

Research Article

Innovation in Surplus Food Management for Organic Waste Reduction and Sustainable Development

Erfin Budianto¹, Reska Pragusta²

1. PT Paiton Energy, Indonesia; EBudianto@pomi.co.id
2. PT Paiton Energy, Indonesia; RPragusta@pomi.co.id

Corresponding Author, Email: EBudianto@pomi.co.id (Erfin Budianto)

Abstract

The Berkatan program, implemented by PT Paiton Energy, is an innovative initiative aimed at reducing food waste through the redistribution of surplus food from the company's cafeteria to the local community. This qualitative study, based on literature review and library research, analyzes the environmental, economic, and social impacts of the program. Data from 2024 and 2025 indicate that the program successfully redistributed 172 kg and 224.8 kg of surplus food, respectively, reducing food waste by 0.172 tons and 0.225 tons. These actions contribute to achieving Sustainable Development Goal (SDG) 12.3.1.a, which targets the reduction of food waste at the consumer level. Moreover, the program has resulted in cost savings of approximately Rp 104,101.95 over two years, demonstrating the economic benefits of food waste management. Socially, the Berkatan program provided food donations worth Rp 22,550,000 to local communities, helping to alleviate food insecurity and contributing to efforts to combat malnutrition. The study highlights the program's positive impact on the company's value chain, with surplus food now integrated into the company's sustainable operations. This shift not only reduces environmental waste but also strengthens PT Paiton Energy's corporate social responsibility (CSR) and sustainability culture. The program also encourages behavior change among employees and the community, fostering a more sustainable mindset.

Keywords: Food Waste Reduction, CSR, Sustainable Development Goals, Surplus Food Redistribution, Corporate Social Responsibility, Waste Management, Sustainability



INTRODUCTION

Waste management, particularly organic waste, has become a global issue that requires immediate attention, especially in the industrial and consumption sectors (Ghisellini et al., 2016). In Indonesia, organic waste management continues to face significant challenges, with food waste being a substantial concern in various sectors, including corporate cafeterias (Cahyani et al., 2022). Improperly managed organic waste not only adds pressure on landfills but also contributes to the production of methane (CH₄) gas, which is harmful to the environment (Ingole & Dhawale, 2021). Therefore, there is a need for innovative solutions that address food waste management while also providing broader social benefits (Xiao et al., 2024).

One possible solution is the food donation program, which redirects surplus food that is still safe for consumption to those in need (Devaraj & Balasubramanian, 2025). This approach has been proven effective in reducing food waste while contributing to the welfare of communities (Jethwa et al., 2018). The Berkatan program, implemented by PT Paiton Energy, aims to utilize surplus food from the company's cafeteria to donate to surrounding communities, reducing waste and enhancing the company's social responsibility efforts. This program is aligned with the Sustainable Development Goals (SDGs), specifically related to reducing organic waste and improving the quality of life in local communities (UN, 2015).

While numerous studies have examined food waste management at the household and food industry levels (Buzby et al., 2014), there is limited research exploring food surplus management in corporate cafeterias as a means of reducing organic waste and contributing to sustainable development. Previous studies have primarily focused on waste reduction without addressing the social impact of redistributing surplus food to communities. Therefore, this study seeks to fill this gap by exploring the success of the Berkatan program, which not only reduces waste but also provides significant social benefits.

This study is important due to the increasing global awareness of organic waste and food waste management issues. Programs like Berkatan demonstrate how companies can actively contribute to waste reduction while providing positive impacts to local communities. Such programs could serve as a model for other companies seeking to contribute to sustainable development goals, particularly in relation to waste management and community welfare.

Research on organic waste management has been extensively conducted, with a focus on various approaches to reducing waste, including food surplus management (Ng et al., 2019). Some studies highlight the importance of food donation programs in reducing food waste and improving community welfare (Aitken et al., 2024). Additionally, corporate social responsibility (CSR) research indicates that sustainable waste management can improve a company's reputation and add value in terms of social responsibility (Millon, 2015). However, few studies have explored the direct relationship between food surplus management in corporate cafeterias, organic waste reduction, and the social benefits of food donations.

This study presents an innovative approach by combining organic waste management with a social program through food surplus donation. The innovation lies not only in waste reduction but also in integrating CSR efforts that directly benefit

the surrounding communities. The Berkatan program at PT Paiton Energy optimizes the value chain by redirecting surplus food that would otherwise be discarded, transforming it into a valuable resource for the community, while also supporting sustainable development goals.

The main objective of this study is to analyze the impact of the Berkatan program on organic waste reduction, cost savings, and the company's social contribution. Additionally, the study aims to assess the effectiveness of the program in reducing food waste and to identify the potential social benefits derived from distributing surplus food to the local community.

This study is expected to contribute to the literature on organic waste management and food waste reduction strategies, as well as inform other companies about the benefits of implementing CSR programs focused on waste reduction. Furthermore, the findings from this study could serve as a reference for developing similar programs in other companies, which can provide not only environmental benefits but also social welfare for communities.

METHODS

This study employs a case study methodology to analyze the implementation and outcomes of the Berkatan program at PT Paiton Energy, which aims to reduce organic waste through the donation of surplus food from the company's cafeteria to local communities. The study focuses on the procedural aspects of food surplus management, the distribution of food, and the program's impact on waste reduction, cost savings, and social contributions.

The implementation of the Berkatan program follows a structured process, which includes several key stages: identification of surplus food, categorization of food suitable for donation, packaging according to food safety and hygiene standards, and distribution to the surrounding community. Surplus food is identified daily based on the volume of unconsumed meals produced by the cafeteria, typically resulting from fluctuations in demand or overproduction as a precautionary measure (e.g., an additional 5% to anticipate unforeseen consumption). Once identified, the food is sorted into categories to ensure that it meets safety standards for consumption. The food is then packaged hygienically in line with established protocols to maintain its dignity-based approach, ensuring that it is presented respectfully and in a manner that maintains the dignity of the recipients. Subsequently, the food is distributed through an established partnership with a third-party social organization that manages the logistical aspect of food delivery.

Data collection for this study was based on both qualitative and quantitative methods. Qualitative data were obtained through interviews and consultations with key stakeholders, including cafeteria managers, the facility team, and representatives from the third-party distribution organization. These interviews focused on the processes involved in identifying, packaging, and distributing surplus food, as well as the perceived challenges and successes of the program. Quantitative data were collected through tracking the amount of food produced, the volume of surplus food identified for donation, and the quantities of food distributed to the community.

Additionally, data on waste reduction, cost savings in waste management, and the social value created through food donations were also analyzed.

To quantify the impact of the program, the study utilized data from the Life Cycle Assessment (LCA) conducted for the period 2024–2025, which provided metrics on food production, surplus food distribution, waste reduction, and associated costs. The study calculated the amount of food surplus that was redistributed to the community, using the weight per package of food to estimate the total weight and volume of food diverted from waste. Furthermore, the study examined the potential savings in waste disposal costs and estimated the social value generated from the food donations, based on the cost of meal box equivalents.

This approach is consistent with best practices in waste management and food donation strategies, which emphasize a systematic and transparent methodology for tracking food donations and the reduction of waste (Montoli et al., 2023). The methodology also aligns with principles of corporate social responsibility (CSR), demonstrating how companies can integrate waste reduction and social contributions into their operational models (Biggi et al., 2024). The combination of qualitative insights and quantitative metrics provides a comprehensive evaluation of the program's effectiveness in achieving its goals of waste reduction and social impact.

RESULT AND DISCUSSION

The Berkatan program, an innovative initiative implemented by PT Paiton Energy, has yielded significant results in terms of organic waste reduction, cost savings, and the generation of social value. By donating surplus food from the company's cafeteria, the program not only addresses food waste but also contributes to the well-being of the surrounding community. This section provides a detailed examination of the program's outcomes, focusing on its effectiveness in reducing food waste, lowering waste management costs, and generating social impact.

Food Waste Reduction

One of the most important outcomes of the Berkatan program is its contribution to reducing food waste. The quantification of surplus food that was identified and distributed to the community demonstrates the program's success in diverting food from landfills. Data for the year 2024 indicates that a total of 391 surplus food packages, amounting to 172 kilograms of food, were donated, while 511 packages (224.8 kilograms) were distributed in 2025. This diversion of food not only reduces the environmental burden associated with food waste but also aligns with global sustainability goals, specifically the SDG target 12.3.1.a, which focuses on reducing food waste at the consumer level (UN, 2015).

The reduction in food waste also has significant environmental implications. When organic waste, such as food, is disposed of in landfills, it decomposes anaerobically, producing methane (CH₄), a potent greenhouse gas (Ingole & Dhawale, 2021). By redirecting surplus food to communities, the program minimizes the potential for methane emissions, contributing to efforts to mitigate climate change. This shift in food disposal practices reflects the growing recognition of the

need for sustainable waste management strategies in both the corporate and public sectors (Ghisellini et al., 2016).

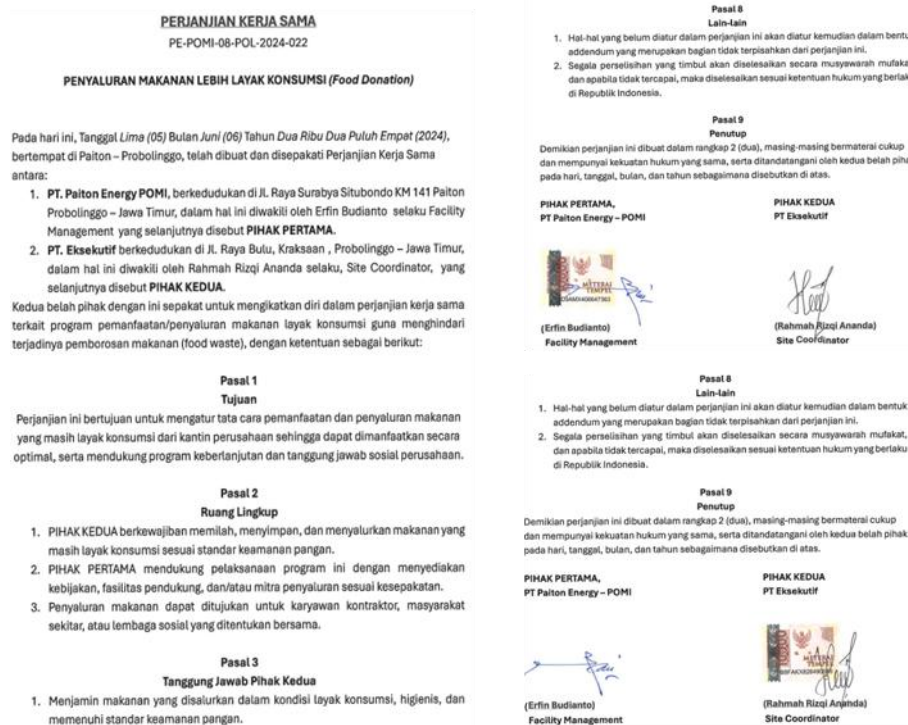


Figure 1. Document of the Agreement with the Third Party

As shown in Figure 1, the agreement with the third-party distributor details the formal process of food donation, ensuring food safety and hygiene standards are met during the entire distribution process. This agreement sets the framework for the program's execution, emphasizing the collaboration between PT Palton Energy and external partners for effective food redistribution.

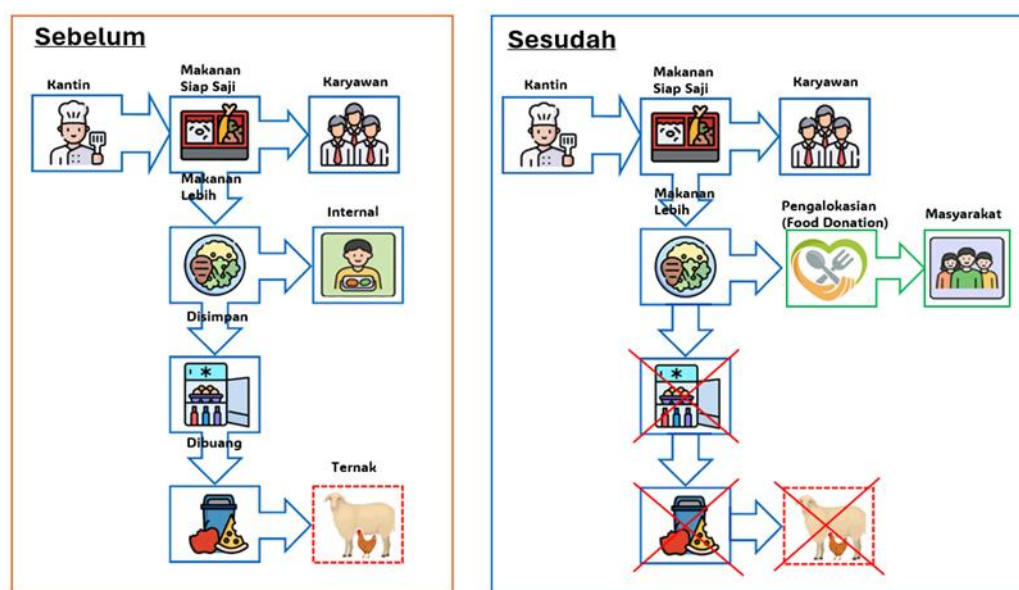


Figure 2. Diagram or Visual Representation of the Innovation Implemented

Figure 2 visually represents the key steps in the Berkatan program's food surplus management process. It provides a clear and concise overview of how surplus food is identified, packaged, and distributed, which is crucial for understanding the innovation behind the program and its contribution to reducing food waste.

Cost Savings in Waste Management

In addition to its environmental benefits, the Berkatan program has led to tangible cost savings for the company in terms of waste management. The reduction in food waste directly influences the costs associated with waste transportation and disposal. According to the program's data, PT Paiton Energy saved approximately Rp 28,807 in waste disposal costs in 2024 and Rp 75,295 in 2025, leading to a total savings of Rp 104,101.95 over the two years. This cost reduction is a direct result of diverting food from the waste stream and reducing the amount of organic waste that needs to be processed and transported to landfills.



Figure 3. Documentation Photo of the Berkatan Program Process



Figure 4. Documentation Photo of the Berkatan Program Distribution

Figures 3 and 4 visually represent the stages of food donation, from the initial identification and packaging of surplus food to its distribution to local communities. These images illustrate the meticulous care taken to ensure the food's quality and safety before it reaches its recipients, reinforcing the dignity-based approach used throughout the program.

The financial savings associated with waste reduction support the argument that sustainable waste management practices are not only environmentally responsible but also economically viable for businesses (Aiguobarueghian et al., 2024). Furthermore, these savings can be reinvested into other sustainability initiatives or used to further enhance the company's social programs, creating a positive feedback loop of environmental and financial benefits.

Social Impact and Corporate Social Responsibility (CSR)

Beyond the environmental and financial outcomes, the Berkatan program has generated substantial social value by providing surplus food to local communities, which contributes to the improvement of public health and nutrition. By redistributing food that would otherwise be wasted, the program helps alleviate food insecurity and supports efforts to combat malnutrition, particularly in areas with high rates of stunting. This aligns with the broader goal of corporate social responsibility (CSR), where businesses take proactive steps to address social issues and contribute to the well-being of the communities in which they operate (Millon, 2015).

The value of the food donated through the Berkatan program is estimated at Rp 9,775,000 for 2024 and Rp 12,775,000 for 2025, resulting in a total social value of Rp 22,550,000 over the two years. This figure underscores the significant impact of the program in terms of its contribution to the community, as it not only reduces waste but also directly enhances the quality of life for individuals who benefit from the donations. Socially, the program strengthens the company's reputation as a responsible corporate citizen, improving its image and fostering goodwill among local stakeholders.

The financial value of the program's donations was calculated based on the cost of a meal box, which was estimated at Rp 25,000 per portion. The program distributed a total of 391 and 511 food packages in 2024 and 2025, respectively, equating to a total donation value of Rp 9,775,000 in 2024 and Rp 12,775,000 in 2025.

Table 1 below presents the detailed data on food production, surplus distribution, and estimated reduction in food waste for each month during the period from July 2024 to June 2025:

Table 1. Calculation of Surplus Food Distributed and Waste Reduction (2024–2025)

Month	Total Production (Portions)	Total Weight of Food Produced			Surplus Food Distributed (Portions)	% of Total Production	Food Waste Reduction	
		gram	kg	Ton			Kg	Ton
Jul-24	6967	3.065.480,00	3.065,48	3,07	82	1,18	36,1	$3,61 \times 10^{-2}$
Aug-24	6919	3.044.360,00	3.044,36	3,04	34	0,49	15,0	$1,50 \times 10^{-2}$
Sep-24	6975	3.069.000,00	3.069,00	3,07	90	1,29	39,6	$3,96 \times 10^{-2}$
Oct-24	6930	3.049.200,00	3.049,20	3,05	45	0,65	19,8	$1,98 \times 10^{-2}$

Month	Total Production (Portions)	Total Weight of Food Produced			Surplus Food Distributed (Portions)	% of Total Production	Food Waste Reduction	
		gram	kg	Ton			Kg	Ton
Nov-24	6959	3.061.960,00	3.061,96	3,06	74	1,06	32,6	$3,26 \times 10^{-2}$
Dec-24	6951	3.058.440,00	3.058,44	3,06	66	0,95	29,0	$2,90 \times 10^{-2}$
Jan-25	6943	3.054.920,00	3.054,92	3,05	58	0,84	25,5	$2,55 \times 10^{-2}$
Feb-25	6981	3.071.640,00	3.071,64	3,07	96	1,38	42,2	$4,22 \times 10^{-2}$
Mar-25	7020	3.088.800,00	3.088,80	3,09	135	1,92	59,4	$5,94 \times 10^{-2}$
Apr-25	6918	3.043.920,00	3.043,92	3,04	33	0,48	14,5	$1,45 \times 10^{-2}$
May-25	6970	3.066.800,00	3.066,80	3,07	85	1,22	37,4	$3,74 \times 10^{-2}$
Jun-25	6989	3.075.160,00	3.075,16	3,08	104	1,49	45,8	$4,58 \times 10^{-2}$

These data demonstrate the scale of the food redistribution efforts and their direct impact on reducing food waste. The program's ability to consistently redistribute surplus food every month helps ensure that less food goes to waste, contributing significantly to sustainable food systems and community well-being.

Sustainability and Long-Term Benefits

The long-term benefits of the Berkatan program are likely to extend far beyond immediate waste reduction and social value. As companies increasingly recognize the importance of sustainability in their operations, programs like Berkatan offer a model for integrating social and environmental considerations into business strategies. By promoting waste reduction and supporting community health initiatives, PT Paiton Energy contributes to the global movement towards a circular economy, where resources are used efficiently and waste is minimized (Ghisellini et al., 2016).

Moreover, the success of the Berkatan program highlights the potential for corporate social responsibility initiatives to create synergies between business objectives and societal needs. In the case of PT Paiton Energy, the program has not only reduced waste and costs but also provided a meaningful way to contribute to the achievement of the Sustainable Development Goals (SDGs), particularly those related to responsible consumption and production (SDG 12) and the reduction of hunger (SDG 2).

Discussion

The findings of the Berkatan program at PT Paiton Energy demonstrate a significant shift in both the environmental and social dimensions of food surplus management. The program has effectively reduced food waste by redistributing surplus food to local communities, thus aligning with global sustainability targets,

specifically the SDG 12.3.1.a, which calls for halving global per capita food waste at the consumer and retail levels (UN, 2015). In 2024, the program successfully redirected 172 kg of food waste to community donations, with 224.8 kg being redistributed in 2025. This reduction in food waste aligns with the growing global recognition of the environmental cost of food waste. As food decomposes in landfills, it produces methane (CH₄), a potent greenhouse gas contributing to climate change (Filonchik et al., 2024). By diverting this food to the community, the Berkatan program mitigates these environmental impacts by reducing methane emissions that would otherwise occur in landfills.

The reduction in food waste through the Berkatan program not only addresses environmental concerns but also highlights the effectiveness of corporate responsibility initiatives in reducing operational costs. In 2024 and 2025, PT Paiton Energy saved a total of Rp 104,101.95 in waste management costs, demonstrating the economic viability of sustainable waste management practices. These cost savings underscore the growing trend of businesses recognizing sustainability as not only a moral imperative but also an economically sound strategy (Ukpoju et al., 2024). Businesses that implement waste-reducing strategies, such as food donation programs, find that they can generate long-term financial benefits while contributing positively to their communities.

Additionally, the social impact of the Berkatan program is significant. The redistribution of surplus food provides a valuable resource to local communities, where food insecurity and malnutrition remain pressing issues. The program has contributed approximately Rp 22,550,000 worth of food donations over two years, underscoring its substantial social value. These findings align with global research showing that food donation programs are a critical strategy for alleviating hunger and addressing malnutrition (Benson, 2021). Specifically, the redistribution of surplus food not only improves access to nutritious meals for communities but also contributes to the reduction of stunting, a key issue in many developing regions (UNICEF, 2020).

The findings of this program suggest that companies can play a key role in solving pressing social and environmental challenges. Corporate social responsibility (CSR) programs such as Berkatan are integral to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) and SDG 12 (Responsible Consumption and Production). These programs can help companies enhance their reputation as responsible corporate citizens, fostering goodwill and trust within their communities. However, it is important to note that the long-term success of such programs depends on the continued commitment of companies to maintaining and expanding these initiatives. Sustainability in corporate programs is not only about immediate benefits but also about building a culture of responsibility that ensures lasting change (Ghisellini et al., 2016).

In conclusion, the results of the Berkatan program provide compelling evidence that corporate initiatives can effectively address the dual challenges of food waste and social welfare. By reducing food waste, mitigating environmental impact, and providing nutritional support to communities, the program exemplifies how businesses can contribute to both global sustainability efforts and local community

well-being. As global awareness of the importance of sustainability grows, such programs offer an effective model for integrating environmental and social considerations into business practices.

CONCLUSION

The Berkatan program implemented by PT Paiton Energy has demonstrated remarkable success in reducing food waste, lowering waste management costs, and generating social value. The program's impact is evident through the significant reduction in food waste, with 172 kg of food saved in 2024 and 224.8 kg in 2025, contributing to a total reduction of 0.172 tons and 0.225 tons, respectively. This diversion of food from landfills has not only reduced environmental burdens but also aligned with the global target of halving food waste at the consumer level. Furthermore, the program has led to a reduction in methane emissions from food waste, contributing to the mitigation of climate change. Financially, the program has resulted in savings of approximately Rp 104,101.95 in waste disposal costs over two years, further highlighting its economic viability.

The social value generated by the Berkatan program is also significant. In 2024 and 2025, PT Paiton Energy donated a total value of Rp 22,550,000 worth of food, benefiting local communities and contributing to efforts to reduce food insecurity and malnutrition. By redistributing surplus food to those in need, the program has not only addressed a key social issue but also strengthened the company's image as a responsible corporate citizen.

In addition to the immediate environmental, financial, and social benefits, the Berkatan program has created long-term value through a transformation in the company's value chain. Surplus food that would have otherwise been wasted is now integrated into the company's operations as part of a sustainable process. This shift not only reduces food waste but also supports the achievement of sustainable development goals (SDGs), particularly SDG 12 (Responsible Consumption and Production). The program also fosters a culture of sustainability within the company, resulting in positive behavioral changes among employees and the local community. These changes reflect a broader commitment to sustainability and social responsibility, enhancing the company's long-term impact.

Recommendations for Future Research

While the Berkatan program has proven to be effective in its current form, future research could focus on evaluating the scalability and replicability of the program in other corporate settings. A comparative analysis of food donation programs across different industries would provide valuable insights into the potential for broader implementation. Additionally, investigating the long-term social impacts, such as improvements in community health and nutrition, would strengthen the understanding of the program's overall effectiveness. Further studies could also explore the integration of technology in the food redistribution process, such as digital platforms to streamline donation efforts, track surplus food more efficiently, and enhance transparency. Lastly, exploring the behavior change in

communities that receive the donations could offer deeper insights into how such initiatives impact social perceptions and foster sustainable practices in society.

Bibliography

- Aiguoarueghian, I., Adanma, U. M., Ogunbiyi, E. O., & Solomon, N. O. (2024). Waste management and circular economy: A review of sustainable practices and economic benefits. *World Journal of Advanced Research and Reviews*, 22(2), 1708–1719.
- Aitken, J. A., Alaybek, B., Hartman, R., Mika, G., Leib, E. M. B., Plekenpol, R., Branting, K., Rao, D., Leets, L., & Sprenger, A. (2024). Initial assessment of the efficacy of food recovery policies in US States for increasing food donations and reducing waste. *Waste Management*, 176, 149–158.
- Benson, T. (2021). Making the achievement of zero hunger and malnutrition a policy priority: A critical assessment of recent national Zero Hunger Strategic Reviews from Asia and the Pacific. *Asia Pacific Journal of Clinical Nutrition*, 30(2), 316–328.
- Biggi, G., Principato, L., & Castellacci, F. (2024). Food waste reduction, corporate responsibility and national policies: evidence from Europe. *British Food Journal*, 126(13), 470–485.
- Buzby, J. C., Farah-Wells, H., & Hyman, J. (2014). The estimated amount, value, and calories of postharvest food losses at the retail and consumer levels in the United States. *USDA-ERS Economic Information Bulletin*, 121.
- Cahyani, F. A., Wulandari, P., & Putri, N. A. (2022). Food waste management regulation in Indonesia to achieve sustainable development goals. *IOP Conference Series: Earth and Environmental Science*, 978(1), 12022.
- Devaraj, L., & Balasubramanian, P. (2025). Optimizing the Redistribution of Surplus Food in the Hospitality Sector: A Paradigm Shift Through the Implementation of Food Donation Systems for a Sustainable Future. *Sustainability*, 17(8), 3556.
- Filonchyk, M., Peterson, M. P., Zhang, L., Hurynovich, V., & He, Y. (2024). Greenhouse gases emissions and global climate change: Examining the influence of CO₂, CH₄, and N₂O. *Science of The Total Environment*, 935, 173359.
- Ghisellini, P., Cialani, C., & Ulgiati, S. (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production*, 114, 11–32.
- Ingle, N. W., & Dhawale, V. R. (2021). Methane production from organic waste—an overview. *J Water Resour Eng Pollut Stud*, 6(3).
- Jethwa, D., Agrawal, A., Kulkarni, R., & Raut, L. (2018). Food wastage reduction through donation. *International Journal of Recent Trends in Engineering and Research*, 4(03), 1457–2455.
- Millon, D. (2015). *Corporate social responsibility and environmental sustainability*.
- Montoli, P., Ares, G., Aschemann-Witzel, J., Curutchet, M. R., & Giménez, A. (2023). Food donation as a strategy to reduce food waste in an emerging Latin American country: a case study in Uruguay. *Nutrire*, 48(1), 22.
- Ng, K. S., Yang, A., & Yakovleva, N. (2019). Sustainable waste management through synergistic utilisation of commercial and domestic organic waste for efficient

resource recovery and valorisation in the UK. *Journal of Cleaner Production*, 227, 248–262.

Ukpoju, E. A., Adefemi, A., Adegbite, A. O., Balogun, O. D., Obaedo, B. O., & Abatan, A. (2024). A review of sustainable environmental practices and their impact on US economic sustainability. *World Journal of Advanced Research and Reviews*, 21(1), 384–392.

UN. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations.

UNICEF. (2020). *Improving child nutrition: The achievable imperative for global progress*. United Nations Children's Fund (UNICEF).

Xiao, N., Kong, L., Wei, M., Hu, X., & Li, O. (2024). Innovations in food waste management: from resource recovery to sustainable solutions. *Waste Disposal & Sustainable Energy*, 6(3), 401–417.