From Trash to Treasure:

Calling For Sustainable Waste Management in NYC's Restaurant Industry

Gillian Feinglass, FIELD Fellowship 2023

the farmlink project

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Executive Summary

Introduction

My name is Gillian Feinglass. I am a senior at Emory University majoring in Human Health and minoring in Sustainability.

The Problem

The United States is in the midst of a food waste crisis, with over a third of its food supply wasted ("Food Waste FAQs"). This squandering of resources not only leads to environmental degradation, greenhouse gas emissions, and strains on finite resources but also carries substantial economic implications, with an annual cost of food waste in the U.S. reaching a staggering $408 billion ("Food Waste in America"). Restaurants are among the most significant contributors to this hefty price tag as the industry alone loses 162 billion yearly due to food waste ("New Study Finds Restaurant Food Waste Amounts to $2 Billion in Lost Profits").

New York City, known for its culinary scene, has implemented various measures to reduce landfill waste among individuals and has made substantial investments in food waste processing infrastructure. However, the majority of restaurant food waste in NYC still finds its way into landfills, negating the environmental progress made by the city's individual-focused programs. This critical oversight in addressing restaurant waste diversion, despite substantial investments in food waste processing infrastructure, underscores the government's failure to effectively target restaurants and necessitates immediate action.

The Solution

Unlike individuals, where the variety of waste they produce is diverse, most of the waste produced by restaurants is organic waste. The unique composition and volume of organic waste that restaurant's create puts them in a prime position to significantly reduce the amount of food waste in landfills. My approach will leverage extensive research, data analysis, expert interviews, and insights from successful case studies of related work in the US to assess the feasibility of diverting food waste from landfills through a voluntary incentive-based waste diversion program. I aim to illustrate the many reasons for targeting restaurants as pivotal players in reducing food waste, highlighting the benefits for the environment, business, and government interests alike.

Conclusion

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This project seeks to advocate for the development of a voluntary food waste diversion program for NYC restaurants, highlighting its potential to significantly reduce food waste in landfills and promote sustainable waste management practices in the industry.

Introduction

Introduction

My name is Gillian Feinglass. I am a senior at Emory University majoring in Human Health and minoring in Sustainability. After working at The Farmlink Project for three years, I was drawn to Farmlink's FIELD Fellowship because of the opportunity to gain direct insight from those who have built careers working in the food insecurity and food waste spaces. My passion for sustainability and my firsthand experiences addressing food waste and food insecurity fuels my enthusiasm for making a meaningful impact through this fellowship.

Phase 2 Experience

During Phase 2 of the FIELD Fellowship, I primarily worked with Earth Matter NY, a nonprofit organization on Governors Island in New York City, dedicated to reducing organic waste in landfills, promoting composting as a means of sustainable waste management, and ensuring that Governors Island remains zero-waste. In collaboration with The Trust for Governors Island, this initiative aims to compost all organic waste generated on the island, including food vendor serviceware, kitchen scraps, and landscaping waste, while also working to divert and compost all organic waste transported to the island.

My role as a Zero Waste Island intern exposed me to the intricacies of composting and provided me with insights into the science and applications of waste diversion. Each day, I engaged in various activities, from sorting through substantial quantities of waste to maintaining composting devices, and engaging with volunteers. Handling thousands of pounds of discarded materials gave me a hands-on understanding of the challenges and opportunities in sustainable waste management.

This experience allowed me to get up close and personal with the issue of food waste in a way that few ever do. As I sifted through discarded food scraps, yard waste, compostable serviceware and other organic materials, I began to reflect on the staggering scale of the problem of food waste, not just on the island but throughout the larger context of NYC and beyond.

My time at Earth Matter encouraged me to think beyond individual actions in addressing food waste. It underscored the urgent need for systemic change, and I credit my learning at Earth Matter as the foundation for my project to address restaurant food waste. It was here that I realized the potential to transform food waste from a problem into a valuable resource for a more sustainable future, and this realization has become

the driving force behind my efforts to advocate for a voluntary food waste diversion program tailored to restaurants in NYC.

Each pile of compost is given a name that is voted on by the team at Earth Matter based on current events and inside jokes.

This is me sorting through bags of garbage ensure no contamination enters the compost.

Earth Matter's Soil Start Farm where the public can use readily available materials To create compost to grow plants in urban soil conditions.

I learned about several backyard composting methods in addition to working with the commercial scale compost piles.

Signs located all around Earth Matter's space.

Organic waste & compostable serviceware that has been sorted to remove any contamination. This pile will soon turn into compost as demonstrated in the bottom left picture.

I also volunteered with The West Side Campaign Against Hunger, an organization committed to alleviating hunger and ensuring dignified access to healthy food for all New Yorkers. This experience allowed me to see the challenges of food insecurity up close and the critical role of food banks in addressing this issue.

Through these experiences, I came to realize the pressing problem statement: the need to transform how Americans perceive and manage their waste. While I understand the detrimental environmental and public health impacts of landfills, I also recognize the public's reluctance to engage with waste due to the prevailing stigma attached to trash and the convenience of maintaining the status quo. My challenge is to break through this barrier and convince the public of the necessity for a comprehensive waste management system, particularly one that diverts food waste from landfills, making it as accessible and intuitive as possible.

The Problem

The United States is in the midst of a food waste crisis. Over a third of America's food supply is wasted along with all the water, energy, fertilizer, fuel, pesticides, and labor invested in its production ("Food Waste FAQs"). The scale of this crisis is staggering: food waste in America consumes the water usage equivalent to 50 million American households and the energy required to power 83 million passenger vehicles each year ("Food Waste Problem," "The Environmental Impacts", "ReFED's New Estimates"). However, food waste does not just pose an ecological crisis; it also carries substantial economic implications, with the annual cost of food waste in the U.S. reaching a staggering $408 billion ("Food Waste in America").

Restaurants emerge as significant contributors to this problem, discarding between four to ten percent of their food before it reaches consumers totaling approximately $1000 of the company's revenue per 3.3 lb of food waste ("Ways to Reduce Restaurant Industry Food Waste Costs," 3). While plate waste, food left uneaten by diners, comprises a startling 70 percent of discarded food, as revealed by a 2021 study conducted by ReFED ("Food Waste Problem").

New York City, renowned as a culinary capital of the world with its vast array of 27,000 restaurants, ranks as one of the nation's most wasteful cities in terms of food waste ("New York: number of restaurants"). In fact, according to ReFed, NYC restaurants disposed of 73.5% of food waste in landfills and 26.3% in incinerators, leaving only a minimal fraction subjected to composting or recycling efforts. Yet, the city's government has taken commendable strides in creating programs to reduce residential food waste

through initiatives such as the citywide residential composting mandate, set to take effect starting in 2024, as well as deploying hundreds of Smart Composting Bins throughout the city for on-the-go composting. In 2022, Mayor Adam's declared that NYC has the largest curbside organics collection program nationwide.

Despite substantial investments in food waste processing infrastructure capable of converting food waste into valuable resources through composting, anaerobic digestion, or repurposing as animal feed, the vast majority of food waste generated in NYC still ends up in landfills. This concerning trend can be attributed to several key factors, including a lack of public education and awareness regarding proper waste sorting practices, lack of restaurant participation in diverting organic waste, resistance to change within the community, and the convenience of the well-defined landfill system.

However, the primary focus of this study revolves around the noticeable absence of effective waste diversion initiatives, both public and private, tailored specifically for the city's restaurants. This deficiency represents a critical oversight that warrants immediate attention. In NYC, current government policies for organic waste diversion from landfills primarily target larger food establishments, including restaurants, grocery stores, hotels, and food service vendors. The program mandates these designated entities to divert their organic waste, aiming to reduce the city's overall landfill contributions and align with broader waste reduction goals. However, due to stringent criteria dictating which businesses must divert their organic waste, only a limited number comply, resulting in minimal impact. Consequently, if a majority of restaurants in NYC continue to dispose of their food waste in landfills, the overall effect remains inconsequential despite the mandated diversion by a select few ("Commercial Organics Requirement").

In the absence of streamlined programs that facilitate waste diversion for restaurants and reduce the time and cost associated with partnering with waste-to-resource companies and facilities, restaurant owners are encouraged to dispose of substantial volumes of organic waste in landfills. As underscored by the Green Restaurant Association, the average restaurant generates a staggering 100,000 pounds of waste annually ("Waste Education Page | Green Restaurant"). Due to the significant portion of organic waste produced by restaurants, these establishments have the potential to divert up to 90% of their waste away from landfills through robust recycling and composting programs ("Waste Education Page | Green Restaurant"). Given that restaurants primarily generate organic waste, they possess a substantial opportunity to reduce the volume of food waste sent to landfills, significantly contributing to addressing this crisis. The significant environmental and economic ramifications of food waste emphasizes the

pressing need for comprehensive waste management actions, particularly within the restaurant industry.

The Solution

The proposed solution for a more comprehensive and sustainable waste management system in New York City involves a multifaceted approach aimed at reducing food waste in the restaurant industry and diverting it away from landfills. This comprehensive solution begins with in-depth research and analysis, seeking to gain a thorough understanding of the current state of waste services and restaurant waste management practices in the city. This involves assessing the volume and composition of restaurant waste, understanding existing waste collection and processing methods, and identifying key policies and financial support programs that may influence waste management practices.

Building on this foundation, the solution involves evaluating best practices from other regions and cities that have effectively managed food waste. By extracting valuable insights and lessons from successful case studies, we aim to tailor an efficient waste diversion program to the unique characteristics of New York City's restaurant industry.

Advocacy and policy development are central to the project. Findings from my research will lead to a compelling call to action directed towards both the government and restaurants to create a voluntary incentive-based program to encourage restaurants to divert their food waste away from landfills. The primary goal of this initiative is twofold. Firstly, it aims to demonstrate the need for a voluntary food waste diversion program specifically designed for restaurants in New York City. This program will prioritize practicality, cost-effectiveness, and efficiency, making it an attractive option for restaurant owners. In addition to highlighting the need for such a program, I will suggest a potential structure for a preliminary voluntary incentive-based program.

Communication and awareness play a vital role in the solution. Findings and recommendations will be disseminated through a presentation, infographics targeted towards restaurant owners, and an op-ed, with a focus on highlighting the feasibility and necessity of the proposed program. Emphasis will be placed on the potential to significantly reduce food waste in landfills, thereby mitigating environmental degradation and greenhouse gas emissions while conserving valuable resources.

Inclusivity and collaboration are fundamental principles of this project. Collaboration among various stakeholders, including government agencies, restaurant owners, waste management companies, and environmental organizations, will be encouraged. An

inclusive approach will ensure that all relevant parties are engaged in the effort to reduce food waste effectively.

Lastly, New York City, with its existing waste infrastructure, has the potential to serve as a model for other cities in championing sustainable waste management practices. By implementing and demonstrating the success of the food waste diversion program, NYC can set an example for the future of waste management and inspire other urban areas to follow suit. This comprehensive approach seeks to address the food waste crisis, protect the environment, and establish NYC as a leader in sustainable waste management practices.

How To Read This Impact Plan

This document presents a compelling case for reimagining the handling of waste in New York City's bustling restaurant industry. It commences with a thorough Needs Assessment that details the present waste management practices among NYC restaurants, unraveling the mandates and the existing paradigms that govern business waste diversion. I delve into the barriers that hinder the evolution of waste handling, illuminating the reasons behind the pervasive use of landfills, and evaluating the environmental repercussions food waste in landfills cause. This exploration is supported with empirical evidence, drawing from an independent survey I conducted of dozens of NYC restaurants, takeaways from several interviews with experts in the field, and data analytics to underline the environmental toll of the current two-bin system (landfill and recycling) adopted by restaurants. Then I will present a targeted solution tailored to the needs previously identified, demonstrating a clear pathway toward implementation. The Logic Model will define the program’s intended impact and goals; the sequence of intended effects; which activities are to produce which effect; and where to focus outcomes and process evaluations. This Impact Plan will conclude with a review of tasks yet to be accomplished, a compelling call to action, and a succinct recapitulation of the essential reflections. This plan serves as a blueprint for stakeholders seeking to navigate the complexities of waste management reform and enact lasting, positive environmental change within the restaurant industry of New York City.

Key Information To Note

In the context of this impact plan:

Food waste refers to food that is discarded or uneaten at the end of the food chain, which is the retail and consumption levels. It is often related to retailers and consumers throwing away food that is not sold or consumed before it goes bad or surpasses its expiration date. Food waste is more about the behavior of retailers and consumers and is often tied to issues like overly strict sell-by dates, buy-one-get-one-free offers that encourage over-purchasing, and consumers' demand for aesthetically perfect food.

Diversion refers to the process of redirecting waste from landfills to more sustainable disposal methods. This can involve recycling, composting, donation, anaerobic digestion, or other forms of waste repurposing. Diversion strategies aim to minimize the environmental impact of waste, conserve resources, and reduce pollution associated with landfill disposal.

Sustainable Waste Information refers to the implementation of waste handling practices that are environmentally responsible, economically viable, and socially equitable over the long term. The aim of sustainable waste management is to keep resources in use for as long as possible, extract the maximum value from them while in use, and recover and regenerate products and materials at the end of their life cycle.

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Needs Assessment

Summary of Needs Assessment:

This Needs Assessment conducts a thorough examination of the current waste management practices among NYC restaurants, exploring the mandates and paradigms that guide business waste diversion. It delves into the barriers that inhibit progressive waste handling techniques, shedding light on the prevalent reliance on landfills and assessing the environmental impacts of food waste in New York as well as the United States. Additionally, it provides information on the business case for restaurants reducing food waste, highlighting why it's financially responsible for restaurants. Moreover, it explores why NYC has the capacity to receive the uptick in food waste. Empirical evidence from an independent survey of numerous NYC restaurants, insights from expert interviews, and data analytics are employed to underscore the environmental toll of the prevalent two-bin system (landfill and recycling) and to demonstrate the necessity for a more sustainable, multi-faceted approach to waste management.

Current Waste Management in New York City Restaurants

The typical waste management approach in New York City restaurants involves disposing of a significant portion of their waste in landfills. According to ReFed, NYC restaurants disposed of 73.5% of food waste in landfills and 26.3% in incinerators, leaving only a minimal fraction subjected to composting or recycling efforts. Disposing of food waste in landfills and incinerators contributes to significant methane emissions, a potent greenhouse gas, and represents a loss of valuable resources used in food production, exacerbating environmental pollution and climate change (“The Estimated Amount, Value, and Calories of Postharvest Food Losses”). While some restaurants may practice recycling for materials like cardboard, glass, and used cooking oil, a notable amount of organic waste, such as food scraps and kitchen waste, often gets mixed with non-recyclable items. This is because most restaurants have a two bin waste system (recycling and landfill). Without a dedicated composting program, organic waste, a substantial component of their waste output, frequently goes unseparated for composting. This situation presents a challenge for the restaurant industry in the city to effectively manage and divert their waste, particularly organic waste, from landfills.

Focus of Project

Within the food system of my hometown, New York City, and more specifically, within the waste management industry, I have identified a significant gap. While commendable

efforts have been made to reduce food waste at the individual level, a notable void exists in initiatives, whether through government policies or comprehensive private programs, aimed at motivating restaurants to divert their waste from landfills. This omission stands as a critical barrier to achieving a more sustainable waste management system. Restaurants constitute a substantial portion of the overall food waste generated in urban areas like New York City ("Insights Engine"). Their operations yield significant quantities of organic waste, including food scraps and kitchen waste, which, when disposed of in landfills, contribute to environmental degradation and the release of harmful greenhouse gasses. By neglecting to address this substantial source of food waste, we miss a valuable opportunity to reduce the environmental impact of our waste management practices. My project seeks to bridge this gap by advocating for a voluntary food waste diversion program for restaurants, with the ultimate goal of influencing policy change in the city and reshaping public perception of waste as a valuable resource.

The Issue Of Negative Public Perception Of Waste

It's important to note that I feel extremely passionate about changing the way waste is managed in America. This is because I have learned in school, with Farmlink, and throughout my time as a FIELD Fellow how destructive landfills are to the environment, posing a significant, and often underplayed, unseen, and unknown, effect on the health and safety of all living organisms. Yet, the prevailing sentiment among the American population is to minimize the amount that they interact and think about waste. In fact, it is not uncommon for Americans to litter instead of throwing their trash away. Trash is seen by the majority as gross, smelly, a nuisance, rather than a potential resource. However, it's essential to acknowledge that many Americans, while recognizing the harm of landfills to the environment and public health, face barriers such as a lack of motivation, time, resources, or accessible infrastructure to change their waste disposal habits. Throwing all their waste into one bag is simply the easiest option for them and that is all that matters. They perceive their individual efforts as inconsequential and ineffective.

Barriers to Changing the Way That Americans Handle Waste

The main barrier to getting Americans to change the way they view and handle their waste is about addressing the deep-seated stigma around trash in order to inspire a widespread desire to have a more comprehensive and environmentally friendly waste management system. The challenge here is to inspire a collective desire for a more comprehensive and environmentally friendly waste management system, with a primary focus on diverting food waste from landfills. To transform the status quo, we must reshape the narrative surrounding waste through education and by altering societal

perceptions of waste. This involves a two-fold strategy: first, reshaping the narrative surrounding waste through education about how to separate waste and the benefits it creates. Education must also involve altering societal perceptions by showcasing waste's inherent value, facilitated through technologies like composting, which enriches soil quality and fosters plant growth, and anaerobic digestion, a process that transforms waste into fuel for vehicles and homes, along with digestate—a valuable fertilizer. Secondly, simplifying the waste management system for maximum ease of use and accessibility by cultivating a second-nature approach, similar to the widespread acceptance of recycling practices.

Typical Types of Waste Generation of Restaurants

- **Organic Waste (Biodegradable):**
  - Food scraps (e.g., fruit and vegetable peels, meat trimmings, dairy products)
  - Plate waste / spoiled food / surplus
  - Used oils and fats.
  - Paper products that are soiled with food (e.g., napkins, paper plates).
- **Recyclable Inorganic Waste:**
  - Glass (bottles, jars)
  - Metals (cans, tins, tinfoil)
  - Plastics (bottles, containers, wraps, bags)
  - Paper and cardboard (boxes, packaging, menus).
  - Tetra Paks and other composite packaging.
- **Non-Recyclable Inorganic Waste:**
  - Plastics that are not accepted in recycling programs (e.g., certain types of plastic wrap, bags, utensils, squeezable bottles, and soft plastics).
  - Soiled or treated paper products that cannot be recycled (waxed paper, used parchment paper, used paper towels)
  - Polystyrene foam (Styrofoam containers, cups).
  - Broken glassware and ceramics.
  - Miscellaneous packaging materials (disposable freezer packs)
- **Hazardous Waste:**
  - Cleaning agents, chemicals, and materials
  - Batteries/light bulbs (from various electronic devices)
  - Electronic waste (such as old kitchen equipment)
- **Special Waste:**
  - Cooking oil that can be recycled into biofuel but should not be mixed with other recyclables. (Grease and grease trap contents)

- Oyster shells (some regions have recycling programs for these).

United States Restaurants and Food Waste

- **Production Of Waste:**
  - In 2021, restaurants and foodservice establishments produced 12.9 million tons of excess food. While not all of this waste is edible (ie: food scraps), to paint a picture of how much 12.9 millions tons of food is, that would be the equivalent of 21.5 billion meals ("Restaurant Food Waste Management Solution").
    - According to a study conducted by ReFed in 2021, the causes of the 12.9 millions tons of food waste generated by restaurant food waste were:
      - Plate Waste: 8.91 Million Tons (69.4%)
      - Catering Overproduction: 1.41 Million Tons (11%)
      - Overproduction: 1.03 Million Tons (8%)
      - Date Label Concerns: 873 Thousand Tons (6.8%)
      - Trimming & Byproducts: 276 Thousand Tons (2.2%)
      - Spoiled Food: 221 Thousand Tons (1.7%)
      - Cooking / Handling Issues: 110.92 Thousand Tons (.86%)
  - According to the Green Restaurant Association, the average restaurant produces 100,000 pounds of food waste a year ("Waste Education Page | Green Restaurant").
  - Four to ten percent of restaurants' food is thrown away before it even reaches the consumer totaling approximately $1000 of the company's revenue per 3.3 lb of food waste ("Ways to Reduce Restaurant Industry Food Waste Costs," 3).
  - While grocery stores are a significant contributor to food waste, the NRDC claims that "restaurants and institutional foodservice providers together generate approximately two to four times the waste of grocery stores, retail supercenters, and wholesale distributors combined" (Gunders and Bloom, 24).
  - American restaurants create an estimated 22 to 33 billion pounds of food waste each year ("Food Waste Is a Massive Problem").
  - According to *Ways to Reduce Restaurant Industry Food Waste*, approximately $100,000 from each $1 million spent on consumer food purchases results in restaurant waste ("Ways to Reduce Restaurant Industry Food Waste Costs,", 1).
- **Causes of Restaurant Waste:**

- **Plate Waste:** U.S. diners do not finish 17% of the food provided on the plate and leave 55% of the food purchased behind resulting in approximately 9% of food purchased at the restaurant is disposed of at the restaurant (Gunders, 11).
- **Overproduction/Unpredictability:** Preparing food in anticipation of potential demand can lead to excess when customer turnout is lower than expected. This makes it challenging to prepare and order the correct amount of feed, leading to waste.
  - Approximately 31% to 40% of the food served to customers never gets consumed ("Ways to Reduce Restaurant Industry Food Waste Costs," 3).
- **Portion Sizes:** Research by Bematech (2019) identifies portion control as a key method for cutting down the costs associated with food waste in restaurants. Lipinski et al. (2013) also highlight the necessity for restaurant managers to offer smaller portions to minimize waste, as larger servings increase the chances of customers leaving food uneaten. Behmen and Milicevic's 16 Tips for Restaurant Food Waste Reduction (2019) observes that excessive portion sizes are a primary source of food waste within restaurants. Since the 1970s, portion sizes in the U.S. have grown significantly, with restaurants often promoting large portions as a value proposition to customers. However, this practice contributes to both increased waste and rising obesity rates.
- **Menu Length:** Extensive menus require more ingredients on hand, increasing the likelihood of some ingredients expiring before they are used (Gunders, 9).
- **Cosmetic Standards:** Customers demand an abundance and a diverse array of cosmetically perfect food that places a significant strain on inventory management and food purchasing. As a result, restaurants feel pressure to often discard produce that is perfectly edible but doesn't meet aesthetic standards for presentation (Gunders, 14).
- **Inventory Management:** Inadequate tracking of inventory can lead to food expiring before it's used. However, there is technology available for restaurants to improve their inventory management. Retailers can reduce their waste by implementing advanced distribution technologies that "will inform product quality and shelf life, such as early product analysis and detection," buying and accepting a wider cosmetic variety of in-season produce, and partaking in "whole-crop purchasing, to ensure full utilization of product grown" ("Roadmap to 2030, 14").

- **Customer Customization Trend:** Customized orders have been growing in popularity over the past years (Chipotle and Sweetgreen, can lead to increased food preparation errors and subsequent waste.
- **Health and Safety Regulations:** Strict regulations may necessitate throwing away food that's been out of temperature control for too long or that has passed its use-by date. This is because barriers to recovering food are not only a liability concern, but the logistics and funds required to collect, package, distribute, store the items disincentive businesses from donating (Gunders, 39).
    - A study conducted by the Food Waste Reduction Alliance in 2016 found that "donated food made up 3.3 percent of total unsaleable food from retailers" ("Analysis of U.S. Food Waste," 12).
- **Storage and Preservation:** Improper storage and preservation techniques can lead to spoilage.
- **Supply Chain Inefficiencies:** Disruptions or inefficiencies in the supply chain can result in food spoiling before it reaches the restaurant or soon after. According to the NRDC, "buyers reject between 2 and 5 percent of shipments outright" due to USDA and buyer standards (Gunders and Bloom, 20). Rejected food will likely be sent to a landfill due to its short shelf life and the difficulty of finding another buyer with such short notice.
- **Lack of Waste Diversion Programs:** Without streamlined programs for composting or donating surplus food, restaurants are often left with no option but to throw it away.

- **Destination Of Restaurant Waste:**
    - **Landfills and Food Waste:** The majority of restaurant waste is sent directly to landfills, primarily because it is the most cost-effective method in the United States. Landfills offer a common and economical way to dispose of food waste, as they do not require much separation and new infrastructure.
    - According to a study conducted by ReFed in 2021, the destinations of restaurant food waste were:
        - Landfill: 9.95 Million Tons (77.1%)
        - Composting: 1.73 Million Tons (13.4%)
        - Incineration: 1.16 Million Tons (9%)
        - Donation: 55.4 Thousand Tons (0.43%)
        - Animal Feed: 1.53 Thousand Tons (0.012%)
        - Sewer: 648 Tons Tons (0.005%)

    - Anaerobic Digestion: 566 Tons (0.004%)
- **Cost Of Waste on Restaurants:**
    - United States restaurants lose 162 Billion yearly due to food waste ("New Study Finds Restaurant Food Waste Amounts to $2 Billion in Lost Profits").
    - Approximately $100,000 from each $1 million spent on consumer food purchases results in restaurant waste ("Ways to Reduce Restaurant Industry Food Waste Costs,", 1).
    - 4% to 10% of food purchased by restaurant leaders never gets to the customer totaling approximately $1000 of the company's revenue per 3.3 lb of food waste ("Ways to Reduce Restaurant Industry Food Waste Costs,", 3).
    - A 2014 study conducted by Business for Social Responsibility (BSR) reported that their companies generated 33 pounds of food waste per every $1,000 of company revenue ("Analysis of U.S. Food Waste," 19).

Why Are Landfills The Most Common Way To Dispose of Food in The U.S?

- **Cost-Effective:** Landfill disposal is often the cheapest and most cost-effective option in the short term. It requires minimal processing and new infrastructure compared to other waste management methods ("Wasted: How America Is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill).
    - **Infrastructure Investments:** There are thousands of active landfills operating in the U.S., ranging from small, local facilities to large regional and municipal landfills. This wide distribution ensures that most areas have convenient access to a landfill for waste disposal. This extensive network of landfills is already in place, reducing the need for significant upfront investments in new facilities (Gunders, 14).
    - **Ease of Use:** Landfills are relatively easy to use and require minimal specialized equipment for waste disposal. They rely on natural decomposition processes, which are relatively straightforward. They can accommodate a wide range of waste types, including municipal solid waste, construction debris, and industrial waste (Gunders, 14).
    - **Transportation Costs:** Landfills are typically located relatively close to the areas they serve, reducing transportation costs for waste haulers. This proximity minimizes the expenses associated with long-distance hauling (Gunders, 14).
    - **Low Labor Costs:** Landfill operations generally require fewer personnel compared to more complex waste management methods like recycling and composting. This results in lower labor costs (Gunders, 14).

    - **Predictable Costs:** Landfill disposal costs are often more predictable and stable over time compared to other methods that may be subject to market fluctuations, such as recycling commodity prices (Gunders, 14).
    - **Economies of Scale:** Large regional or municipal landfills can benefit from economies of scale. They can efficiently handle significant volumes of waste, which can lead to lower operational costs per ton of waste disposed (Gunders, 14)
    - **Flexibility:** Landfills offer flexibility in waste acceptance. They can handle variable waste streams and do not require extensive sorting or processing before disposal. This flexibility makes them suitable for a wide range of waste generators (Gunders, 14).
- **Existing Infrastructure:** This infrastructure consists of a network of landfills that are strategically located across the country to accommodate the disposal needs of various communities, businesses, and industries.
    - **Carting Companies:** Waste collection and disposal services are provided by a multitude of private carting companies. These companies play a crucial role in collecting waste from households, businesses, and institutions and transporting it to landfills. They often operate fleets of garbage trucks that pick up waste on scheduled routes.
    - **Government-Run Waste Programs:** Many municipalities and local governments in the U.S. also run their own waste management programs. These government-operated programs may include curbside pickup services for residential waste and recycling, as well as drop-off centers for hazardous and bulky waste. These programs are designed to ensure that waste is properly collected and managed in compliance with local regulations.
    - **Powerful Stakeholders:** The US waste and recycling industry was worth $91 billion in 2022. This means that there are many powerful stakeholders that have a vested interest in prolonging the current way that waste is managed (“US Waste and Recycling Industry Worth $91B”).
    - **NYC Organics Processing Capacity:** DSNY “has determined that there is currently sufficient organics processing capacity available to allow for an increase in food waste diversion and thus proposed to apply the requirement to additional large food-generating businesses in the city (New York City Department of Sanitation, 1)”
        - **Mayor’s Zero Waste Challenge:** NYC has a goal to send zero waste to landfill by 2030. The government is encouraging businesses to divert “at least 50 percent of their waste from landfill

and incineration" ("Zero Waste Challenge - Mayor's Office of Sustainability").

- **Minimal Sorting:** Landfill disposal does not require extensive sorting of waste materials, making it a more simple and easy process for both households and businesses (Gunders, 14).
- **Regulatory Approval:** Landfill disposal methods are generally accepted and regulated by local and state authorities, making it a straightforward option for waste management (Gunders, 14).

The Environmental Impact of Landfills

- **Methane Emissions and Global Warming:**
  - The United Nations estimates that if global food loss and waste were a country, it would rank third in the world for greenhouse gas emissions after the U.S. and China. Landfills in the United States are the third-largest human-made source of methane emissions, accounting for 15.5 percent of the country's methane emissions according to the Environmental Protection Agency's (EPA) annual report on U.S. Greenhouse Gas Emissions and Sinks in 2021 ("Inventory of U.S. Greenhouse Gas Emissions and Sinks", 48).
- **Global Warming:**
  - Methane is a potent greenhouse gas that, when released into the atmosphere, contributes to global warming and climate change. It has a much greater heat-trapping capacity than carbon dioxide. The Environmental Defense Fund explains that "even though CO2 has a longer-lasting effect, methane sets the pace for warming in the near term and at least "25% of today's warming is driven by methane." Rising temperatures severely threaten all forms of life on Earth by increasing the frequency and intensity of natural disasters, rising sea levels, heat waves, and melting glaciers ("Methane: A crucial opportunity in the climate fight").
- **Air Quality:**
  - **Airborne Particulate Matter:** Landfills can generate airborne particulate matter, including dust, ash, and fine particles. These particles can become suspended in the air and be carried by the wind, leading to reduced air quality. Inhaling these particles can have adverse health effects, especially for individuals with respiratory conditions ("From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste", 97).

    - **Release of Volatile Organic Compounds (VOCs):** Landfills can emit volatile organic compounds, which can react with other pollutants in the atmosphere to form ground-level ozone, a major component of smog. Ground-level ozone can harm both human health and the environment ("From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste", 99.)
- **Soil Degradation:**
    - **Leachate Seepage:** One of the primary ways landfills affect soil quality is through leachate, which is the liquid that percolates through the waste in a landfill and can contain a variety of contaminants. When leachate infiltrates the surrounding soil, it can introduce pollutants such as heavy metals, organic compounds, and hazardous chemicals. These contaminants can alter soil chemistry and composition, making it less fertile and potentially toxic to plants and soil organisms (The Estimated Amount, Value, and Calories of Postharvest Food Losses," 3).
    - **Soil Erosion:** Landfills often involve extensive land disturbance during their construction and operation. The removal of natural vegetation and topsoil can increase the vulnerability of the exposed soil to erosion by wind and water. Eroded soil can be transported away from the landfill site, leading to soil loss and degradation of nearby ecosystems (The Estimated Amount, Value, and Calories of Postharvest Food Losses," 3).
    - **Acidification:** Landfill decomposition processes can generate acidic conditions due to the production of organic acids and other byproducts. Acidic leachate can further contribute to soil acidification, which can harm soil organisms and reduce soil fertility ("Inventory of U.S. Greenhouse Gas Emissions and Sinks," 14).
    - **Loss of Soil Biodiversity:** Landfills can lead to the loss of native vegetation and habitat fragmentation, which can result in reduced soil biodiversity. Many soil organisms, including insects, earthworms, and microorganisms, are vital for maintaining healthy soil structure and nutrient cycling (The Estimated Amount, Value, and Calories of Postharvest Food Losses," 3).
    - **Pesticides and Heavy Metals:** Many landfills contain household and industrial waste that includes pesticides, heavy metals, and other hazardous substances. These can accumulate in the soil and persist for many years, posing risks to human health, wildlife, and the environment (Wasted: How America is Losing Up to 40 percent of Its Food from Farm to Fork to Landfill." 7).
- **Water Pollution**

- **Leachate Seepage:** If landfills are not properly managed and lined, liquid known as leachate can seep into the ground and potentially contaminate groundwater supplies. This contaminated liquid can contain organic and inorganic chemicals, heavy metals, pathogens, pesticides, and other pollutants. These compounds can be harmful to aquatic life and human health. For example, leachate can affect drinking water quality and, in turn, impact the quality of the air when the water is used for various purposes (The Estimated Amount, Value, and Calories of Postharvest Food Losses," 3).
- **Groundwater Contamination:** Groundwater can become contaminated when leachate percolates through the soil. The pollution can spread from the landfill site to affect wells and springs that might be used for drinking water, irrigation, or other purposes ("From Farm to Kitchen: The Environmental Impacts of U.S. Food Waste," 97).
- **Surface Water Contamination:** Leachate or contaminated runoff from a landfill can enter surface water bodies such as rivers, streams, lakes, and wetlands. This can occur through overland flow during heavy rains, direct discharge, or indirectly through groundwater connections. This pollution can degrade water quality and in coastal areas, landfill pollutants can find their way into the sea, affecting marine ecosystems. Additionally, the degradation of waste, especially plastics, can lead to microplastics entering the food chain ("Inventory of U.S. Greenhouse Gas Emissions and Sinks," 65).

- **Wildlife Health and Biodiversity**
  - **Habitat Disruption:** Landfills disrupt natural habitats, often replacing them with artificial structures and waste piles. This displacement can lead to competition for resources in new areas, limit breeding and foraging grounds, lead to population decline, and increase stress on wildlife populations. As a result, changes in animal behavior may occur. Food waste in landfills attracts scavengers, such as rats, seagulls, and crows, which can disrupt local ecosystems. These animals may displace native species and compete with them for resources. This can have cascading effects on food webs, potentially leading to imbalances in local ecosystems (The Estimated Amount, Value, and Calories of Postharvest Food Losses," 3).
  - **Air and Water Pollution:** Landfills can release pollutants into the air and nearby water bodies through gas emissions and leachate. These pollutants, including methane, VOCs, heavy metals, and chemicals, can harm aquatic life and terrestrial animals if they enter local ecosystems.

Water pollution can impact aquatic habitats, leading to declines in aquatic biodiversity (The Estimated Amount, Value, and Calories of Postharvest Food Losses," 3).
    - **Disease Spread:** Landfills can attract animals that are vectors for diseases. Increased animal populations near landfills can lead to the spread of diseases to both wildlife and domestic animals. These animals may ingest harmful materials or become entangled in waste, leading to injuries or fatalities. Plastic waste, in particular, poses a threat to animals that may ingest or become trapped by it (Wasted: How America is Losing Up to 40 percent of Its Food from Farm to Fork to Landfill." 21).
- **Effect on Local Human Health**
    - Exposure to landfill pollutants can lead to respiratory problems, exacerbate preexisting conditions like asthma, and cause symptoms such as coughing, wheezing, and shortness of breath ("The Hidden Damage of Landfills").

Why A Two Bin System (Landfill and Recycling) In Restaurants Is Detrimental to The Environment

- **Missed Food Waste Diversion:** A two-trash system lacks a dedicated bin for food waste or organic materials. Instead, a significant portion of restaurant waste, which includes food scraps and kitchen waste, gets mixed with landfill-bound items such as soft plastics and cleaning materials. When organic waste ends up in landfills, it decomposes and produces harmful greenhouse gasses like methane and carbon dioxide, contributing to climate change. Food waste in the number one material in American landfills. In 2018, the EPA estimates that food straps represent 24% of the material sent to landfills ("Sustainable Management of Food Basics | US EPA").
- **Wasted Resources:** Food waste, when disposed of in landfills, not only generates methane but also represents a significant loss of resources like water, energy, fuel, and labor invested in food production and distribution. When organic materials are not properly sorted and diverted, these valuable resources go to waste. A study in the Environmental Science and Technology journal found that over 2 percent of the nation's energy use is dedicated to growing, manufacturing, transporting, refrigerating, and cooking food that is not eaten; "the equivalent of 16 billion gallons of gasoline (enough to cover 6 weeks of gasoline use by everyone in the U.S.)" ("Wasted Food, Wasted Energy," 1).
- **Missed Sustainability Goals:** Many cities and regions, including New York City, have set sustainability goals to reduce landfill waste and promote recycling

and composting. A two-trash system in restaurants that does not facilitate proper waste separation hinders progress toward these goals.

Alternative options for food waste diversion available for All NYC Businesses

- **Commercial Organics Collection:** Any businesses can arrange for collection by a private carter, transport organic waste themselves, transport organic waste themselves or process the material on-site in-vessel composting. More information will be provided in the section titled "NYC Mandates and Rules for Business's Food Waste Diversion."
- **Private Composting Services:** There are several private companies in NYC that provide food waste pickup services for composting. Businesses can hire these services to ensure that their food waste is processed properly. The following are names of leading carting companies in NYC offering these services:
    - Recycle Track Systems
    - Check Sammy
    - Mr. T Carting
    - Royal Waste Services, Inc.
    - Waste Connections
    - The Smarter Carter
- **Anaerobic Digestion:** Businesses can also send their food waste to anaerobic digestion facilities, where it will be broken down to produce biogas (a renewable energy source) and digestate, which can be used as a soil amendment ("Inventory of U.S. Greenhouse Gas Emissions and Sinks", 703).
- **In-Vessel Composting:** Large generators of food waste might use in-vessel composting systems, which can handle large volumes of organic waste and speed up the composting process through controlled conditions.
- **Dehydration/Freeze Drying:** Some businesses may opt for on-site solutions like dehydration or freeze-drying to reduce the weight and volume of their food waste, which can then be used as animal feed or composted more efficiently.
- **Waste-to-Water Systems:** These systems use bio-digestion to liquefy food waste, which can then be safely discharged into the sewage system and processed at wastewater treatment plants (Basic Information about Water Reuse).
- **Zero Waste Initiatives:** Some businesses adopt broader zero waste initiatives, looking to minimize waste in all forms and finding innovative ways to reuse, repurpose, or recycle materials that were formerly discarded.

Current NYC Mandates and Rules for Business's Food Waste Diversion

- **Who is Mandated:** New York City requires certain businesses, such as large food manufacturers, wholesalers, and retail food stores, as well as stadiums and arenas, to separate their organic waste. They can either arrange for collection by a private carter, transport organic waste themselves, or process the waste on-site. Businesses who must comply with the NYC Commercial Organics Rule under Local Law 136 of 2013 and 3rd designation by Rule (Effective July 31, 2020) ("New York City Department of Sanitation" & "New York City Department of Sanitation").
    - **Food Services**
        - Occupy a floor area of at least 6,000 square feet, or, when combined with all food services in the same building or location, at least 8,000 square feet
        - Are part of a chain with two or more NYC locations with a combined floor area of at least 8,000 square feet
    - **Retail Food Stores**
        - Occupy at least 10,000 square feet
        - Are part of a chain with three or more NYC locations with combined floor area of at least 10,000 square feet
    - **Other establishments**
        - Catering establishments that host events attended by more than 100 people
        - Temporary public events that are attended by more than 500 people
        - Arenas and stadiums with a seating capacity of at least 15,000 people
        - Food manufacturers that occupy a floor area of at least 25,000 square feet
        - Food wholesalers that occupy a floor area of at least 20,000 square feet
        - Hotels with at least 100 guest rooms
- **Separation Expectations**
    - Separate staff-handled back of house organic waste (scraps, plant trimmings, food-soiled paper, and certified compostable products) must be separated and diverted from landfills.
    - Certified compostable products should meet Carter or processor specifications.
- **Compliance**

- Provide labeled containers for the collection of organic waste in all areas where organic waste is handled or set out by employees ("label" means a display of words).
- Post and maintain signs with instructions on identifying and separating organic waste from garbage and recyclables. The signs must be visible to employees in all areas where organic waste is handled.
- Ensure that employees place organic waste in appropriately labeled containers and do not mix organics with garbage or recyclables.
- Ensure that containers for source-separated organic waste are latched at the time of storage or set-out.
- Arrange for organic waste to be transported and/or processed separately from garbage and recycling. Post a sign next to your BIC decal that clearly indicates your arrangement.

If Throwing Away Food Waste In Landfills is So Bad For The Environment And The Alternatives Are So Much Better, Why Don't More Restaurants Do It?

- **Infrastructure and Logistics:** Implementing waste diversion programs requires infrastructure for collecting, sorting, and processing food waste. However, many areas in the United States lack waste-to-resource facilities that can handle large volumes of food waste, and there are few streamlined programs to aid businesses in diverting their waste effectively. Moreover, For the food that can be donated, a survey conducted by The Food Waste Alliance found that "43% of respondents identified transportation constraints, 39% also identified liability concerns and 39% indicated insufficient refrigeration and or onsite storage as challenges" ("Analysis of U.S. Food Waste Among Food Manufacturers Retailers, and Restaurants," 31) As a result, if restaurants do not donate this food in time, it will become food waste, and likely sent to a landfill.
    - **Limited Waste-to-Resource Facilities Nationwide:** Waste-to-resource facilities, such as composting facilities and anaerobic digesters, are essential for converting food waste into valuable resources like compost and biogas. Unfortunately, not all regions have sufficient infrastructure to accommodate the volume of food waste generated by restaurants. This lack of facilities can discourage businesses from pursuing waste diversion, as they may not have convenient and cost-effective options for disposing of their food waste sustainably.
    - **Transportation Challenges:** Even in areas with some waste-to-resource facilities (such as NYC), transportation logistics can present challenges for restaurant waste diversion. Transporting food waste

to distant facilities can be costly, both in terms of time and resources. This can deter restaurants, especially smaller establishments, from participating in diversion programs.

- **Lack of Streamlined Programs:** While waste diversion programs exist in various forms, there is a lack of standardized, user-friendly programs specifically tailored to restaurants. Many businesses, especially smaller ones, may find it overwhelming to navigate the complexities of waste diversion on their own. The absence of streamlined, turnkey solutions can be a barrier to participation.
- **Financial Barriers:** Establishing and maintaining waste diversion infrastructure can be expensive, and businesses may be hesitant to invest in these initiatives without clear financial incentives or support. Without assistance or incentives, restaurants may be reluctant to take the necessary steps to divert waste from landfills.
  - **The Smarter Carter:** I had a conversation with a representative from The Smarter Carter, a company offering services for transporting organic waste to waste-to-resource facilities. They mentioned that businesses will incur higher disposal costs if their waste doesn't go to a landfill.
  - **Volume and Type of Waste:** The cost of waste disposal can be influenced by the volume and type of waste. Certain waste-to-resource facilities apply charges based on weight or volume. For smaller volumes, carting companies might often charge more for waste disposal at waste-to-resource facilities due to the logistical challenges or specialized handling required.
  - **Service Fees:** Waste management services oftentimes charge a fee for their services, including sorting, collection, and processing.

- **Lack of Education:** Many people are not aware of the impact that food waste in landfills has on the environment and do not know how to properly separate waste. Without the necessary training, employees may not know how to separate different types of waste effectively. This can result in contamination of recycling or compost streams, making waste diversion less efficient.
- **Limited Knowledge of Alternative Options:** Restaurant owners and employees might not be familiar with composting, anaerobic digestion, or other sustainable practices that can divert food waste from landfills. Without knowledge of these options, they are less likely to consider them as viable solutions. As a result, the lack of education plays a significant role in the continued diversion of restaurant waste to landfills.

- **Cost Misconceptions:** Restaurant owners may falsely assume that pursuing sustainability initiatives is inherently unprofitable or unrealistic. This misconception can stem from a lack of understanding of the potential cost savings and environmental benefits associated with waste diversion practices.
- **Cost considerations:** Landfill disposal is often the cheapest option for restaurants. Alternative methods like composting and anaerobic digestion can be more expensive to implement and maintain.
- **Lack of Incentives:** Without proper incentives, such as financial incentives or tax benefits for waste diversion, restaurants may not have a strong motivation to change their waste disposal practices.
- **Regulatory Barriers:** In some areas, there may be regulatory barriers or restrictions that hinder restaurants from diverting food waste. Regulations related to waste handling, health codes, and zoning can sometimes be barriers to implementing sustainable waste diversion practices.
- **Perceived Complexity:** Managing food waste diversion programs can be perceived as complex and time-consuming. Restaurants may be concerned about the operational challenges and training required for staff to participate effectively.
- **Limited Space:** Restaurants, particularly those in urban areas, may have limited space for waste sorting and storage. This can make it challenging to separate and store different types of waste for diversion.
- **Consumer Behavior:** Consumer expectations and behaviors can also influence restaurant waste practices. If customers are accustomed to large portion sizes and excessive packaging, it can be difficult for restaurants to change these practices without risking customer satisfaction.
- **Resource Constraints:** Restaurants may lack the resources, time, and expertise needed to implement waste diversion programs. They may need assistance and guidance to make the transition.
- **Short-Term Planning:** Some restaurants may prioritize short-term profitability over long-term sustainability. They may not see immediate financial benefits from waste diversion efforts and, therefore, may be hesitant to invest in them.

Key Takeaways From Testimonials From Experts in Related Industries

- Nina Sevilla, Program Advocate, Food Waste & Food Systems, People & Communities Program at The National Resource Defense Council
    - **Question:** Why do you think food diversion efforts by the government have predominantly focused on individuals rather than restaurants?
        - "In some places I have seen that local governments have primarily focussed on diverting waste from businesses to waste-to-resource facilities and have barely worked with residential organic waste collection. While I can't speak specifically to New York City, a couple reasons why governments may be inclined to focus on residential waste is that most local governments in the United States have residential waste disposal infrastructure. According to several studies, we've seen that individuals or homes are the largest generator of food scraps. So, targeting the residential sector is a good place to start because on the whole more food waste is being generated there than the food sector."
    - **Question:** Can you share your vision for a future with significantly reduced food waste? What changes and initiatives do you hope to see in the coming years to combat this issue more effectively? Do you see a future of sustainable waste management happening in the United States?
        - "I think that sustainable waste management is attainable. A couple things need to happen, though. First and foremost, our society must undergo a mindset shift. We need to value our food more because as it is right now, we are throwing out 40% of our food. We also need to adjust how we value our food because in our current state, the general public does not adequately value food in the way it should. There is a tremendous amount of work and money that goes into the labor and production of our food. It's imperative that we buy only what we need, store our food well, and put more time into deciding what food we need. The hope is that less waste will be generated in the first place. Another important thing to consider is that I would like to see compost collection and composting be the norm. I think this is impossible. I live in San Francisco and we use a three bin system (landfill, recycling, and organic waste) and it now feels like the norm. I think other cities can adopt a three bin system as well."
    - **Question:** What are your thoughts on composting and anaerobic digestion? Do you think one is better than the other? Do you think both should be utilized to divert waste from landfills?

        - "When considering composting versus anaerobic digestion, both methods offer distinct advantages in managing food waste. Composting, for instance, is highly efficient in creating a closed-loop system that ensures nutrients continuously cycle through. However, one drawback of anaerobic digestion is that while it generates biogas, the resulting digestate isn't always suitable for composting. Responsible anaerobic digestion remains a valuable process in waste management, although there's caution regarding relying on waste as a renewable energy source. It's essential to ensure the responsible handling of anaerobic digestion to mitigate potential environmental impacts. I'd love to delve deeper into resources that detail the responsible implementation of anaerobic digestion for a more comprehensive understanding of its ecological implications."
    - **Question:** What can the federal government do to support a more sustainable waste system in the United States?
        - "Absolutely, fostering a sustainable waste system in the United States necessitates a multi-faceted approach that starts from the grassroots level. The federal government can play a pivotal role by setting a national reduction goal as a guiding principle for waste management practices. The Environmental Protection Agency (EPA) offers valuable insights and strategies on waste reduction that can serve as a foundation for federal initiatives."
        - "To support this initiative, federal funding allocation becomes crucial. Increased funding can be channeled towards comprehensive research endeavors aimed at identifying innovative waste management techniques. Furthermore, directing resources, potentially through the Farm Bill, towards initiatives that promote waste reduction, such as supporting organic waste bans and bolstering infrastructure for waste-to-resource facilities, is pivotal."
        - "An exploration of legislative acts like the Zero Food Waste Act advocated by the Natural Resources Defense Council (NRDC) could serve as a blueprint for federal policies. This act outlines strategies to minimize food waste through various channels, from enhanced recovery efforts to sustainable disposal methods. Aligning federal initiatives with such comprehensive frameworks can significantly contribute to establishing a more sustainable waste management system in the country."

- **Question:** From your perspective, what are the key challenges and barriers faced by restaurants when it comes to food waste reduction and sustainable waste management?
  - "From my perspective, restaurants grapple with significant challenges in implementing food waste reduction and sustainable waste management practices. Firstly, the operational constraints within the industry often mean that restaurants are running on tight margins, making it challenging to allocate time and resources to engage fully in waste reduction efforts."
  - "Studies, like the one conducted by the World Resources Institute (WRI) focusing on food businesses and their return on investment for food waste reduction, underscore a critical point. Investing in waste reduction practices not only contributes to environmental sustainability but also yields substantial economic benefits. For instance, for every dollar invested in food waste reduction, restaurants see a noteworthy return on investment, translating into significant cost savings."
  - "Despite the evident economic advantages, there's a need for increased awareness and education within the restaurant industry about these potential benefits. Moreover, implementing effective waste reduction strategies often requires upfront investments in infrastructure or training, which can pose initial barriers for many restaurants, especially smaller or independently owned establishments."
  - "Support mechanisms, such as tailored guidance, financial incentives, and access to resources or technologies geared towards waste reduction, could significantly aid restaurants in overcoming these barriers. Collaborative efforts involving industry stakeholders, government agencies, and nonprofits can play a pivotal role in providing the necessary tools and support to help restaurants adopt and sustain effective waste management practices."
- **Question:** Do you believe it is feasible to establish an incentive-based voluntary program that collects food waste from restaurants? If not, what are the potential challenges or barriers?
  - "Absolutely, the establishment of an incentive-based voluntary program for collecting food waste from restaurants holds significant promise. The successful example set by the Philadelphia Business Network showcases a similar initiative that demonstrates the feasibility and potential impact of such programs."

        - "Consumer consciousness regarding sustainability has been steadily rising, presenting a unique opportunity for restaurants to align with this growing trend. Leveraging this increased awareness can serve as a compelling angle for restaurants to participate in and benefit from such programs. Consumers increasingly value businesses that demonstrate a commitment to environmental responsibility, making it a win-win scenario for both restaurants and their clientele."
        - "However, despite the potential, there are challenges to consider. One significant hurdle might be the initial reluctance or lack of awareness among restaurants about the benefits of participating in such programs. Additionally, logistical issues, such as the cost and infrastructure required for waste collection and transportation, could pose challenges, particularly for smaller restaurants with limited resources."
        - "To navigate these potential barriers, it's crucial to design the program thoughtfully. Providing clear incentives, whether financial benefits or enhanced brand reputation, and offering practical support, such as guidance on waste separation or facilitating partnerships with waste management entities, can encourage broader restaurant participation."
        - "Moreover, collaboration between government bodies, local businesses, waste management companies, and community organizations would be pivotal in establishing and sustaining such programs. By addressing these challenges through strategic planning and collaborative efforts, the feasibility of incentive-based voluntary programs aimed at collecting food waste from restaurants can be significantly enhanced."
- Marisa DeDominicis, Co founder of Earth Matter NY
    - **Question:** Could you provide insights into how composting and waste diversion initiatives can impact the local environment and community, in addition to reducing waste sent to landfills?
        - "Composting is the number one way individuals can feel that they are making a change. They can see, literally before their eyes, the waste being diverted from landfills and transformed into productive soil. It's something that is very tangible for people to see how they are tackling global climate issues. People can see with their own eyes how much food is being diverted away from a landfill.

Composting can impact our environment by increasing soil health and diverting waste from the landfill which produces methane.
        - "As for New York City, most of the waste goes to incinerators in New Jersey in low income neighborhoods which is creating health issues for low income people."
    - **Question:** Why do you think composting efforts by the government have predominantly focused on individuals rather than restaurants in NYC?
        - "I think the government feels that it is easier to roll out services that focus on residents because the department of sanitation is the one that is responsible for collecting. Restaurants and commercial sectors have to work with non-governmental carters. So, to institute organic recycling would be more challenging without regulations. "
        - "NYC should target the commercial realm first because large amounts of food waste happens in restaurants, and educating employees on proper waste separation like we have on Governor's Island is relatively straightforward."
    - **Question:** In your view, does NYC currently possess the capacity to process food waste from restaurants on a larger scale effectively?
        - "Right now New York City is primarily relying on composting and anaerobic digestion to process food waste. NYC has been focussing much more on anaerobic digestion than composting. A lot of the residential organic waste is going to anaerobic digesters to create methane scraps. From my knowledge, I know there are facilities many miles away that New York City uses, but I do not think there's enough capacity as we need for larger volumes of waste."
        - "There are existing programs to encourage large business facilities to divert organic waste, but I am very skeptical about how much is actually being processed because I know there is such a high level of contamination in these bags of waste because of improper sorting, which likely leads a lot of the waste to not end up in a waste-to-resource facility."
    - **Question:** What are your thoughts on composting and anaerobic digestion? Do you think one is better than the other? Do you think both should be utilized to divert waste from landfills?
        - "When discussing composting versus anaerobic digestion, both methods offer unique advantages in managing organic waste. In New York City, where less than 1% of produced organics are captured, considering a 50% capture rate seems ambitious. While composting is incredibly valuable for enriching soil and supporting

food production, it might be challenging to address the entirety of organic waste solely through composting."
    - "Anaerobic digestion presents a promising solution, particularly for managing large volumes of organic waste efficiently. However, relying exclusively on anaerobic digestion might not align with the holistic benefits that composting offers for soil health and food production."
    - "To strike a balance, a hybrid approach could be beneficial. I believe that allocating around 25% of collected food scraps for composting would effectively harness the soil-enhancing benefits while utilizing anaerobic digestion for bulk waste processing. It's crucial to acknowledge that anaerobic digestion does produce sludge as a byproduct, containing elements that aren't favorable for the environment, emphasizing the importance of a comprehensive waste management strategy."
    - "Encouraging widespread participation in these initiatives poses a significant challenge. The city and its government must actively promote and incentivize participation in composting and anaerobic digestion programs to achieve meaningful waste diversion from landfills. In this context, biodigestion could emerge as a critical solution worth exploring further, given its potential in waste management."
    - "Ultimately, a comprehensive waste management strategy for NYC should encompass a blend of composting, anaerobic digestion, and possibly biodigestion, each contributing its unique strengths to mitigate waste sent to landfills while being mindful of their respective environmental impacts and promoting sustainable practices."
- Jacob Cohen, Owner of NYC restaurants Dell'anima and Libertine
    - **Question:** In your experience, do you think food waste is a prevalent issue in the NYC restaurant industry? Are there specific challenges or factors that contribute to this problem?
        - "Waste is a huge area that can be improved in restaurants. The nature of restaurant operations in this bustling city presents specific challenges that contribute to this problem. One significant factor is the unpredictable nature of restaurant demand. Preparing for varying customer traffic and preferences can lead to overproduction, resulting in excess food that might go to waste."

        - "A main challenge for us is prepping food in a high-paced and small environment. One day could see a flurry of activity while the next might not match the same level of demand. Balancing food preparation to meet fluctuating demands while minimizing waste is a constant juggling act for restaurants."
        - "In a city like New York, where the restaurant scene is vibrant and diverse, there's a considerable emphasis on freshness and variety. This sometimes leads to shorter shelf lives for certain food items, increasing the likelihood of waste if they aren't utilized promptly."
        - "Additionally, operational constraints, such as limited storage space and time pressures in a fast-paced environment, can contribute to food waste. Finding the delicate balance between adequate preparation to meet demand without overproducing remains a significant challenge for many restaurants in the city."
        - "Addressing these challenges might require innovative strategies, such as better inventory management, more flexible menu planning, or even exploring partnerships with local food banks or composting facilities to redirect surplus food away from landfills. Overall, while food waste is indeed a prevalent issue in NYC's restaurant industry, proactive measures and creative solutions can help mitigate its impact."
    - **Question:** Would you consider opting into a voluntary incentive based program to encourage food waste diversion?
        - "Definitely. If there's a voluntary program that offers incentives for diverting food waste, count me in. Making the effort to separate waste wouldn't be a big deal for me or my business, especially if it's straightforward and doesn't involve a bunch of complicated steps or extra costs. If it's a simple and hassle-free process, I'm all for it. Getting some incentives on top of helping the environment sounds like a win-win situation to me."
    - **Question:** Are there any specific challenges or obstacles that you believe are unique to restaurants in NYC when it comes to implementing sustainable waste management practices?
        - "Absolutely, in NYC, restaurants face unique challenges in adopting sustainable waste management practices. Limited space and the fast-paced nature of the city's dining scene make it tough to manage waste efficiently. High operational costs and tight margins often hinder investments in new waste management systems. Also, the diverse food offerings and fluctuating customer demands add

complexity, making it tricky to predict and manage food inventory effectively. Finally, navigating stringent regulations and finding affordable waste disposal alternatives in a densely populated urban environment pose significant hurdles for restaurants aiming to implement sustainable waste practices."

- Annette Nielson, Executive Director of the Hunter College New York City Food Policy Center
    - **Question:** Why do you think composting/food diversion efforts by the government have predominantly focused on individuals rather than restaurants in NYC?
        - "It seems like the focus on composting and food diversion efforts has leaned toward individuals in NYC because it's more straightforward for the government to collaborate with residents. The Department of Sanitation often engages with and already has systems in place for residential waste management. Coordinating with individual households might be more manageable logistically compared to the diversity and scale of restaurants, which have different operational needs and complexities. Working with residents could also be seen as a starting point, building momentum and understanding before expanding efforts to include larger establishments like restaurants."
    - **Question:** From your perspective, what are the key challenges and barriers faced by restaurants in New York City when it comes to food waste reduction and sustainable waste management?
        - "We live in a capitalistic society and there must be a financial benefit to incentive restaurant owners to divert waste from landfills. That would serve as a key driver for restaurants. Operational costs in the city are high, and many restaurants operate on narrow profit margins, making it challenging to allocate funds for new waste management systems or training programs. The lack of clear and immediate financial benefits for waste diversion efforts poses a significant barrier, especially when investments in sustainability might not show immediate returns."
        - "It is also challenging for restaurants to navigate the diverse regulatory landscape and finding affordable waste disposal alternative."
        - "Ultimately, aligning financial incentives with sustainable waste management practices could be a crucial catalyst for NYC restaurants to actively engage in food waste reduction efforts."

- **Question:** Based on your experience at Hunter College Food Policy Center and beyond, do you think that NYC is ready to make significant strides in diverting food waste from restaurants destined for landfills?
  - "I am hopeful that NYC is ready to make strides in diverting food waste from landfills. We have a lot of smart committed people in our government. Now it's about following through will these grand ideas to improve how we handle our organic waste. What will be key is to make sure we have allocated the resources, staffing, and education to ensure that this is a success this round."

The Business Case For Restaurants To Reduce Food Waste

- **Financial Responsibility:** Every business, including restaurants, should embrace sustainable practices. Waste diversion should not be viewed as a burden but as a prudent financial decision, especially in the long run.
  - Champions 12.3, a coalition aiming to cut global food waste in half by 2030, conducted a report in 2019 across 12 countries. The review found that in the first year of using a food waste reduction program, 76 percent of the 114 restaurants studied recovered their initial investment. Within two years, 89 percent had recouped their investment ("The Business Case For Reducing Food Loss and Waste," 1).
  - Utilizing technology to track product quality and shelf life is an effective strategy to mitigate food waste generation. Collecting data on the extent and frequency of food wastage allows restaurants to make informed decisions that cut costs, improve efficiency, and reduce waste.
  - Restaurants lose $162 billion annually due to food waste. Prioritizing sustainable waste management practices can yield long-term cost savings for restaurants ("New Study Finds Restaurant Food Waste Amounts to $2 Billion in Lost Profits").
- **Environmental Responsibility:** Reducing food waste is not only financially responsible but also environmentally responsible. Food loss and waste have significant economic, social, and environmental impacts.
  - Food loss and waste are responsible for an estimated 8 percent of annual greenhouse gas emissions, making it the third-largest emitter after China and the United States ("The Business Case For Reducing Food Loss and Waste," 1).
  - Reducing food loss and waste can generate a triple win: for the economy, food security, and the environment.

    - Reducing food waste costs to half would reduce food waste by 22% per year ("Ways to Reduce Restaurant Industry Food Waste Costs," 2)
- **Economic Benefits:**
    - A study analyzing historical data from nearly 1,200 business sites across 17 countries found a median benefit-cost ratio of 14:1. This means that for every $1 invested in food loss and waste reduction, half of the surveyed company sites realized a $13 or greater return ("The Business Case For Reducing Food Loss and Waste," 2).
    - An estimated 10% of the U.S. workforce is employed in the restaurant industry. Reducing food waste costs could increase jobs by 15,000 per year, decrease consumers' expenses for food, and increase consumer satisfaction ("Ways to Reduce Restaurant Industry Food Waste Costs," 3).
    - The food service industry plays a pivotal role in the United States' economic development and job market. According to findings by the National Restaurant Association in 2017, there are more than one million restaurant establishments in the United States. These establishments are projected to contribute approximately 4% to the country's Gross Domestic Product (GDP) and employ an estimated 10% of the American workforce ("Ways to Reduce Restaurant Industry Food Waste Costs," 3).
- **Nonfinancial Benefits:** In addition to financial gains, there are non-financial motivators for reducing food loss and waste, such as waste regulations, environmental sustainability, food security, stakeholder relationships, brand recognition, and ethical responsibility.
- **Success Stories:** In the Champions 12.3 study of 114 restaurants in 12 different countries, participating restaurants have demonstrated the effectiveness of food waste reduction efforts. Over three years, the average site reduced food waste by weight by 58 percent, aligning with the United Nations Sustainable Development Goal 12.3 to cut food waste in half ("The Business Case For Reducing Food Loss and Waste," 5).
    - **The Ship Inn:** A traditional pub in the United Kingdom, aimed to improve its financial margins through food waste reduction ("The Business Case For Reducing Food Loss and Waste," 9). Here's how they achieved impressive results:
        - **Measure:** The Ship Inn started with manual measurement, sorting waste into "spoilage," "prep," and "plate waste" bins that were measured at the end of each day. This cost-effective process provided a rough overview of waste patterns.

        - **Start small:** The Ship Inn implemented changes gradually, one at a time, to assess their effectiveness individually and build momentum among staff.
        - **Results:** After a four-week trial period of manual measurement, they achieved an 84 percent reduction in spoilage and a 67 percent reduction in plate waste. Total waste reduced by a significant 72 percent during this period. This trial period not only reduced waste but also improved staff and customer understanding of the initiative, making long-term waste reduction more effective.
    - **IKEA Food:** IKEA Food, part of the global IKEA brand, embarked on a "Food is Precious" initiative to reduce its food waste by 50 percent ("The Business Case For Reducing Food Loss and Waste," 10). Here's how they achieved remarkable results:
        - **Measure:** IKEA stores in the United Kingdom and the United States piloted programs using smart scale systems from vendors like LeanPath and Winnow Solutions. The pilot program resulted in a 23–54 percent decrease in food waste over six months.
        - **Engage staff:** IKEA appointed "Food Waste Champions" in each store to motivate colleagues and ensure program implementation. They also had a "Country Implementation Responsible" for each market to spearhead implementation and provide support.
        - **Results:** IKEA saw a 20 percent reduction in food waste within 12 weeks and most stores had a 20-week payback period. This example shows that large global chains like IKEA can successfully reduce food waste through measured steps, staff engagement, and a commitment to ongoing improvement.
- **Payback Periods:** Implementing food waste reduction programs is cost-effective. Within the first year of implementing such a program, 76 percent of the sites had recouped their investment, and within two years, 89 percent had surpassed a 1:1 benefit-cost ratio ("The Business Case For Reducing Food Loss and Waste," 1).
- **Inexpensive Investments:** The food waste reduction programs implemented by surveyed sites were relatively inexpensive in terms of absolute dollars spent. All sites kept their total investment in food waste reduction between $10,000 and $20,000 over three years.
- **Strategies Employed**: Successful food waste reduction strategies included measurement, staff engagement, reducing overproduction, rethinking inventory and purchasing practices, and repurposing excess food.

    - **Predict Food Orders:** Restaurants can utilize manual or digital systems to predict food orders and implement predictive ordering technology. By doing so, leaders can have more accurate data, a better understanding of food order patterns, control over kitchen operations, which ultimately can lead to less waste.
        - For example, leaders could implement applications and solutions such as Cloud Big Data to collect data from customers via food ordering habits and preferences to better predict food orders (Ways to Reduce Restaurant Industry Food Waste Costs," 6).
- **Conclusion:** Reducing food waste is a financially, environmentally, and ethically responsible strategy for restaurants. It not only cuts costs but also aligns with global sustainability goals, reduces greenhouse gas emissions, and enhances a restaurant's reputation and brand value. Embracing food waste reduction can lead to significant financial benefits while contributing to a more sustainable future.

Takeaways From Waste Diversion Initiatives in The United States

- SB 1383 in California represents a significant milestone in waste management legislation, specifically targeting organic waste diversion from landfills. Overall, SB 1383 serves as a model for other regions aiming to reduce organic waste in landfills. It highlights the importance of setting clear targets, implementing comprehensive regulations, investing in infrastructure, and conducting outreach and education to achieve significant reductions in organic waste disposal (California's Climate Progress on SB 1383). However, it also showcases the complexities and challenges involved in enforcing such ambitious legislation and the need for ongoing evaluation and adaptation in waste management policies. Some key takeaways from this legislation include:
    - **Mandatory Organics Diversion:** SB 1383 mandates a significant reduction in organic waste sent to landfills. It sets ambitious targets to divert organic waste, aiming to cut the disposal of organic waste by 75% from 2014 levels by 2025.
    - **Focused on Methane Emissions Reduction:** Organic waste in landfills generates methane, a potent greenhouse gas. SB 1383 recognizes the importance of reducing methane emissions by diverting organic waste and implementing strict regulations to achieve this reduction.
    - **Broad Applicability:** The law applies to various sectors beyond just residential waste. It encompasses commercial entities, schools, and multifamily residences, making it comprehensive in its scope.

    - **Implementation Challenges:** Implementing such stringent regulations poses challenges. It requires significant infrastructure development, including expanding composting and anaerobic digestion facilities, as well as creating systems for collection and processing.
    - **Education and Outreach:** SB 1383 emphasizes the need for public education and outreach programs to inform residents, businesses, and waste management entities about the new regulations, the importance of organic waste diversion, and how to comply with the law.
    - **Penalties for Non-compliance:** The legislation enforces penalties for non-compliance, motivating entities to adhere to the regulations.
    - **Learning from SB83:**
        - **Clear Targets and Regulations:** SB 1383 demonstrates the importance of establishing clear waste diversion targets and comprehensive regulations for organic waste management.
        - **Methane Emissions Reduction Focus:** Highlighting the significance of diverting organic waste to reduce methane emissions, a potent greenhouse gas.
        - **Comprehensive Scope:** The legislation applies not only to residential waste but also extends to commercial entities, schools, and multifamily residences.
        - **Challenges in Implementation:** The challenges of implementing stringent regulations include infrastructure development and education and outreach needs.
        - **Penalties for Non-Compliance:** Enforcing penalties for non-compliance acts as a motivator for adherence to the regulations.
- The Compost Feasibility Study conducted by Resource Recycling Systems (RRS) for Washington, D.C.'s Department of Public Works (DPW) presents crucial insights and recommendations to enhance organic waste management. Overall, the study provides a concrete foundation for DPW to progress toward sustainable waste management practices. It outlines a clear pathway for expanding organics collection and composting, addressing challenges in regional processing, financial investments, and environmental targets, aligning with D.C.'s overarching waste diversion objectives. Here are the key takeaways:
    - **Current Waste Potential:** The study estimates a substantial volume of food and yard waste, around 149,000 tons annually, from residential and commercial sources. Presently, only a fraction of this waste is composted, highlighting a significant opportunity for expansion.

- **Regional Processing Capacity:** Challenges exist in regional processing capabilities. Only two nearby facilities accept food waste, insufficient to accommodate the District's full needs. RRS recommends establishing an aerated static pile composting facility within D.C. for cost-effectiveness and increased capacity.
- **Rollout Plan:** The study proposes a five-year rollout plan for organics collection. This plan includes site identification, permitting, contracting, and eventual collection expansion across neighborhoods, culminating in the opening of the composting site by the fourth year.
- **Financial Considerations:** Building a composting facility within the District presents an upfront cost estimated between $7-11 million, while container and truck expenses for collection may range from $17-22.5 million. However, RRS suggests that this investment could potentially save and generate revenue, considering the substantial costs associated with transferring waste to existing facilities.
- **Environmental Goals:** The study aligns with D.C.'s aim to achieve an 80% waste diversion goal, emphasizing a shift away from landfill and waste-to-energy practices. By focusing on diverting food scraps alongside yard waste, the city could significantly bolster its waste diversion rate, **currently standing at 21%.**
- **Balancing Costs and Environmental Impact:** DPW acknowledges cost considerations but emphasizes that environmental outcomes will remain a primary focus. Director Christopher Shorter emphasized in an interview that financial factors won't override the larger environmental goals.
- **Learning from the DC Compost Feasibility Study**
  - **Waste Potential:** Identifies substantial food and yard waste, indicating an opportunity for expansion in composting efforts.
  - **Regional Processing Challenges:** The study highlights the need for improved regional processing capabilities within Washington, D.C.
  - **Rollout Plan Suggestions:** Proposes a five-year plan for organics collection expansion, including site identification and permitting.
  - **Financial Considerations:** Presents initial investment estimates for composting facilities and collection expenses and explores potential cost savings in the long run.
  - **Environmental Goals and Cost Balance:** Emphasizes the shift towards waste diversion while balancing costs and environmental outcomes.

- The Food Saver Challenge, conducted by the Sustainable Business Network (SBN) in partnership with the National Resource Defense Council (NRDC), is a proactive initiative aimed at addressing food waste issues in Philadelphia. It invites various local food-related businesses, including restaurants, grocery stores, bakeries, coffee shops, and hotels, to participate in a six-month program focused on reducing, repurposing, and donating food that would otherwise be wasted. Overall, the Food Saver Challenge represents a collaborative, community-driven effort that empowers local businesses to actively participate in reducing food waste, aligning with the city's broader objectives for a more sustainable waste management system ("SBN's Food Saver Challenge"). Here are some key takeaways:
    - **Scope and Focus:** The challenge centers on combatting food waste, recognizing its substantial contribution (around 20%) to Philadelphia's waste stream, aligning with the city's broader goal of diverting 90% of waste from landfills by 2035.
    - **Community Engagement:** The initiative encourages participation from a diverse range of food-related establishments, intending to build a culture of waste reduction across Philadelphia.
    - **Collaborative Efforts:** Partnerships with the NRDC, local food recovery organizations, technical assistance services, and waste management companies demonstrate a comprehensive approach, providing businesses with tools, resources, and support to address food waste.
    - **Incentives and Support:** Participating businesses gain access to software, food redistribution support, technical assistance, and recognition opportunities. Additionally, the chance to win a cash prize of $5,000 incentivizes active participation.
    - **Recognition and Visibility:** Businesses involved in the challenge receive acknowledgment through media coverage, city-wide recognition, and increased visibility, highlighting their efforts in reducing food waste.
    - **Alignment with City Goals:** The Food Saver Challenge correlates with the City of Philadelphia's broader Zero Waste initiatives, promoting waste diversion, community engagement, and policy support for sustainable waste management practices.
    - **Learning from The Food Saver Challenge**
        - **Focus on Food Waste:** Recognizes food waste as a significant portion of the waste stream and aligns with broader waste diversion goals.

- **Community Engagement:** Encourages participation from various food-related establishments, fostering a culture of waste reduction.
- **Collaborative Approach:** Partnerships with organizations offer businesses tools, resources, and technical assistance.
- **Incentives and Support:** Offers incentives, software access, recognition, and the opportunity to win a cash prize.
- **Alignment with City Goals:** Correlates with Philadelphia's Zero Waste initiatives, promoting waste diversion and policy support for sustainable practices.

These takeaways collectively showcase the importance of clear targets, community engagement, collaborative efforts, incentives, and alignment with broader city goals, forming a robust foundation for your voluntary incentive-based program for NYC restaurants.

Independent Data Collection

NYC Restaurant Waste Management Survey

I conducted a restaurant survey of dozens of restaurants in NYC to better understand their current waste disposal practices, explore potential barriers to waste separation and food waste diversion, and assess their willingness to adopt more sustainable waste management practices. The input provided by the restaurants will be helpful in guiding my program development and implementation to create a more environmentally responsible and efficient waste management system for NYC restaurants.

Figure 1:

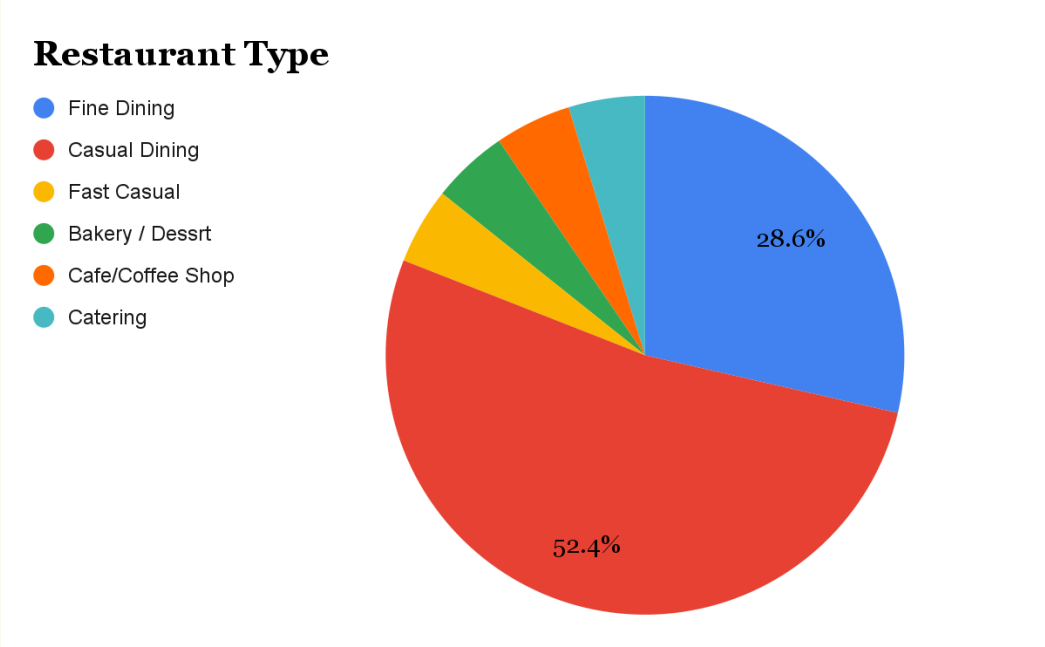

Figure 1 shows the distribution of various restaurant types. This diversity is a key strength of this study and has several implications for the generalizability of its findings:

Real-World Applicability: The presence of different restaurant types, including fine dining, casual dining, fast casual, bakery/dessert, cafe/coffee shop, and catering, ensures that the study captures a broad cross-section of the NYC restaurant industry. This diversity makes the findings more representative of the city's culinary landscape. Additionally, since the study includes a wide range of restaurant types, the insights gained from it can be applied to various segments of the foodservice industry.

Holistic Understanding: The variety of restaurant types enables a more holistic understanding of waste management practices in NYC's diverse culinary scene. It acknowledges that different types of establishments may face unique challenges and opportunities when it comes to sustainability and waste reduction.

Figure 2:

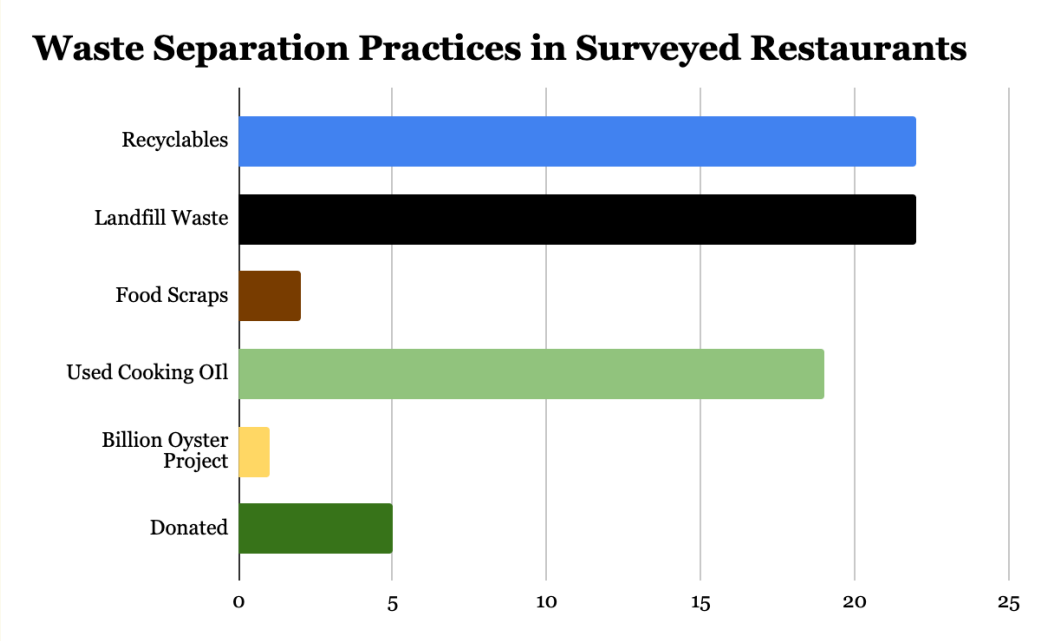

Figure 2 highlights the varying degrees of engagement among NYC restaurants in sustainable waste management practices. While there are promising initiatives, such as the separation of used cooking oil and surplus food donation, these findings underscore the need for increased education and support to encourage more restaurants to adopt sustainable waste management practices, particularly in the area of food waste diversion.

Used Cooking Oil Diversion: It is encouraging to see that a significant number of restaurants (19 in total) are actively engaged in diverting their used cooking oil from landfills. This is because used cooking oil can be recycled and converted into biofuel. This positive trend can be attributed to the presence of dedicated companies like Mahoney Environmental, Citywide, and free programs such as the NYC Clean Air Group, which offer convenient and environmentally responsible disposal solutions for used cooking oil. These programs serve as excellent examples of industry support for sustainable waste management.

Surplus Food Donation: The participation of five restaurants in surplus food donation programs is a commendable step toward reducing food waste and supporting those in need within the community. This practice not only aligns with environmental goals but also fulfills a crucial social responsibility. However, the fact that only 22% of surveyed restaurants are currently involved in food donation suggests an untapped

potential within the industry. Many more restaurants likely possess surplus edible food that could be redirected to charitable causes.

Recycling and Landfill Waste Bins: The survey results indicate that most restaurants have a 2 bin waste system which is consistent with standard industry practices. However, the absence of a dedicated composting program means that organic waste, a significant component of their overall waste output, often goes unseparated and ultimately ends up in landfills. With only two restaurants currently diverting food scraps from landfills, this indicates that a majority of restaurants are not yet actively engaged in composting efforts.

Figure 3:

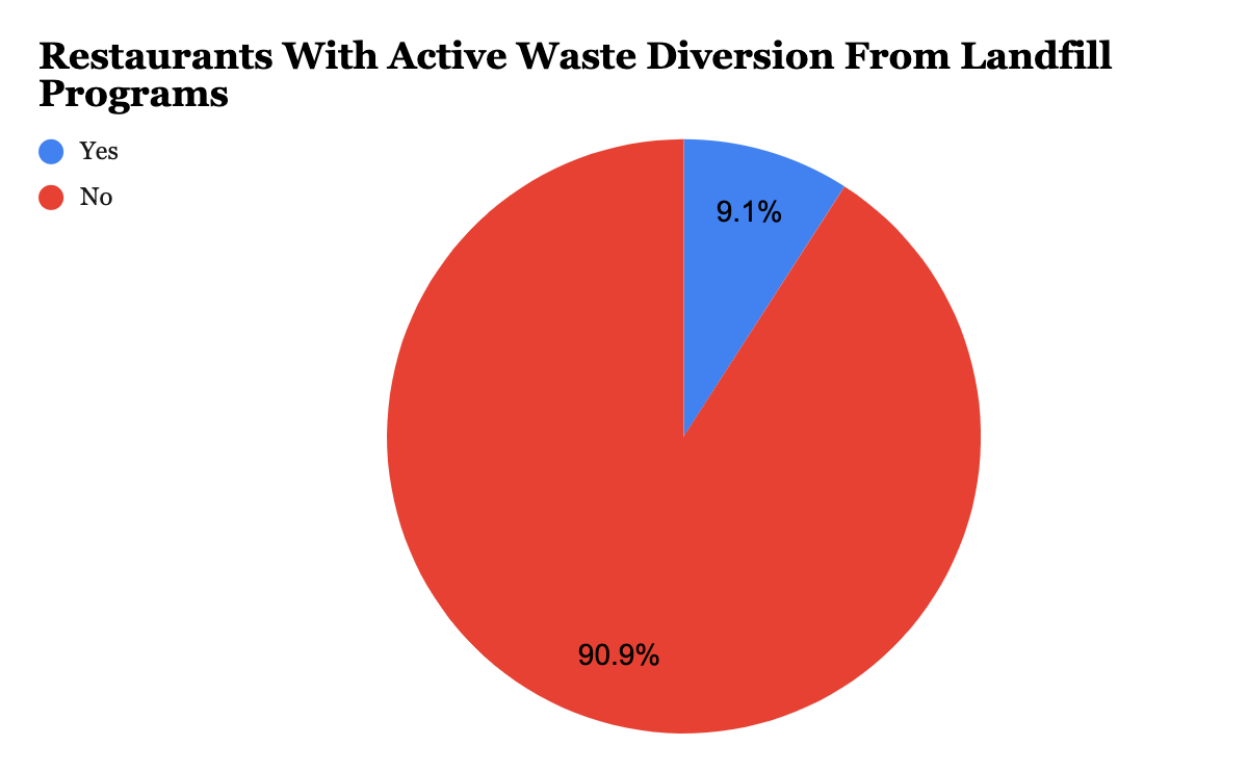

Figure 3 provides a clear snapshot of the current state of waste diversion programs in the surveyed NYC restaurants and is crucial in understanding the overall landscape of sustainable waste management practices within the industry. The data highlights several key points:

Low Adoption of Waste Diversion Programs: The most significant observation from Figure 3 is that a vast majority of the surveyed restaurants, accounting for 90.9%, do not have active waste diversion programs in place. These findings suggest that there may be a substantial portion of the industry that has yet to fully engage in efforts to divert waste away from landfills.

Limited Participation in Waste Diversion: On the positive side, 9.1% of the surveyed restaurants have active waste diversion programs. While this percentage may seem relatively low, it signifies that there are some establishments within the city that are taking proactive steps toward reducing their environmental footprint. This is promising and suggests that there is at least some awareness of and interest in sustainable waste management practices among NYC restaurants.

Opportunities for Expansion: The data in Figure 3 underscores a significant opportunity for growth and improvement in waste diversion efforts within the restaurant industry. With the vast majority of restaurants not currently participating in such programs, there is ample room for expansion. This presents a clear call to action for various stakeholders, including government agencies, industry associations, and environmental organizations, to support and incentivize more restaurants to implement waste diversion initiatives.

Alignment with Study Objectives: In the context of the study's objectives, Figure 3 reinforces the importance of assessing the challenges and feasibility of diverting food waste from restaurants in New York City. The overwhelming majority of restaurants without active waste diversion programs highlight the need for comprehensive research and advocacy efforts to promote the adoption of sustainable waste management practices within the industry.

Figure 4:

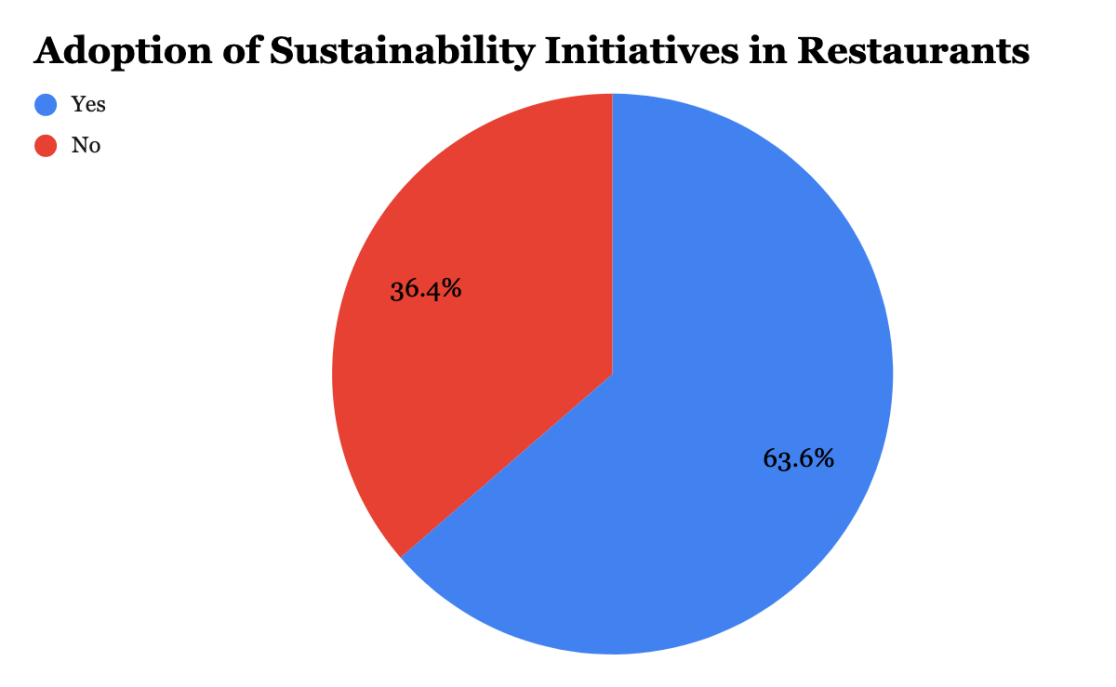

Figure 4 provides valuable insights into the willingness of NYC restaurants to embrace sustainability practices beyond just waste diversion. The data in this figure reflects a positive trend, with 64.6% of surveyed restaurants indicating that they have adopted sustainability initiatives. This finding has several noteworthy implications:

Diverse Approaches to Sustainability: The term "sustainability initiatives" can encompass a wide range of practices, from waste reduction to energy efficiency, sourcing local and organic ingredients, reducing water consumption, and more. The diversity of initiatives embraced by these restaurants indicates that sustainability is seen as a multifaceted concept that extends beyond waste management alone. Examples of surveyed restaurants sustainability efforts include

- A compost company picks up organic waste and brings it to a composting facility
- Cooking oil is collected and converted into biofuel
- Edible surplus food is sent to Too Good To Go
- Edible surplus food is taken by restaurant employees to local food banks
- Track waste

Promising Willingness to Embrace Sustainability: The fact that nearly two-thirds of the surveyed restaurants have adopted sustainability initiatives is a promising sign. It suggests that a significant portion of the restaurant industry in NYC is

open to and actively pursuing practices that contribute to environmental and social responsibility.

Alignment with Consumer Expectations: The high percentage of restaurants adopting sustainability initiatives could be indicative of a growing awareness among consumers regarding environmental and ethical concerns. As more consumers seek environmentally conscious dining options, restaurants may be responding by implementing sustainability practices to meet these expectations and differentiate themselves in the market.

Opportunity to Build Upon Sustainability Efforts: Restaurants that have already embraced sustainability initiatives may be more open to expanding their efforts to include waste diversion programs in the future. This presents an opportunity for advocates of waste diversion to collaborate with restaurants already committed to sustainability, potentially leading to broader adoption of waste reduction strategies.

Figure 5:

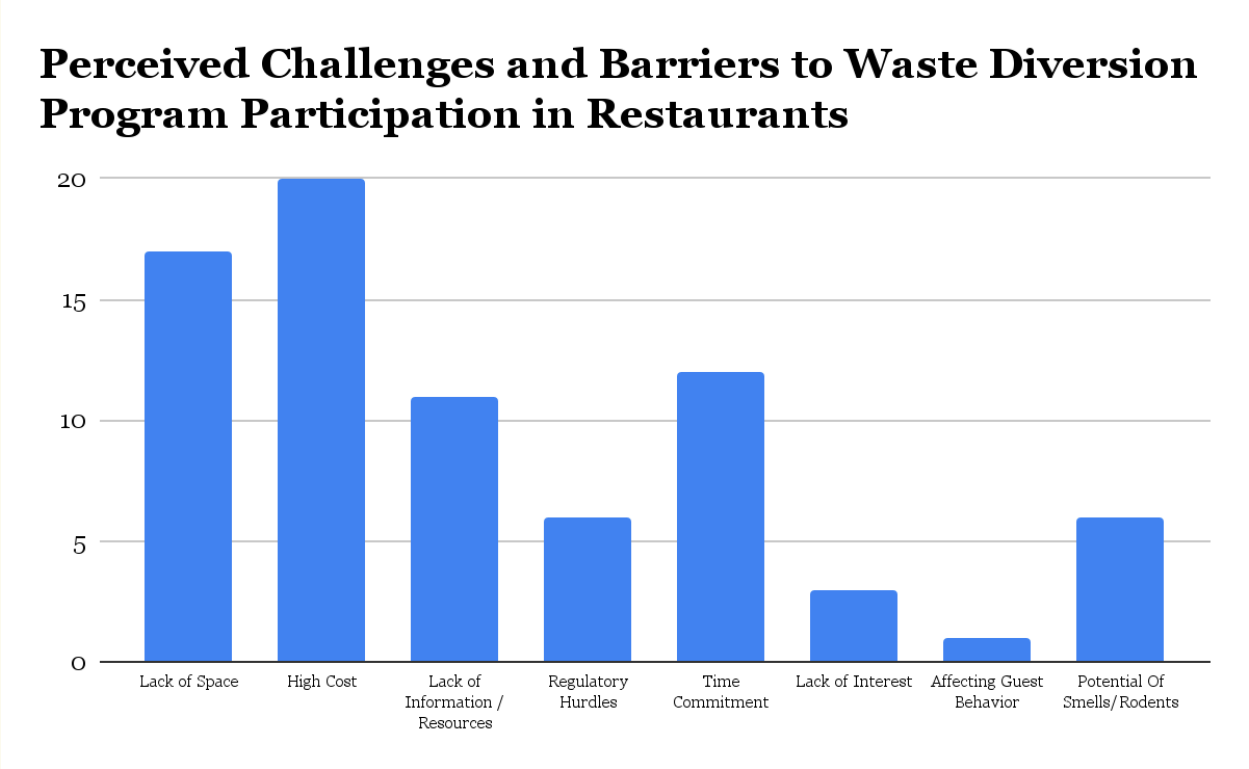

Figure 5 provides valuable insights into the key challenges and barriers that restaurants encounter when attempting to participate in waste diversion programs. Here's an analysis of the findings:

High Cost: Almost all of the respondents are most concerned about changing their waste diversion practices to be more sustainable because they believe that there will be a high cost associated with this. Costs that may come from such a program include initial setup costs and ongoing expenses associated with waste diversion efforts. However, this barrier can be overcome through financial incentives, grants, or subsidies for waste diversion initiatives from the government or large grants. While the upfront cost may be larger, it's important to emphasize that the long-term benefits, such as reduced waste disposal expenses, environmental benefits, and potential revenue from recycling and composting, can far outweigh the initial investment. Additionally, collaboration with waste management providers and leveraging economies of scale can further alleviate the financial burden for participating restaurants.

Lack of Space: Lack of space is the 2nd greatest concern for restaurants. This challenge suggests that many restaurants perceive limited physical space as a significant

barrier to implementing waste diversion programs. To address this, it may be necessary to develop more space-efficient waste separation and storage solutions tailored to restaurant settings. A potential solution to this problem are trash compactors. Compacting reduces waste volume and leads to fewer waste collection trips which can help reduce the fuel and carbon emissions.

Lack of Information/Resources: As highlighted by 50% of the respondents, a lack of information or resources emerges as a primary obstacle to altering restaurant waste management practices. This underscores the critical gap that this project aims to fill. Without accessible and well-structured information and resources, restaurants lack the incentive to modify their waste management approaches. To effectively address this challenge, it is essential to develop user-friendly, straightforward waste diversion programs that eliminate unnecessary complexities. Furthermore, comprehensive educational components must be integrated into these programs. Making information and resources readily available and easy to access is paramount to encouraging restaurants to embrace waste diversion practices. Streamlined guidance and ample resources are essential for encouraging restaurants to take meaningful steps toward sustainability.

Figure 6:

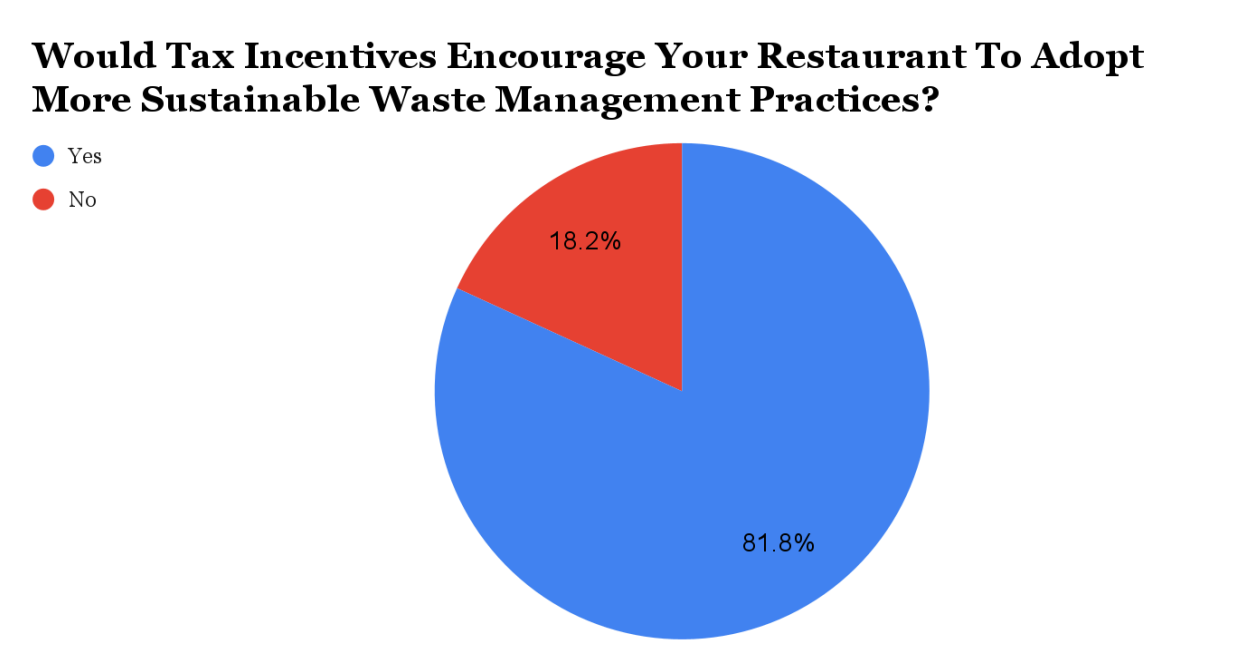

Figure 6 demonstrates the restaurant's willingness to adopt more sustainable waste management practices due to tax incentives. The overwhelming response of 81.8% in favor of tax incentives as a motivator is indicative of a crucial aspect of promoting sustainability in the restaurant industry.

Financial Motivation: 81.8% of restaurants strongly emphasizes the need for financial incentives to drive change in waste management practices. While awareness of environmental issues is crucial, Figure 6 highlights that awareness alone may not be sufficient to drive change in the restaurant industry. Financial considerations appear to be a significant catalyst for restaurants to take action. Combining educational efforts with tangible financial benefits, like tax incentives, can create a more compelling case for restaurants to embrace sustainability. This aligns with the understanding that restaurants often operate on thin profit margins (the average profit margins of United States restaurant's is between three and five percent) and may be hesitant to invest in sustainability efforts without financial benefits.

Policy Implications: The high percentage of affirmative responses suggests that government policies offering tax incentives or other financial rewards could be an effective strategy to encourage restaurants to adopt sustainable waste management

practices. Such policies may include tax deductions, credits, or grants for businesses that actively participate in waste diversion programs.

Figure 7:

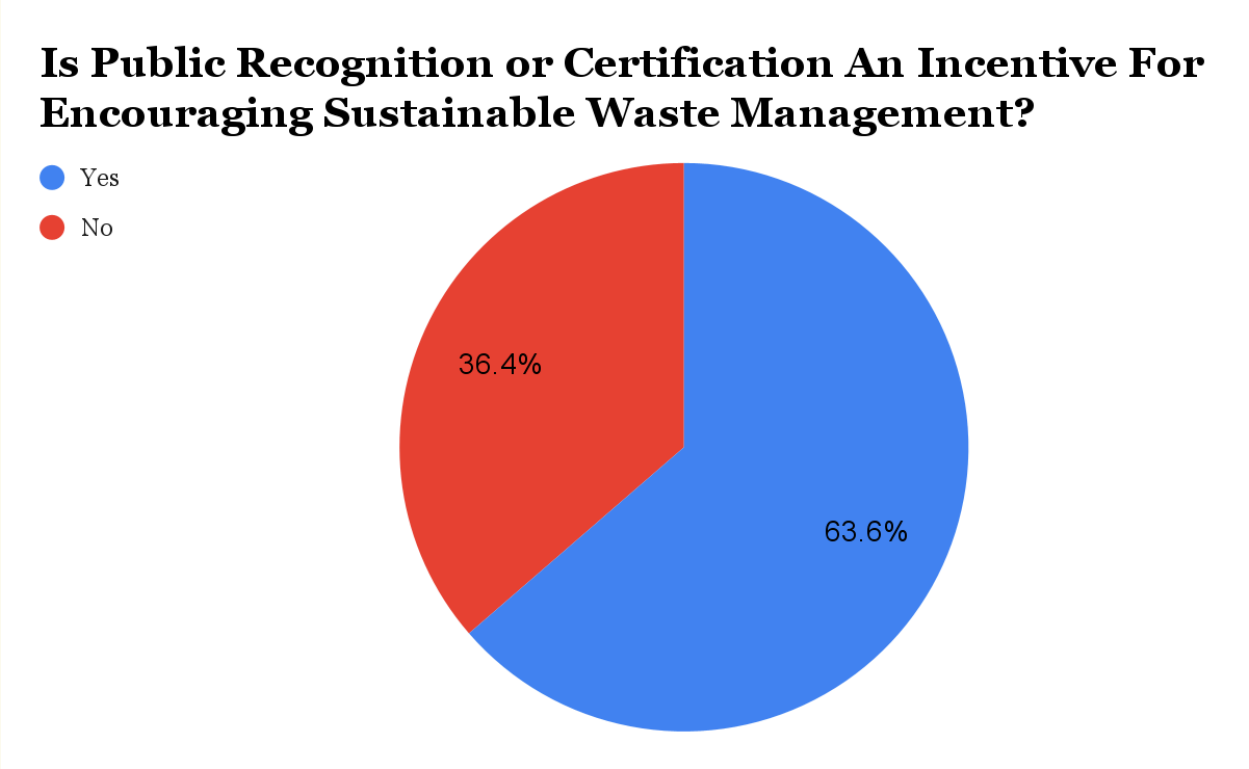

Figure 7, which examines whether public recognition or certification serves as an incentive for encouraging sustainable waste management in restaurants, reveals valuable insights about the role of certification and public perception in driving sustainability efforts.

Importance of Certification: The majority of surveyed restaurants (63.6%) acknowledge that public recognition or certification serves as an incentive for adopting sustainable waste management practices. This finding suggests that certification programs, such as eco-friendly or sustainability badges, can be effective tools for motivating restaurants to participate in waste diversion initiatives.

Consumer Awareness: Certification and public recognition not only incentivize restaurants but also contribute to increasing consumer awareness. Restaurants that display certifications may attract environmentally conscious diners who appreciate sustainable practices. A comprehensive approach that addresses both financial and

public recognition aspects is likely to yield the best results in encouraging restaurant participation.

Importance of Multiple Incentives: While certification is important, it's worth noting that the majority of restaurants still prioritize financial incentives (as seen in Figure 6). This suggests that a combination of both financial benefits and public recognition through certification can be a powerful motivator for restaurants to engage in sustainability initiatives.

Program Development Considerations: For organizations or initiatives aiming to promote sustainable waste management in the restaurant industry, Figure 7 highlights the importance of incorporating certification or recognition programs. Creating clear and recognizable signs or certifications can help restaurants communicate their commitment to sustainability to customers.

Figure 8:

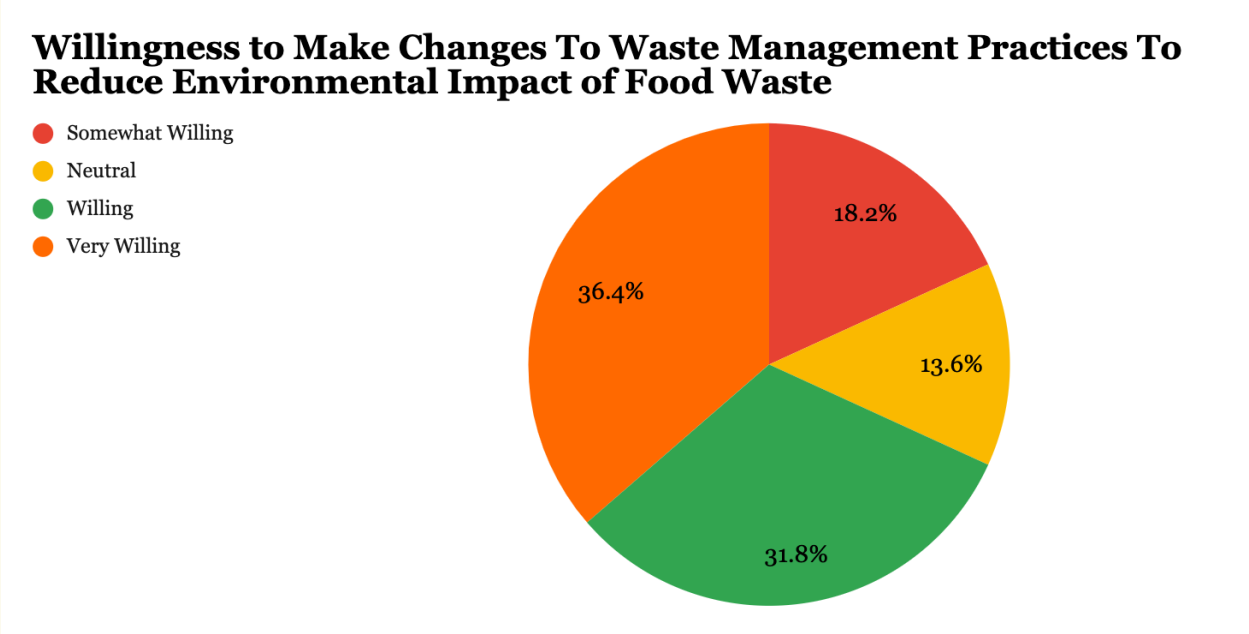

Figure 8 provides insights into the readiness of surveyed restaurants to embrace changes that reduce the environmental impact of food waste. Figure 8 underscores a positive willingness among surveyed restaurants to make changes in their waste management practices to reduce the environmental impact of food waste. This willingness, combined with the absence of strong resistance, bodes well for efforts aimed at promoting sustainability in the restaurant industry. It emphasizes the importance of tailored approaches to engage and support restaurants in their transition towards more eco-friendly waste management practices.

Positive Willingness: The majority of surveyed restaurants express a willingness to make changes in their waste management practices to reduce the environmental impact of food waste. A combined 68.2% of respondents fall into the categories of "willing" (31.8%) and "very willing" (36.4%). This indicates a substantial level of receptivity to adopting more sustainable practices.

No Complete Resistance: A positive aspect of the findings is the absence of respondents categorically opposed to making changes. The fact that 0% of respondents chose "not willing" implies that there is no strong resistance among the surveyed restaurants to implementing environmentally responsible waste management practices.

Neutral Response: Approximately 13.6% of respondents indicated a "neutral" stance, suggesting that they may be open to change but require further information or

incentives to fully commit. This group represents an opportunity for targeted education and engagement efforts.

Opportunity for Engagement: For restaurants looking to implement waste diversion programs or initiatives, Figure 8 signals that a significant portion of the industry is open to change. It provides a promising foundation for outreach and engagement efforts to encourage more restaurants to take steps towards sustainability. The distribution of responses suggests that the shift towards more sustainable waste management practices may occur gradually. Therefore, strategies and programs should be designed to accommodate varying levels of readiness among restaurants.

Overarching Takeaways From The Independent Survey of NYC Restaurants

- **Diversity and Generalizability:** The inclusion of a wide range of restaurant types strengthens the survey's applicability to the NYC restaurant sector. With such diversity, the insights are not limited to a niche segment, allowing for a comprehensive view of waste disposal practices and potential areas for improvement across the industry.
- **Sustainable Waste Management Engagement:** The significant engagement in cooking oil diversion, driven by the presence of dedicated companies and programs, illustrates the beneficial impact of industry support and accessible solutions for restaurants.
- **Low Adoption of Composting:** A concerning finding is the low participation in composting, indicating that most organic waste still ends up in landfills. This shows a substantial gap between current practices and potential sustainability targets.
- **Willingness to Adopt Sustainability:** Despite limited engagement in some waste diversion practices, the high percentage of restaurants with sustainability initiatives suggests an existing foundation of environmental consciousness. This openness to sustainability practices could facilitate the introduction of more comprehensive waste diversion programs.
- **Challenges to Waste Diversion:** Restaurants identify high costs, lack of space, and a dearth of information as significant barriers to adopting waste diversion. These concerns highlight the necessity for tailored solutions that are cost-effective, space-efficient, and well-informed.
- **Financial Incentives and Policy Implications:** The positive response to tax incentives underscores the power of financial motivation in promoting sustainable waste management. This suggests that policy measures offering financial benefits could significantly influence restaurant behaviors.

- **Public Recognition and Certification:** The majority of restaurants view public recognition or certification as beneficial. This indicates that formal acknowledgment of sustainability efforts can encourage waste diversion practices and influence consumer choices.
- **Readiness for Change:** There is a notable readiness among the surveyed restaurants to adopt changes that would mitigate the environmental impact of their waste. No resistance to change suggests that the industry is at least open to considering more eco-friendly practices.
- **Summary:** While there is a clear indication of commitment to sustainability in some areas, the survey reveals a significant opportunity for growth in terms of food waste diversion. High costs, spatial challenges, and lack of information are key barriers that need to be addressed through financial incentives, efficient design, and education. Moreover, the positive inclination toward tax incentives, certification, and overall willingness to engage in more sustainable practices offer a fertile ground for developing effective waste management programs. With tailored strategies that address these specific concerns and leverage existing sustainability efforts, there is a strong potential for NYC restaurants to significantly reduce their environmental footprint through improved waste management practices.

the farmlink project

Solution Proposal

Problem Statement

Despite New York City's efforts to mitigate landfill waste through individual-focused measures and investment in food waste processing infrastructure, the city's restaurants continue to significantly contribute to the food waste crisis. The majority of their food waste is not being diverted from landfills, resulting in substantial economic losses and environmental impact that counteract the city's sustainability initiatives.

Solution Statement

To address the persistent food waste issue in NYC restaurants, my solution is a voluntary incentive-based comprehensive waste diversion program that offers education, financial incentives, and streamlined processes for sustainable waste management. This program will be supported by tailored information resources, space-efficient waste handling tools, and a recognition system for participating businesses, encouraging widespread industry adoption and alignment with the city's environmental goals.

Meeting A Need

This solution meets a need by directly addressing the critical challenges that restaurants face in diverting waste from landfills

- **Education:** Many restaurants lack the necessary information and resources to implement sustainable waste management practices. The provision of education demystifies the process, equipping businesses with the knowledge to make informed decisions.
- **Financial Incentives:** The high costs associated with initiating and maintaining waste diversion practices are a significant barrier, especially for restaurants. The average restaurant in the United States has a profit margin between three and five percent. Financial incentives, such as tax incentives make the adoption of these practices more feasible for restaurants operating with narrow profit margins (“What is the Average Restaurant Profit Margin?”).
    - **Contingency for Tax Benefits:** Restaurants are only incentivized through tax benefits to divert food waste, provided they adhere to contamination-free standards, ensuring a pure waste stream that enhances the efficiency of recycling and composting processes.
- **Space Efficiency:** The limited space in NYC restaurants can make additional waste bins for separation a challenge. Space-efficient tools and compacting solutions would make participation in waste diversion programs more practical.

- **Recognition and Certification:** Public recognition through certification programs incentivizes restaurants by aligning with consumer expectations and differentiating them in the market, serving both environmental and business interests.
- **Regular Pickup Services:** Ensuring consistent and reliable pickup services to manage waste before it becomes a nuisance. This approach mimics the efficiency of a carter, maintaining hygiene standards and minimizing the smell, a critical factor for restaurants in densely populated urban areas like NYC.
- **Environmental Impact:** By diverting food waste that would otherwise be sent to a landfill to a waste-to-resource facility, greenhouse gasses will be prevented from entering the atmosphere. Moreover, the food waste will be transformed into a resource that can either improve soil quality and plant growth, feed animals, or provide fuel for cars and homes. Diverting waste away from landfills holds the potential for a greener, more sustainable future through a circular economy.

What Is Needed To Successfully Build This Solution

- **Stakeholder Engagement:** Collaborate with restaurant owners, chefs, staff, and customers to gain buy-in and commitment to reducing portion sizes.
- **Education and Training:** Implement comprehensive training programs for restaurant staff on the benefits and techniques of portion control.
- **Policy Development:** Work with NYC government and industry associations to develop policies that encourage or incentivize restaurants to reduce portion sizes.
- **Consumer Awareness Campaigns:** Launch educational campaigns to inform consumers about the benefits of smaller portion sizes for both the environment and health.
- **Research and Data Analysis:** Conduct ongoing research to understand consumer behavior and preferences related to portion sizes, and monitor the impact of the implemented changes.
    - **More Information & Data on Waste Management Systems:**
        - Volume and composition of waste generated by restaurants
        - Logistical information on how waste is collected, transported, and processed
        - Information on incentives or financial support programs offered for waste diversion efforts
        - Most up to date regulations and policies related to waste management in NYC

        - Inventory of existing waste-to-resource facilities and services available to restaurants in NYC, especially local organizations that conduct pickups.
    - **More Information % Data on Environmental and Economic Impact of Current Waste Management System:**
        - Environmental data related to landfill usage by restaurants
        - Data on how waste is collected, transported, and processed.
        - Data on the financial costs of waste management
    - **More Data On Benefits Of Food Diversion From Landfills:**
        - Data on the environmental benefits of diverting food waste from landfills.
        - Information on potential revenue streams from diverting food waste.
        - Insights from experts and stakeholders in the waste management and restaurant industries.
    - **More Outreach with NYC Restaurants**
        - Collect more data from restaurant owners to better understand their current waste disposal practices, explore potential barriers to waste separation and food waste diversion, and assess their willingness to adopt more sustainable waste management practices.
- **Waste Tracking & Financial Analysis Tools:** Use waste tracking systems such as The Leanpath Food Waste Prevention Platform to reduce food waste generation regularly measuring waste to evaluate goals and reveal cost-cutting opportunities.
- **Collaboration with Waste Management Services:** Partner with waste management services to ensure any unavoidable waste is disposed of responsibly.

Implementation Steps:

- **Initial Assessment and Buy-In:** Reach out to restaurants and conduct an initial assessment to gauge interest and capacity for program participation. Gain buy-in from restaurant owners and managers by highlighting the benefits, including potential tax incentives.
- **Infrastructure Installation:** Work with each restaurant to install the three-bin system, ensuring it fits within their space and workflow. Provide signage and instructional materials for proper use.
- **Staff Onboarding:** Roll out the educational program to all staff members at participating restaurants. Ensure ongoing support is available for any questions or additional training needs.

- **Logistics Coordination for Compost Pick-Up:** Finalize agreements with waste management services for compost pick-up. Communicate the schedule and process to the restaurants to ensure compliance and efficiency.
- **Monitor and Adapt:** Once the program is in operation, monitor the progress closely. Gather feedback and make adjustments to training, pick-up schedules, or bin placement as necessary.
- **Tax Incentive Implementation:** Create a pitch to NYC government arguing why it is in their best interest both economically and environmentally to encourage restaurants to divert food waste away from landfills. Work with the local government to implement the tax incentive program. Create clear guidelines for restaurants to qualify and maintain their eligibility for the incentives.
- **Reporting and Compliance:** Develop a reporting system for restaurants to track their waste management practices and for the local organization to confirm compliance before providing tax incentives.
- **Feedback and Continuous Improvement:** Establish a feedback loop with all stakeholders involved to continually improve the program's effectiveness and adapt to any challenges encountered.

Steps For Solution Implementation

1. **Set-Up a Three-Bin Waste System:** Coordinate with participating restaurants to install a three-bin waste separation system on their premises.
    a. Provide the necessary bins and clear labeling to guide the separation of compost, recycling, and landfill waste.
2. **Staff Training And Education:**
    a. Develop an educational program that includes materials and workshops about the importance of waste separation and how to do it properly.
    b. Schedule training sessions for restaurant staff, emphasizing the environmental and economic impacts of waste management.
3. **Organizing Compost Pick-Up:**
    a. Partner with a local waste management organization or a designated composting facility to manage regular and efficient pick-up services for the separated compostable waste.
    b. Establish a schedule for pick-up that aligns with the volume of waste produced by the restaurants to avoid odor and space issues.
4. **Financial Incentives For Restaurants:**
    a. Collaborate with the NYC government to structure a tax incentive program for restaurants that actively participate and comply with the waste separation and composting program.

b. Ensure the incentive is substantial enough to motivate restaurants to join and maintain high standards of waste management
c. Incentives are contingent upon the restaurant's adherence to contamination-free standards, ensuring a clean waste stream that enhances the efficiency of recycling and composting processes.

Anticipated Outcomes of Impact Plan

- **Overarching**: A call to action in the form of a presentation, infographics, and op-ed that advocates for the establishment of a voluntary incentive-based food waste diversion program for restaurants in NYC.
- **Short-term:** Call people to action to see that the waste management practices of NYC restaurants are not sustainable or comprehensive, and need to change.
- **Intermediate:** NYC policymakers and stakeholders commit to making a ching in how restaurant waste is handled.
- **Long-term:** NYC adopts an incentive based system that allows restaurants to participate in a program to divert food waste, leading to substantial amounts of waste to be redirected to waste-to-resource facilities.

Results

The current state of my proposal's implementation potential indicates that while it may not be entirely ready for immediate implementation, it is steadily progressing in that direction. Throughout the course of this fellowship, I've gathered substantial data and presented why there is an urgent need to target restaurants as agents capable of significantly reducing food waste destined for landfills. My preliminary program proposal focuses on encouraging restaurants to divert waste voluntarily through incentives provided by the government, recognizing that simply raising awareness about the environmental harm of food waste is insufficient. Restaurant owners prioritize profitability, and without clear incentives and streamlined programs, they are unlikely to change their practices, particularly when faced with potential increased costs compared to competitors.

I successfully completed most of my Objectives and Key Results (OKRs), which included developing a 4 minute presentation, writing an op-ed, and creating infographics. These outputs were supported by compelling evidence from my data collection efforts and interviews with industry experts, highlighting the environmental destructiveness of food waste in landfills and the pressing need for NYC to develop programs targeting restaurants for waste diversion. However, due to time constraints, I was unable to

collect as much data as I would have liked to demonstrate the feasibility of such a program in greater detail.

One special takeaway from this project was the wealth of knowledge I gained and the passion it ignited within me to continue this work in the future. I conducted numerous interviews with industry experts, including composting experts, restaurant owners, and food policy leaders. Securing these interviews required persistence, but they provided valuable insights and strengthened my understanding of the issues at hand.

The results of my actions include initiating important conversations within the industry about reshaping our waste management system and reframing how we perceive waste as a valuable resource for a more sustainable future. My project has shed light on the insufficiencies of the current waste management system, and I anticipate that my forthcoming op-ed will further convince a wider audience of this fact.

Looking ahead, my project has the capacity to move beyond its initial stages. I still need to gather more data and information, but I believe I can reach a point where I can potentially pitch this idea to the NYC government or seek support from grant organizations to develop and implement this program on a larger scale. My Logic Model proved helpful in understanding the causal relationships between my actions, but it could have been more effectively utilized with more comprehensive data.

In summary, this project has laid a strong foundation for further work to transform this idea into a reality, addressing restaurant food waste and contributing to a more sustainable future for NYC and beyond.

Implementation Potential

While the current status of my proposal's implementation potential suggests that while it may not be fully prepared for immediate deployment, it is steadily advancing in that direction, offering valuable insights that could prove beneficial for future implementation.

This impact plan was primarily targeted towards stakeholders such as the government and restaurant owners, urging them to recognize the compelling case for expanding efforts to reduce food waste in landfills and take action as swiftly as possible.

However, the information presented here can benefit a wider audience. It serves as a valuable resource to help readers understand the potential of food waste as a critical resource for a more sustainable future. It also highlights why the current waste management system is failing us all and provides clear avenues for improvement, even if the development and support of my proposed program are not yet fully fleshed out.

This impact plan can be used to demonstrate to the government why it should actively encourage the diversion of food waste from landfills. It emphasizes that this action is not only environmentally responsible, but also economically advantageous, even if further data collection is required to fully support these claims. The strongest takeaway for government action is that relying solely on residential waste diversion mandates is insufficient. Without comprehensive public education and a shift in public perception of waste from "gross" to "resource," the effectiveness of such mandates is limited.

This impact plan underscores the potential of targeting restaurants, which predominantly produce organic waste, as a key group to significantly reduce the volume of food waste ending up in landfills. Their waste stream is incredibly diverse, making them an excellent initial focus. In many ways, restaurants offer a unique opportunity for substantial progress in combating food waste. Readers, particularly government officials and restaurant stakeholders, should give serious consideration to these insights and take proactive measures to not only contribute to a more sustainable waste management future but also initiate the necessary actions to achieve it.

Conclusion

One of the most valuable takeaways from the FIELD Fellowship is the never-ending quest for data. It has become clear that there's always more to learn, and true understanding often comes from both reading and engaging with others directly. My experience at Earth Matter reinforced the significance of hands-on work, where I witnessed the transformative power of compost firsthand. It's not just about improving soil quality and fostering growth; it's about reconnecting with our food and acknowledging the consequences of our wasteful behavior. It's a profound problem when people dispose of waste without fully comprehending its impact on the environment. Working at Earth Matter showed me the dedication of individuals who strive to make the world a better place by diverting waste into compost.

When it comes to data collection on food waste and recovery, I've encountered substantial challenges. Locating reliable data proved to be a significant hurdle, as sources often presented conflicting or vastly different information. The variability in data depending on the source complicated the overall understanding of the issue. This unexpected intricacy demanded more time and effort than initially anticipated. If I were to approach this task anew, I'd emphasize commencing data collection earlier and implementing a more structured approach to meet deadlines effectively. This experience has underscored the importance of meticulous planning and proactive data gathering in navigating such multifaceted subjects.

Throughout this project, I learned about the broken state of our waste management system and our disconnected relationship with food. I confronted the uncomfortable truth that simply knowing the right thing to do isn't enough to motivate behavior change. Incentives, particularly financial ones, are crucial. Despite some discouraging revelations, I also discovered many incredible individuals dedicated to tackling seemingly insurmountable problems. From researchers analyzing restaurant waste to the dedicated staff at Earth Matter sorting through mountains of waste daily, I witnessed firsthand the efforts to address this immense challenge.

Looking ahead, I will continue this work during my next semester of college, gathering more comprehensive data to make a compelling case for reevaluating waste management systems in NYC and the United States. I firmly believe in the potential of restaurants to make a positive impact by reducing greenhouse gas emissions associated with food waste. Globally, food waste ranks as the third-largest greenhouse gas emitter, trailing only China and the United States. My hope is that my work, both now and in the future, can change a few minds, sparking a chain reaction that leads to a more

sustainable future. I encourage people to read this impact plan and recognize the potential it holds, inspiring them to take action too.

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