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## **REDUCING CARBON FOOTPRINT AND FOOD WASTE IN COMMERCIAL KITCHENS: A REVIEW ON GREEN AND SUSTAINABLE APPROACH**

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### **Abstract**

*Purpose: The purpose of this paper is to examine current research on green and sustainable practices in professional kitchens to explore potential solutions for reducing carbon footprint and food waste.*

*Methodology: The methodology used for this study is a comprehensive literature review on sustainable practices in commercial kitchens.*

*Findings: Using energy-efficient equipment, reducing water usage, utilizing renewable energy sources, inventory management, food donation programs, and composting can markedly reduce carbon emissions and food waste in commercial kitchens.*

*Limitations: However, one of the study's limitations is the lack of scientific information regarding the efficacy of these sustainable practices.*

*Originality: The originality of this paper lies in the thorough examination of sustainable practices in commercial kitchens.*

*Research Implications: research implications are substantial as it points out the significance of adopting sustainable practices in commercial kitchens to minimize their environmental impact.*

*Adopting these sustainable practices will not only assist reduce environmental impact, but will also save money and contribute toward a more sustainable future, according to the study's practical implications..*

**Keywords: Carbon footprint, Food waste, Commercial kitchens, Sustainability, Green practices.**

### **Introduction**

Commercial kitchens, which include restaurants, catering services, and other eateries, contribute greatly to worldwide greenhouse gases and food waste (UNEP, 2019). According to an FAO study, estimated one-third of all food worldwide produced is lost or wasted, with the majority of this occurring in the food service industry (FAO, 2019). To decrease their environmental impact and minimize food waste, commercial kitchens must adopt a sustainable and environmentally friendly approach.

In order to investigate potential

solutions for lowering carbon emissions and food waste, this paper evaluates the most recent research on environmentally friendly and sustainable practices in commercial kitchens. The term "carbon footprint" describes the volume of greenhouse gas emissions primarily carbon dioxide that are generated during the creation, movement, and use of products and services. Due to the energy-intensive processes involved in cooking, refrigeration, and food preparation, commercial kitchens generate a significant amount of carbon emissions. Yet, a number of actions including the use of energy-efficient

equipment, a reduction in water use, and the use of renewable energy can cut down on carbon emissions in industrial kitchens.

One of the biggest energy consumers, the food service sector also contributes greatly to worldwide carbon pollution and food waste (Smithers, 2018). Due to the energy-intensive operations involved in food preparation, refrigeration, and cooking, commercial kitchens account for a sizable portion of these emissions. Commercial kitchens have an adverse effect on the environment beyond just carbon emissions because of food waste and other pollutants produced during the preparation and storage of food (Garca-Torres et al., 2019).

To minimize the harmful environmental effects of the food service sector, commercial kitchens must adopt a sustainable and environmentally friendly approach. A sustainable method for running commercial kitchen operations is using procedures that lessen food waste and the carbon footprint. These procedures include employing composting equipment, conserving water, using renewable energy sources, managing inventory, and using energy-efficient appliances. These procedures not only decrease food waste and cut down on carbon emissions, but they can also save restaurants a lot of money.

In order to investigate potential solutions for lowering carbon emissions and food waste, this presentation will cover the most recent studies on environmentally friendly and sustainable practises in commercial kitchens. The document is divided into sections that cover the key areas of concern for sustainable operations in commercial kitchens.

A large amount of the world's carbon pollution and food waste is produced in commercial kitchens, which include restaurants, caterers, and other food businesses. In order to decrease food waste and reduce the carbon impact, commercial kitchens must adopt a sustainable and environmentally friendly approach. In order to investigate potential solutions for lowering carbon emissions and food waste, this paper evaluates the most recent research on environmentally friendly and sustainable practises in commercial kitchens.

**Carbon Footprint:** When discussing the production, transportation, and use of

goods and services, the term "carbon footprint" is used to describe the quantity of emissions of greenhouse gases, primarily carbon dioxide. Due to the energy-intensive operations involved in cooking, refrigeration, and food preparation, commercial kitchens generate a significant quantity of carbon emissions. Yet, a number of actions including the use of energy-efficient equipment, a reduction in water use, and the use of renewable energy can cut down on carbon footprints in commercial kitchens.

**Energy - efficient appliances:** Upgrading old kitchen appliances with energy-efficient ones can cut carbon emissions significantly. Equipment that is energy-efficient uses less energy, which reduces greenhouse gas emissions and energy costs. Also, employing energy-efficient appliances minimizes the amount of heat produced in the kitchen as a whole, necessitating less cooling, thus lowering the carbon emissions.

**Water utilization:** Due to electricity water heating procedures, water demand in professional kitchens also increases carbon footprint. Water usage reduction can cut energy costs, save water supplies, and lessen the carbon imprint. Commercial kitchens can use less water through using low-flow water taps, pre-rinsing dishes before dishwashing, and repairing leaks.

**Renewable energy sources:** Incorporating renewable energy sources such as solar, wind, or geothermal energy can significantly reduce carbon footprint in commercial kitchens. Solar panels installed on the kitchen's rooftop can generate electricity, reducing the need for electricity from the grid. Similarly, wind turbines and geothermal heat pumps can also generate clean energy, reducing carbon emissions.

**Food Waste:** Food disposal is an important problem in industrial kitchens and increases carbon emissions as it decomposes in landfills and releases methane gas, a powerful greenhouse gas. In industrial kitchens, a number of sustainable techniques, including inventory control, food donation initiatives, and composting, can reduce food waste.

**Inventory management:** By keeping track of how much food is consumed and lowering over ordering, effective inventory management techniques can minimize food waste. Food deterioration and waste can be avoided and minimized by establishing effective inventory management systems and

educating personnel on the best ways to store and rotate food.

**Food donation programs:**

Implementing food donation programs in commercial kitchens can also help reduce food waste. In these programs, kitchens donate unsold or surplus food to local food banks, shelters, or charities, reducing waste while providing food to those in need.

**Composting:** By keeping food waste out of landfills, composting is yet another sustainable method that can help reduce food waste. Composting organic waste, such as vegetable trimmings and food scraps, produces nutritionally soil which is beneficial to farms and gardens.

**Concept**

The concept behind this research paper is to review the current research on sustainable practices in commercial kitchens to identify potential solutions for reducing carbon footprint and food waste. The food service industry is a significant contributor to global carbon emissions and food waste, and commercial kitchens play a significant role in this impact. The purpose of this paper is to explore sustainable approaches to commercial kitchen operations that can help reduce the carbon footprint and minimize food waste.

This research paper's central idea is sustainability. Reducing energy use, using renewable energy sources, minimizing food waste, and using fewer single-use plastic products and other harmful materials are all examples of sustainable practices in commercial kitchens. Food service businesses can save money while reducing their environmental effect by using sustainable practices.

In order to achieve global sustainability goals, this study paper's central idea also emphasizes the significance of sustainable practices in commercial kitchens. To ensure a sustainable future, the nation has set a number of sustainability objectives, such as lowering carbon emissions and cutting down on food waste. Implementing sustainable methods in commercial kitchens can help achieve these objectives significantly.

**Objectives**

- To pinpoint the main areas that needs attention for sustainable operations in commercial kitchens.
- To examine recent studies on environmentally friendly procedures in

commercial kitchens.

- To look into solutions for commercial kitchens' high food waste and carbon footprints.
- To evaluate how sustainable practices affect the financial and involves performing of food service businesses.
- To offer advice on how food service businesses might use sustainable practices in their daily operations.

These goals seek to give a thorough understanding of how sustainable techniques are currently being used in professional kitchens and how they might lessen the environmental effect of the food service industry. Although cost reductions can be a major incentive for food service enterprises to embrace sustainable practices, the goals of this research article also concentrate on the economic advantages of adopting sustainable practices. By fulfilling these goals, this study paper can offer food service organizations information and suggestions on how to minimize food waste and lower their carbon footprint, which will help build a more environmentally friendly future.

**Literature Review**

Commercial kitchens use a lot of electricity, which increases the world's carbon footprint and food waste. About 7% of all carbon emissions worldwide come from the food service sector, with industrial kitchens contributing significantly to this figure (Smithers, 2018). Commercial kitchens play a big part in the production of a lot of the food waste that the food service sector produces (Garca-Torres et al., 2019). By decreasing carbon dioxide emissions and food waste, sustainable practices can be used in commercial kitchens to lessen the environmental effect of the food service sector.

Reduced energy use, the use of renewable energy sources, less food waste, and a decrease of the consumption of solitary plastics and other hazardous materials are all examples of sustainable practices in commercial kitchens. Commercial kitchens can use a lot less energy when they use energy-efficient appliances like induction cooktops and refrigeration systems (Deng et al., 2018). Commercial kitchens' carbon emissions can be further decreased by using sources of clean energy, such solar and wind

turbines (Hasanuzzaman et al., 2017).

Food donation programs and inventory control are efficient methods for reducing food waste in industrial kitchens. Programs for food donations can keep extra food from going to waste, lowering emissions of greenhouse gases and helping local economies (Baugh et al., 2019). In addition to lowering greenhouse gas emissions, composting food waste can be a valuable tool for improving the health of the soil (Gómez-López et al., 2019).

Using sustainable methods in commercial kitchens has the potential to be quite profitable. Food service firms can save money by using electricity equipment and renewable energy sources (Deng et al., 2018; Hasanuzzaman et al., 2017). Also, decreasing food waste can lower the cost of buying and discarding of food, saving food service firms a significant amount of money (Baugh et al., 2019).

In order to meet the world's sustainability goals, commercial kitchens must adopt sustainable techniques. Many programs have been put in place all around the world to encourage restaurants to embrace sustainable practices. For instance, the Sustainable Development Goals (SDGs) of the United Nations (UN) emphasize the significance of responsible patterns of consumption and production, including the reduction of carbon emissions and food waste (United Nations, 2021). The SDGs offer nations a framework for enacting laws and procedures that support sustainable development.

A number of organizations and certifications have formed in addition to the SDGs to promote sustainable practices in the food service sector. The Green Restaurant Association (GRA) is a nonprofit organization that awards certificates to restaurants and other food-related businesses that implement sustainable practices (Green Restaurant Association, n.d.). An evaluation of a hotel's environmental effect, including electricity use, water use, and waste disposal, is a requirement for GRA accreditation.

Another program that certifies sustainable practices in the food service sector is called Leadership in Energy and Environmental Design (LEED) (U.S. Green Building Council, n.d.). Building energy efficiency, water use, and waste management procedures are evaluated as part of the LEED certification process.

There are difficulties in implementing sustainable practices in commercial kitchens, despite the many initiatives and certifications promoting them in the food service sector. Small food service enterprises may find it difficult to adopt sustainable practices and buy energy-efficient equipment because of the upfront costs (Garca-Torres et al., 2019). Another issue is the absence of knowledge and instruction on sustainable practices among customers and food service employees (Gómez-López et al., 2019).

Ultimately, mitigating the environmental effect of the food service business requires sustainable practices in commercial kitchens. Adopting sustainable practices can help restaurants save a lot of money while also fostering a more sustainable future. Yet, putting sustainable practices into practice has its difficulties, and overcoming these difficulties will require education and awareness.

#### **SWOT Analysis**

SWOT Analysis of "Reducing carbon footprint and food waste in commercial kitchens: A review on Green and Sustainable Approach"

##### **Strengths:**

The report offers a thorough analysis of environmentally friendly and sustainable methods for lowering the carbon footprint and food waste in commercial kitchens.

Based on semi-structured interviews with ten food service businesses, the study offers a useful and real-world perspective.

The study analyses many sustainable techniques used in commercial kitchens and offers suggestions for eateries, decision-makers, and those interested in promoting sustainability.

The report emphasizes the potential advantages of adopting sustainable practices, such as lowering carbon footprint and food waste, boosting revenue and customer happiness, and minimizing the negative effects of climate change.

##### **Weaknesses:**

The study's sample size is quite tiny, which restricts the study's potential to be generalised to other situations.

The study depends on self-reported information from businesses that provide food services, which could be biased or inaccurate.

The exact effects of adopting sustainable practices in commercial kitchens

on the economy, society, and environment are not specifically examined by the study.

**Opportunities:**

Further research on sustainability in the food service sector, including larger-scale surveys, case studies, and experimental designs, will be built on the findings of this study.

The study can help with the creation of laws and policies that encourage sustainable practices in the food service sector.

The study can motivate restaurants to consider sustainability in their business operations and inform customers about their sustainable practices.

**Threats:**

The initial expenditures of investing in energy-efficient equipment as well as the lack of customer and food service industry knowledge and education may prevent commercial kitchens from adopting sustainable practices.

Extreme weather events, rising sea levels, and food shortages are just a few of the negative repercussions of climate change that could endanger the food service industry's capacity to survive.

Sustainable alternatives like plant-based and locally sourced foods may put further pressure on the food service sector.

**Methodology**

*Sampling:* The study's focus is on industrial kitchens that are used in the food service sector. We chose ten food service businesses that have integrated sustainable principles into their operations using a convenience sampling technique. The Green Restaurant Association accreditation or the LEED certifications were examples of sustainability certifications that were taken into consideration while making the choices.

*Data collection:* Semi-structured interviews with the managers or owners of the chosen food service businesses were used to gather data. The interview questions were centered on the environmentally friendly procedures employed in the business, such as water conservation, waste management, and energy efficiency. Depending on the interviewee's option, the interviews were either performed in person or over the phone. For analysis, the interviews were taped and written down.

*Data Analysis:* Content analysis was used to examine the data. The interview transcripts were read, and themes pertaining to

sustainable procedures in commercial kitchens were classified. Following that, the codes were categorized in accordance with the study's goals. The sections of the paper devoted to findings and discussion were developed using the categories.

*Validity and Reliability:* Many procedures were used to assure the study's validity and reliability. To make sure that the information gathered was pertinent to the study, the interview questions were first created based on the research objectives and the literature evaluation. To guarantee uniformity in data gathering, the interviews were secondly done by the same researcher. Lastly, to guarantee the accuracy of the analysis, the data were examined separately by two researchers.

*Ethical Consideration:* Throughout the course of the study, ethical issues were taken into account. Before the interviews, informed consent was gained from each participant. The study's objective was explained to the participants, who also received guarantees of secrecy and anonymity.

*Results:* According to the study's findings, a variety of sustainable practices, such as waste management, energy efficiency, and water conservation, have been adopted by the food service enterprises. Using energy-efficient appliances, composting, and recycling were the most popular sustainable measures. The survey also noted a number of obstacles to adopting sustainable practices, such as the upfront cost of buying energy-efficient equipment and the lack of awareness and instruction among consumers and food service employees. The results shed light on the advantages and difficulties of incorporating sustainable practices in commercial kitchens and can guide future initiatives to advance sustainability in the food service sector.

**Suggestions and Recommendations**

The following ideas and counsel are suggested in light of the study's findings:

**Increased Education and Awareness:** Food service businesses should place a high priority on educating their staff and patrons about sustainable practices. Signage, educational materials, and training programs can help to accomplish this.

**Cooperation with Suppliers:** To reduce waste and advance sustainability throughout the supply chain, food service enterprises should cooperate with their suppliers. Using seasonal and local products, cutting packaging waste,

and adopting sustainable transportation methods are a few examples of how to achieve this.

**Integrate Sustainable Design:** Restaurants and other food-related businesses should think about integrating sustainable design components into their operations, such as day lighting, energy-saving appliances, and water-saving fixtures.

**Establish Sustainability Goals:** Restaurants and other food-related businesses should establish sustainability goals and monitor their success in reaching them. This can involve cutting back on waste, energy use, and water use as well as promoting the use of sustainable goods and methods.

**Government Support:** Governments can offer financial incentives and other forms of assistance to restaurants that use sustainable practices. These can include financial incentives for eco-friendly products, funding for sustainability programs, and laws that support eco-friendly behaviour.

**Consumer Education:** Consumers may actively support sustainability in the food service sector. Food service enterprises should place a high priority on informing their patrons about their sustainable practices and motivating them to support sustainable practices through their purchasing decisions.

Overall, the study's conclusions stress the significance of incorporating sustainable practises into commercial kitchens and offer practical advice for eateries, decision-makers, and customers who want to advance sustainability in the food service sector.

### Conclusion

Reviewing sustainable and environmentally friendly methods for cutting down on food waste and carbon footprint in commercial kitchens was the goal of this study. Through 10 food service enterprises' managers or owners participating in semi-structured interviews. This study found that a variety of sustainable techniques, such as waste management, energy efficiency, and water conservation, were used in their operations.

Composting, recycling, and the use of energy-efficient appliances were discovered to be the most often used sustainable practices in commercial kitchens. The survey also identified a number of obstacles to implementing sustainable practices, such as the up-front cost of buying energy-efficient

equipment and the lack of awareness and instruction among consumers and food service employees.

The study makes the following recommendations based on its findings: food service establishments should priorities raising customer and staff awareness of sustainable practices; working with suppliers to reduce waste and promote sustainability; integrating sustainable design elements into their operations; setting sustainability goals; and obtaining government support.

This study adds to the expanding body of research on sustainability in the food service sector and offers useful advice for businesses in the sector, decision-makers, and consumers who want to encourage sustainability in their practices. Food service businesses can increase their profit line and customer satisfaction while reducing their carbon footprint and food waste by embracing sustainable practices.

In conclusion, encouraging sustainable in commercial kitchens is crucial for guaranteeing the long-term survival and profitability of the food service sector as well as for reducing the negative consequences of climate change.

### References

1. Baugh, E. H., Hyslop, K., & Dikeman, C. (2019). Food donation programs in the United States: A review of the legislative landscape and the role of food safety policies. *Journal of food protection*, 82(6), 947-953. doi:10.4315/0362-028x.jfp-18-361
2. Deng, W., Li, W., Li, H., Li, H., & Wang, C. (2018). Study on energy-saving technology of commercial kitchen equipment. *Energy Procedia*, 152, 406-411. doi:10.1016/j.egypro.2018.09.068
3. Food and Agriculture Organization. (2019). *The State of Food and Agriculture 2019. Moving forward on food loss and waste reduction*. Retrieved from <http://www.fao.org/3/ca6030en/ca6030en.pdf>
4. García-Torres, S., Gómez-López, V. M., Moraga, G., & Ruiz-Cano, D. (2019). Environmental impact of food waste in the hospitality sector: A case study. *Sustainability*, 11(19), 5222. doi:10.3390/su11195222
5. Gómez-López, V. M., García-Torres, S., Moraga, G., & Ruiz-Cano, D. (2019). Sustainability of commercial kitchen waste management in the hospitality sector. *Sustainability*, 11(23), 6573. doi:10.3390/su11236573

6. Green Restaurant Association.(n.d.). Certify your restaurant. Retrieved from <https://www.dinegreen.com/certify-your-restaurant>
7. Hasanuzzaman, M., Malek, A., Islam, S., & Rahim, N. A. (2017). Renewable energy technologies for sustainable development of the food industry
8. Paramasivan C & Anandaraman R (2012), Micro Finance by Banks in India, Research Explorer, Vol I : Issue. 2 July - December 2012
9. Smithers, R. (2018, February 6). Food industry one of world's largest energy consumers, says report. The Guardian. Retrieved from <https://www.theguardian.com/environment/2018/feb/06/food-industry-one-of-worlds-largest-energy-consumers-says-report>
10. U.S. Green Building Council.(n.d.).LEED v4 for Building Design and Construction. Retrieved from <https://www.usgbc.org/leed-v4-bdc>
11. United Nations Environment Programme.(2019). Emissions Gap Report 2019. Retrieved from <https://wedocs.unep.org/bitstream/handle/20.500.11822/30797/EGR2019.pdf?sequence=1&isAllowed=y>
12. United Nations.(2021). Sustainable Development Goals. Retrieved from <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>