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Sustainable practices in vegan restaurants in Yogyakarta regarding food sourcing, food packaging and waste

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I declare that this thesis is my own work. I confirm that the research, analysis, and findings presented are the results of my independent efforts, and all sources and literature used have been properly cited.

I also acknowledge the use of AI tools for grammar and stylistic refinement. Specifically, ChatGPT was used for stylistic suggestions, and the university's Grammarly account was used for both grammar and stylistic adjustments.

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Abstract

This thesis explores the extent to which vegan restaurants in Yogyakarta implement sustainable practices in food sourcing, packaging, and waste management. The theoretical framework delves into sustainability within the restaurant industry, highlighting specific practices related to sourcing, packaging, and waste. Based on surveys and follow-up conversations with seven out of eight identified vegan restaurants, the study also examines motivations and barriers. Findings show that all participants engage in some level of sustainable practice, primarily motivated by environmental concerns. Reported challenges include high costs, limited infrastructure, and low public awareness. This research helps fill a gap in the literature on sustainability practices in vegan restaurants in Indonesia.

Keywords:

Sustainability, sustainability practices, food industry, restaurant, Yogyakarta, Indonesia

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Introduction

Sustainability has become an increasingly important issue in the restaurant industry worldwide. Restaurants have a notable impact on the environment through food sourcing, packaging, and waste production. In response, many establishments are exploring more sustainable alternatives. Vegan restaurants, in particular, are often associated with ethical and environmental values. By offering plant-based meals, they are already contributing to sustainability goals such as reducing greenhouse gas emissions and limiting resource use.

This thesis investigates the extent to which vegan restaurants in Yogyakarta, Indonesia, implement sustainable practices in three key areas: food sourcing, packaging, and waste management. The study also explores the motivations that lead these restaurants to adopt sustainable practices and the challenges they encounter in doing so. Although there is growing international research on sustainability in restaurants, few studies focus specifically on vegan restaurants, and even fewer address the Indonesian context. This research aims to help fill that gap by focusing on vegan establishments in one of Indonesia's most culturally rich cities.

The practical part of this thesis involved identifying eight fully vegan restaurants in Yogyakarta, of which seven agreed to participate. Data was collected using a qualitative approach, primarily through survey responses and follow-up conversations with restaurant owners or staff via WhatsApp and Instagram. This approach allowed for a deeper understanding of the sustainable practices implemented in these restaurants, as well as their motivations and the barriers they face.

The first chapter, the literature review, provides an overview of existing research on sustainability in the food industry, with a focus on veganism and key sustainable practices such as food sourcing, packaging, and waste management. It concludes by highlighting the limitations of current sustainable practices. Chapter 2 explores veganism in Indonesia, discussing the rise of plant-based eating and the development of local vegan cuisine. Chapter 3 examines sustainability in the Indonesian food industry more broadly, considering environmental, economic, and social dimensions. Chapter 4 narrows the focus to sustainable practices in Indonesian restaurants, specifically looking at how food sourcing, packaging, and waste management are approached. Finally, Chapter 5 presents the practical part of the research, which focuses on vegan restaurants in Yogyakarta that participated in a survey and follow-up communication. It details the research methods used and offers a thorough analysis and interpretation of the collected data.

1 Literature review

Sustainability has become an essential topic in the global restaurant industry, driven by concerns about environmental degradation, resource use, and social responsibility (Jones et al. 2014). Restaurants are major contributors to environmental issues through food waste, energy consumption, and unsustainable sourcing. As a result, there is increasing interest in practices such as sustainable food sourcing, waste reduction, and eco-friendly packaging.

This literature review examines how sustainability is understood and applied in the restaurant sector, focusing on three key areas: food sourcing, food packaging, and waste management. These are explored within the broader framework of the three pillars of sustainability: environmental, social, and economic. In addition, the review considers how veganism, as both a lifestyle and dietary practice, aligns with sustainability goals such as reducing emissions and promoting ethical consumption.

Although international research on sustainable restaurants is expanding, vegan restaurants remain underrepresented, especially in Indonesia. While some studies address sustainability in Indonesian restaurants generally, none specifically examine vegan establishments, despite their potential to lead in sustainable practices. This study aims to fill that gap by investigating how vegan restaurants in Yogyakarta approach sustainability in practice.

The review is structured into six sections: sustainability dimensions; veganism, lifestyle, and leading a "green life"; sustainable food sourcing practices; innovative food packaging solutions; waste management strategies; and, finally, the limitations of current sustainable practices. This last section sets the stage for the empirical part of the study, which explores how sustainability is implemented and challenged in the local context of vegan restaurants in Yogyakarta.

1.1 Sustainability Dimensions

Sustainability is often defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987: 41). Although widely accepted, this definition has been criticized as too general (Heinberg 2010). To make the concept more applicable to businesses, Elkington (2013) introduced the "triple bottom line" framework, which emphasizes a balance between environmental care (Planet), social responsibility (People), and financial performance (Profit).

In the restaurant industry, sustainability is not only seen as a way to reduce environmental impact but also as a tool to improve community engagement and long-term profitability. This section explores how restaurants implement sustainability across the three dimensions (Figueiredo 2021).

Economic restaurant sustainability entails maintaining profitability in the long term, minimizing costs, and being resource-efficient. Numerous studies have indicated the benefits of sustainability practices on organizational performance. Saikia (2024) states that sustainable practices improve business performance, including cost reduction, improved brand image, and guest satisfaction. This is also supported by studies carried out by Kasim (2007) and Jones et al. (2014). Kasim's (2007) study reveals that green practices save costs on energy and water. Furthermore, Jones et al. (2014) found that sustainable waste management practices such as recycling and composting are cost savers in waste disposal. Saikia's observation that sustainable practices render firms competitive is supported by studies conducted by Perramon et al. (2014) on restaurants in Spain and Chiu and Hsieh (2016) on restaurants in Taiwan. Both of the studies concluded that sustainable practices help in the reputation, attitudes of customers, and market position of a restaurant, especially in times of crisis, but also in attracting new customers and improving employee satisfaction because employees are proud to be part of an environmentally friendly firm. The same worldwide perspective is increasingly relevant in the Indonesian setting as well. For instance, Winowatan et al. (2024) highlight how Lago'Ta Cafe & Resto implemented energy-saving initiatives that produced lower electricity bills, while also acknowledging the fact that it is hard to upscale such activities due to budget and coordination limitations. Similarly, Halim et al. (2024) demonstrate that practices of green accounting, such as using LED lights, purchasing locally, and using sustainable décor, reduce operational costs, improve corporate reputation, and raise guest satisfaction. These findings indicate that, despite potential difficulties in the initial implementation of sustainable measures, particularly for small businesses, the long-term financial benefits become clearer for restaurants in Indonesia.

The sustainability of the environment has been gaining increased attention due to the significant role played by the restaurant industry in the utilization of resources and the production of waste. Recommendations made by the Green Restaurant Association (Green Restaurant Association 2018) include water conservation, minimizing waste, local and organic food buying, energy-saving appliances, and the use of reusable alternatives. The actions remain hypothetical for small restaurants faced with resource limitations. Maynard et al. (2020) observe that while many restaurants adopt basic practices such as recycling and local sourcing, stricter ones, such as reducing meat consumption and donating surplus food, are not common,

pointing toward ongoing problems. Indonesian research mirrors the same international patterns. Evidence shows widespread use of organic and local produce, with many restaurants having seasonal menus and some having kitchen gardens (Sari et al. 2022; Wenten et al. 2024). Energy-efficient technologies like LED lights and improved cooling systems are increasingly being used (Wenten et al. 2024; Winowatan et al. 2024), alongside water-efficient appliances (Swastika et al. 2022). Waste management practices vary from basic recycling (Yanti et al. 2022) to more complex forms like recycling waste into animal feed (Bastyan et al. 2022). Packaging consists of using old-fashioned bamboo containers alongside modern biodegradable packaging (Yanti et al. 2022; Bastyan et al. 2022). These findings suggest that although Indonesian restaurants are moving along smoothly in adopting environmentally friendly practices, they continue to grapple with the inclusion of comprehensive environmental solutions.

Social sustainability in the restaurant industry encompasses critical issues, including workers' rights, community health, and social justice, yet remains frequently overshadowed by environmental and economic concerns in sustainability discourse (de Morais Cardoso et al. 2022). Scholars like Legrand et al. (2010) suggest the integration of Corporate Social Responsibility (CSR) indicators such as fair labor practices, local community involvement, and guest involvement as tools to quantify and manage social sustainability. While their model provides useful theoretical guidance, it is not based on evidence of large-scale implementation and industry-wide influence. Later empirical evidence confirms this theoretical-practical gap. De Morais Cardoso et al. (2022) found that Brazilian restaurants show limited social sustainability in practice, while most run social projects and have safety officers, few provide sustainability training. A more straightforward model appears in Higgins-Desbiolles and Wijesinghe's (2019) study of Australian restaurants, where initiatives included supporting local farms, providing ethical food, and educating employees on sustainability. The small sample of only 20 restaurants, however, decreases the external validity of their findings to broader settings. The literature reveals that Indonesian restaurants operationalize social sustainability through multi-stakeholder engagement, as evidenced by Wenten et al.'s (2024) findings on supplier education programs and eco-friendly practice adoption. Bastyan et al. (2022) contribute further insights through documented staff-centered initiatives, including restaurant garden, food donations, and environmental training programs. Swastika et al.'s (2022) work complements these findings by demonstrating successful guest participation models in conservation activities like beach clean-ups and tree planting. These findings reveal a global

gap in restaurant social sustainability, showing promising multi-stakeholder models alongside persistent implementation challenges.

1.2 Veganism, Lifestyle, and Leading a "Green Life"

Veganism, originally rooted in animal rights activism, has evolved into a broader lifestyle movement that emphasizes ethical consumption, personal health, and environmental sustainability (Haenfler et al. 2012; Gheihman 2021). At its core, veganism promotes the idea that individual consumer choices, particularly in food, can drive positive social and environmental change. These values have become increasingly visible in sustainability discourse, where plant-based diets are often highlighted for their reduced ecological footprint.

The environmental benefits of veganism are well-documented. Scarborough et al. (2023) found that vegan diets can reduce greenhouse gas emissions by up to 75% compared to high-meat diets, although their findings are based on earlier consumption data that may not fully reflect current trends. Earlier research by Rosi et al. (2017) also demonstrated that omnivorous diets impose the highest environmental loads, while Baroni et al. (2007) concluded that plant-based diets, particularly when combined with organic agriculture, have the lowest environmental impact. However, these studies also caution that not all vegan diets are inherently sustainable. For instance, highly processed vegan foods may carry a higher environmental cost than whole-food omnivore diets (Rosi et al. 2017).

Globally, people adopt veganism for a range of reasons, including animal welfare, personal health, environmental concerns, and, increasingly, economic and social responsibility (Janssen et al. 2016; Ghaffari et al. 2022). These motivations are influenced by cultural and regional contexts. In Indonesia, for example, Agatha et al. (2024) found that health and environmental factors were primary drivers among urban youth in West Surabaya. However, many participants had varying definitions of veganism, suggesting limited public awareness and inconsistent practices. Van der Laarse (2015) similarly found that while many Indonesians cited health, animal welfare, and environmental ethics as motivators, nearly half of self-identified vegetarians still consumed animal products, indicating flexible interpretations of plant-based eating.

While individual motivations for adopting veganism are well established, there is growing interest in how these values are expressed within vegan food businesses. Studies by Kotebagilu et al. (2023) and Riverola et al. (2022) show that vegan restaurateurs are driven by a combination of internal motivations, such as personal values, health consciousness, and care for animals, and external factors like rising consumer demand and gaps in plant-based dining

options. However, these studies focus primarily on why individuals choose to open vegan restaurants, not on whether or why such establishments adopt sustainable practices.

Very few studies globally have examined the implementation of sustainability within vegan restaurants. A notable exception is Niederle and Schubert (2020), who found that some vegan restaurants in Brazil incorporated sustainability practices such as sourcing local and organic ingredients, reducing waste, and using eco-friendly packaging. These practices were often seen as natural extensions of vegan values, though they were also influenced by branding, identity, and target market. Even so, such research remains extremely limited, and to date, there appears to be little to no published work that focuses specifically on how vegan restaurants in Indonesia approach sustainability. To address this gap, this study investigates whether vegan restaurants in Yogyakarta implement sustainable practices related to food sourcing, food packaging, and waste management, and explores the motivations behind these practices, if present, as well as the barriers that may prevent their adoption.

1.3 Sustainable Food Sourcing Practices

Sustainable food sourcing is one of the major themes in environmentally and socially sustainable food system development. Sustainable food sourcing involves the selection of ingredients that reduce environmental degradation, promote ethical labor practices, and enhance long-term food security (Ekechukwu 2021).

Jia et al. (2024) proposed the use of short food supply chains (SFSCs), in which producers and consumers are connected with minimal intermediaries. SFSCs reduce traveling distances, enhance transparency and traceability of food, but also support farmers with fair prices, which enhances local economic development. Additionally, several strategies have been proposed. Legrand et al. (2010) recommend sourcing seasonal, organic, and fair-trade produce and directly purchasing from farmers locally, while Bell et al. (2010) propose organic farming and integrated pest management (IPM). Roy (2024), Holmes et al. (2018), and Inwood et al. (2009) found that the majority of restaurants choose local and seasonal food for environmental and community benefits, yet it was noted that taste and freshness of the products were also the drivers. This may suggest that restaurants are often driven by business interests in addition to ethical and environmental commitments.

More recent Indonesian case studies provide a window into how these practices are achieved in the context of real restaurant operations. Wenten et al. (2024), Bastyan et al. (2022), and Winowatan et al. (2024) each document a strong emphasis on local sourcing, consistent with SFSCs' underlying principles and overall sustainable procurement trends. Wenten et al.

(2024) and Bastyan et al. (2022) also point out the use of non-GMO, organic, and pesticide-free vegetables in Natys and Suku Restaurants, respectively, indicating a shared focus on quality and health alongside sustainability. Their menus also reflect transparency in labeling for food restrictions, including gluten-free or vegetarian options. Sari et al. (2022) also note that a restaurant in Bali grows some of its own ingredients in a garden and uses them in the menu, exemplifying a hyper-local sourcing strategy that reduces dependency on external supply chains. Winowatan et al. (2024: 236) outline 80% local food utilization at Lago'Ta Café & Resto in Sulawesi, but with fewer references to organic certification or clear menu disclosure, suggesting adaptability in implementation based on location or business capacity.

These examples illustrate that while the shared thread of commitment to sustainable sourcing exists, the character of the approaches and degree of involvement differ, based on logistical, geographical, and consumer conditions, highlighting the need for flexible strategies tailored to specific contexts for effective implementation.

1.4 Innovative Food Packaging Solutions

Single-use packaging of plastics, while cost-effective and low-cost, has a high environmental contribution to pollution, degradation, and resource exploitation (Mohseni 2023; Babaremu et al. 2022). Therefore, demand for sustainable packaging in terms of biodegradable, reusable, and recyclable packaging materials is increasing (Khandeparkar et al. 2024).

Innovations using cassava starch and mushroom mycelium show further promise. Mycelium biodegrades within weeks and leaves a much smaller environmental footprint than polystyrene, while cassava starch offers advantages over plastic in terms of emissions and resource use (Casarejos et al. 2018; Pohan et al. 2023; Matheus et al. 2023; Enarevba and Haapala 2023). Reusable materials, such as glass and metal, can also significantly reduce environmental harm; for instance, reusable packaging in Sweden was found to lower climate impact by 59% compared to single-use plastic (Aggarwal 2024: 12). Meanwhile, recyclable materials like paper and cardboard conserve resources but are often limited by durability and water resistance (Chen et al. 2013).

In the context of Indonesia, several restaurants have adopted innovative approaches to reduce plastic use. Sari et al. (2022) emphasize the use of wooden plates, while Yanti et al. (2022) suggest besek (baskets made of woven bamboo) as takeaway containers. Bastyan et al. (2022) state that Suku Restaurant Bali uses paper straws instead of plastic straws and wooden plates, utensils, and cassava paper for takeaway boxes, pizza boxes, and cups. Accordingly, Swastika et al. (2022) refer to the use of recycled content to create straws, coasters, and glass

lids, the avoidance of plastic bottle water, and the application of biodegradable or tree-product-free material in restaurants in Bali.

These practices reflect a growing shift toward localized, biodegradable alternatives that align with broader global sustainability efforts. However, while these materials show promise, researchers agree that further studies are needed to address limitations in durability, cost, and scalability (Panou and Karabagias 2023). As such, these developments underscore the importance of advancing and scaling sustainable packaging innovations to effectively reduce the environmental impact of food service industries worldwide.

1.5 Waste Management Strategies in Restaurants

Restaurants generate a high amount of solid waste, including paper, cardboard, plastics, food waste, and glass, which are detrimental to the environment (Singh et al. 2014).

Several strategies have been proposed to address this issue. Pirani and Arafat (2014) highlight prevention and reduction as key strategies, while Legrand et al. (2010) emphasize the importance of staff training and waste separation for successful implementation. Singh et al. (2014) suggest rewards for returnable containers and bring-your-own-packaging discounts, though these may face challenges in regions with low environmental awareness. Derqui et al. (2016) focus on local supply, smaller portion sizes, recycling leftovers, and offering take-away packaging. However, many restaurants perceive food waste as primarily the consumer's responsibility, limiting the impact of these measures. Papargyropoulou et al. (2014) propose a hierarchy for managing food waste: prevention, redistribution, recycling, and composting, and suggest food banks and animal feed recycling, although their model is mainly designed for Europe and may not be universally applicable. ReFed (2016) offers a roadmap including food donation and composting, but is better suited for large-scale operations. Singh et al. (2014) also recommend compostable packaging and waste audits to broaden sustainability efforts.

Recent studies from Indonesia illustrate how waste management practices are implemented on the ground. Wenten et al. (2024), Bastyan et al. (2022), and Winowatan et al. (2024) document approaches reflecting both shared sustainability goals and local adaptations. Natys Restaurant, described by Wenten et al. (2024), employs recycling, composting, and waste segregation, with measures like repurposing used linen and separating liquid from solid waste to maximize resource recovery. Bastyan et al. (2022: 4) highlight Suku Restaurant's waste reduction through reusable cutlery, digital menus, and a certified third-party partnership ensuring 70% of waste is repurposed into pig feed and eco enzyme. Winowatan et al. (2024) report Lago'Ta Café & Resto sorts waste and composts organic matter for garden use, but could

improve plastic waste reduction despite creative reuse of drums for decor and bins. These cases show that while recycling, composting, and segregation remain central, the scale of waste management varies, emphasizing the need to tailor strategies to operational capacity and local infrastructure.

The effectiveness of these frameworks depends on local cultural attitudes, infrastructure, and economic realities. Thus, adapting waste management practices to specific contexts, especially in developing regions, is essential for meaningful environmental sustainability.

1.6 Current Sustainable Practices and Their Limits

As widespread as the adoption of sustainability is becoming, there are very real barriers to its implementation by restaurants. High cost of green products, equipment, or packaging remains a major barrier (Kasim and Ismail 2012; Jordaan 2023). Lack of access to green suppliers, little government support, and weak policy enforcement only add to the difficulty of implementing it (Robinson et al. 2024). Most also lack the time, staff, and skills to implement and sustain sustainable systems (Kharola et al. 2022; Freeman 2011). Food waste continues to be a top issue, often due to poor infrastructure and poor awareness of donation or recycling (Sakaguchi et al. 2018).

Indonesian restaurants face widespread challenges in adopting sustainable practices. Winowatan et al. (2024) identified several adoption barriers faced by a restaurant in Sulawesi, including high adoption costs, limited availability of environmentally friendly products, lack of finance, and inadequate infrastructure. Similarly, Sucipto and Rosanto (2024) revealed limiting factors at Stuja Coffee in Jakarta, such as the lack of sophisticated energy-efficient technologies, low organic and seasonal ingredient use because of cost and supply chain issues, insufficient employee and customer sustainability training, and suboptimal waste management mechanisms like composting and recycling.

In order to dismantle these barriers, investment in green infrastructure will be required, partnering with neighborhood suppliers, and tailored education initiatives to motivate eco-friendly practices.

1.7 Conclusion

This literature review explored how sustainability is practiced in the restaurant industry by focusing on food sourcing, waste management, and packaging. It used the triple bottom line framework to examine the economic, environmental, and social dimensions of sustainability. While many studies highlight how sustainable practices can improve efficiency and customer

satisfaction, challenges such as high costs, limited access to suppliers, and lack of infrastructure remain major barriers, especially for small businesses.

The review also considered the role of veganism as a lifestyle that supports sustainability. Vegan diets are widely recognized in Western literature for reducing environmental harm, but studies often focus on personal motivations rather than how vegan values are applied in restaurant operations. In Indonesia, limited research has been done on veganism, and even fewer studies explore vegan food businesses or their approach to sustainability.

In terms of food sourcing, global and Indonesian studies emphasize the benefits of local, seasonal, and organic ingredients. However, much of this research focuses on general restaurants, and few explore how sourcing choices reflect the ethical or environmental goals of vegan establishments. Similarly, while many Indonesian restaurants are adopting waste management strategies such as composting or recycling, studies rarely examine the motivations behind these practices or the specific barriers faced by vegan restaurants. Packaging innovations, such as the use of biodegradable materials, are growing in popularity, but cost, quality, and availability often limit their use. Again, most studies are based in Western countries and focus on large or luxury restaurants.

Across all themes, one pattern is clear. There is a strong lack of research on vegan restaurants in Indonesia, especially those in Yogyakarta. Most studies explore sustainable practices in isolation and do not address the motivations or constraints involved. No research appears to exist that focuses specifically on how vegan restaurants in Yogyakarta approach sustainability.

This study aims to fill that gap. By examining how vegan restaurants in Yogyakarta implement sustainable practices in food sourcing, packaging, and waste management, and by exploring the motivations and barriers behind these efforts, it provides insights into an understudied area and adds to the growing conversation on sustainability in the Indonesian food sector.

2 Veganism in Indonesia

2.1 The Rise of Veganism in Indonesia: Trends and Cultural Influences

In the majority of countries, vegans and vegetarians make up a small percentage of the population. (Arwanto et al. 2022). In Indonesia, there are an estimated 2 million vegans and vegetarians. Although a small number compared to the overall population of 281 million people, veganism and vegetarianism are slowly becoming more popular (Arwanto et al. 2022: 1). Indonesia is the 16th best vegetarian destination in the world, with the lowest meat consumption and a vegetarian score index of 278 (Oliver's Travels 2017). Indonesia was the third highest in the world in vegetarianism growth based on Euromonitor survey, and 73% of the surveyed Indonesians consumed plant-based food in 2021 (Hutabarat 2021; Meatless Kingdom 2022).

This shift is reflected in a growing number of vegans and vegetarians. In 2007, 60,000 Indonesians became members of the Indonesia Vegetarian Society (IVS); in 2017, 500,000 vegetarians; and in 2024, the numbers show that over 2 million vegetarians are in Indonesia (Arwanto et al. 2022: 3; Indonesian Vegetarian Society n.d.). However, the number of vegans is unknown. There has also been an observable increase in the number of vegetarian and vegan restaurants. From 438 restaurants in 2017 to more than 2000 restaurants in 2023 (Oliver’s Travel 2017; Indonesian Vegetarian Society n.d.).

Tradition of dietary food, religious belief, health factors, environmentalism, and tourism drive this trend of veganism in Indonesia. Even though the contemporary movement of veganism is still new in Indonesia, veggie diets in Indonesia have long been present within the country's culinary tradition (van der Laarse 2015).

The majority of Indonesian traditional dishes are naturally vegetarian, with much reliance on native ingredients such as tempeh, tofu, coconut, and vegetables (Kumparanesia 2025). Ancient use of these ingredients follows Indonesia's farming economy and cuisine, where vegetarian foods were often more readily available and affordable compared to meat foods (van der Laarse 2015; Susilo and Smith 2023). The country's tropical climate also supports the cultivation of many fruits, vegetables, legumes, and cereals, and therefore, plant-based foods are readily accessible (van der Laarse 2015; Susilo and Smith 2023). Religious and

philosophical concepts have played a significant role in determining dietary habits in Indonesia (Susilo and Smith 2023).

Buddhism and Hinduism, the dominant cultures before Islam took its spread to the archipelago, encourage vegetarianism as religious practice and preachment against violence (van der Laarse 2015; Susilo and Smith 2023). Vegetarianism remains strong with most Balinese Hindus even until today, particularly during the period of spiritual and religious observances and during periods of fasting and religious pilgrimages (van der Laarse 2015; Susilo and Smith 2023). Islam, the major religion in Indonesia, is not a plant-based food diet. However, it promotes ethical food consumption through halal principles, which require animals to be treated humanely and food preparation to be sanitary (van der Laarse 2015; Susilo and Smith 2023). As a result, some Muslim populations in Indonesia are adopting plant-based diets due to ethical consumption (van der Laarse 2015; Susilo and Smith 2023). Over the last few years, health, environmental, and animal welfare concerns have constituted the most significant reasons for the increasing trend of veganism in Indonesia (van der Laarse 2015).

A recent study on vegetarianism and veganism by Dewi et al. (2022) found that 45.3% of the respondents eat a plant-based diet due to health reasons and to prevent the risk of chronic diseases such as heart disease, diabetes, and obesity. Yet, 11.5% of the sample cited environmental reasons, which increase as there is greater awareness about deforestation, ocean pollution, and greenhouse gas emissions due to massive animal husbandry. Meanwhile, 39.9% of the respondents are religiously or morally opposed to vegetarians and vegans, like those in Hindu and Buddhist populations. Fewer people (3.4%) are of the belief that the human body is physiologically attuned to plant food (Dewi et al. 2022: 176-180). These findings reflect a broader trend in which veganism in Indonesia is increasingly seen as a part of a sustainable lifestyle. While health and religious beliefs remain dominant motivators, the rising awareness of environmental issues, especially among younger generations, has positioned veganism as a response to ecological challenges such as deforestation, climate change, and the environmental impact of animal agriculture (van der Laarse 2015; Dewi et al. 2022). In this context, plant-based living is no longer viewed solely as a personal or cultural decision but also as a form of ethical and environmental engagement. As such, veganism is increasingly understood as a sustainable lifestyle that aligns with Indonesia's efforts to address ecological challenges.

Additionally, tourism has remained one of the major drivers in the development of vegetarianism and veganism in Indonesia. In March 2024, foreign tourist arrivals increased by 19.86% year-on-year to 1.04 million - a reflection of a gradual recovery in the tourism industry (Trading Economics 2024). As a global tourism destination, Bali has emerged as a vegan food

hotspot, with more than 200 vegan and vegan-friendly restaurants serving health-conscious tourists and expatriates (Pointing 2023). This has propelled the high-speed expansion of vegan restaurants, cafes, and food businesses, most of which combine Indonesian dishes with modern-style plant-based cuisine. The Balinese vegan culture has also spread to other big cities like Jakarta, Bandung, and Yogyakarta, where there is the unveiling of new-age plant-based brands and products. According to statistics provided by the World Vegan Organization, Jakarta, the capital city of the island of Java, is now Indonesia's second most vegan and vegetarian city with more than 74 vegan and vegan-friendly restaurants and cafes (Pointing 2023).

2.2 Local Vegan Cuisines

Traditional Indonesian local cuisine offers a range of vegan food, which has been part of the nation's culinary identity for decades and continues to serve as a foundation for sustainable eating today.

Rice, spices, vegetables, peanuts, coconut milk, tofu, and tempeh are among the common ingredients (Kumparanesia 2025). Tempeh, which is produced by fermenting soybeans, contains high protein and has high fiber, prebiotic, and vitamin levels (Evan 2021). Because of its affordability and extensive availability, it is a staple food that is served in warungs (small restaurants), restaurants, and supermarkets (Evan 2021). Tofu, which is also extensively consumed, can be served in most dishes, from soups to stir-fries. These traditional, locally sourced ingredients support not only the dietary diversity but also reflect environmentally sustainable practices, due to their low ecological footprint (Keulana n.d.).

Many well-known dishes are already vegan or can be made vegan with minimal modifications. A few examples are gado-gado, pecel, sayur asem, sayur lodeh, and urap. Gado-gado, a salad made of blanched vegetables, tofu, tempeh, and peanut sauce, is a popular dish emphasizing fresh, indigenous ingredients (Keulana n.d.). Pecel, the Javanese adaptation of gado-gado, contains a spicier peanut sauce and is most often served with rice or lontong (compressed rice cakes) (Keulana n.d.). A few other naturally vegan foods include sayur asem, which is a sour soup created from tamarind; sayur lodeh, which is a stew of vegetables cooked in coconut milk; and urap, a dish of steamed vegetables mixed with grated coconut and spices (Keulana n.d.; Lopez n.d.). Indonesian cuisine is regionally diverse, and therefore, the range of plant foods varies from island to island.

Nasi pecel (vegetables and peanut sauce with rice), oseng-oseng tempe (stir-fry of tempeh with chilies and sweet soy sauce), and gudeg (young jackfruit stew, sweet) are favored in Java. Bali, with a vegetarian culture shaped by Hinduism, offers lawar nangka (young

jackfruit with spice) and sate lilit tempe (tempeh satay) (Trisdayanti et al. 2022). In Sumatra, there is rendang nangka (jackfruit rendang), a vegetarian variant of the popular beef rendang, and in Sulawesi, sayur kelor (moringa leaf soup) and bubur manado (a thick rice porridge with vegetables) are common (National Geographic 2023; TasteAtlas n.d.). This extensive variety of vegan-friendly dishes shows that Indonesia's plant-based cuisine is not a foreign concept, but rather an evolution of deeply rooted culinary traditions.

In response to increasing demand driven by health trends, ethical values, and tourism, many Indonesian dishes are being changed for a modern vegan audience. Dishes such as soto (Indonesian traditional soup), martabak (stuffed pancake), and even bakso (meatballs) have become ubiquitous in Indonesian cities, offering vegan equivalents that maintain the same taste and texture of these beloved dishes. In addition, the innovation of plant-based meat substitutes made from mushrooms, jackfruit, and soy has enabled more people to embrace vegan lifestyles without sacrificing familiarity with Indonesian cuisine (Trisdayanti et al. 2022).

A survey of Yogyakarta's vegan restaurants indicated that many offer plant-based versions of popular Indonesian meat dishes to familiarize tourists with local cuisine and provide Indonesians with well-known flavors to try veganism. Classics in these include lontong opor (rice cakes in coconut milk curry, traditionally with chicken but replaced with tofu or mushrooms), rendang (coconut stew cooked slowly in spices, traditionally with beef but replaced with jackfruit or tempeh), and gudeg (sweet young jackfruit stew, traditionally served with egg but modified to be entirely plant-based). Some also serve nasi uduk (coconut milk-infused rice served with fried tempeh or vegetable side dishes), soto Betawi (Jakarta-style coconut milk soup, originally beef-based but adapted with tofu or mushrooms), and rawon (dark herbal soup, usually beef-based but remade with mushrooms and keluak nuts), showing how plant-based adaptations are keeping Indonesia's rich culinary traditions alive while catering to a growing vegan customer base.

Additionally, from a sustainability perspective, these ingredients that are part of a vegan diet have a much lower environmental impact compared to those in meat-based diets. A vegan diet significantly reduces greenhouse gas emissions and land use by 75% while also cutting water use by 53% and lowering the impact on biodiversity by 65% (Scarborough et al. 2023). Among plant-based foods, tempeh stands out as a particularly eco-friendly option. It has a carbon footprint nearly eight times smaller than beef and requires significantly less water to produce. These benefits make the vegan diet and foods like tempeh practical and impactful choices for promoting environmental sustainability and preserving vital resources in Indonesia (Rooks 2024).

3 Sustainability in the Food Industry in Indonesia

Sustainability in the food industry is influenced by a range of economic, environmental, and social factors. In Indonesia, where food production and consumption play a central role in everyday life, these factors present both opportunities and challenges for implementing sustainable practices.

This chapter explores how sustainability is approached in the Indonesian food sector through three key dimensions: economic, environmental, and social. The first section looks at how financial constraints, supply chain access, and consumer preferences shape food sourcing, packaging, and waste management. The second section focuses on environmental concerns such as deforestation, agricultural emissions, and plastic pollution. The final section addresses social issues, including the conditions of small-scale farmers and unequal access to healthy, affordable food.

By examining these national-level dynamics, this chapter provides important context for understanding what kinds of sustainability practices are possible in Indonesian restaurants and how these practices are influenced by broader systemic limitations.

3.1 Economic Sustainability in Food Practices

Economic sustainability is the ability of a system to remain profitable throughout its operations while maintaining broad-based social benefits and ensuring a positive or neutral impact on the natural environment. It supports long-term financial viability without compromising social equity or environmental integrity (U.S. Department of Agriculture n.d.).

In Indonesia, where approximately 30% of the national workforce is employed in agriculture, economic conditions play a critical role in shaping decisions related to food sourcing, packaging, and waste management (Mandala Consulting 2023). For small and medium-sized food businesses, including vegan restaurants, sustainable practices are often constrained or enabled by cost structures, infrastructure access, and consumer demand patterns.

This section examines the national-level economic conditions that define what sustainable food practices are feasible in the Indonesian context.

3.1.1 Local vs. Organic Food Sourcing

Local food sourcing is widespread in Indonesia and generally considered economically advantageous. Most smallholder farmers produce key staples such as rice, tofu, tempeh, vegetables, and fruits. Products that form the foundation of many vegan restaurant menus (The

Jakarta Post 2020). These items are typically distributed through short, informal supply chains and sold in traditional markets. Such arrangements reduce transportation costs, spoilage, and overall pricing for restaurants and consumers (Rahimi & Demirbaş 2023). As a result, local sourcing is not only environmentally beneficial but also represents the most accessible and affordable option for food businesses.

In contrast, certified organic food remains financially and logistically out of reach for most producers and restaurants. European consumers tend to associate organic labels with quality and health; the Indonesian context might differ (Bartolozzi 2025).

Many traditional farming practices in Indonesia have historically aligned with organic principles, which are characterized by low inputs, small-scale operations, and minimal chemical use, despite lacking formal certifications (Reuter and MacRae 2019). This phenomenon is well documented: millions of non-certified "organic by neglect" farms rely on natural nutrient cycles and biodiversity rather than agrochemical sources (ITC and CTA 2021). In Java, such smallholder systems based on ecological farming and moral economies have persisted for decades and are increasingly recognized as viable, sustainable models (Reuter and MacRae 2019).

However, to meet official organic standards today, producers must undergo expensive certification processes involving audit fees, record-keeping, and compliance checks (Relawati et al. 2024; Zulvera et al. 2023). A study in West Sumatra revealed that over 70% of organic farmer groups had abandoned certification due to high costs and difficult administration processes (Zulvera et al. 2023: 700). As a result, certified organic farmland remains a very small fraction of Indonesia's total agricultural land, just 261 hectares of fully certified land was recorded in 2016 (Zmudczynska and Andoko 2019).

In 2010, the government launched a program called "Go Organic". The aim was to support organic food development. However, expensive certifications and a lack of knowledge regarding the benefits of organic food were the main barriers to the program's achieving its aim (Relawati et al. 2024). Between 2009 and 2012, the Balinese government supported local organic certification by covering the full certification cost for 22 farmer groups (Katto-Andrighetto 2018). Similarly, the Organic Certification Institute (LSO), which is responsible for ensuring the products labeled as "organic" meet Indonesian national standards, offered farmers in West Sumatra a free organic certification. However, despite this no-cost opportunity, the growth of organic farmer groups and certified organic farmers in West Sumatra remains minimal (Zulvera et al. 2023).

For vegan restaurants, this means that while sourcing organically is ideal in theory, in practice, they rely almost exclusively on uncertified local produce that is economically viable but not recognized under formal organic standards.

3.1.2 Packaging: Traditional Materials vs. Biodegradable Innovations

Packaging plays a key role in economic and environmental sustainability, particularly in food preservation and transportation. In Indonesia, traditional organic materials such as banana leaves, palm leaves, and woven bamboo (besek) are still commonly used in rural and informal food settings. These materials are low-cost, biodegradable, and culturally rooted in Indonesian food traditions (Kasmana and Maulina 2015; Ministry of Tourism and Creative Economy of the Republic of Indonesia 2024).

However, for most commercial restaurants, including vegan establishments, plastic remains the dominant packaging material due to its scalability, durability, and minimal unit cost. Thin plastic bags and containers can be mass-produced at a fraction of the cost of biodegradable or traditional materials. For instance, while a plastic food container may cost around Rp 300, its biodegradable equivalent made from cassava starch or palm fibers can cost up to Rp 5,000 (Eloksari 2021; Somewang 2023). As a result, cost considerations often outweigh environmental ideals, particularly for restaurants operating within narrow profit margins.

This economic imbalance limits the widespread adoption of sustainable packaging solutions, even among businesses that are environmentally conscious. Vegan restaurants may adopt traditional wrapping for dine-in orders, but frequently revert to plastic for deliveries and takeaway due to affordability and consumer convenience.

3.1.3 Waste Management: Economic and Infrastructure Barriers

Waste management in Indonesia faces significant economic and structural challenges. Between 2000 and 2019, the country lost an estimated Rp 213 to 551 trillion annually due to food waste, amounting to 4-5% of its GDP (LCDI 2021: 6; Sutrisna and Mallipu 2024: 2). Despite this scale of the issue, public investment in waste infrastructure remains low. Regional governments, which are legally responsible under Law No. 18/2008, allocate an average of just 0,6% of their budgets to waste management, which is far below the national recommendation of 3% (Antara News 2025). In Yogyakarta, this situation is similar, with allocations under 1% and little evidence of capacity improvements (Salma 2025).

This underfunding results in insufficient waste collection services, particularly in rural areas where nearly 60% of communities lack regular waste pickup (Sahu 2024). Nationally,

approximately 57% of all waste is handled informally through open dumping or burning, creating environmental and health risks (Juwita 2025).

The underlying issue of inadequate infrastructure can be traced back to the broader challenge of weak planning at the local government level. Across Indonesia's 514 regencies and cities, less than 200 have put forward a formal Waste Management Plan (RIPS). Even among those that have, a significant number are either incomplete, still under development, or have not been updated, which reflects a lack of coordinated efforts to address waste management at the regional scale (Salma 2025).

For restaurants, the financial cost of managing waste responsibly through composting, sorting, or contracting private disposal services is often prohibitive. Furthermore, processing waste can cost up to Rp 1,6 million per tonne, while municipalities like Depok charge tipping fees as low as Rp 6,000 per tonne, which is far below the cost-recovery threshold (Farizal and Ekky 2019; Yusuf et al. 2025; IESR 2025). With 74% to 98% of municipal waste budgets spent on labor alone, there is little room for infrastructure upgrades (Yusuf et al. 2025).

Consequently, most restaurants, including vegan ones, lack the financial means or access to facilities that would allow for meaningful waste reduction, even if such practices align with their environmental commitment.

3.1.4 Consumer Behaviour and Market Dynamics

In Indonesia, consumer preferences are heavily influenced by economic considerations. Although environmental awareness is growing, the majority of consumers remain highly price-sensitive. A 2024 Snapcart survey found that over 20% of respondents view sustainable products as unaffordable, and many prioritize cost and convenience over environmental impact (International Trade Administration 2024; Andika and Setyanta 2024; Snapcart 2024).

Research also shows that consumers are willing to pay a small premium for biodegradable packaging, averaging Rp 2,2000 more, but willingness varies across age, gender, and education levels (Jati et al. 2025). Meanwhile, for organic food, the cost remains a major barrier for low-income groups, even when health benefits are acknowledged. Still, some surveys indicate that over 60% of consumers would prefer government-certified organic products (Wahida et al. 2013).

For vegan restaurants, this creates a challenging trade-off: adopting sustainable sourcing or packaging practices frequently entails increased operational costs, which may necessitate higher pricing. However, such price adjustments risk deterring customers who perceive veganism or sustainability as elitist or financially inaccessible.

3.2 Environmental Sustainability in the Food Sector

Environmental sustainability in the food sector refers to the adoption of practices that reduce the industry's negative impact on the natural environment. This includes lowering greenhouse gas emissions, conserving water, minimizing waste, and promoting the efficient use of natural resources (Quimivita n.d.)

In Indonesia, where agriculture, land-use change, and poor waste management are major contributors to environmental degradation, the food sector plays a significant role in driving emissions and ecological damage (Climate Transparency, 2022; Ismawati et al., 2022). These systematic pressures shape the environmental responsibilities and limitations of actors in the food system, including vegan restaurants. This chapter focuses on two major environmental issues in the Indonesian food sector: emissions from land use and agriculture, and the environmental impact of plastic packaging waste.

3.2.1 Deforestation and Greenhouse Gas Emissions

Environmental sustainability in Indonesia's food sector is closely tied to land use and deforestation. Agriculture, forestry, and food production contribute significantly to Indonesia's greenhouse gas (GHG) emissions, accounting for nearly half of the national emissions when land-use change and forestry are included (Rahmanulloh 2023; Climate Transparency 2022).

Deforestation is largely driven by agricultural expansion, particularly for palm oil plantations. Indonesia is the world's largest palm oil producer, and extensive land clearing, often through slash-and-burn methods, has led to the loss of over 6 million hectares of forest cover between 2000 and 2012 (Green Earth 2023; Setyanto 2015). Peatland burning is especially harmful, releasing up to 1,400 Mt CO_2 annually, while decomposition of drained peat adds another 600 Mt CO_2 (Setyanto 2015: 4).

Within the agriculture sector, rice cultivation accounts for the largest share of emissions (43%), followed by enteric fermentation from livestock (21%) and manure management (20%) (Climate Transparency 2022: 14).

The effects of deforestation go beyond carbon emissions. Clearing forests and changing how land is used also causes serious harm to the environment. These actions not only destroy animal habitat but also put many species at risk, resulting in reduced biodiversity. Indonesia is one of the most biodiverse countries in the world, with thousands of unique animals and plants, many now in danger. Well-known animals like tigers, orangutans, and elephants are losing their homes and facing greater threats. Removing forests also damages soil, making farming harder in the future. Local communities that depend on forests for food, medicine, and income are also

affected. Yet, only 4,5% of Indonesia's land is officially protected by international conservation standards (Green Earth 2023; Naik 2024).

Given the significant role of agriculture and land use in Indonesia's deforestation and emissions, plant-based diets are increasingly recognised as a more sustainable alternative. By relying less on emission-intensive agricultural inputs and placing less pressure on land and biodiversity, vegan diets can contribute to reducing environmental harm (Scarborough et al. 2023). While most evidence is global, the relevance to Indonesia is clear, as traditional plant-based foods like tempeh and tofu are already widely integrated into local diets.

3.2.2 Plastic Packaging Pollution

Plastic packaging poses another significant environmental threat in Indonesia's food industry, driven by widespread use and limited waste management infrastructure. The food and beverage sector is responsible for about 65% of the nation's plastic consumption, with over 80% of that used for packaging (Ismawati et al. 2022; Indonesia Invests 2016).

Indonesia generates roughly 3 million tonnes of unmanaged plastic waste every year, and nearly a third of this waste enters marine environments. Around 10 billion plastic bags are discarded into the local environment each year, which contributes to severe pollution in rivers and oceans. Rivers such as Brantas, Solo, Progo, and Serayu are among the most polluted globally due to plastic leakage, underscoring the severity of the problem (SEA Circular n.d.: 2).

Globally, Indonesia is the second-largest contributor to marine plastic pollution, accounting for about 10% of total ocean plastic waste. Inadequate landfills systems and poor enforcement lead to widespread dumping with major environmental consequences. Marine life is particularly affected, often harmed, or killed by entanglement or ingestion of plastic debris (SEA Circular n.d.: 2).

Improper disposal of plastics also threatens public health. Soil and water contamination, toxic air emissions, and increased greenhouse gas release all contribute to ecosystem degradation and climate change (Athira n.d.; Gunawan 2024; Waluyo and Kharisma 2023). The burning of plastic waste in informal industries is especially hazardous. In Tropodo, East Java, plastic is commonly used as fuel in tofu production. Researchers conducted tests on chicken eggs from the area and found dioxin levels 70 times higher than the European Union's safety limits, with links to cancer, developmental disorders, and respiratory illness among residents. This was the second-highest concentration of dioxins ever recorded in eggs across Asia, raising

serious concerns about food safety and toxic exposure in the local population (Ismawati et al. 2022; Ray et al. 2019).

In response to the growing crisis, the Indonesian government has introduced several regulatory measures. Regulation No. P.75/2019 was introduced as Indonesia's Roadmap for Extended Producer Responsibility (EPR). This policy targets waste from materials like plastics, paper, aluminum, and glass, involving key actors such as brand owners, manufacturers, importers, retailers, and the food and beverage industry. It mandates producers to implement waste-reduction strategies through sustainable product and packaging design, take-back systems for reuse, and recycling of post-consumer products (Ministry of Environment and Forestry 2020: 4).

Additionally, Indonesia has implemented two key presidential decrees to strengthen its waste management efforts: Decree No. 97/2017, which outlines the National Policy and Strategy for managing household and similar waste (JAKSTRANAS), and Decree No. 83/2018, which focuses on addressing marine plastic pollution through the 2017-2025 Action Plan. These initiatives serve as national frameworks to guide efforts in reducing and managing waste. The government has set a national target to achieve 100% effective waste management coverage by 2025 (Vietnam News Agency 2025). The targets are cutting solid waste generation at the source by 30%, ensuring proper handling of 70% of solid waste, and reducing 70% of marine plastic debris by 2025(Ministry of Environment and Forestry 2020: 1-4). Despite Indonesia's national goal of reaching full waste management coverage by 2025, progress remains significantly behind target, with only around 39% of waste currently being properly managed. This considerable gap has led many to view the 2025 target as unrealistic under current conditions (Vietnam News Agency 2025)

3.3 Social Sustainability in the Food System

Social sustainability in the food system refers to ensuring fair and equitable conditions for both food producers and consumers. It involves supporting decent livelihoods for those involved in food production and supply, promoting equitable access to nutritious food, and addressing systemic social inequalities throughout the food system (Nguyen 2018).

In Indonesia, these issues are particularly important due to the dominance of smallholder agriculture, persistent poverty among rural populations, and widespread food insecurity. This section outlines two major social aspects of the Indonesian food system: the status of small-scale farmers and the population's unequal access to healthy food. These national-level

dynamics shape the broader sustainability landscape in which food-related actors, including restaurants, operate.

3.3.1 Small-Scale Farmers and Livelihoods

Agriculture remains a cornerstone of Indonesia's economy, ranking as the second-largest sector in terms of GDP contribution at 13%, and providing employment for nearly 30% of the national labor force (Mandala Consulting 2023). A vast majority of 93% of the country's farmers operate on a small scale, typically cultivating no more than two hectares of land. These farmers are responsible for producing the majority of staple crops such as rice, corn, and cassava (FAO n.d.; Afifa 2023).

Despite their central role, many smallholder farmers live below the poverty line. In 2021, about 70% of farmers earned less than the national poverty threshold, with an average income of Rp 5 million per year. In contrast, large-scale farmers earned about Rp 22 million (Afifa 2023).

This disparity is rooted in limited access to agricultural inputs such as fertilisers, irrigation, modern equipment, and financial services. These barriers reduce productivity and reinforce structural inequality between rural and urban producers (Gunawan et al. 2022; Alta et al. 2023).

Although the government has introduced support programmes such as fertiliser help, seed distribution, and training for farmers, the efforts have had little effect on reducing poverty. As a result, small-scale farmers still face financial difficulties, even though they play an important role in producing the country's food (Salma 2024).

Understanding the problems faced by small-scale farmers is important for building a sustainable food system. Since they produce much of the food eaten in cities, including restaurants, their situation influences how food is sourced and how its value is seen. Food sourcing cannot be truly fair or sustainable if the people who grow the food are not treated fairly.

3.3.2 Food Insecurity

Food insecurity continues to be a significant issue in Indonesia despite ongoing economic growth. The country faces a "triple burden" of malnutrition: undernourishment, obesity, and micronutrient deficiencies. While the national undernourishment rate has decreased from 19% to 5%, around 16 million people remain undernourished, and 13 million are food-insecure (Laborde et al. 2024). Child malnutrition is especially concerning, with over 30% of children under five stunted and 10% severely underweight. Moreover, 70% of the

population cannot afford a healthy diet. These challenges are exacerbated by climate change, natural disasters, and the socio-economic impacts of the COVID-19 pandemic (Laborde et al. 2024, 4-5).

To respond, the government has launched several programmes. Makan Siang, initiated under President Prabowo Subianto, aims to deliver free balanced meals to schoolchildren and pregnant women. Its goal is to reach 80 million people by 2029 and support community-based food provision, including sourcing from local farmers (The Jakarta Post 2025; Lakshmi and Mariska 2025). Similarly, Aksi Bergizi, a pilot programme in cooperation with UNICEF, promotes adolescent nutrition through healthy breakfasts and iron supplementation. It showed improvements in school attendance and dietary behaviours, despite logistical challenges in food quality and delivery (UNICEF 2024).

These programmes highlight national efforts to increase food access, yet they also reveal the scale of the problem. Limited affordability, poor dietary quality, and regional disparities in access remain widespread.

In this context, the social sustainability of the food system depends not only on how food is produced but also on who can access it. Food that is environmentally sustainable but unaffordable to most cannot be considered socially sustainable. As food businesses operate within this national landscape, issues of affordability, accessibility, and nutritional value remain relevant considerations for any evaluation of sustainable practices.

4 Sustainable Practices in Indonesian Restaurants

Sustainability has become an essential focus in the food service industry, with restaurants playing a key role in addressing environmental and social challenges. In Indonesia, where agriculture and waste contribute significantly to emissions, restaurants are adopting practices that reduce their ecological footprint and support local communities. This section explores sustainable food sourcing, eco-friendly packaging, and waste management strategies implemented by Indonesian restaurants to promote more responsible and resilient operations.

4.1 Sustainable Food Sourcing

The global food system is responsible for around 25% of greenhouse gas (GHG) emissions, which is mainly caused by deforestation, industrial agriculture systems, and long-distance transportation (Deer and Oak n.d.). In Indonesia, where agriculture and land use contribute nearly half of the country's emissions, sustainable sourcing is essential in minimizing the carbon footprint of the food industry (Rahmanulloh 2023: 5-6). As key players in the food value chain, restaurants play a critical role in affecting these trends by influencing purchasing.

Sustainable food sourcing is sourcing ingredients to minimize environmental degradation, enhance social justice, and enhance long-term economic viability (Sharma 2024; DH Hospitality Group 2024). For restaurants, this means sourcing locally grown, seasonal, and responsibly produced ingredients, as well as sourcing fewer resource-intensive supply chains (DH Hospitality Group 2024).

4.1.1 Local and Seasonal Sourcing

Sourcing local and seasonal ingredients is widely regarded as a practical and impactful strategy for promoting sustainability in the food service industry. Local food generally refers to agricultural products that are grown and consumed within a defined geographic radius, typically between 100 and 150 kilometers (Rahimi and Demirbaş 2023: 258). In Indonesia, which features diverse agricultural zones and a tropical climate, a broad array of fruits, vegetables, and herbs can be sourced locally either throughout the year or during specific growing seasons.

The environmental advantages of local food sourcing are significant. It reduces greenhouse gas emissions by minimizing the distance food travels from farm to table, and it also lessens the need for excessive packaging, as products sold through local markets often

require little or no plastic wrapping. Many local farmers employ organic or low-input agricultural methods, which help reduce dependence on synthetic chemicals, enhance soil health, and maintain biodiversity. Additionally, supporting local agriculture contributes to the preservation of farmland and green space, both critical for long-term ecosystem stability and climate resilience (Rahimi and Demirbaş 2023).

Economically, purchasing local food supports rural and urban communities alike. It fosters job creation, enhances market access for small-scale farmers, and contributes to income stability. These dynamics also help preserve agricultural knowledge and traditions while mitigating the risk of land loss due to urban expansion. Financially, money spent in local markets tends to recirculate within the community, strengthening regional economies through multiplier effects that benefit related sectors (Rahimi and Demirbaş 2023).

From a social perspective, local food systems cultivate closer relationships between producers and consumers, thereby increasing transparency, trust, and public engagement (Rahimi and Demirbaş 2023). When local food sourcing is combined with a focus on seasonal availability, meaning ingredients are used at their peak natural harvest period, it further enhances sustainability.

Seasonal sourcing minimizes reliance on energy-intensive production and imported goods, supporting agricultural systems that operate efficiently within natural seasonal patterns (Bryce 2024). Indonesia's tropical climate allows many crops to grow year-round, although certain varieties remain tied to specific seasons. Menu planning based on seasonal availability can reduce procurement costs, lower food waste, and improve nutritional quality (Voicu 2021).

Moreover, consumer preferences strongly align with local and seasonal sourcing. Numerous studies indicate that consumers and restaurants perceive local food as fresher, tastier, and more responsibly produced, often associating it with organic or sustainable farming methods (Inwood et al. 2009). Convenience, affordability, and the belief that buying local strengthens the regional economy further motivate such preferences (Holmes et al. 2018; Roy 2004). In the Indonesian context, consumers across diverse ethnic and geographic backgrounds consistently regard local foods as superior in quality and value. Arsil et al. (2014) found that 77.7% of Indonesian consumers believe local food is more affordable than national or imported alternatives (Arsil et al. 2014: 119).

Nonetheless, several barriers hinder the consistent implementation of local and seasonal sourcing. Seasonality naturally limits the year-round availability of certain products. Additional challenges may include price volatility and logistical constraints, particularly in transportation and delivery (Holmes et al. 2018; Roy 2004). Limited local production capacity, driven by rapid

urbanization and constrained agricultural land, also poses a significant challenge (Budiman and Musthofa 2023).

This is evident in urban environments such as Yogyakarta City, where rapid urban growth and limited farmland make it difficult to meet household vegetable demand. Among 15 key vegetable types examined, only spinach and water spinach are reliably produced within the city limits (Budiman and Musthofa 2023: 155–156). Napa cabbage, tomatoes, eggplants, and cayenne peppers are also produced in the Special Region of Yogyakarta; however, the level of production is insufficient to meet demand and must be supplemented with supplies from outside the region. Other staples such as cucumber, carrots, potatoes, garlic, beans, and chayote are typically sourced from outside the Special Region, particularly from Central Java districts like Magelang, Wonosobo, Temanggung, and Boyolali.

The Giwangan Main Market serves as a central distribution point, supplying the majority of vegetables transported into the city, underscoring the capital's dependency on external agricultural regions' agriculture. Yogyakarta's limited agricultural land and rapid urbanization have made it difficult to produce enough vegetables locally. As a result, the city remains heavily dependent on external regions to fulfill its vegetable demand, highlighting the constraints of local and seasonal sourcing in urban settings (Budiman and Musthofa 2023).

4.1.2 Organic Sourcing

Organic food refers to produce grown and processed without the use of synthetic pesticides, chemical fertilizers, genetically modified organisms (GMOs), or artificial additives. In the context of restaurant operations, incorporating organic ingredients enables establishments to provide meals that align with health-conscious values by avoiding potentially harmful substances. Organic foods are also frequently associated with enhanced taste and quality, as nature-based agricultural methods are believed to support greater freshness, flavor, and nutritional integrity (Ace Natural 2024).

Beyond individual health benefits, organic farming contributes to environmental sustainability through practices that protect soil structure, conserve water, and support biodiversity. It further aligns with ethical considerations, including improved animal welfare and equitable labor standards, reflecting the growing concerns of socially aware consumers. As plant-based diets gain traction globally, the integration of organic fruits, vegetables, grains, and legumes allows restaurants to respond to shifting consumer preferences for food that is not only nutritious but also sustainably and ethically sourced (Ace Natural 2024).

4.1.3 Hyper-Local Sourcing

Hyper-local sourcing refers to the procurement of ingredients from a restaurant's immediate surroundings, including on-site gardens, rooftop farms, and neighboring urban agricultural spaces. This proximity enables nearly instantaneous harvesting and utilization, thereby enhancing freshness, taste, and nutritional value. Many hyper-local operations adopt innovative, soil-free cultivation techniques such as hydroponics and aquaponics, which are particularly well-suited to densely populated areas where traditional farmland is scarce. Grounded in sustainable, small-scale agricultural models, this approach minimizes the use of fossil fuels and synthetic inputs, reducing the overall environmental footprint (Vending Times 2022).

For restaurants in urban areas like Yogyakarta, hyper-local sourcing offers a practical and sustainable way to access fresh ingredients. Crops such as spinach and water spinach can be easily grown in small spaces using methods like polybag verticulture. Other suitable options include napa cabbage, eggplants, and cayenne peppers, which are well adapted to compact urban environments and have short growth cycles (Budiman and Musthofa 2023). Additionally, versatile and easy-to-cultivate ingredients like chili, pandanus, turmeric, ginger, blue pea flower, and basil can enhance menu diversity and nutritional value, making them ideal choices for restaurants embracing hyper-local sourcing (A Journey Bespoken n.d.).

For restaurants, hyper-local sourcing presents a range of operational advantages. It facilitates vertical integration by allowing full control over the food production process, reduces dependency on external supply chains, lowers procurement costs, and curbs food waste. Furthermore, it reinforces consumer confidence through supply chain transparency, encourages community involvement through outreach and educational initiatives, and supports sustainable development objectives by combining environmental stewardship with economic viability (Infuse Hospitality 2024; Vending Times 2022).

4.1.4 Adoption of Sustainable Food Sourcing in Indonesian Restaurants

In recent years, many restaurants across Indonesia, especially in Bali and Java, have been embracing more sustainable food sourcing practices. A key trend among them is a strong focus on using local ingredients, often sourced directly from nearby farmers. For example, places like Burgreens and Lago'Ta Cafe & Resto rely heavily on local farms, with Lago'Ta Cafe & Resto sourcing up to 80% of its ingredients from nearby producers (Saraswati 2022; JOOi Team 2022; Winowatan 2024: 236). This not only supports local agriculture but also ensures fresher, more seasonal food. Along with local sourcing, many restaurants prioritize

organic and seasonal ingredients. Restaurants such as Hilton and Natys are committed to offering menus rich in organic, chemical-free produce that changes with the seasons (Sari et al. 2022; Wenten 2024). Some go even further by growing their own ingredients or partnering closely with specific farms. For instance, Burgreens works with over 200 farmers and pays fair trade prices, showing a deep ethical commitment (JOOi Team 2022). Transparency and quality control are also important, with some restaurants sending staff to visit suppliers and clearly labeling vegetarian or vegan options on their menus (Swastika et al. 2022). Overall, these restaurants share a dedication to local, organic, and seasonal sourcing, applying these values in different ways from fair trade partnerships to in-house gardens and farm collaborations, reflecting a meaningful move toward sustainability in Indonesia's food scene.

These sourcing strategies, though varied in scale and approach, demonstrate a clear movement among Indonesian restaurants toward more sustainable operations. The next section explores how this commitment extends beyond ingredients to include innovations in food packaging.

4.2 Food Packaging Considerations

Plastic packaging has long been a staple in the restaurant industry thanks to its low cost, durability, lightweight feel, and ability to keep food fresh and hygienic, especially for takeout and delivery (Mohseni 2023). Because of these properties, many food businesses across Indonesia still heavily rely on plastic. However, the main problem is what happens after the plastic is used. Poor waste management, limited recycling facilities, and careless disposal practices have led to widespread plastic pollution, with much of it ending up in landfills, waterways, and oceans, harming ecosystems and contributing to a growing environmental crisis (Babaremu et al. 2022; Khandeparkar et al. 2024; Adekanmbi et al. 2024).

As plastic pollution continues to worsen across Indonesia, the food service sector is facing growing pressure to adopt more sustainable packaging solutions. In response, a growing number of restaurants are turning to alternatives that still provide the benefits of plastic, such as strength, hygiene, and food safety, but with far less impact on the environment.

4.2.1 Traditional Organic Packaging Materials

Traditional organic packaging materials have been utilized in Indonesia for centuries, and the most common among them are banana leaves, coconut leaves, teak leaves, hibiscus leaves, guava leaves, palm leaves, bamboo, and pandan leaves (Kasmana and Maulina 2015). These are readily available and affordable throughout the country (Ministry of Tourism and

Creative Economy of the Republic of Indonesia 2024). These leaves can be utilized directly without processing, except for bamboo, which must be woven into baskets (Kasmana and Maulina 2015). All of them are biodegradable, resource-based, renewable, antimicrobial, and antibacterial by nature, eco-friendly, and provide class-leading food protection (Kasmana and Maulina 2015).

Banana leaves in Indonesia are widespread as they are durable, waterproof, and possess antimicrobial properties (Rikasa and Mufeez 2023). In Balinese, they are symbolic as well as utilitarian, and they are mostly used in rituals such as weddings and cremations (Sari et al. 2023). Denpasar food snack producers prefer Batu banana leaves produced in Payangan village in Gianyar due to their thickness and freshness (Sari et al. 2023). These leaves need no pre-treatment, will not stain food, and are simple to shape, making them useful and culturally important.

Bamboo is a highly renewable commodity with low water use and high growth, grown organically without pesticides and fertilizers. Bamboo stands are responsible for releasing more carbon dioxide and producing more oxygen than a similar tree stand, fighting climate change. Bamboo is a biodegradable, renewable product that breaks down within 2–6 months under different environmental conditions (Green Alternatives 2023). It is used in the manufacture of besek in Indonesia, food-storing baskets that allow for air flow and regulate bacterial growth (Ministry of Tourism and Creative Economy of the Republic of Indonesia 2024).

4.2.2 Biodegradable and Innovative Packaging Solutions

Several local companies have emerged that manufacture biodegradable and innovative packaging products that will reduce environmental impact without sacrificing the needs of food businesses. Among the leading brands are Evoware, Avani, and Plépah, each contributing unique solutions to sustainable food packaging.

Avani is a Bali-based social enterprise that manufactures eco-friendly packaging from biodegradable, renewable materials. Their cassava bags, made from cassava, that is, cassava starch and natural additives, completely biodegrade within 3 to 6 months into carbon dioxide and biomass without any toxic residue. This can be sped up by dissolving in hot water, softening in cold water, or burning, where only a small amount of ash will be left behind. Avani also offers cups, bowls, and straws produced from FSC-certified forest paper, with straws biodegrading ideally after an hour. PLA-based cutlery and bagasse-based plates and trays complete their certified compostable range of products, all of which promote a circular economy (Avani Eco n.d.; The Index Project n.d.).

Jakarta-based Evoware produces plastic-free, compostable food packaging from seaweed, cassava, rice, sugarcane, palm leaves, bamboo, and wood. Their seaweed packaging dissolves in water and can even be used as fertilizer, and the Ello Jello edible cup is a zero-waste alternative to plastic cups. Cassava bags come in water-soluble and water-resistant forms, rice straws biodegrade within a month's time, and sugarcane bagasse containers are microwave- and oven-safe. Evoware is also developing a 3D seaweed farming system to guarantee sustainable raw materials, preserve marine biodiversity, and promote circular economy principles (Evoware 2022).

Plépah is an Indonesian social enterprise that transforms agricultural waste, such as areca palm leaf sheaths, into durable, sustainable food containers such as plates, bowls, and takeaway boxes. The leaf sheaths are naturally water-resistant and strong, with unique fiber patterns that don't need a chemical coating. Their products biodegrade and compost in 60 days, are reusable when clean and dry, freezer-safe to -18°C, and oven- and microwave-safe to 200°C. Plépah partners with community-based micro-manufacturing hubs, enabling small-scale farmers to generate local jobs, and promoting inclusive economic growth while offering scalable solutions for single-use plastics (Nadira 2020; Plepah 2023: 3-4)

4.2.3 Adoption of Sustainable Packaging in Indonesian Restaurants

In Indonesia, more restaurants and cafes are choosing sustainable food packaging. They use traditional ideas combined with new, eco-friendly methods. For instance, Ijen, a zero-waste restaurant in Bali, embodies the philosophy of resource-conscious dining by eliminating single-use plastics altogether, serving meals on banana leaves, and using wooden cutlery, pottery plates, and glassware (JOOi Team 2022). Similarly, The Avocado Factory in Canggu, Bali, has achieved a 98% plastic-free operation, emphasizing recyclable packaging as a practical alternative to single-use items (JOOi Team 2022). Stuja Coffee in Jakarta advances this vision through innovative use of corn- and cassava-based glasses and bottles, and compostable bags products that resonate with the efforts of companies like Avani and Evoware. Retrorika Coffee & Bar in East Java uses stainless steel straws and besek bamboo baskets for takeaway orders, reinforcing the relevance of traditional solutions in modern hospitality settings. The plant-based chain Burgreens furthers this commitment with cassava-based degradable bags, wooden cutlery, and paper straws (Saraswati 2022). Collectively, these initiatives signal a convergence of traditional knowledge, innovation, and responsible entrepreneurship, pointing toward a scalable, community-rooted response to Indonesia’s plastic crisis.

4.2.4 Challenges in the Implementation of Sustainable Packaging

However, there are still several challenges in putting sustainable packaging into practice across Indonesia. The main limiting factor is that biodegradable or sustainable packaging is more expensive, even being much more expensive than conventional ones, with the price being up to 16 times more expensive. This cost difference limits adoption, especially by small food companies with low margin levels (Eloksari 2021; Somewang 2023). Low consumer awareness of the benefits and proper disposal of biodegradable packaging remains. A study by Terzioğlu et al. (2025) indicates that inconvenience, resistance to behavior change, and hygiene concerns remain to hinder consumer uptake, with increased education and behavior change campaigns being emphasized. In addition, while the government has put in place regulations such as the Extended Producer Responsibility under MoEF Regulation No. 75/2019, enforcement is often uneven and most violations remain unremedied at the local level (Wang and Karasik 2022). To overcome these issues, Indonesia must tackle costs, scale up composting facilities, public education, and more active policy enforcement.

4.3 Waste Management Effectiveness

Indonesia is the world's second-largest producer of plastic waste after China and the second-largest producer of food waste after Saudi Arabia (Ministry of Environment and Forestry 2020; Waluyo and Kharisma 2023).

According to the National Waste Management Information System (SIPSN) of the Ministry of Environment and Forestry, in 2023, the volume of waste generated in Indonesia was 25 million tons. In 2024, this number increased to 34 million tons of waste, with the largest portion of 39,3% being food waste and the second largest portion of 19,74% being plastic waste. 60% of waste was generated from households and around 20% from businesses such as restaurants (Ministry of Environment and Forestry 2024).

Despite growing waste volumes, Indonesia’s recycling and waste recovery systems remain underdeveloped. Of all the waste produced in Indonesia, around 72% is handled using different approaches primarily through landfilling (69%), followed by recycling (12%), composting (8%), waste banks (4%), energy recovery (3%), and other methods (4%). Despite these efforts, approximately 28% of the total waste still goes unprocessed or unmanaged (SEA Circular n.d.: 2).

The food sector, especially restaurants, contributes substantially to this total, producing organic (leftover ingredients, uneaten customer meals, and spoiled items), inorganic (plastic,

paper, glass), and hazardous (non-recyclable, non-compostable-grease, cleaning chemicals) waste streams (Gentile 2024).

Given their impact, restaurants play a central role in the urban waste cycle and have several sustainable options to reduce and manage their waste, including waste segregation, composting, recycling, and collaborations with waste banks.

4.3.1 Waste Segregation

Waste segregation is the practice of separating organic, recyclable, and non-recyclable materials at the source. It is a vital first step toward sustainable waste management in restaurants, as it enables composting, recycling, and safe disposal processes to work effectively.

Proper segregation reduces pollution, conserves resources, and improves public health by keeping hazardous and recyclable materials out of landfills and ecosystems. It also helps lower waste management costs and fosters more sustainable operations (ACTenviro 2024).

Despite these benefits, the implementation of segregation in Indonesian restaurants faces significant challenges. While some establishments have adopted internal sorting systems, their efforts are often undermined by infrastructure gaps. It was noted that waste collection services often mix sorted waste during transportation, and there are no regulations mandating that restaurants segregate waste or mechanisms to ensure that the segregation process is respected after collection (Mustika 2025). Additionally, restaurant-level barriers such as limited space, staff capacity, and lack of training further hinder consistent segregation practices (Budijati et al. 2021).

4.3.2 Composting

Composting is a biological waste management technique that decomposes organic materials such as food scraps, plant waste, and agricultural byproducts through aerobic (oxygen-rich) or anaerobic (oxygen-free) processes. This process converts waste into nutrient-rich compost, an eco-friendly fertilizer that enhances soil health and agricultural productivity (Salleh et al. 2020; Farahdiba et al. 2023).

In Indonesia, aerobic composting, where biodegradable materials are stacked in long rows and periodically turned, is commonly used in large-scale and communal settings. For example, Surabaya operates 26 composting facilities that process park and household waste into compost and animal feed (Farahdiba et al. 2023). Composting helps reduce landfill pressure, lowers carbon emissions by 20%-25%, and supports both environmental and rural development goals (Salleh et al. 2020; Farahdiba et al. 2023: 9). However, challenges such as

odors, soil acidification, and leachate-related contamination must be managed (Farahdiba et al. 2023).

A practical variant of aerobic composting is the use of biopore infiltration holes (lubang resapan biopori), a simple and space-efficient method suited to urban areas. These small vertical holes are filled with organic waste, which is naturally broken down by soil organisms, improving soil fertility and rainwater absorption while significantly reducing methane emissions (Zero Waste n.d.). As a decentralized and low-cost approach, biopori offers a scalable solution for restaurants and households with limited land or resources for traditional composting.

4.3.3 Maggot Black Soldier Fly (BSF) Utilization

Black Soldier Fly (BSF) technology is a sustainable waste management method that uses the larvae of Hermetia illucens to convert organic waste into high-value products like protein-rich animal feed and compost. It is more efficient than traditional composting because it processes waste faster and produces commercially useful outputs (Climate and Clean Air Coalition n.d.). Indonesia's tropical climate offers ideal conditions for BSF larvae to thrive, making it especially suitable for this technology. The resulting by-products include nutrient-dense insect protein and frass fertilizer, supporting environmental and economic sustainability (Farahdiba et al. 2023).

Between 2020 and 2021, Surabaya established four BSF processing units in Jambangan, Wonorejo, Bratang, and Menur. These facilities processed up to 50 tons of food waste in Jambangan and 40–50 tons in Wonorejo, achieving waste reduction rates of 84% and 54%, respectively (Farahdiba et al. 2023: 8).

The main benefits include reduced landfill use, lower greenhouse gas emissions compared to conventional composting, and the production of high-protein animal feed (Climate and Clean Air Coalition n.d.).

However, challenges remain, especially in waste collection and public participation, as many households do not separate organic from inorganic waste, complicating the food waste supply for BSF facilities (Farahdiba et al. 2023)

4.3.4 Recycling Centers - Waste Banks

Waste banks (bank sampah) offer a practical and community-based solution for restaurants in Indonesia to manage inorganic waste more sustainably. These systems operate like conventional banks. Restaurants and other participants "deposit" sorted recyclable materials such as plastics, paper, or glass, which are weighed and given monetary value. This

amount is recorded in an account and can be withdrawn as cash or exchanged for goods, providing a direct financial incentive for waste segregation (Switch Asia 2020).

By partnering with local waste banks, restaurants can reduce the volume of waste sent to landfills while supporting community-based recycling efforts. As of 2024, more than 30,000 waste banks are operating across Indonesia, reflecting growing adoption (Antara News 2024).

The use of waste banks allows restaurants to cut waste disposal costs, enhance their environmental reputation, and contribute to a circular economy. It also aligns with broader sustainability goals by encouraging staff and customers to participate in responsible waste practices. However, challenges remain. Many waste banks face limited infrastructure, a lack of regulatory clarity, and insufficient training for proper operation, which can limit their scalability and reliability (Budiyarto et al. 2025).

4.3.5 Examples of Sustainable Waste Management in Indonesian Restaurants

Several Indonesian restaurants and cafes demonstrate proactive approaches to waste management by implementing waste sorting, recycling, and innovative reuse strategies. Common among them is the practice of waste segregation, where organic and inorganic wastes are separated at the source to facilitate targeted processing. For example, Jong Won employs a unique method of processing organic waste into maggots, which are then used as animal fodder, while inorganic waste is sent to a recycling cooperative, KSM Madusari, for further processing (Saraswati 2022). Similarly, Ijen separates waste streams, composts organic waste, and converts part of it into livestock feed, with inorganic waste recycled separately (JOOi Team 2022). Cafes like Stuja Coffee in Jakarta and Retrorika Coffee & Bar in East Java also prioritize waste segregation. Retrorika further recycles organic waste into compost, reflecting a sustainable approach aligned with broader environmental goals (Saraswati 2022). A notable variation in practice is seen at Elephant, which incorporates food waste reduction by using less visually appealing vegetables in meals that would otherwise be discarded and channels organic waste to local farmers who feed it to pigs. This approach not only minimizes waste but also supports local agriculture (JOOi Team 2022).

Many Indonesian restaurants and cafes actively separate organic and inorganic waste, recycling inorganic materials while repurposing organic waste through composting, livestock feed, or innovative methods like maggot farming. Though all prioritize waste segregation, their approaches to organic waste reuse vary, reflecting flexible strategies adapted to local needs and sustainability goals

5 Practical Part

5.1 Methodology and Research Design

5.1.1 Research Aim and Question

This research aims to examine the extent to which vegan restaurants in Yogyakarta adopt sustainable practices in food sourcing, packaging, and waste management. It also seeks to explore the motivations behind these practices and the barriers that prevent or limit their implementation. The research is guided by the following central research question: *To what extent do vegan restaurants in Yogyakarta implement sustainable practices in food sourcing, packaging, and waste management, and what are their motivations and barriers?*

5.1.2 Methodological Approach

A qualitative-dominant mixed-methods approach was employed to address the research question. The primary data collection method was a structured online survey designed to gather both quantitative and qualitative responses. This combination enabled the identification of measurable patterns in sustainability practices while also providing space for participants to elaborate on their motivations, challenges, and the contextual realities behind their practices.

5.1.3 Research Design

The study employed an exploratory, descriptive, and case-based research design. It is exploratory in nature due to the limited existing research on vegan restaurants in Indonesia, particularly in relation to sustainability. It is descriptive because it documents and categorizes current sustainability practices in food sourcing, packaging, and waste management. It is also case-based, as it focuses specifically on vegan restaurants operating within the Yogyakarta Special Region.

5.1.4 Data Collection Strategy

Data were collected through an online survey created with Google Forms. Follow-up questions were sent via WhatsApp and Instagram, platforms widely used by Indonesian businesses for communication. WhatsApp was prioritized for initial contact, with Instagram used as a secondary option when responses were not received. These tools provided accessible, flexible means of communication, appropriate for small business settings. Further details on the survey structure and follow-up process are discussed in Section 5.2.

5.1.5 Ethical Considerations

All participants were approached individually. The researcher introduced themselves, explained the research purpose and topic, and made clear that participation was entirely voluntary. Consent was collected in two stages. Firstly, participants were asked if they were willing to participate before receiving the survey. Second, after follow-up communication, they were asked for consent to use the names of their restaurants and any content from private message exchanges in the thesis.

Although the survey was not anonymous because participants provided their restaurant's name, no identifying personal data (e.g., name of owners or staff) was collected. All data were stored securely. Ethical principles of transparency, informed consent, voluntary participation, and confidentiality were maintained throughout the research process.

5.2 Survey Design and Implementation

5.2.1 Survey Structure and Content

The primary data collection tool was a structured online survey consisting of 19 questions, created using Google Forms. Sixteen questions were open-ended to allow participants to describe their practices in their own words. Three were closed-ended: one multiple choice with an "Other" option, and two Likert-scale items with six options (Strongly agree, Agree, Less agree, Disagree, Strongly disagree, and Don't know*).* Only one of the Likert-scale questions included an "Other".

5.2.2 Question Flow and Thematic Organization

The survey followed a thematically structured flow designed to guide participants from general awareness to specific practices and personal reflections. It began by asking for the restaurant's name and their familiarity with terms such as "sustainability", "sustainable practices", or "green practices".

The next section focused on food sourcing, with questions exploring where ingredients were sourced, the reasons behind sourcing decisions, the types of markets used, specific foods sourced from those markets, and whether the restaurant offered a seasonal menu.

The following section addressed packaging practices, asking what types of packaging material were used, why those choices were made, and what kinds of straws or utensils were provided. This was followed by a question on waste management, including how waste was managed.

The final section focused on evaluation and reflection, asking whether sustainable practices were easy or difficult to implement in Indonesia, whether the menu was sustainable, what motivated sustainable practices, what challenges or barriers existed, and whether sustainability was perceived as too costly or not. The survey concluded with an open-ended request for specific examples of sustainable practices adopted in the restaurants.

5.2.3 Language, Accessibility, and Clarity

The survey was initially written in English and then translated into formal Indonesian. A native Indonesian speaker reviewed the translation for grammar and clarity. To support understanding, the survey opened with a brief explanation of the term “green practices”, along with examples. Although this term was chosen for accessibility, it may have slightly reduced academic precision compared to “sustainable practices”.

5.2.4 Survey Distribution and Completion

The survey was distributed to participants individually via WhatsApp or Instagram, depending on the restaurant’s preferred method of communication. These platforms were chosen due to their common use by small and independent businesses in Indonesia for both customer engagement and daily operations. Before sending the survey, the researcher introduced the study and clarified that participation was entirely voluntary. Participants were encouraged to complete the survey at their own convenience, and most responses were received within one week.

5.2.5 Follow-Up Conversations

To clarify survey responses and add depth, brief follow-up conversations were conducted via WhatsApp or Instagram. These informal exchanges allowed the researcher to ask targeted questions based on participants’ answers. For example, some were asked to specify which ingredients they source, whether they used other packaging materials, or to explain their waste management strategies more fully.

These short, tailored conversations functioned as informal interviews and helped fill in gaps or clarify vague responses. Participants had already consented to participate in the study, and additional consent was obtained to include restaurant names and information from private messages. These follow-ups provide important context and strengthen the reliability of the data.

5.3 Selection Process for Research Participants

The selection of research participants was based on purposive sampling, with specific inclusion criteria aimed at identifying vegan restaurants operating in Yogyakarta. A total of seven restaurants participated in the study. These establishments were selected based on three main criteria: they had to be fully vegan, located within the Special Region of Yogyakarta, and operational at the time of data collection. The researcher confirmed their vegan status directly with the owners or managers during initial communication.

The initial identification of restaurants was guided by the researcher's personal experience of living in Yogyakarta and previously visiting or ordering from several vegan establishments in the city. To broaden the selection, the researcher also checked the HappyCow website to see if there were other vegan restaurants listed in Yogyakarta. Some participating restaurant owners were also asked whether they were aware of any additional fully vegan restaurants in the area, but none were reported.

In total, eight restaurants were contacted. One declined to participate due to technical issues with the survey and did not respond to follow-up. As a result, the final sample consists of seven restaurants that met all inclusion criteria and completed the survey.

5.4 Participants Profile

LN Fortunate Coffee is part of a Southeast Asian vegan franchise that originated in Taiwan. It is located near the busy tourist area of Malioboro Street. The restaurant offers a wide range of Indonesian and European dishes, but also offers vegan pastries, cakes, and plant-based drinks. The price range is from 15,000 to 35,000 rupiah. The restaurant is a popular spot, mostly for tourists.

Black Forest Coffee is located in the tourist district of Prawirotaman. It offers a diverse menu of Indonesian and European cuisine, including vegan steak, rawon soup, teriyaki noodles, and mushroom skewers. With appetizers, main dishes, and desserts available, prices range between 20,000 and 40,000 rupiah. The restaurant has a cozy interior and a plant-filled terrace.

Veganissimo is a vegan restaurant that is owned and operated by a family and is located in Pringwulung culinary village, Condongcatur. The restaurant provides Indonesian and Chinese cuisine with a daily set menu and also special festive menus for Ramadan and Idul-Fitri festivities. The restaurant provides a lesehan (floor seating) eating experience. Prices of 15,000

to 25,000 rupiah. Its unique, special cultural atmosphere and changing menu are well-liked among the locals.

RM Vegetarian Lusidus has a vegan menu with an Indonesian and European focus, such as tofu stir-fry, fried noodles, and rice meals. The menu is affordable, and the price range is between 10,000 and 25,000 rupiah. The restaurant is not located in a tourist area and is visited mostly by locals or tourists nearby.

Somayoga Vegan is a vegetarian restaurant in a scenic rice field setting, out of the city center. Mushroom-based meat substitute is served in traditional Indonesian cuisine. Menu prices range from 10,000 to 25,000 rupiah. Somayoga Vegan is renowned for its peaceful natural setting and creative vegan dishes duplicating meat textures that are a hit among customers looking for a relaxing eating experience.

Simple Plant Kitchen is not only a vegan restaurant but also an art venue. Located outside tourist areas, it offers Indonesian-European cuisine such as noodles, tempeh steak, and spaghetti pesto for food prices ranging from 15,000 to 35,000 rupiah. MSG and palm oil are not found in the restaurant, and animal rights are promoted through an adjacent shop and information flyers, so it is a socially responsible place to dine.

Loving Hut is a globally recognized vegan fast-food franchise. In Indonesia, there are several locations, including Yogyakarta. It serves a range of Asian-inspired vegan dishes, including soto, fried rice, and vegan skewers. Prices generally fall between 15,000 and 40,000 rupiah. Its mission is inspired by spiritual teachings advocating compassion and a plant-based lifestyle.

5.5 Survey Data Analysis Techniques

The data were analyzed using a qualitative-dominant approach, consistent with the exploratory and descriptive nature of the study. Thematic analysis was applied to the open-ended responses, which were grouped into eight key themes based on the structure of the survey: (1) Awareness of Sustainability, (2) Food Sourcing Practices, (3) Menu and Cultural Considerations, (4) Packaging Practices, (5) Waste Management, (6) Motivations and Values, (7) Barriers and Challenges, and (8) Examples of Sustainability.

Responses were hand-coded and reviewed for recurring patterns, similarities, and contrasts. Descriptive quantification (e.g., the number of restaurants reporting a specific view

or practice) was included where helpful, though the primary emphasis remained on the qualitative content. Follow-up clarifications gathered via WhatsApp and Instagram were integrated into the dataset to enrich understanding and ensure accuracy.

5.6 Results

Awareness of Sustainability

The first survey question assessed whether participants were familiar with the concept of sustainability or sustainable/green practices. All seven restaurants confirmed their familiarity. Six selected “Agree,” and one, Simple Plant Kitchen, selected “Strongly Agree.” Though no definitions were requested, these results reflect a shared baseline awareness of the term among respondents.

Food Sourcing Practices

When asked about types of sourcing locations, all seven restaurants reported sourcing their ingredients primarily from traditional markets. Six of them relied on markets located within the Special Region of Yogyakarta. The most frequently mentioned was Gowok Market, used by both Veganissimo and RM Vegetarian Lusidus. Other reported markets included Beringharjo (Fortunate Coffee), Krapyak (Black Forest Coffee), Demangan (Veganissimo), and Caturtunggal (Loving Hut). Simple Plant Kitchen sourced from several markets depending on availability, including Niten, Giwangan, and Prawirotaman. Somayoga Vegan mentioned sourcing from Prambanan Morning Market, as well as from a vegetable stall in Yogyakarta that receives produce directly from Magelang-based farmers. This made Somayoga Vegan the only restaurant that regularly sourced ingredients from outside the region.

In addition to market purchases, three restaurants (Simple Plant Kitchen, Somayoga Vegan, and RM Vegetarian Lusidus) also used homegrown ingredients, including herbs and leafy greens cultivated in small-scale gardens. Simple Plant Kitchen explained, “We use ingredients from our garden, sometimes from friends’ gardens, and for what we don’t grow, we buy from traditional markets or local producers (e.g., tofu, tempeh).” And only one restaurant, Black Forest Coffee, reported using imported ingredients, specifically seitan, in addition to locally sourced products.

The following question aimed to find out their reason for sourcing from the above-mentioned locations. When it comes to local markets within the Special Region of Yogyakarta, affordability was the most commonly cited reason, mentioned by four restaurants. Supporting local farmers was highlighted by two restaurants as an ethical motivation. Freshness and quality

were each mentioned by two restaurants. Loving Hut noted convenience as a key factor, while Black Forest Coffee specifically pointed out transportation efficiency. Somayoga Vegan, which sources from a vegetable stall linked directly to Magelang farmers, emphasized both quality and cost-effectiveness: “The vegetables are fresh, of good quality, and cheaper than those in local markets.” Simple Plant Kitchen added environmental and health reasons for using homegrown produce: “Besides being cheaper, using homegrown ingredients means they’re free from preservatives or chemical fertilizers, helps reduce plastic waste, and supports ecosystem balance.”

The following question asked what type of ingredients they source from these places. From local markets within the region, carrots and broccoli were the most frequently mentioned, each cited by three restaurants. Potatoes, cauliflower, napa cabbage, green mustard, corn, tempeh, and tofu were each mentioned by two. Veganissimo and RM Vegetarian Lusidus reported the most extensive and overlapping lists, including all the above items and several types of eggplant. Loving Hut also used carrots and broccoli, along with tomatoes and mushrooms. Black Forest Coffee mentioned mushrooms, while Simple Plant Kitchen listed purple cabbage, iceberg lettuce, onions, and garlic. Some ingredients were unique to one restaurant: chayote to RM Vegetarian Lusidus, and green and long beans to Veganissimo. Somayoga Vegan was the only restaurant sourcing from outside the region, obtaining green mustard, broccoli, carrots, and cabbage from Magelang-based farmers.

Several also shared details on homegrown produce. Simple Plant Kitchen stated: “Sweet potatoes, basil, passion fruit, chili, ginseng leaves, pandan, papaya, Japanese papaya leaves, mangkukan leaves, and sirih bumi are from our garden. Butterfly pea flowers come from a friend’s garden.” RM Vegetarian Lusidus grew chilies and herbs at home and Somayoga Vegan maintained a small garden, explaining: “Mint leaves, cassava leaves, lettuce (in progress), kaffir lime leaves, bay leaves, etc., in small amounts due to limited space.” Additionally, when asked if some ingredients are hard to source, only two restaurants responded. Somayoga Vegan stated there are none that are hard to source; however, Veganissimo noted that vegetables such as bitter mustard, cucumbers, and kailan were only available at specific markets like Pathuk and Kranggan, limiting their regular use.

The last question from this theme was to find out if restaurants incorporate seasonal ingredients into their menus. Two restaurants, Black Forest Coffee and Simple Plant Kitchen, reported offering seasonal menu adaptations based on ingredient availability. The remaining five restaurants did not make seasonal changes. One, Somayoga Vegan, noted: “No, the ingredients are always available and easy to get.”

Menu and Cultural Considerations

Traditional Indonesian cuisine plays a prominent role in most of the vegan restaurants included in this study. Six out of seven participants reported offering local dishes on their menu, often as a way to stay culturally rooted or meet customer expectations. Only one restaurant, Loving Hut, did not include traditional dishes, explaining simply that their "menu has not been updated."

The variety of dishes mentioned was broad and regionally rich. Veganissimo, for example, listed gudeg, nasi lemak, and padang rice, while Simple Plant Kitchen offered an extensive range including rawon, soto betawi, rendang, and tongseng. Cultural and religious holidays also influence menu design. Veganissimo prepares lontong opor for Eid and bakcang for the Dragon Boat Festival. Similarly, Somayoga Vegan offers a vegan version of ketupat opor, noting that such adaptations allow them to "celebrate traditions and avoid repetition."

Motivations for offering traditional dishes ranged from preserving cultural identity to meeting consumer expectations. Black Forest Coffee explained, "Indonesians are more familiar with local dishes, and tourists prefer Indonesian specialties." Simple Plant Kitchen shared that "traditional menus are in demand," and mentioned they even "share recipes with visitors" as part of the dining experience. This blending of authenticity and outreach was a recurring theme across responses.

Sustainable menu practices were less consistently defined but present in several responses. RM Vegetarian Lusidus described growing chili and herbs at home and sourcing vegetables from nearby markets. Simple Plant Kitchen focused on ingredient quality and availability, using local, natural, healthier, and more available ingredients. At Somayoga Vegan, sustainability was framed as an evolving process: "Every year we review and improve the menu for innovation and creativity." However, Fortunate Coffee mentioned they had not yet adapted their menu in explicitly sustainable terms, and Veganissimo expressed uncertainty about what such efforts would involve.

Packaging Practices

The packaging practices reported by vegan restaurants in Yogyakarta reveal that most businesses use a combination of packaging materials rather than relying on a single type. The responses reflect a balance between environmentally conscious intentions and practical constraints such as cost and convenience.

In terms of packaging materials, paper boxes emerged as the most frequently used item, reported by six of the seven restaurants. Plastic bags were also common, used by four

restaurants either alongside paper or as a separate packaging layer. Two restaurants, Somayoga Vegan and Simple Plant Kitchen, reported using banana leaves in combination with other materials. Biodegradable packaging was mentioned by two restaurants. Black Forest Coffee reported using biodegradable bags, while Simple Plant Kitchen used compostable materials produced by the Indonesian brand Avani for takeout orders only. According to their clarification, these Avani products were not used in-house and were offered with an added fee.

Restaurants often combine different types of materials. For example, Somayoga Vegan listed banana leaves, paper boxes, and plastic, while Veganissimo and RM Vegetarian Lusidus used both plastic bags and paper boxes. Loving Hut explained that while they use paper lunchboxes, these have a thin plastic lining, and the plastic bags used for takeout are conventional.

When asked about the reasons, participants provided different reasons for their packaging decisions. Environmental concern was cited by three restaurants, while four referred to practical considerations such as cost and convenience. Some businesses framed their choices around customer engagement and awareness. Simple Plant Kitchen, for example, explained that the high cost of their compostable packaging was intentional, stating it is used "to encourage customers to bring their own containers and be more aware of waste." Other responses highlighted logistical factors. RM Vegetarian Lusidus and Fortunate Coffee described their packaging as convenient or effective. Somayoga Vegan cited simplicity, and Veganissimo selected plastic primarily for its lower cost.

Straw and utensil practices varied across restaurants, reflecting a mix of biodegradable alternatives and conventional plastic use. Four restaurants used biodegradable or alternative materials. Fortunate Coffee reported using biodegradable utensils, and Black Forest Coffee uses bamboo options. Loving Hut mentioned using cassava-based straws from the Indonesian brand Ecorasa, and Simple Plant Kitchen noted that "wooden utensils are provided with an extra charge". Plastic utensils were still in use at three restaurants. Black Forest Coffee, Veganissimo, and RM Vegetarian Lusidus reported using plastic, although RM Vegetarian Lusidus noted that these were "only provided upon request." Somayoga Vegan followed a similar approach, offering utensils only when specifically requested. Simple Plant Kitchen stated that they do not provide straws.

Waste management

Vegan restaurants in Yogyakarta reported a range of approaches to managing waste, reflecting differing levels of infrastructure, space, and environmental commitment. Most

establishments implemented basic separation of waste, and several adopted additional strategies such as composting, recycling, or collaboration with external services.

Four restaurants stated that they separate organic from inorganic waste. Fortunate Coffee handles organic waste using a biopore pit constructed by the restaurant, while inorganic materials are collected by local residents and scavengers. Simple Plant Kitchen combines waste separation with recycling and composting. RM Vegetarian Lusidus reported sorting plastic waste by whether it can be reused and sending non-reusable materials to a waste bank. Loving Hut noted that it is currently developing its system for separating dry and wet waste.

Two restaurants described composting practices. Fortunate Coffee manages composting on-site, and Veganissimo stated that their organic waste is collected and composted by their regular trash handler.

Three businesses rely primarily on external waste disposal services. Somayoga Vegan and Loving Hut send their waste to third-party collectors. Black Forest Coffee reported that waste is handled by a private disposal company, explaining that "there is no separation or composting due to a lack of space."

Motivations and Values

On the topic of motivations for implementing sustainable practices, four restaurants identified environmental protection as their main motivation for implementing sustainable practices. Fortunate Coffee focused on protecting the environment, RM Vegetarian Lusidus mentioned contributing to a better Earth, Black Forest Coffee aimed to reduce waste pollution, and Loving Hut referred to maintaining environmental balance. Other participants highlighted broader ethical or ecological concerns. Simple Plant Kitchen focused on preserving nature and wildlife. Veganissimo mentioned that their motivation is to reduce the use of non-eco-friendly materials. Somayoga Vegan linked sustainability to animal welfare and environmental responsibility.

When asked whether they believed their restaurant currently implements sustainable practices, Fortunate Coffee and Simple Plant Kitchen selected "strongly agree." RM Vegetarian Lusidus, Somayoga Vegan, and Loving Hut selected "agree," while Black Forest Coffee and Veganissimo selected "less agree."

Barriers and Challenges

In response to whether implementing sustainable practices in Indonesia is considered easy or difficult, all seven restaurants reported that it is difficult. Fortunate Coffee cited the challenge of changing consumer and operational habits, while Black Forest Coffee highlighted

the high cost of environmentally friendly materials, low public awareness, and limited distribution of sustainable alternatives. Veganissimo and RM Vegetarian Lusidus both pointed to a general lack of concern and inadequate facilities or information. Loving Hut emphasized the limited access to information and infrastructure, explaining that "Yogyakarta lacks a centralized waste depot and accessible information on waste management." Somayoga Vegan stressed the importance of proper education, and Simple Plant Kitchen linked the challenge to a need for environmental awareness, warning that nature and animals are already suffering the consequences of inaction.

At the restaurant level, six out of seven participants reported financial barriers. Black Forest Coffee explained that good-quality biodegradable packaging is "2–3 times more expensive," and Fortunate Coffee agreed that sustainable materials are "a bit expensive." RM Vegetarian Lusidus and Loving Hut acknowledged cost as a factor, while Simple Plant Kitchen suggested that although nature provides everything, "humans make it expensive." Veganissimo did not mention cost specifically, but described sustainable practices as troublesome.

In terms of specific operational barriers, RM Vegetarian Lusidus noted the difficulty of reducing plastic use, particularly for takeout and online orders. Four restaurants referred to infrastructure issues, including limited access to suppliers and waste services. Three noted challenges related to inconsistent awareness among staff or customers. Somayoga Vegan expressed concern that not all employees share the same values or understanding of sustainability.

Examples of Sustainability

All seven restaurants shared examples of sustainable practices adopted in their operations. Fortunate Coffee reported using eco-friendly straws and containers, and separating organic and inorganic waste for reuse. Black Forest Coffee highlighted the use of paper boxes and biodegradable plastic. Veganissimo stated that they recycle organic waste. RM Vegetarian Lusidus described a multifaceted approach, including collecting plastic for recycling at the waste bank, growing some vegetables, sourcing ingredients locally, and only providing plastic utensils upon request.

Somayoga Vegan emphasized a long-term commitment to a fully vegan and environmentally conscious lifestyle, rooted in the principle of avoiding harm to other beings. Simple Plant Kitchen shared their educational outreach initiative, the "Nabati Nusantara" program, which promotes plant-based diets through food sampling and recipe sharing in

villages and schools. Loving Hut noted that they support local agriculture by sourcing fresh produce from traditional markets and directly from farmers.

Together, these findings illustrate a range of sustainable practices, values, and constraints shaping the operations of vegan restaurants in Yogyakarta. The following chapter will explore the implications of these findings in relation to existing literature and theoretical frameworks.

5.7 Interpretation

This section interprets the findings in relation to the research question: *To what extent do vegan restaurants in Yogyakarta implement sustainable practices in food sourcing, packaging, and waste management, and what are their motivations and barriers?*
The results show that while sustainability is widely understood and ethically valued among participants, implementation is shaped by a mix of ideals and constraints. Practices are present but partial, driven more by operational realities than comprehensive strategies.

Food Sourcing Practices

All restaurants sourced ingredients locally, primarily from traditional markets in Yogyakarta, with a few using homegrown produce. These practices align with the short food supply chain (SFSC) model discussed by Jia et al. (2024) and mirror similar patterns found in Indonesian restaurants by Wenten et al. (2024), Bastyan et al. (2022), and Winowatan et al. (2024). However, the motivations reported, such as affordability, freshness, and convenience, suggest that local sourcing is not necessarily a deliberate sustainability strategy, but a reflection of practical realities. This challenges assumptions that proximity always equals sustainability. For example, Somayoga Vegan sourced from outside the region due to cost, highlighting the limitations of SFSCs when affordability is a priority.

Simple Plant Kitchen's layered sourcing from its own garden to markets shows a more intentional approach, echoing practices documented by Sari et al. (2022) in Bali. Yet overall, the sourcing strategies appear to be shaped more by access, routine, and price than by environmental commitment. This reflects how sustainability is embedded in daily operations, not as a formal policy, but as a byproduct of resource-conscious decisions.

Packaging Practices

Packaging practices were mixed. Most restaurants used a combination of materials, with plastic still in circulation. While some used biodegradable or traditional packaging, such as

banana leaves, these were typically limited in scope. One restaurant used branded products like Avani only for takeout and charged extra, framing it as a way to encourage customers to bring their own containers. These selective efforts illustrate that sustainable packaging is not yet fully institutionalized in everyday practice.

The continued use of plastic alongside biodegradable items shows the tension between sustainability ideals and practical barriers such as cost, availability, and customer habits. This supports Panou and Karabagias's (2023) argument that durability and affordability often outweigh environmental concerns in practice. Traditional packaging options like banana leaves, described by Kasmana and Maulina (2015) and the Ministry of Tourism and Creative Economy (2024), were known and culturally relevant but underutilized. Their limited adoption suggests that knowledge alone is insufficient without supportive infrastructure and aligned customer expectations.

Waste Management

Waste management was implemented across all restaurants, but with varying depth. Most separated organic and inorganic waste, and some engaged in composting, recycling, or collaborated with third-party services. However, advanced practices were limited to a few restaurants, with others citing a lack of space or facilities. This reflects a baseline awareness of sustainability but also a tendency toward reactive rather than strategic waste practices.

These findings echo Bastyan et al. (2022) and Wenten et al. (2024), who observed a range of sustainability efforts in Indonesian restaurants shaped by operational scale, infrastructure, and staffing. They also reinforce Papargyropoulou et al.'s (2014) point that effective waste reduction requires adaptation to local conditions. In this case, sustainability is present in intention but constrained in execution, suggesting that waste management remains a functional necessity rather than an environmental strategy.

Motivations

Restaurants consistently cited environmental values as their primary motivation. Responses like "to protect the environment" and "to preserve nature" suggest that sustainability is not simply a trend but part of their ethical identity. These motivations were visible in practices like supporting local farmers, using biodegradable materials, and promoting customer awareness.

This aligns with Niederle and Schubert's (2020) findings that vegan restaurants often view sustainability as an extension of vegan values. In Yogyakarta, this link is equally clear: sustainability is expressed not just as a business decision but as a moral position. This is

significant because it demonstrates that even without regulatory pressure, intrinsic values can drive sustainable behavior. In mission-oriented contexts like vegan restaurants, environmental commitment can be embedded in identity rather than imposed externally.

Barriers and Challenges

Despite strong motivation, all restaurants described sustainability as difficult to maintain. Cost was the most commonly cited challenge. Biodegradable packaging, in particular, was often described as unaffordable, especially for small businesses. This confirms findings by Kasim and Ismail (2012) and Jordaan (2023), who identified financial constraints as a persistent barrier in the hospitality industry.

Infrastructure also emerged as a consistent obstacle. Restaurants reported difficulties in accessing suppliers, sourcing sustainable materials, and disposing of waste efficiently. These constraints align with Winowatan et al. (2024) and Sucipto and Rosanto (2024), who highlight weak supply chains, limited product availability, and poor waste systems in Indonesia. In this context, even motivated businesses face structural limitations that prevent broader adoption of sustainability practices.

Overall, the findings demonstrate that vegan restaurants in Yogyakarta are engaged with sustainability, but implementation remains uneven. Practices in food sourcing, packaging, and waste management reflect both ethical intent and operational compromise. While motivations are strong and aligned with the core values of veganism, real-world challenges such as financial, infrastructural, and logistical constraints limit the depth and consistency of these efforts. Importantly, sustainability in this context is not limited by a lack of interest, but by a lack of support. The research question is thus answered: sustainability is present across all restaurants, but to varying extents. Implementation is guided by values but shaped and constrained by external conditions. Without stronger institutional support and systemic change, sustainability will remain fragmented and heavily reliant on individual initiative.

Conclusion

This thesis set out to examine the extent to which vegan restaurants in Yogyakarta implement sustainable practices in food sourcing, packaging, and waste management, and to understand their motivations and barriers. Through this lens, the study aimed to contribute to the growing but still limited body of research on sustainability in the Indonesian food service sector, particularly within the context of veganism.

The findings reveal that all restaurants in the study engage with sustainability, but to varying degrees. Food sourcing was largely local and affordable, though not always driven by environmental intent. Packaging practices were inconsistent and often shaped by customer expectations and cost. Waste management was present across all cases, but limited by infrastructure. The motivations behind these efforts were consistently linked to environmental values and the ethics of veganism, while key barriers included cost, lack of supplier access, and insufficient support systems.

In answering the research question, this thesis shows that sustainable practices are present and ethically motivated, but constrained by structural realities. The study contributes to the literature by focusing on an under-researched group of vegan restaurants in a mid-sized Indonesian city and providing a detailed, context-specific account of how sustainability is practiced outside of large urban centers like Jakarta or Bali.

Several limitations must be acknowledged. The sample size was small, and responses were self-reported. The study also did not explore motivations for opening vegan restaurants, nor did it assess the long-term economic benefits of sustainability for these businesses. Both topics would be important avenues for future research in Yogyakarta or similar Indonesian settings.

In sum, this thesis shows that while the ethical foundation for sustainability is strong among vegan restaurants in Yogyakarta, progress is limited by structural barriers. Yet, despite operating in a context with limited resources and minimal institutional support, these restaurants are making meaningful, value-driven efforts toward environmental responsibility. Their commitment, often expressed through small but intentional actions, reflects not only awareness but integrity. These businesses serve as important examples of how sustainability can be pursued at the grassroots level, even when conditions are far from ideal. Their efforts deserve recognition, and their experiences offer valuable insight for shaping more supportive policies and systems in the future.

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List of Appendices

Appendix A: Survey Questionnaire and Responses

This appendix contains the complete survey package used in this research. It begins with the translated version of the original survey introduction, followed by the full set of survey questions and the responses provided by vegan restaurants in Yogyakarta. All content, including the introduction, questions, and responses, has been translated from Bahasa Indonesia into English**.** The researcher double-checked all translations to ensure they accurately reflect the original meaning and intent of the participants.

Hello. My name is Bianka Orendášová, and I am a student from one of the universities in the Czech Republic. I lived in Yogyakarta for two years as a student at the Faculty of Cultural Sciences, Universitas Gadjah Mada. I am currently writing a thesis on sustainable practices in vegan restaurants in Yogyakarta. The purpose of this research is to find out whether vegan restaurants in Yogyakarta implement sustainable practices in their businesses, what specific practices they carry out, as well as their motivations and obstacles. I would be very grateful if you could take the time to complete this survey. The survey contains 19 questions. Please answer honestly and write as much as you like - the more, the better. This survey is entirely voluntary, but if you do complete it, it would greatly help me. Green practices refer to actions taken to protect the environment and to produce products that minimize environmental damage. Some "green" actions implemented in the hospitality business include using local or organic products, installing water-saving devices, conserving energy, sourcing local food, reducing waste and plastic use, using biodegradable bags, supporting local farmers, composting, using reusable rather than disposable tableware, and turning off lights and taps when not in use.

Question 1: Could you write the name of the restaurant?

Restaurant	Response
Fortunate Coffee	Fortunate Coffee
Black Forest Coffee	Black Forest Cafe
Veganissimo	Veganissimo
RM Vegetarian Lusidus	RM Vegetarian Lusidus
Somayoga Vegan	Somayoga VEGAN
Simple Plant Kitchen	simpleplant kitchen
Loving Hut	Loving Hut

Question 2: Are you familiar with the term sustainability or sustainable/green practices?

Restaurant	Response
Fortunate Coffee	Agree
Black Forest Coffee	Agree
Veganissimo	Agree
RM Vegetarian Lusidus	Agree
Somayoga Vegan	Agree
Simple Plant Kitchen	Strongly agree
Loving Hut	Agree

Question 3: Could you mention the sources of the food ingredients used in this restaurant? (vegetables, fruits, tempeh, etc.)

Restaurant	Response
Fortunate Coffee	Local market in the Special Region of Yogyakarta
Black Forest Coffee	Local market in the Special Region of Yogyakarta; Seitan meat is imported from abroad and local brands
Veganissimo	Local market in the Special Region of Yogyakarta
RM Vegetarian Lusidus	Local market in the Special Region of Yogyakarta
Somayoga Vegan	Local market outside the Special Region of Yogyakarta; Some come from our own garden
Simple Plant Kitchen	We use ingredients from our garden, sometimes from friends' gardens, and for what we don't grow, we buy from

	traditional markets or local producers (e.g., tofu, tempeh)
Loving Hut	Local market in the Special Region of Yogyakarta

Question 4: Why does the restaurant source ingredients from the place you mentioned above? (cheaper, more convenient, better quality, want to support Indonesian farmers...)

Restaurant	Response
Fortunate Coffee	To support local farmers
Black Forest Coffee	Vegetables from the local market are cheaper, more efficient (transport), and fresh
Veganissimo	Cheaper
RM Vegetarian Lusidus	Cheaper and fresher
Somayoga Vegan	Good quality directly from farmers & convenient
Simple Plant Kitchen	Besides being cheaper, using homegrown ingredients means they’re free from preservatives or chemical fertilizers, helps reduce plastic waste, and supports ecosystem balance
Loving Hut	Cheaper, more convenient, and supports farmers

Question 5: Does the restaurant source ingredients from local markets? If yes, please name the markets.

Restaurant	Response
Fortunate Coffee	Beringharjo Market
Black Forest Coffee	Yes, Krapyak Market

Veganissimo	Gowok and Demangan Markets
RM Vegetarian Lusidus	Yes, Gowok Market
Somayoga Vegan	Prambanan Morning Market or from farmers in Magelang
Simple Plant Kitchen	Sometimes from Niten, Giwangan, and Prawirotaman Markets
Loving Hut	Caturtunggal Market

Question 6: What specific foods does the restaurant get from local markets? (types of vegetables, fruit,...)

Restaurant	Response
Fortunate Coffee	Vegetables
Black Forest Coffee	Cap cai (stir-fried vegetables), fried mushrooms, penyetan, soto, rawon
Veganissimo	Capcay, tempeh, tofu, various vegetables
RM Vegetarian Lusidus	Tofu, tempeh, all vegetables
Somayoga Vegan	Vegetables
Simple Plant Kitchen	Lettuce, onions, garlic, iceberg lettuce, purple cabbage
Loving Hut	Mustard greens, carrots, tomatoes, broccoli, mushrooms, etc.

Question 7: Does the restaurant offer seasonal menus based on available ingredients in Yogyakarta?

Restaurant	Response
Fortunate Coffee	No
Black Forest Coffee	Yes
Veganissimo	No
RM Vegetarian Lusidus	No

Somayoga Vegan	No, the ingredients are always available and easy to get
Simple Plant Kitchen	Yes
Loving Hut	No

Question 8: Do you offer traditional Indonesian recipes on your menu? Why?

Restaurant	Response
Fortunate Coffee	Yes, to help introduce local cuisine
Black Forest Coffee	Yes, Indonesians are more familiar with local dishes, and tourists prefer Indonesian specialties
Veganissimo	Yes. For example, gudeg, padang rice, nasi lemak
RM Vegetarian Lusidus	Yes, but not every day
Somayoga Vegan	Yes, we highlight traditional Javanese dishes
Simple Plant Kitchen	Yes, traditional menus are in demand, and we share recipes with visitors
Loving Hut	No, because the menu has not been updated

Question 9: What type of packaging materials does the restaurant use for takeout orders?

Restaurant	Response
Fortunate Coffee	Paper boxes
Black Forest Coffee	Biodegradable bags and paper boxes
Veganissimo	Plastic bags and paper boxes
RM Vegetarian Lusidus	Plastic bags and paper boxes
Somayoga Vegan	Banana leaves, paper boxes, plastic
Simple Plant Kitchen	Banana leaves, eco-friendly and compostable packaging from Avani

Loving Hut	Paper lunchboxes, some plastic, plastic cups for drinks

Question 10: Why does the restaurant use these materials for takeout?

Restaurant	Response
Fortunate Coffee	More effective
Black Forest Coffee	More sustainable, more convenient
Veganissimo	Cheaper
RM Vegetarian Lusidus	More convenient
Somayoga Vegan	Simpler and less hassle
Simple Plant Kitchen	To be environmentally friendly; expensive packaging encourages customers to bring their own containers and be more aware of waste
Loving Hut	Trying to be more environmentally friendly

Question 11: What types of straws and utensils does the restaurant use for takeout?

Restaurant	Response
Fortunate Coffee	Biodegradable
Black Forest Coffee	Plastic and bamboo
Veganissimo	Plastic
RM Vegetarian Lusidus	Plastic, only upon request
Somayoga Vegan	Only provided upon request
Simple Plant Kitchen	No straws
Loving Hut	For now we use straws from the Ecorasa brand which are made from cassava

Question 12: How does the restaurant manage its waste? (recycling, composting, etc.)

Restaurant	Response
Fortunate Coffee	Separates organic and inorganic waste
Black Forest Coffee	Uses a waste disposal service
Veganissimo	Trash collector turns organic waste into compost
RM Vegetarian Lusidus	For plastic that can still be used will be stored for reuse. Plastic that cannot be reused will be collected for recycling at the waste bank.
Somayoga Vegan	Given to specialized handlers; picked up twice a week
Simple Plant Kitchen	Waste separation, recycling, and composting
Loving Hut	Given to waste management service

Question 13: In your opinion, is implementing sustainable practices in Indonesia difficult or easy? Why? (e.g., expensive, cheap, lack of concern, lack of information...)

Restaurant	Response
Fortunate Coffee	Not easy, because it requires changing habits
Black Forest Coffee	It is difficult because materials that are called environmentally friendly are usually more expensive, awareness of sustainability is still low and the distribution of sustainable materials is still rare.
Veganissimo	There are still many who don't care and the facilities are inadequate

RM Vegetarian Lusidus	It's quite difficult due to lack of concern and also inadequate information.
Somayoga Vegan	Depending on who understands the level of difficulty or ease, there must be good and correct EDUCATION.
Simple Plant Kitchen	If you are not used to it, it will definitely be difficult, but we have to think about nature so that we care more about the amount of plastic waste that is produced, and nature has begun to be damaged and the creatures in it are starting to be threatened, especially animals, which is very sad, it has a big impact on animals.
Loving Hut	It tends to be difficult, one of the reasons is that so far we haven't been able to find enough information.

Question 14: Does this restaurant make its menu sustainable? How?

Restaurant	Response
Fortunate Coffee	Not yet
Black Forest Coffee	Does not dispose used cooking oil into drains; sells it for recycling
Veganissimo	Not sure
RM Vegetarian Lusidus	Grows chili and some herbs at home; buys vegetables at local markets
Somayoga Vegan	For now, yes and no; every year we review and improve the menu for innovation and creativity
Simple Plant Kitchen	Yes, uses local, natural, healthier, and more available ingredients

Loving Hut	Working on it by making environmentally friendly (animal-free) food

Question 15: Do you think this restaurant implements sustainable practices?

Restaurant	Response
Fortunate Coffee	Strongly agree
Black Forest Coffee	Less agree
Veganissimo	Less agree
RM Vegetarian Lusidus	Agree
Somayoga Vegan	Agree
Simple Plant Kitchen	Strongly agree
Loving Hut	Agree

Question 16: What motivates the restaurant to implement/maintain sustainable practices?

Restaurant	Response
Fortunate Coffee	To protect the environment
Black Forest Coffee	To reduce pollution from waste
Veganissimo	As long as we can reduce use of non-eco-friendly materials, we do
RM Vegetarian Lusidus	For a better Earth
Somayoga Vegan	Go Green, Save The Planet, live without harming animals, preserve the Universe
Simple Plant Kitchen	To preserve nature, ensure wildlife balance and happiness, prevent destruction
Loving Hut	For environmental balance

Question 17: What are the problems/barriers/difficulties in implementing/maintaining sustainable practices? Can you give examples?

Restaurant	Response
Fortunate Coffee	Some sustainable materials are expensive
Black Forest Coffee	These sustainable materials are expensive, there are still few suppliers, and there is a lack of awareness about them.
Veganissimo	Not sure
RM Vegetarian Lusidus	Reducing plastic use, especially for takeout/online sales
Somayoga Vegan	Human Resources that each individual is not on the same frequency with the above things such as Go.VEGAN, they do not yet have awareness for Healthy Food, all for our health & we must protect this planet Earth
Simple Plant Kitchen	Many people scoff or find it complicated; we start with light education and sharing
Loving Hut	One issue is waste management

Question 18: Do you think implementing sustainable practices is too expensive for restaurants?

Restaurant	Response
Fortunate Coffee	A bit expensive
Black Forest Coffee	Yes, biodegradable packaging with good quality is 2–3x more expensive
Veganissimo	Just troublesome
RM Vegetarian Lusidus	It could be
Somayoga Vegan	Depending on the understanding & benefits and education that we receive, each individual is different
Simple Plant Kitchen	Actually, everything is in nature, it's just humans who make it expensive.
Loving Hut	Not really

Question 19: Can you give examples of sustainable practices in this restaurant?

Restaurant	Response
Fortunate Coffee	Uses eco-friendly straws, food containers; separates organic and inorganic waste for reuse
Black Forest Coffee	Uses paper boxes and biodegradable plastic
Veganissimo	Recycles organic waste
RM Vegetarian Lusidus	Collects used plastic for recycling at the waste bank, grows some vegetables, shops locally, gives plastic utensils only on request
Somayoga Vegan	Maintaining a long-term Pure Vegan, Go Green, Save the Planet lifestyle starts with cruelty-free food - promoting happiness for all beings
Simple Plant Kitchen	Runs the 'Nabati Nusantara' program - educates villages and schools by sharing plant-based food samples and recipes
Loving Hut	Buying fresh products from traditional markets and directly from farmers

Appendix B: WhatsApp and Instagram Follow-up Conversations

This appendix includes the full follow-up conversations conducted with participating restaurants via WhatsApp and Instagram. These informal, text-based exchanges were used to clarify survey responses or obtain additional contextual information. The conversations were semi-structured, meaning the researcher adapted the questions depending on each restaurant's initial responses and the direction of the dialogue.

All participants gave explicit written consent for their restaurant names and message content to be included in this thesis. The original messages were written in Indonesian and have been translated into English for consistency and clarity. The researcher double-checked all translations to ensure they accurately reflect the original meaning and intent of the participants.

Fortunate Coffee

- Q: Does the restaurant use biodegradable bags for take-out?

A: As for plastic bags, we currently do not use biodegradable ones. This has been the case for the past few months.

- Q: Does the restaurant separate organic and inorganic waste? What happens to it?

A: We separate organic and inorganic waste. Organic waste is placed into a biopore pit, while inorganic waste is collected by local residents and later picked up by scavengers at the waste site.

- Q: Was the biopore pit built by the restaurant or provided by the government?

A: We built it ourselves, on our own initiative and with our own funding, using concrete like a regular pit.

Black Forest Coffee

- Q: Can you provide information on your waste disposal service?

A: There is no separation or composting due to a lack of space. Waste is handled entirely by a waste transport service.

Veganissimo

- Q: Which vegetables do you buy in Jogja markets?

A: Green mustard, napa cabbage, bitter melon, purple eggplant, salad eggplant, green eggplant, green beans, long beans, corn, corn cobs, broccoli, cauliflower, carrots, potatoes, etc.

- Q: Do you have difficulty sourcing certain vegetables?

A: Bitter mustard, cuciwis, and kailan are only available at Pathuk and Kranggan markets.

- Q: Do you offer holiday-specific dishes?

A: For Eid, we make lontong opor. For the Dragon Boat Festival, we prepare bakcang.

RM Vegetarian Lusidus

- Q: What traditional foods do you occasionally offer?

A: Nasi Gudeg, Nasi Uduk.

- Q: Which vegetables are bought at local markets?

A: Carrots, corn cobs, cauliflower, broccoli, cabbage, chayote, eggplant, green mustard, napa cabbage, potatoes, etc.

- Q: Do you offer special holiday menus, such as for Eid or Chinese New Year?

A: None.

Somayoga VEGAN

- Q: Why do you source vegetables from outside Yogyakarta?

A: There’s a nearby vegetable stall selling produce directly from Magelang farmers. The vegetables are fresh, of good quality, and cheaper than those in local markets.

- Q: What do you grow in your garden?

A: Mint leaves, cassava leaves, lettuce (in progress), kaffir lime leaves, bay leaves, etc., in small amounts due to limited space.

- Q: Which vegetables do you buy in Jogja markets?

A: Green mustard, broccoli, carrots, cabbage, etc.

- Q: Do you face difficulties finding vegetables in the market?

A: No significant difficulties.

- Q: Do you offer holiday dishes?

A: Yes, to avoid repetition and celebrate traditions. For Eid, we make a vegan version of ketupat opor using tempeh, tofu, or mushrooms.

- Q: Do you buy vegetables from a stall in Jogja that sources from Magelang?

A: Yes, the stall is owned by a Magelang farmer.

- Q: Is the pricing at this stall better than Jogja markets?

A: Yes, the vegetables are fresher and cheaper because they come directly from the farmer.

- Q: Are vegetables like green mustard, broccoli, carrots, and cabbage from this stall?

A: Yes.

Simple Plant Kitchen

- Q: What traditional foods do you offer?

A: Rawon, Soto Betawi, Bongko Mento, Garang Asem, Nasi Goreng Kecobrang, Tongseng, Soto Sukoharjo, Rendang, and more.

- Q: Is Avani material used for all packaging and utensils?

A: Avani is used only for take-out as a backup. In-house dining uses regular plates. Avani products and wooden utensils are provided with an extra charge to encourage customers to bring their own containers.

- Q: Which vegetables/fruits are from markets, and which are from your garden or friends' gardens?

A: Sweet potatoes, basil, passion fruit, chili, ginseng leaves, pandan, papaya, Japanese papaya leaves, mangkukan leaves, and sirih bumi are from our garden. Butterfly pea flowers come from a friend's garden.

Loving Hut

- Q: Does the restaurant use plastic or biodegradable bags for take-out?

A: Our paper boxes have a thin plastic lining and are not immediately biodegradable, but we use them as part of our eco-friendly effort. The plastic bags used are still the conventional market ones.

- Q: Does the restaurant manage waste by separating it or using biopore pits?

A: We are currently working on separating dry and wet waste.

- Q: What are the challenges in implementing sustainable waste practices?

A: Yogyakarta lacks a centralized waste depot and accessible information on waste management. Additionally, the cost is relatively high. However, we do process specific waste like used oil bottles and jerry cans in an eco-friendly way.

- Q: Is the separated wet waste composted?

A: After separation, if I'm not mistaken, the wet waste can be composted.