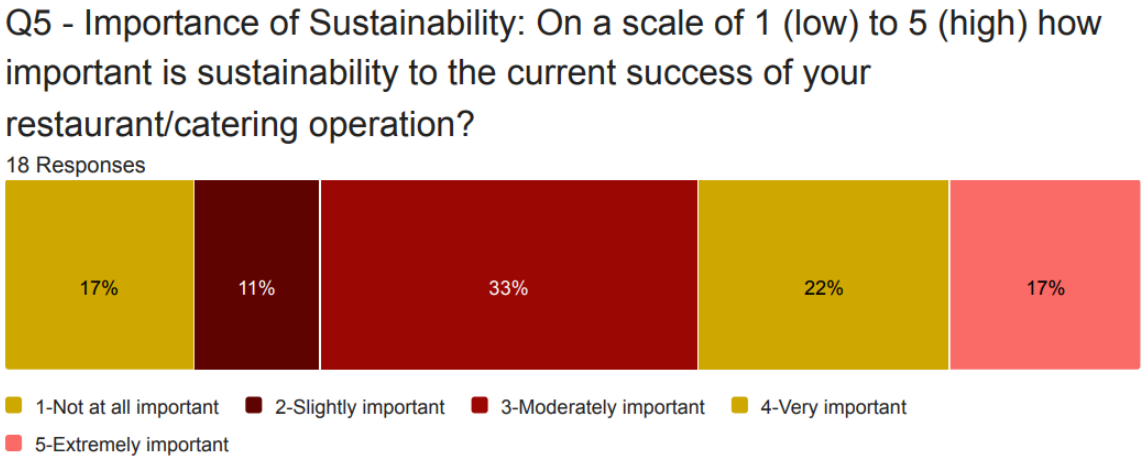
Thank you so much for taking the time to speak with us today

Appendix G: Participants Survey Data Results









Q9 - Origin of Food: “To what extent do you know the place of origin (e.g. – region, state, or country) for the food products that you serve?

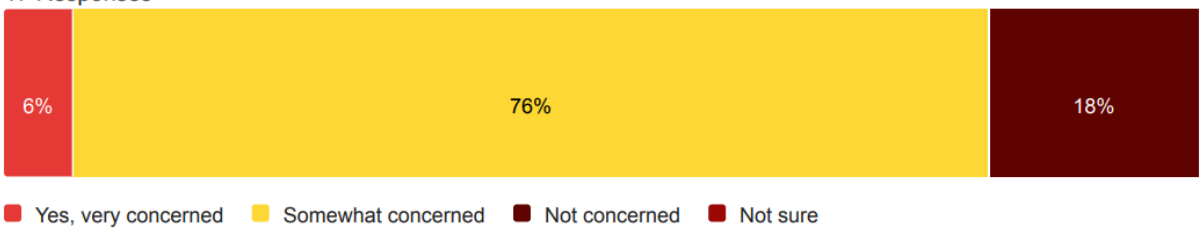
17 Responses

Q10 - Which of the following statements best represent your views about locally sourced foods (check all that apply)?

17 Responses

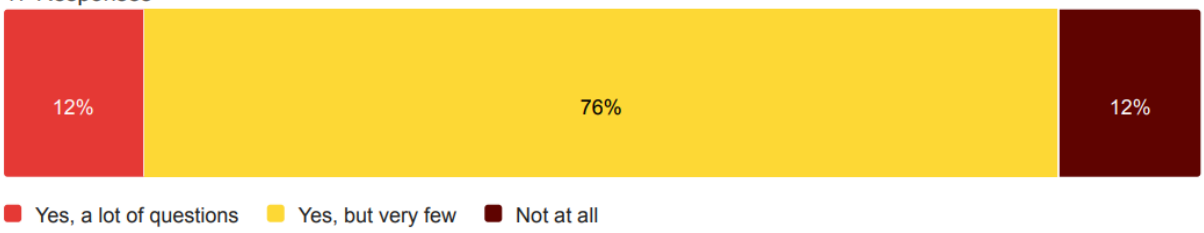
Q11 - Customer Awareness: Do you believe your customers are concerned about the sustainability of the food they consume?

17 Responses



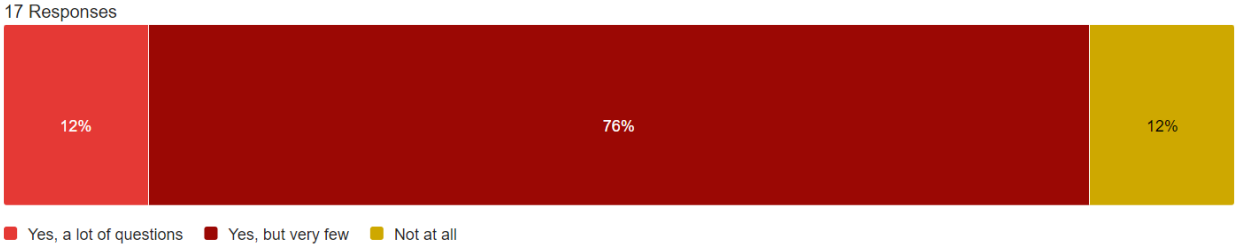
Q12 - Have customers voiced questions/concerns about if your food is locally sourced?

17 Responses



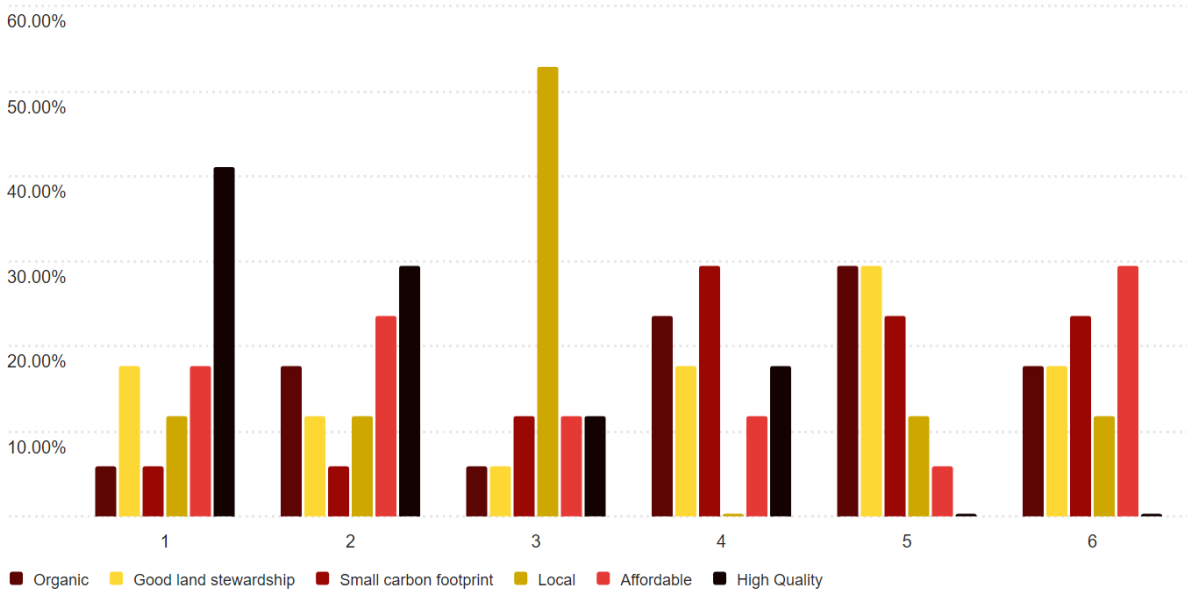
Q13 - Have customers voiced questions/concerns about if your food is locally sourced?

17 Responses



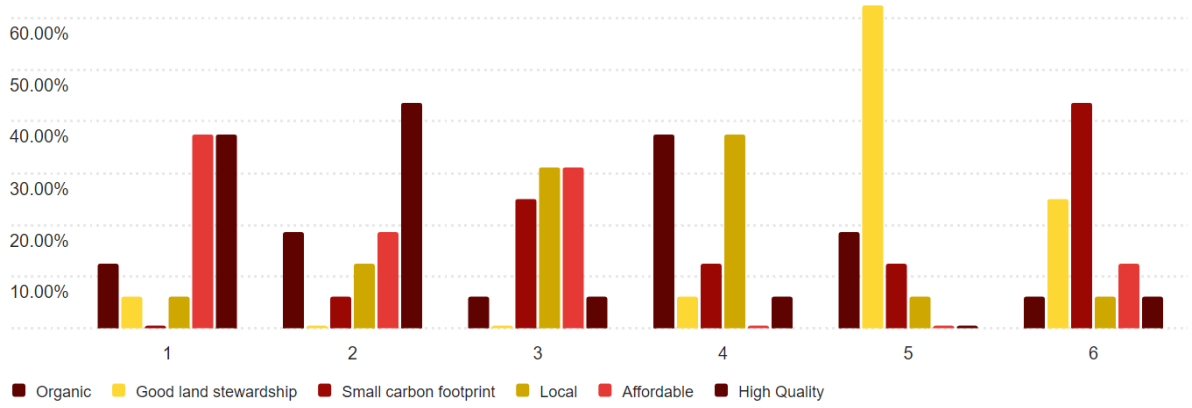
Q13 Please rank the level of importance of the following to YOU when sourcing food products from 1-6, with1 being the most important and 6 being the least important.

17 Responses



Q14 - Please rank the level of importance of the following to YOUR CUSTOMERS when sourcing food products from 1-6, with 1 being the most important and 6 being the least important. Please assign each number only once.

16 Responses



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About the Authors

Sarah Kirby
Sarah lives in Colorado Springs, CO. She received her Bachelor of Arts in Sustainability from the University of Louisville in Louisville, KY, where she was also the sustainability intern for Aramark. She managed the vertical garden tower by educating students and staff. She went back to earn this degree twelve years after receiving her Associate of Arts degree from the University of Central Arkansas in Conway, AR. She had also started a farmer's market during COVID to support the local community, which consistently held 25 vendors and was deemed a Kentucky Proud market. The pandemic sparked her passion in sustainability as the opportunities in the food supply chain industry increased. Throughout her studies she has continued working a full-time job, starting a family, and moving across the country. Currently, she is working as the Operational Sales Lead for Bimbo Bakeries USA. The distribution and production company allows Sarah to focus on food waste management for over 150 people and 31 facilities.

Bridgette Byrd
Bridgette is originally from New Jersey, aka the Garden State. She graduated Cum Laude in May 2020 from Rutgers University, having earned her Bachelor of Arts in Psychology with a minor in Cognitive Neuroscience, forging a path in nutrition security and education in low-income and marginalized communities. She is an AmeriCorps, FoodCorps alumna who served during the years 2022-2024. Her work had a tremendous impact in the Newark Public School District, fostering a school-wide culture of health and well-being. She is featured with the USDA NJ Department of Agriculture for coordinating and implementing Jersey Fresh Farm to School initiatives. She shares her story of service in the FoodCorps Service Member Spotlight Video, "Cultivating Community with Food." In 2024 she was honored as "Community Partner of the Year" for her idea to start a Conscious Consumption initiative to reduce food waste. Bridgette's environmental impact has certified her as a Rutgers Environmental Steward for her passion and dedication to improving the environment. Her international journey includes sustainable initiatives in community farms where she addressed food insecurity throughout Greece to rural areas in Puerto Rico serving as a Rutgers Global Experiential Leader. Bridgette is currently pursuing a Master of Science in Sustainable Food Systems from Arizona State University to forge a new path in sustainable food reform and building resilient communities.

Jessica Smith
Jessica was born and raised in rural Connecticut before moving to the Hudson Valley, NY, where she completed her AOS in Culinary Arts and BBA in Food Business

Management from the Culinary Institute of America. She spent a semester abroad in Italy, where she cultivated a deep appreciation for local food systems and sustainable agriculture. After college, Jessica worked as a chef at minibar by José Andrés, a two-Michelin star restaurant in Washington, D.C. She held various jobs in the food service industry, from catering manager to head chef, chef instructor, and even as a product developer for an ice cream company. She spent years as a restaurant manager for the Culinary Institute of America before moving on to work for Vassar College as the Assistant Director of Dining Services. She has a deep passion for sustainable foods that nourish the body, enrich the land, and taste good too! When not working on her master's degree at ASU, you can find her reading a good book or exploring the best Hudson Valley restaurants with her husband and pets.

Jessica Greensides

Jessica is from the Bay Area, California. She received her BS in Sustainability with a Minor in English in 2022 from Arizona State University. During this time Jessica managed multiple Starbucks locations and developed a Partners for Sustainability Chapter to promote proper waste and food disposal. After graduation, she became a Global Sustainability Fellow with Starbucks Corporation. Her role involved implementing over 14 water projects in local coffee-growing communities to enhance watershed life and address access to clean water. After that she served as a Sustainability and Equity Coordinator at the Greater Stockton Chamber of Commerce, where she worked to help local businesses reduce their environmental footprint through different programs. Currently, she is a Sustainability Advisor at Republic Services, working in waste management to help initiate organic material collection at a commercial level. She is pursuing her Master's in Sustainable Food Systems at Arizona State University with the intent to help address food waste and loss.

Yaquana Williams

Yaquana is an educator, lover of plants, foodie, and herbalist. She was born in New Jersey, growing up in Newark and Irvington, where she was introduced to her love of urban farming. She comes from a lineage with southern roots and a deep love for cooking. She is a graduate of Pitzer College with a Bachelor’s Degree of Arts in Africana Studies. There, she completed a senior thesis project titled “Finding the Future in the Soil: Black Farm Collectives and Black Liberation.” Her thesis collected stories on the work Black farm collectives in Johannesburg, South Africa; Havana, Cuba; and Newark, NJ, are doing to create access to organic produce for the communities they are in. She is deeply passionate about combating food apartheid in urban communities by looking at how cities are creating urban farms and gardens to increase food access. After graduating in 2021, she served as an AmeriCorps FoodCorps Service member for a year in the Newark Public School district, creating outdoor garden experiences for children to learn about the power of food. She also was a student under The Peoples

Medicine School, Hood Herbalism, and the Rooted Medicine Circle, all herbal medicine programs centered on building restorative relationships to the land and honoring nature's medicine. With her knowledge, she has held community workshops in her hometown, teaching residents how to use local plants to support their bodies. Currently, she serves as the Sustainable Food Systems Program Manager at the Office of Sustainability for the City of Newark.

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