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Food waste and its effect on green retailing in South Africa

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Abstract

Food waste and its contribution towards environmental degradation, wastage of embedded resources and food insecurity is receiving more attention globally. Retail businesses increasingly use green retailing to address food waste by attempting to balance business and environmental sustainability. This paper explored food waste management practices in the South African retail sector. Data was gathered from retail waste management companies, retail industry associations and industry specialists in South Africa. The data was analysed thematically. The major findings show that a few major South African retailers have implemented some green retail practices to reduce food waste. Green retailing as a tool for addressing food waste in South Africa is in its initial phase, with the potential to progress with rising industry stakeholder pressure. Recommendations were made for both retailers and policy-makers to encourage food waste reduction.

Keywords: *Food Waste, Green Retailing, Food Security, Waste Management, Sustainability*

1.0 Introduction

Food waste is a significant problem approaching crisis proportions. Estimations are that a third of all the food produced for human consumption globally is either lost or wasted (Wunderlich & Martinez, 2018:332; Goransson, Nilsson & Jevinger 2018:332; WWF, 2017:7). This is especially concerning considering the rising proportion of the global population that is food insecure. That is, those who have run out of food or gone without eating for a day or more (Galli, Cavicchi & Brunori, 2019:289). In southern Africa, the percentage of severely food insecure people increased from 20.4% in 2015 to 30.9% in 2017 (FAO, 2018:191). This is in sharp contrast to rising food waste in South Africa, which in 2013 was about 10 million tonnes from an estimated 31 million tonnes of food available (Nahman & de Lange, 2013:8). In the absence of updated statistics, it is possible that these figures are currently higher. The contradiction between rising food waste and food insecurity highlights the unsustainability of the current system of food production and consumption (Galli et al., 2019:289; Wunderlich & Martinez, 2018:332).

2.0 Research problem

Food waste has several negative effects, including the degradation and greenhouse effect on the environment due to emissions from disposal of food waste in landfills and other phases of the food supply chain (Welch, Swaffield & Evans, 2018:10), the depletion of water and other resources embedded in food production and distribution that are wasted if the food is discarded, and the price of food as its cost is factored into the selling price.

About 20% of all food waste occurs in the retail phase of the food supply chain (FSC). Although this is minimal in comparison to the food waste taking place in other phases, research suggests that more influence on food waste reduction can be exerted at the retail stage for several reasons (Cicatello et al., 2017:273). Firstly, retailers are strategically located in the FSC with upstream influence on production and downstream influence on consumption preferences (Welch et al. 2018:10; Filimonau & Gherbin, 2017:1184). A related factor is that the concentration of the sector results in a handful of large players who can exercise considerable market power to influence change along the supply chain. In South Africa, the top four retailers hold 72% of the market (Competition Commission SA, 2019:1). Thirdly, the nature of retail operations makes it easier to quantify and monitor food waste compared to the isolated food waste that occur at the production and consumption stages (Cicatello et al., 2017:273).

Not much research has been done on food waste in retailing, especially in developing countries (Oelofse, Muswema & Ramukhwatho, 2018:1; Teller, et al., 2018:983; FAO, 2015:2). Studies on food waste in South Africa have focused on consumer effects on food waste in stores (du Toit, 2018) and at the household level (Oelofse, et al., 2018). Studies have also been undertaken to quantify food waste and its relationship with other supply chain factors (Le Roux, 2017). Other studies such as Nahman and de Lange (2013), WWF (2017) looked at food waste in the FSC and its implications on cost, food security and environmental sustainability. This paper aims to fill the knowledge gap on food waste and green retailing in South Africa.

The study collected data from various retailers and other retail sector interest groups and industry specialists on how retailers are addressing this phenomenon through green retail practices. This allowed for benchmarking not only among South African retailers but also global green retail practices. The study's focus on food waste also has socio-

economic and environmental benefits for the country through food waste reduction recommendations for both retailers and the government to support the SDG goal of halving food waste by 2030.

3.0 Literature review

Food waste is a significant global concern because of the rising number of hungry and food insecure people across the globe, the embedded resource inputs and nutrition lost with wasted food, and the negative environmental effect of food waste (WWF, 2017:7; FAO, 2018:2). The UN Sustainable Development Goals (SDGs), particularly SDGs 12-14, call for improved food security and reduced waste, especially food waste. Based on the SDGs, national governments have framed customised policies to guide local food waste management practices, such as direct bans on food waste disposal to landfills, subsidies, and tax reforms to encourage greater food waste donations for redistribution.

In South Africa, as is the case globally, pressure has been mounting on industries to reduce waste and be more conscious of their footprint on the environment. Legislation such as the National Environmental Management Act (1998), the National Environmental Management Waste Act (2008), and National Waste Management Strategy (2020) are intended to provide necessary guidance and support to waste management efforts. In 2018, the Western Cape government announced a ban on organic waste disposal to landfills by 2027 while aiming to achieve a 50% reduction target by 2022 (Green Building Africa, 2018).

Three significant retail industry initiatives—Food Waste Voluntary Agreement (FWVA), the South African Alliance to End Plastic Pollution in the Environment, and the South African Plastics Pact—supported by various private and public stakeholders across the FSC were under consideration at the time of the study. The aim is to initiate dialogue around food waste and start the process of working towards a voluntary agreement around food waste, including measurement, reporting standards and performance monitoring. The initiative's outcome is expected to provide clear guidelines for stakeholders, and is expected to be an industry-led tool implemented through a public benefit organisation. South African retailers are already supporting these initiatives.

3.1 Food waste versus food loss

It is important to differentiate between food loss and food waste. FAO (2015) and Wunderlich and Martinez (2018) define food loss as food originally intended for but not consumed by humans due to loss that occurs early in the food supply chain (FSC) such as during production, harvesting, transportation and storage (post-harvest). Food waste, on the other hand, occurs in the later stages of distribution and marketing and consumption (Wunderlich & Martinez, 2018:332; WWF, 2017:7). It comprises retailers, food service providers and consumers. As such, this paper focused on food waste.

3.2 Drivers of food waste

Understanding the causes of food waste is important because it can facilitate targeted interventions to avoid and minimise food waste (Teller *et al.*, 2018:988). Drivers of food waste in retail stores mostly relate to retail store management behaviour and customer behaviour (Wunderlich & Martinez, 2018:332). These are discussed below.

Staffing

Inadequate employee numbers and knowledge and skills in demand forecasting, product ordering and handling lead to an oversupply of products and slow inventory turnover, resulting in wastage due to spoilage or expiration (Teller et al., 2018:986; Gunders, 2012:11). Low remuneration results in high employee turnover, further exacerbating the industry's lack of knowledge or skills.

Product quality specifications

Internal product quality standards (appearance, weight, size, shape, colour etc.) set by the retailer for their suppliers is also a cause of food waste as products that do not meet the standard are rejected (Gunders, 2012:10; de Hooge, et al., 2018:698), even though some guidelines have no bearing on the products' intrinsic quality or safety.

Shelf availability

Permanent on-shelf availability and a wide product range also contribute to in-store food waste (Gruber, et al., 2016:2). The goal to provide customers with multiple choices often leads to "overstocking and overhandling by both staff and customers and damage to items on the bottom from the accumulated weight" (Gunders, 2012:10).

Pre-packaging

Pre-packaging products mean that a retailer may be forced to purchase more than the required quantity, resulting in overstocking (Gunders, 2012:10).

Date labelling

The variations of terminology (sell-by, best-before, use-by, freeze-by, expiry date) cause much confusion among consumers (NRDC, 2013:17). Often, customers can not distinguish between quality and safety date labels and assume that a product is not safe for consumption if it has reached its sell-by date (NRDC, 2013:19-20). Additionally, retailers remove products approaching the sell-by/best-before date from the shelves to limit the risk of product liability and potential damage to their brand reputation (Priefer, Jörissen & Bräutigam, 2016:160).

Sales promotions

In-store promotion activities, especially 'buy-one-get-one-free' have also been observed to result in food waste because customers are encouraged to buy more than they need to 'benefit' from this (Priefer, et al., 2016:157). In-store promotions also fuel food waste since they shift the focus of product sales, adding complexity to demand forecasting (Eriksson, 2015:25).

Customer in-store behaviour

Customers tend to choose the 'newest' products, increasing the likelihood that products with earlier date labels will remain unsold. Customers also prefer ideal-looking products, resulting in "…perfectly edible and nutritional foods that are considered… 'ugly' being left behind

and wasted (Wunderlich & Martinez, 2018:335)". In addition, damage to products occurs on the shop floor as customers handle products to make their purchase selection, contributing to spoilage of chilled and frozen products through removing products from cold chain areas (Teller et al., 2018:986; Goransson, et al., 2018:332; Jevsnik, Ovca & Likar, 2006:83).

3.3 Green retailing

Green retailing encompasses the entire supply chain, facilities and infrastructure, customer touchpoints and products, and post-consumer behaviours. It reduces costs and improves revenue for the retailer by increasing product supply chain efficiencies, waste reduction and efficient resource utilisation, and being a growing marketing avenue to attract consumers who are conscious about sustainability (Chinomona & Chivhungwa, 2019:13; Sinha, et al., 2014:115).

Drivers of green retailing

The literature highlights internal and external drivers of green retailing. The internal drivers include retailers' civic concern, brand reputation and profitability (Swaffield, Evans & Welch, 2018:43; Naidoo & Gasparatos, 2018:128). Green retailing can lead to reductions in material, energy and services, capital and labour costs (Naidoo & Gasparatos, 2018:128), and this financial benefit is a principal driver of green retailing.

The external drivers include environmental policy and external stakeholder pressure (Swaffield, et al., 2018:43; Naidoo and Gasparatos, 2018:128). The UN SDGs set the environmental sustainability norms and broad agendas adapted to various national contexts. Some of these policies are punitive, whereas others reward sustainable business practices through provisions such as tax relief on food donations (McCarthy, 2016). While punitive action could help as a deterrent, it may only promote minimum required compliance, and government policies that encourage and reward environmentally aware behaviour could be more effective (Naidoo & Gasparatos, 2018:129). Media reports on business practices and pressure from sustainability activists also push the green retailing agenda.

Employee engagement

Employee engagement primarily aims to familiarise employees with the retailers' sustainability plan, and provide relevant education, training, and skills to equip them to perform effectively in line with the sustainability plan. Employee engagement is "…significant owing to the enormous power of employees to reach and influence customers, suppliers, and co-workers (Siegel, Badiane & McElrath, 2012:24)".

Sustainable product sourcing

Retailers use various activities aimed at procuring products to enhance sustainable production and consumption. For example, choice editing is a strategy whereby retailers assess the sustainability of products and penalise unsustainable products by either "denying premium shelf space to less sustainable products" (UNEP, 2012: 130) or not stocking unsustainable products altogether (Naidoo & Gasparatos, 2018:131).

Price discounts

Price discounts on products approaching the sell-by/best-before date is a common practice used by retailers to encourage demand for these products and minimise food waste. Retailers are also increasingly offering fresh products that do not meet stated quality standards for sale at reduced prices (Hermsdorf, Rombach & Bitsch, 2017:2533; Blanke, 2015:396).

Product shelf life management

Monitoring and temperature control for storage and display of chilled and frozen products help to improve the shelf life of foods by reducing spoilage (Naidoo & Gasparatos, 2018:130). Automated temperature monitoring equipment in refrigerated display cases and other technologies such as dry-misting (European Supermarket Magazine, 2020) are used for this purpose. In addition, innovations in packaging designed to increase storage food longevity in the home also help reduce food waste at the household level (Welch, Swaffield &s Evans, 2018:4).

Date labelling

Retailers have tried to address the issues of the confusing date labelling nomenclature. In 2018, for instance, Tesco announced plans to stop using best-before dates on over a hundred of its fruit and vegetable products (Tesco, 2018). Recommendations included using only one date label, such as the use-by date, to minimise confusion (Cole, 2017).

Food donations

Donated food is the most preferred waste prevention measure because the food ends up being used for the intended purpose: human consumption (Garrone, Melacini, Perego & Sert 2016: 1076; Eriksson, 2012:20). Where food is donated, most large retailers partner with community organisations, food banks and other non-governmental organisations (NGOs) to do so (Hermsdorf, et al., 2017:2532; Richter & Bokelmann, 2016:424).

Technology applications

Apps such as Neighbourly Food, FoodCloud, and Olio link food retailers with surplus or close-to-expiry date food to interested parties such as charities, community organisations and individual consumers to collect the food for redistribution or buy it at discounted prices (Cole, 2017).

External stakeholder engagement

While external stakeholder engagement includes consumers, the media, NGOs, government institutions, members of boards of directors, investors and others, the focus of this paper is on the customer stakeholder group, as the other groups would already have a defined position in the sustainability and food waste reduction discourse and retailers are more likely to collaborate with them or report on initiatives implemented.

The main aim of customer engagement is to sensitise customers about environmental sustainability and encourage them to make sustainable demand and consumption decisions (Naidoo & Gasparatos, 2018:132; Delai & Takahashi, 2013:213). Retail communication such as Morrison's 'wonky fruits and veg', Tesco's 'perfectly imperfect' and Intermache's 'inglorious fruits and vegetables' are some examples of such

campaigns. Part of raising customer awareness is encouraging customers to use the products they buy and thus minimise household food waste. To this end, many retailers provide product information including proper food storage processes, meal planners, recipes, and food recovery (Welch, et al., 2018:5; Priefer, et al., 2016:160).

South African green retail practices

Most literature on South African green retail practices comes from retailers' sustainability reports. These reports have minimal information on food waste reduction activities undertaken. However, one food waste reduction activity which most South African retailers engage in is food donations (Shoprite, 2019:22; Woolworths, 2019:12). FoodForward South Africa, Gift of the Givers and other registered communities and NGOs collect food donations from retailers for redistribution. Some retailers sell surplus and close to expiry non-perishable foods to Foodeez, who sells it to the public at discounted prices (Rivett-Carnac & von Bormann, 2018:12).

4.0 Analytical framework

Dyllick and Muff's (2016) typology of business sustainability was used in this paper to analyse the effect of food waste reduction activities on green retailing among South African retailers. The image below displays the analytical framework:

Figure 1: Dyllick and Muff's Business Sustainability Typology (BST)

BUSINESS SUSTAINABILITY TYPOLOGY (BST)	Concerns (What?)	Values Created (What for?)	Organizational Perspective (How?)
Business-as-Usual	Economic concerns	Shareholder value	Inside-out
Business Sustainability 1.0	Three-dimensional concerns	Refined shareholder value	Inside-out
Business Sustainability 2.0	Three-dimensional concerns	Triple bottom line	Inside-out
Business Sustainability 3.0	Three-dimensional concerns	Creating value for the common good	Outside-in
The key shifts involved:	1st shift: broadening the business concern	2nd shift: expanding the value created	3rd shift: changing the perspective

Source: Dyllick, T. and Muff, K. (2016)

Dyllick and Muff (2016:168) proposed three business sustainability typologies (BSTs). In the first, a business recognises the socio-economic challenges as raised by external shareholders. The business addresses these challenges by integrating them "into existing processes and practices without changing the basic business premise and outlook (Dyllick & Muff, 2016:164)." The second approach to business sustainability (BST 2.0) "includes social and environmental values" (Dyllick & Muff, 2016:164) to improve the triple bottom line (people, planet, profit). In the third approach (BST 3.0), a business seeks to address the socio-economic challenges for the common good. BST 3.0 is termed the 'true business sustainability' approach and is recommended to make the greatest contribution to resolving sustainability issues (Dyllick and Muff, 2016:166).

5.0 Methodology

The study used a qualitative research design. Data was collected using an electronic survey and semi-structured interviews. The survey was shared with retailers registered on the Wholesale and Retail Sector Education and Training Authority (W&RSETA) database and a database of retailers

that was purchased for the purposes of this research. The database facilitated access to 15,854 retailers of different sizes across South Africa. The survey was distributed to all the retailers on the database and yielded a response rate of 1.5% (241). Only data from food retailers (76) was used for this paper. Fourteen semi-structured interviews were also conducted with waste management businesses, industry associations and other industry specialists to validate and give context to the survey findings. Data was analysed using thematic analysis to identify patterns and trends in the data.

6.0 Results

6.1 Survey results

Respondent characteristics

Tables1, 2, and 3 below provide summaries of the respondents' characteristics:

Table 1: Respondents' characteristics

Location	**Percent**
Cape Town	22.4
Johannesburg	14.5
Pretoria	9.2
Durban	9.2
Centurion	3.9
Bloemfontein	2.6
Vanderbijlpark	2.6
Mossel Bay	2.6
Prince Albert	2.6
Other	30.3
Total	100

Table 2: Retailer size by number of employees

Number of employees (n=76)	**Percent**
< than 50 employees	42.1
Between 50 – 200 employees	27.6
> 200 employees	30.3
Total	100

Table 3: Respondents' position

Position (n=73)	Percent
Owner	34.2
Managerial	53.4
Other	12.3
Total	100

Based on their Internet Protocol addresses, 36.9% (n=76) of the surveyed food retailers who responded were based in Cape Town and Johannesburg, with the rest being in various cities and towns across South Africa. The sizes of the retail operations ranged from under 50 to over 200 employees. Just under half of the businesses (42%, n=76) had less than 50 employees, while 28% (n=76) had between 50 and 200 employees, and 30% (n=76) had over 200 employees. Although it was not possible to accurately determine whether the retailers who responded were representative of the population, there was fair representation judging from the spread of the respondents' geographical location and size of their retail operations. Most of the respondents were either owners of the retail business or were in managerial positions, with 88% (n=73) being directly responsible for waste management.

Green retail drivers

The respondents gave several reasons driving their green retail activities. The two most cited were pressure from environmentally conscious consumers and the retailers' own values. Other reasons given included legislation, corporate head office directive, operating efficiencies (especially energy saving), cost-saving, general industry pressure, and pressure from suppliers and producers.

Food waste and green retailing

Regarding food waste management, it emerged that 40% (n=70) of the retailers did their own waste management, 33% (n=70) appointed their own waste management companies, while 27% (n=70) used municipal waste management services. Table 4 below gives a summary of the waste management options used by the retailers.

Table 4: Food waste management

Food wase management option (n=70)	Percent
Own waste management	40
Own appointed waste management company	32.9
Municipal waste management	27.1
Total	100

More than half (57%, n=76) of the food retailers have implemented some form of waste reduction. However, of those that provided details about waste reduction initiatives (60%, n=76), only 37% (n=46) have implemented specific food waste reduction initiatives. Table 5 below shows the food waste reduction initiatives used by these retailers. Food donation to charities was used by 17.4% (n=46). Composting, use of slightly damaged vegetables in the delicatessen, and sale or donation to farmers for animal feed were used by 19.6% (n=46) of the retailers. Just over 41% had packaging-related waste reduction initiatives in place, while 21% (n=46) had other initiatives in place, some of which impact on food waste, such as improving supply chains and in-store operations to reduce waste such as selling unpackaged fresh produce.

Table 5: Food waste reduction initiatives used

Initiative (n=46)	Percent
Composting	4.3
Donations and charities	17.4
Animal feed	10.9
In-store	4.3
Packaging related	41.3
Other	21.7
Total	100

Some of the most cited challenges with implementing green retail initiatives were consumer preferences that are not supportive of green retailing, suppliers not being willing to shift to greener practices, retailers not having waste reduction alternatives or options, insufficient government support, and a lack of funding for such initiatives.

Table 6 below gives a summary of the use of waste reduction targets amongst the retailers. A notable 60% reported not having any waste reduction targets. However, approximately 35% (n=65) indicated that they had waste reduction targets, which included targets for food, paper, plastic, electricity, and greenhouse gases/carbon footprint reduction.

Table 6: Setting food waste reduction targets

Set targets	Percent
Yes	35.4
No	60
Don't know	4.6
Total	100

6.2 Interview results

As mentioned in the methodology section, industry specialists, waste management companies and industry associations were interviewed to provide an overview of global and local food waste and waste reduction practices in the retail sector.

Food waste drivers

The interviewees highlighted several food waste drivers. Different food date labels were identified as a significant challenge as they confuse consumers. It was noted that primary packaging, e.g. pallets, contributed most to food waste, as opposed to plastic and cardboard, as bulk stacking caused damage to produce, especially those at the bottom. Staffing was another contributor to food waste that was identified, as some merchandisers are not equipped with the necessary knowledge and skill to minimise food waste. Insufficient temperature monitoring and maintenance of refrigerated display equipment were also said to contribute to food spoilage.

The interviews highlighted that most major retailers only sell grade 1 and 2 fresh produce, which means producers must find alternative markets for or discard grade 3 produce. Respondents also pointed out that suppliers/distributors repeatedly supply lower stock levels than what is required by retailers. To mitigate against this, stores exaggerate their orders to ensure they receive the correct amount of product, often leading to wastage when complete orders are delivered.

Challenges in managing food waste

The interviewees pointed out that the amount of waste generated by retailers is largely unknown, and while some retailers are open, many more are not willing to work with researchers and industry specialists to gather relevant information. Additionally, often in retail shopping centres, waste reduction and zero waste conflict with the nature of the

waste management industry. In addition, efforts in waste management are focused on keeping costs low, thus, the separation of organic waste at source is often not requested due to the costs around the implementation of this.

South African green retail practice

Corroborating the survey findings, the interviewees brought up food donations for redistribution and ready-made meals as part of retailers' food waste reduction initiatives. Furthermore, price discounting to increase sales was cited as being in use by some retailers such as Checkers and Shoprite on foods close to their sell-by date.

7.0 Discussion

The findings show that the significance of food waste in South Africa is recognised by the retail sector and other FSC players and stakeholders. The respondents also exhibited an appreciation of the significance of their role in addressing the problem.

7.1 Food waste definition

The lack of a common understanding and characterisation of food waste has significant implications for its quantification and reporting. While a universal definition may not be possible due to cultural and other influences (Galli, et al., 2019:292), a regional or national level understanding may be more achievable.

7.2 Food waste drivers

Standardised date labelling was highlighted as necessary to address food waste. Collaboration between private and government stakeholders on consumer education was also listed as necessary for lasting benefits. The inclusion of sustainability in the school curriculum is another example of collaboration that can help to change consumer behaviour.

7.3 Food waste and its effect on green retail

Interestingly, the interview findings show that the scale of food donations by retailers to participating partners have risen in recent years, though only 17.4% of food retailers surveyed noted that they engage in this activity. This may be an indication that food donations are only now beginning to grow.

Although conversion of food waste into organic compost and animal feed is not widely used, it has potential for growth because it adds to the retailers' product offering and income stream. Composting also significantly contributes to environmental sustainability and would therefore add to a positive retail brand perception.

Surprisingly, the green retail practices of price reduction for produce approaching their sell-by date was only cited by two retailers. Price discounting is a very common feature in South African retailing. Its absence from the survey findings could imply that South African retailers use it as a marketing tool and not as a food waste management tool.

The interviews with industry specialists highlighted the challenge researchers encountered in getting information from some retailers. Therefore, it is vitally important to avail accurate information for knowledge generation, evaluate and inform practice, and support relevant policy generation.

Three categories of green retail activities outlined in the literature are internal operations, supply chain management and stakeholder engagement. Based on the findings, it appears that the retailers are focused on operating efficiency. Supply chain management and stakeholder engagement areas of green retailing still need to be engaged with by the retailers. However, recommendations for each of these categories are provided below.

Choice editing, supplier green products rating, and denying premium shelf space to unsustainable products were not cited by retailers. In addition, promotion of imperfect products, consumer education, technology applications and employee training did not emerge as part of South African green retail practices.

Using Dyllick and Muff's (2016:164) typology of sustainability, it is argued that green retailing in South Africa best fits BST 1.0: retailers recognise the need to address food waste reduction because it is a social and business risk. Current retailers' initiatives to address food waste use their existing processes and infrastructure such as donations to food

banks and conversion within the business to satisfy customer demand and add value to the business.

8.0 Conclusion and recommendations

While South African retailers have shown a commitment to engaging in green retailing and addressing food waste reduction, more can be done in the sector. The following recommendations are for retailers and policymakers.

Table 7: Recommendations

Retailers
Operations
Appointing a sustainability champion to drive the sustainability agenda, with clear actions and targets.
Employee support/training for efficient performance (especially accurate demand forecasting and merchandising).
Eliminating 'buy-one-get-one-free' promotions that lead to waste.
Introducing food waste targets, with measurement and reporting.
Date label standardisation
Supply chain
Sustainable product sourcing and collaboration with suppliers (including supplier green product rating).
Consumer engagement
Raising awareness of the environmental and socio-economic implications of food waste to encourage responsible consumption behaviour.
Visibly placed product information such as product storage, recipes etc. to minimise food spoilage and encourage usage of produce once bought.
Policymakers
Facilitating setting targets aligned to SDG Target 12.3 to direct retailers' efforts
Legislation incentivising food waste reduction while discouraging its disposal to landfills.
Research funding - food waste and reduction/prevention measures across the FSC; green product research; research into green technology etc.
Guiding policy on food waste measurement standards with a clear reporting and monitoring process.
Facilitating standardisation of date labels.
Tax relief/incentivisation.
Inclusion of food waste and food supply chain in the education curriculum to raise awareness among consumers from an early age.

9.0 Limitations and further research

This study contributes to the understanding of the causes of food waste and the green retail practices being used to mitigate the problem. Its limitations include a dearth of information on food waste at the retail stage of the FSC in South Africa and the low response rate to the survey. Further areas of research include quantification of in-store retail food waste and monitoring and evaluation of the efficacy of food waste reduction strategies used by different types and sizes of retailers. Retail employees and consumer perceptions of retail food waste would also provide different perspectives of the phenomenon.

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