

Contemporary Innovations in Food Waste Management in Commercial Foodservice Outlets in Kenya

Albert Daniel Odula^{1*}, Leah Wawuda Waseni²

¹The Eldoret National Polytechnic Hospitality, Nutrition & Dietetics Department

²Kaiboi Technical Training Institute Food & Beverage Department

*Corresponding author email: albertodula@gmail.com

Published online: 6th July, 2023

Abstract

Food waste is one of the biggest problems in commercial foodservice sector because a high amount of food produced is never eaten. Commercial foodservice outlets loses food to waste at various stages during purchasing, transportation, storage, preparation, cooking, serving, and even after serving. There is evidence that the majority of waste in dumpsites is food waste. Moreover, when food goes to landfills, it decomposes without access to oxygen thereby producing methane gas, a greenhouse gas that has great effects in destroying the environment and contributing to climate change. Other than the resources throughout the value chain that are put towards production of uneaten food wasted, the major concern is the high level of starvation and food insecurity present in Kenya. The ultimate consequence of food waste is therefore economically, morally and environmentally wrong. The purpose of this study was to examine the contemporary innovations in food waste management. The objective of the study was to identify the contemporary innovations in food waste management in commercial foodservice outlets. The study adopted documentary analysis research design where a systematic procedure was used to review previous literature materials. The study concluded with a framework that brought the findings together which indicated that while there were practices put in place to manage food waste in foodservice outlets in Kenya, appropriate food waste management innovations were lacking in most of the outlets due to limitations of awareness, finances, technology and sufficient sensitization. The three sustainability principles of reduce, reuse and recycle are not yet fully embraced. Foodservice operators are therefore encouraged to adopt innovations aimed towards reducing the amount of food waste in their daily operations.

Key words: Food waste, Innovations, Foodservice outlets, Commercial foodservice, Food

Introduction

According to United Nations Food and Agriculture Organization (FAO,2013), food waste is defined as the amount of food often unused or left over and discarded from kitchens and eating establishments as a result of decisions and actions of foodservice providers and customers. Food refers to edible products going to human consumption (Gustavsson et al., 2011). Commercial foodservice refers to sectors of the foodservice industry that provide food and beverages to make profit or to earn adequate return on investment through their products and services. Foodservice outlets are establishments that engage in the provision of food and beverages for immediate consumption by people who are away from their homes in so as to satisfy their various needs at specific times. Such foodservice outlets include different types of restaurants, hotels, outside catering, retail stores and transport catering sectors. Innovations refers to the development of new ideas which offer solutions to a wide range of the current problems.

FAO, 2013 reports that between 33-50% of global food production is never eaten. This accounts for an annual value of 1 trillion dollars and 1.3 billion tons of wasted food. While an estimated population of 800 million people in the world (1 in 9 people) suffer from hunger every night, a quarter of the wasted food could feed each one of them. It takes a landmass larger than China to grow food that is never eaten. In addition food that is never eaten accounts for 25% of all freshwater consumption globally, an equivalent to a six month flow of the river Nile. Moreover, if food goes to landfills, it decomposes without access to oxygen and creates methane which is 23 times more deadly than carbon dioxide. If food waste was a country, it would be the third largest emitter of greenhouse gases after China and the USA. With 2.3 billion people joining the planet by 2050, 60-70% increase in global food production is required or we can just stop throwing away our food. The report by FAO posits that 54% of the world's food wastage occurs during production, post-harvest handling and storage. 46% happens at the processing, distribution and consumption stages. This means that developing countries such as Kenya suffer more food losses and waste during agricultural production, while food waste at the retail and consumer levels tends to be higher in middle and high income regions where it accounts for 31-39% of total wastage than in low income regions at 4-16%. The later a food product is lost along the chain, the greater the environmental consequences, FAO's report notes. Food waste in Kenya make up the bulk of the country's solid waste at 51% (Government of Kenya Vision, 2030) with 1.9 million tons equivalent to Kshs 150 billion worth of food going to waste each year $\frac{1}{3}$ of which is lost

through wastage by consumers who buy more than they need (Kenya National Bureau of Statistics).

Statement of the problem

While eating out has continuously been on the increase in Kenya especially in urban centers, a significant amount of food produced in commercial foodservice outlets is never consumed for various reasons and thus ends up in landfills as waste. This results in economic losses, harm to the environment and morally wrong owing to the alarming rates of starvation and food insecurity currently present in Kenya.

Study objective

The objective of this study was to identify contemporary innovations in food waste management in commercial foodservice outlets.

Significance of the study

The findings of this study presents a range of contemporary innovations in food waste management that offers sustainable food waste management solutions which if adopted by commercial foodservice outlets in Kenya can significantly help reduce the amount of food waste in their daily operations.

Literature review

Foodservice outlets are establishments serving meals for consumption by people away from their homes. Euromonitor (2016) considers foodservice to include establishments that offer full table service and focus more on provision of food. These include cafes and bars which offer a variety of snacks and focus more on drinks service, takeaways and home delivery outlets which do not offer dining facilities at their premises, fast foods which offer quick service over the counter, self service establishments which offer variety on their menu at low prices, kiosks which are relatively small and mobile with limited offer and low price, and outdoor catering which offer food and beverage services off their premises. Foodservice outlets therefore do not include retailers which offer ready to eat food whose final preparation must be completed by the customer.

Food waste management

In the entire food value chain, food waste can occur during purchasing, transportation, storage, preparation, cooking, serving and after serving (Betz et al., 2015). According to Silvennoinen et al. (2015) food waste can be divided between originally edible and originally inedible. The originally inedible food includes vegetable peelings, trimmings, bones and coffee grounds. Beretta et al., (2013), divide food waste into avoidable, partially avoidable and unavoidable. Avoidable food waste refers to good food that could be eaten before being thrown away. Unavoidable waste refers to the portion of food that is normally not eaten for example, banana peels and chicken bones. Partially avoidable waste refers to food that may be eaten in certain situations but not all the time for example, potato skins. Eriksson et al. (2017) distinguish food waste reduction at production level and management of food waste that is unplanned. Food waste has been perceived as a big challenge but which is avoidable. This has driven the United Nations to adopt the Sustainable Development goals with a target of halving the per capita global food waste at the retail and consumer levels and then reduce the amount of food waste along the supply chains by the year 2030 (FAO, 2013). Such goals may be achieved (Beretta et al., 2013), however there is a close link between management of food waste and consumption practices in order to avoid wasting food.

In foodservice outlets food waste management has proved to be a complex phenomenon involving a wide range of factors and activities. While there are establishments which separate and weigh their food waste (Pirani and Arafat 2016), there are foodservice professionals who approach food waste management in terms of managerial attitudes and mitigation practices (Heikkila et al., 2016). The existing studies more often include other sectors in the food industry such as producers, manufacturers and retailers. However, managerial approaches on food waste management may include food donations, customer awareness campaigns, price reduction, proper labeling and packaging.

Innovations in foodservice outlets

With increasing pressure on foodservice outlets to engage in effective waste management, they tend to exhibit incremental approaches which are step by step operational improvements on their existing processes and available systems related to waste reduction (Beise and Rennings, 2005). Examples are, developing green restaurant management standards, corporate social responsibility, including green foods on their menu, green equipment and green environment. Such initiatives require a low level of new knowledge and newness to the

establishment that is adopting them (Dewar and Dutton, 1986). Initiatives related to improvement of technology and application of internet networks to improve food waste management require high level technical skills and management systems (Wen et al., 2017) contrary to incremental innovation whose key element is being relatively less complex and harnessing existing business processes.

Radical innovations on the other hand is aided by technology to significantly alter the waste management approaches. Such initiatives represent a total shift from the existing practices (Carrillo-Hermosilla et al., 2010). They require greater depth of knowledge, resources, commitment, and more time and involve high risk for market uptake. They can make significant contributions in environmental sustainability, for example, Paper Company can transform part of its waste into green energy that can increase its resource efficiency. However, there is a continuous development in both incremental and radical innovations in various industrial processes and systems (Hage, 1980) although engagement in waste management innovations depends on the ability of an establishment to gain support from the management, mobilize resources and overcome potential resistance from stakeholders (Depledge, 2011). Radical innovations may not be adopted if the establishment does not have knowledge resources to absorb and interpret them (Souto, 2015). Food waste management therefore requires creativity, awareness of the goals and procedures and a reflection on the actions of foodservice outlets. Such awareness enables innovation initiatives in foodservice outlets to be experimental approaches in food waste reduction.

Methodology

The study adopted documentary analysis as a qualitative research method which is a systematic procedure for reviewing documents. Like other analytical methods, documentary analysis involves qualitative data examination and interpretation so as to make meaning, gain understanding and develop empirical knowledge (Corbin and Strauss, 2008). This method is particularly applicable to qualitative case studies which requires a description of a single phenomenon (Stake, 1995). Collection of secondary data was aided by a checklist for the selection of studies to be reviewed using the key words; food waste, innovations, foodservice outlets, commercial foodservice, food. The study focused on one research theme; contemporary innovations. The key words were used to extract data from computer based and internet transmitted journals and materials for a schedule of two weeks data collection period. The studies found through the search protocol were evaluated and included studies on

innovations in food waste management in commercial foodservice outlets but not including studies pertaining to food waste from producers, manufacturers and retail sectors which do not offer food for immediate consumption. The sectors are not directly related, however, innovations in food waste management is paramount in the entire food supply chain if meaningful milestones have to be made in reduction of food waste therefore such studies were taken forward to be included in the review. To ensure that the data was collected, a review panel for the study consisting of subject experts and academics with knowledge about the foodservice sector was constituted. The panel helped set the conceptual framework of the study. Data was then analyzed using content analysis and presented in the form of logical statements. The examination of the data suggested that the majority of the prior studies were conducted in other sectors of the food industry with only a few coming from the foodservice sector. The documentary analysis and review revealed that researchers of the selected prior studies used quantitative, qualitative as well as mixed methods of data analysis in their research design. Documentary review for the purpose of this study was efficient, available and provided broad coverage.

Results and discussions

A study by Osiako and Kumitha (2020) identified practices and procedures implemented among coast beach hotels in Kenya. They established that there are practices of food waste management which were implemented by the majority of the hotels in the coast region. According to Osiako and Kumitha, only 38% of the hotels either recycled their food waste or fed it to animals. A few of the leftover food was composted indicating that recycling was not popular among the hotels in this area possibly because of lack of either technical knowhow or lack of recycling plants in the area. The three principles of reduce, reuse and recycle were not yet fully adopted by the hotels as compared to developed countries where they are popular practices. Appropriate waste management innovations were lacking in most of the hotels and most of the waste they generated were just dumped into the environment at the local dump sites. While there were two major tourism awarding schemes for best sustainable practices in Kenya few hotels at the coast subscribed and participated in eco-award programs, Osiako and Kumitha (2020). The major limitation for not adopting such best practices among the coast was related to awareness, finances, technology and sufficient sensitization.

Hotels in Mombasa have waste management programs where food waste is sorted into pig feeds, compost and refuse. Pig farmers from the neighborhood collect the sorted food waste

on a daily basis. This indicates that the waste is being recycled, reused and composted although on a limited scale. Kimeu (2015) investigated how waste management affected operational performance and examined waste management practices implemented by hotels in Mombasa County. He established that there is a moderate effect of waste management practices on operational performance of the hotels. Kariuki (2014) on the other hand sought to investigate the relationship between green practices and operational performance of hotels in the coastal region of Kenya. He established a positive effect of green practices on operational performance.

The food and beverage sector generates most of the waste estimated at 46% of the entire waste produced in foodservice outlets, a much higher scale compared to household food waste (Kasim, 2007). The level of commitment by foodservice outlets to reduction and recycling of waste depends largely on regulatory policies and government support. These legislations should impose penalties on non-compliant organization's (Ervin et al., 2012). The literature indicates that the commonly implemented food waste management practices by foodservice outlets are separation of wastes, donation of leftover food and composting of kitchen food waste.

Conclusion and recommendations

This study sought to identify contemporary innovations in food waste management implemented by foodservice outlets in Kenya. Few studies have been done to identify such innovations in Kenya as a whole with the majority of the studies done focused on the coastal region. There is therefore a gap in the literature concerning innovations in foodservice outlets. From the findings, foodservice outlets have generally embraced the innovations which are low cost (Incremental) or those which have no cost at all as opposed to innovations which are considered more expensive to implement (Radical) for example, innovations that involve development of technology. Moreover, innovative practices which are perceived to interrupt the luxury and comfortable experiences that customers are seeking are also avoided, for example, provision of food waste recycling bins at the front of house areas. The study recommends that the government and other stakeholders provide commercial foodservice outlets with subsidized costs of acquiring innovative technological solutions. The customers should offer support by contributing to reduction of food waste by accepting to pay more for environmentally friendly products and services. Foodservice operators should also sensitize

their customers and offer more training to their employees as this will help create awareness on innovations in food waste.

The study recommends that the government and other stakeholders should provide innovative technological solutions at subsidized cost to foodservice operators. Customers should offer support by accepting to pay more for environmentally friendly products and services. Foodservice operators should sensitize their customers and offer more training to their employees to create awareness on innovations in food waste

References

Beise, M., & Rennings, K. (2005). Lead markets and regulation: A framework for analyzing the international diffusion of environmental innovations. *Ecological Economics*, 52 (1), 5-17.

Beretta, C., Stroessel, F., Baier, U., & Hellweg, S. (2013). Quantifying food losses and the potential for reduction in Switzerland. *Waste management*, 33 (3), 764-773.

Betz, A., Buchli, J., Gobel, C., & Muller, C. (2015). Food waste in the Swiss food service industry- Magnitude and potential for reduction. *Waste management*, 35, 218-226.

Carillo-Hermosilla, J., Del Rio, P., & Konnola, T. (2010). Diversity of eco-innovations: Reflections from selected case studies. *Journal of Cleaner Production*, 18(10), 1073-1083.

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory (3rd Ed)*. Thousand Oaks, CA: Sage.

Depledge, M. (2011). Pharmaceuticals: Reduce drug waste in the environment. *Nature*, 478 (7367), 36-36

Dewar, R.D., & Dutton, J.E. (1986). The adoption of radical and incremental innovations: An empirical analysis. *Management Science*, 32 (11), 1422-1433.

Eriksson, M., Osowski, C.P., Malefors, C., Bjorkman, J., & Eriksson, E. (2017). Quantification of food waste in public catering services- A case study from a Swedish municipality. *Waste management*, 61, 415-422.

Ervin, D., Wu, J., Khanna, M., Jones, C., & Wirkkala, T. (2012). Motivations and barriers to corporate environmental management. *Business strategy and the environment*, 22 (6), 390-409.

Euromonitor International (2016). *Consumer food service*. http://www.euromonitor.com/consumer-food_service (retrieved April 15, 2021).

Food and Agriculture Organization of the United Nations (FAO) 2013. *The state of Food Insecurity in the World 2013. The multiple dimensions of food security*. FAO: Rome (Italy).

Government of Kenya Vision 2030: *The environment*, 2007.

Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). *Global food losses and food waste*. FAO, Rome, Italy.

Hage J. (1980). *Theories of organizations: Form, process and transformation*. John Wiley & Sons.

Heikkila, L., Reinikainen, A. Katajajuuri, J.M., Silvennoinen, K., & Hartikainen, H. (2016). Elements affecting food waste in the food service sector. *Waste management*, 56, 446-453.

Kariuki, E.K., (2014). Relationship between green practices and operational performance of hotels in the coastal region, Kenya. *Masters Thesis*, University of Nairobi.

Kasim, A. (2007). Towards a wider adoption of environmental responsibility in the hotel sector. *International Journal of Hospitality & Tourism Administration*, 8 (2), 25-49.

Kenya National Bureau of Statistics. 2016. *Economic survey 2017*. Nairobi: Kenya National Bureau of Statistics

Kimeu, D.M. (2015). Effects of waste management practices on the operational performance of hotels in Mombasa County, Kenya. *Masters Thesis*, University of Nairobi.

Osiako P.O., & Kumitha, H.R. (2020). Environmental management practices among coastal beach hotels in Kenya. *African Journal of Hospitality, Tourism and Leisure*, 9(1).

Pirani, S.I., & Arafat, H.A. (2016). Reduction of food waste generation in the hospitality industry. *Journal of Cleaner Production*, 132, 129-145.

Silvennoinen, K., Heikkila, L., Katajajuuri, J.M., & Reinikainen, A. (2015). Food waste volume and origin: Case studies in the Finnish food service sector. *Waste management*, 46, 140-145.

Souto, J.E. (2015). Business model innovation and business concept innovation as the context of incremental innovation and radical innovation. *Tourism management*, 51, 142-155.

Stake, R.E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.

Wen, Z., Hu, S., De Clercq, D., Beck, M.B., Zhang, H., & Liu, J. (2017). Design, implementation and evaluation of an Internet of Things (IoT) network systems for restaurant food waste. *Waste Management*.