Food Waste Minimisation Guidebook FOR SUPERMARKETS



Singapore Food Agency

National Environment Agency
Safeguard · Nurture · Cherish

*The Singapore Food Agency (SFA) was formed since 1st April 2019 to replace the Agri-Food & Veterinary Authority (AVA) and oversee Singapore's food safety and security.

Disclaimer
This Guidebook aims to provide guidelines to assist supermarket operators in developing their own food waste reduction plans, and should be read in conjunction with applicable legislation/regulations. NEA and then-AVA shall not be responsible for any errors or omissions appearing in this guide. All references and sources of the information appearing in this guide have been cited and credited to the best of our knowledge.

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- Cold Storage Singapore (1983) Pte Ltd
- NTUC FairPrice Cooperative Pte Ltd
- Sheng Siong Supermarket Pte Ltd

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CHAPTER I: INTRODUCTION

Food waste accounts for about 11% of total waste generated in Singapore and is a key priority waste stream under Singapore's Zero Waste Masterplan. In 2023, approximately 755,000 tonnes of food waste were generated, equivalent to the weight of about 52,000 double-decker buses. Only 18% was recycled or treated onsite, and the rest was sent to Waste-to-Energy plants for incineration and energy recovery. More can be done to minimise food waste, and ensure that food resources are utilised in a more efficient manner. Moreover, reducing food waste can help reduce the unnecessary depletion of food supplies, thereby enhancing food security in Singapore.

WHY SHOULD BUSINESSES CARE

ECONOMICS

Identifying the sources of food waste can uncover inefficiencies in the supply chain, such as the wastage of raw materials. For businesses, it makes economic sense to reduce wastage of raw materials that are bought. Apart from material cost savings, companies also save on disposal fees. These ultimately translate to an increase in profits.

SOCIAL

In Singapore, there are about 105,000 households earning below $1,500 a month[1]. Some of these households may face difficulties in securing adequate food supply. Thus, in improving our practices and attitudes towards food production and waste management, supermarket operators can also consider the donation of surplus or unconsumed food to help those in need.

ENVIRONMENT

When food goes to waste, so do all of the resources (e.g. energy and water) that were used to produce it, making the environmental implications of wasted food more significant.

In addition, food waste disposed of is incinerated with general waste and the ashes produced are sent to our only offshore landfill. Due to Singapore being land-scarce, it is not sustainable to allow food waste to grow uncurbed. If overall waste continues to increase at our current rate, Singapore will need a new landfill every 30-35 years.

AIM

The aim of this Guidebook is to help supermarket operators in Singapore contribute to protecting the environment by minimising food waste.

With the guidelines presented here, supermarket operators can develop food waste minimisation plans to suit individual business needs and benefit from the resultant cost savings from reducing food waste disposed of. Furthermore, supermarket operators could involve consumers in the food waste reduction effort by spreading the awareness to encourage consumers to cut food wastage.

The strategies in this Guidebook have been classified according to the food waste management hierarchy shown in Figure 1 below. The preferred approach is to avoid wasting food in the first place, followed by redistributing unsold or excess food and then treating/recycling food waste.

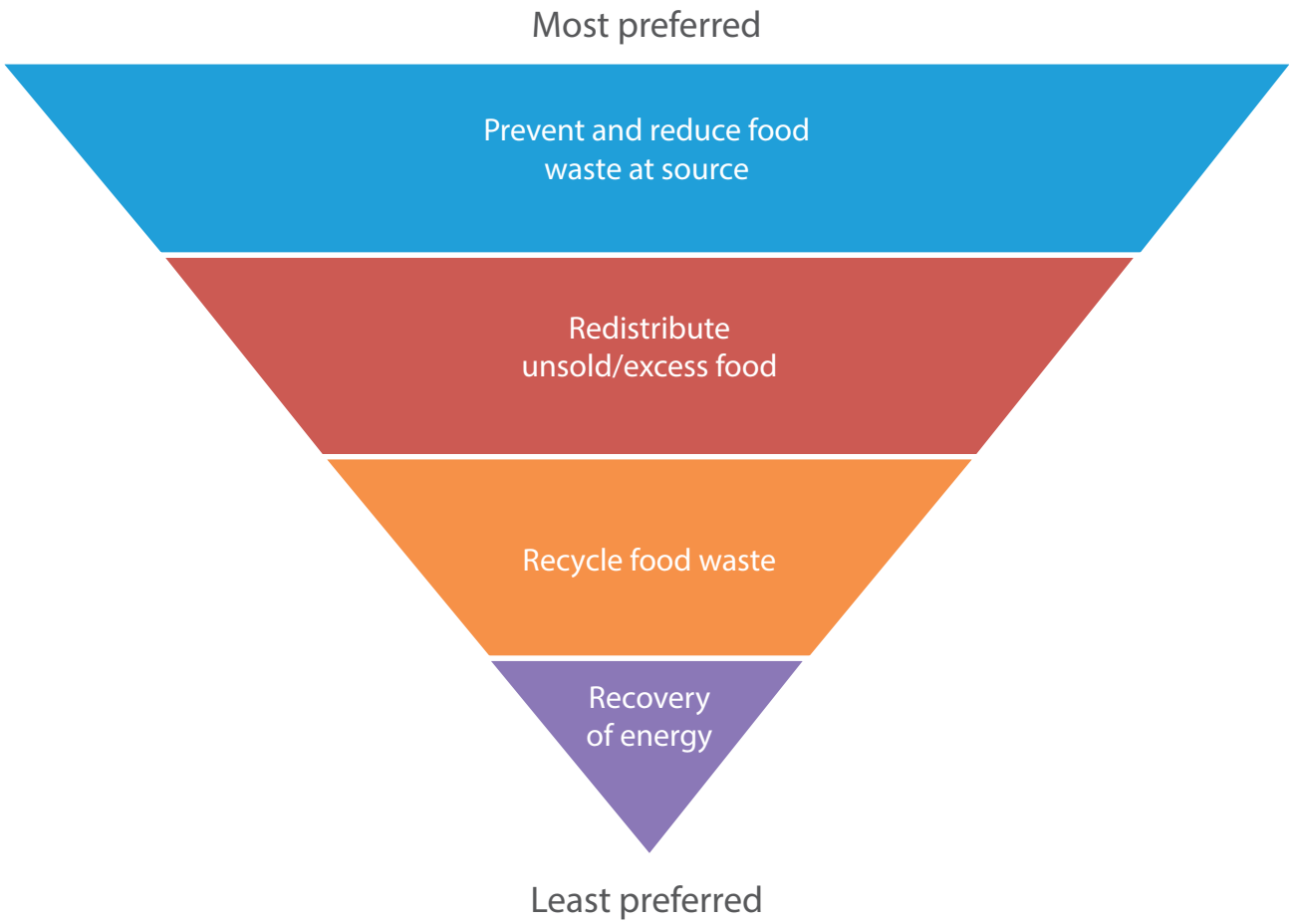


Figure 1: Food waste management hierarchy (Image: NEA)

CHAPTER II: REDUCE

This chapter will outline how supermarket operators can reduce food waste throughout the retail and service processes across the different stages as listed below.



Figure 2: Steps detailed in this guide for food retailers to reduce food waste

1. PLANNING

- Conduct waste audit
- Assess the cost of food waste

CONDUCT WASTE AUDIT

Before a meaningful food waste minimisation plan can be developed, a baseline waste audit would have to be conducted to analyse the composition of food waste and allow supermarket operators to identify the main sources of and reasons for food wastage. Once the sources and causes are identified, supermarket operators can then target relevant business practices and see how they can be improved to reduce food waste. Thereafter, food waste audits can be conducted periodically (e.g. half-yearly, annually) to review the effectiveness of the measures taken, as well as identify further opportunities to reduce waste for disposal.

A team, comprising staff from all stages of the food retail operations, such as preparation and retail, could be set up to conduct the waste audits.

During the food waste audit:

- Collect source-segregated food waste samples daily over a period of time (e.g. for a typical week) to get a better understanding of the food waste generated. If food waste is mixed with other waste, the waste will first need to be sorted to extract the food waste portion.
- Analyse the food waste to determine the types and quantities of food waste (e.g. vegetable trimmings, chicken/ fish bones) generated at each stage of the retail and service process.
- Identify the reasons for the food waste e.g. whether it is excess food from over-production, or food that has gone bad due to poor inventory management, etc.
- Record how the food waste is managed, e.g. whether the food waste is discarded or recycled.

To facilitate documentation of the findings from the food waste audits, a sample food waste audit template is included in Annex 1. For more detailed procedures on conducting a proper food waste audit, supermarket operators may refer to the Food Loss and Waste Accounting and Reporting Standard by World's Resource Institute.

In assessing the amount of food waste generated and their associated costs, supermarket operators can choose to adopt food waste tracking systems. Supermarket operators can track their food waste generated with the use of simple weighing scales or the adoption of smart technology software. Understanding the sources of food waste generation and their associated quantities will allow supermarket operators to come up with targeted measures to reduce waste. More information about smart metering system can be found under Annex 2 of this guide.

Case Study - NTUC FairPrice

NTUC FairPrice has set up a working group to look into the issue of food waste. Other than looking into the internal responses and thoughts towards food waste, the working group also reviews processes to better manage food waste from their operations, such as coming up with a waste accounting protocol - NTUC Food Waste Index, which correlates the total food waste to the total retail space. The index dropped 39 per cent from 11.9kg per sqm in 2014 to 7.2kg per sqm in 2015. Developed from a consultative study, the index enables NTUC FairPrice to track its food waste generation from each shopfront on a common term and monitor its progress on their various food waste reduction initiatives under their Food Waste Framework.

Case Study - Sheng Siong

At Sheng Siong's Central Distribution Centre, food waste is separated from general waste and the tonnages sent for disposal are tracked monthly. Waste is also measured during food processing such as trimming, sorting, and packing of fruits and vegetables.

Sheng Siong is also currently carrying out a trial collection of food waste data at some of its outlets by weighing the amount of fruit and vegetable waste thrown away daily.

ASSESS THE COST OF FOOD WASTE

By assessing the cost of food waste, supermarket operators can estimate the potential savings from reducing food waste and put up a case for a change in their business practices. The actual cost of food waste is not just the cost of food ingredients wasted. It also includes the following costs:

1. Waste Collection & Disposal Costs

   These costs can either be fixed or variable according to the amount of waste. On top of the haulage fees and waste disposal gate fees, fees for rental of waste compactors should be included where applicable; and

2. Staff & Utilities Cost

   To compute the staff and utilities costs, first estimate the proportion of food prepared that is eventually discarded, then estimate the time spent by staff in preparing all the food and the associated utilities cost (electricity/gas/water). Finally, multiply the associated utilities cost by the estimated proportion.



Figure 3: The true cost of food waste is higher than what it appears to be.

2. PURCHASING

- Improve inventory management

IMPROVE INVENTORY MANAGEMENT

Research has shown that much food is wasted due to poor inventory management which may result in the overstocking of shelves. Not all the food is used and the unused food has to be thrown away because of its perishable nature. An electronic inventory management system or software may help track stock levels more effectively.

Some companies also select a single staff to be a primary purchaser. The assigned role helps to prevent overlaps in ordering and receiving by different employees.



Figure 4: Proper inventory management is important for reducing food waste

Supermarket operators can employ data analytics tools and work with their suppliers to carry out demand forecasting and take into account factors such as weather changes, competition, economic situations and consumer confidence as these can affect consumers' purchasing pattern. Forecasting the changes in demand patterns can help supermarket operators better manage their stocks.

With greater understanding of demand patterns, supermarket operators will be able to order food stock right before they are to be used or sold and consider bulk purchases only when needed. Other than reducing the amount of food waste generated, supermarket operators will also benefit from lower inventory costs and improve freshness of products.

3. STORAGE

- Inspect incoming goods
- Label upon receiving
- Control storage conditions
- Adopt first-in-first-out (FIFO) Policy

INSPECT INCOMING GOODS

Always inspect incoming goods for any spoilage during transportation or due to improper handling during delivery and check that the food is kept within the safe temperature range and is properly handled. Ensuring that food is kept in good conditions prevents premature spoilage and potential food poisoning.

LABEL UPON RECEIVING

Supermarket operators can consider labelling food once they are received. Labels should include the product description, date of receipt, expiry date (where applicable)[2] and may also include storage instructions. Labels help staff to store food in proper conditions and adopt first-in-first-out (FIFO) and first-expire-first-out (FEFO) policy.

CONTROL STORAGE CONDITIONS

Ensure proper storage procedures and proper control of time and temperature to prevent spoilage of stored food. Whenever possible, enhance ventilation to prevent spoilage of fresh produce[3]. For cooked food, hot food should be kept at above 60^{O}C and cold food below 5^{O}C.

Areas designated for food storage and packaging materials should be situated away from toilets, dust, smoke, objectionable odours and other contaminants. Racks and pallets for food storage should also be in good and sanitary conditions.

Good hygiene practices prevent contamination and ensure the safety of the food. Supermarket operators should also invest in appropriate equipment for different food types. Ensuring that food is handled hygienically would prevent wastage due to the need to discard contaminated or spoilt food.

ADOPT FIRST-IN-FIRST-OUT (FIFO) AND FIRST-EXPIRE-FIRST-OUT (FEFO) POLICY

FIFO policy refers to using stocks in the order based on the date that they are received while FEFO policy refers to using stocks in the order of their expiry dates. FIFO and FEFO are methods of stock rotation and can be applied to ingredient usage, packaging, display and serving of food products. Supermarket operators can consider placing stocks that were received first or expires earliest at the front of the display shelves so that they are more likely to be purchased by consumers.

[2]Refer to the Singapore Food Agency (SFA) website for A Guide to Food Labelling and Advertisements (https://www.sfa.gov.sg/docs/default-source/food-information/labelling-and-packaging-information/a-guide-to-food-labelling-and-advertisements.pdf)

[3]Refer to the Singapore Food Agency (SFA) website for Good Warehousing Practices (https://www.sfa.gov.sg/docs/default-source/food-manufacturing-and-storage/goodwarehousingpractices.pdf) and guidelines and educational materials on safe food practices (https://www.sfa.gov.sg/food-retail/safe-food-practices-guidelines/safe-food-practices-guidelines)

4. HANDLING

- Adopt cold chain management

ADOPT COLD CHAIN MANAGEMENT

Some supermarkets have distribution facilities to receive goods from suppliers or manufacturers. Food products are further packaged or processed at these facilities before being transported to the outlets. Besides maintaining a high standard of hygiene during the handling process, supermarket operators can ensure the safety and quality of the food products by adopting cold chain management when redistributing them to the outlets. The cold chain is a temperature-controlled supply chain that can be used to help to ensure the shelf-life of perishable products during temporary storage or en-route to their destination. Examples of such products include fresh agricultural produce, seafood and frozen food.

It is recommended for supermarket operators to use logistics vessels such as trucks with refrigerated docks or multiple refrigeration zones to maintain the quality and safety of food products at the right temperatures (frozen, refrigerated or dry) during delivery. References can also be made to the Singapore Standards for the cold chain management of vegetables, chilled pork and milk and dairy products.



Figure 5: Refrigerator Truck For Perishable Freight Transport

5. SALES AND SERVICE

- Consider demand-based production
- Consider different approaches for the display and sale of food products
- Encourage customers to reduce wastage

CONSIDER DEMAND-BASED PRODUCTION

Supermarket operators often produce food in bulk to cope with volatility in the demand of products and to display food in abundance for visual appeal. However, perishable food products such as sushi and cooked meals are usually disposed of at the end of the work day if left unsold. Where possible, these should be produce in batches throughout the day, with production tagged to demand.



Figure 6: Perishables such as sushi can go stale after being left on shelves for long periods

CONSIDER DIFFERENT APPROACHES FOR THE DISPLAY AND SALE OF FOOD PRODUCTS

Displaying an abundance of food often reassures customers that the produce is fresh. Hence, supermarket operators may fill shelves completely or overfill baskets. However, overstocking can lead to wastage as much of the overstocked food could perish before they are purchased or consumed.

Case Study - Stop and Shop



A supermarket chain in the United States, Stop and Shop, used shallow baskets and dummy layers to create the impression of abundance while cutting down on actual supplies that were taken in from suppliers. While it took more labour to refill the display, goods were less likely to go bad. Goods also appeared fresher and more appealing.

Figure 7: The use of dummy layers can prop fruits up, giving the impression of abundance (Image: Telegraph UK)

Other than looking into the display of the food items, supermarket operators may re-consider their promotion for perishable or slightly blemished food products. For example, supermarket operators could set up a marked-down section where consumers can purchase food products nearing their expiry dates or slightly blemished fruits at lower prices.



Figure 8: 'Reduced-to-clear' sections in supermarkets to sell produce nearing expiry or fresh produce that have been displayed for a few days

ENCOURAGE CUSTOMERS TO REDUCE WASTAGE

Supermarket operators play an important role in changing public perception of food that looks less than perfect. Supermarket operators can help customers be more aware of food waste generated and pass on positive messages such as handling food with care or that slightly blemished fruits and vegetables are still fit for consumption. In addition, they can advise customers against squeezing or prodding fruits to test for freshness which can result in produce being spoilt prematurely.

Case Study - Dairy Farm Singapore and NTUC FairPrice

The Dairy Farm supermarket chain has set up marked-down sections at its outlets, selling food products approaching their expiry dates at lower prices. Dried goods items such as canned food are placed near checkout counters while fresh produce are placed within their individual sections with a sticker stuck on to indicate that they are sale items.

NTUC FairPrice also marks down prices for seafood and chilled meats that have been on display for a day.





Figure 9: NTUC FairPrice's campaign, "Great Taste Less Waste", discourages food waste by encouraging purchase of slightly blemished products

Case Study - NTUC Fairprice

NTUC FairPrice first piloted the "Great Taste, Less Waste" selection at seven of its hypermarkets in May 2015 under its FairPrice - CSR Food Waste Reduction Framework. Fruits and vegetables with blemishes are cut into smaller pieces before being repackaged and sold at reduced prices. This selection aims to raise awareness that imperfect looking produce are still perfectly edible and to educate customers on handling food with care. By May 2016, the selection has been rolled out to 102 FairPrice outlets.



Case Study - Sheng Siong

Signages are put up at Sheng Siong supermarket outlets to remind customers to handle produce with care.



6. STAFF TRAINING

- Provide adequate staff training
- Ensure high level of hygiene standards
- Keep staff motivated

PROVIDE ADEQUATE STAFF TRAINING

Supermarket operators could conduct training and briefing for new staff on ways to reduce food waste. Staff should be briefed on proper food storage and handling procedures. For example, fruits such as bananas can be bruised easily due to rough handling and should be handled with care.

ENSURE HIGH LEVEL OF HYGIENE STANDARDS

Storage places such as refrigerators and shelves should be cleaned regularly to prevent pest infestation. Work benches should be cleaned throughout the day and thoroughly sanitized at the end of the work day.

Supermarket operators should ensure that staff maintain a high standard of hygiene as unhygienic practices may lead to food wastage.

KEEP STAFF MOTIVATED

Keeping staff motivated to reduce food waste can result in improvements and innovation in work processes. For example, food preparation staff can help to identify areas for improvement in existing food preparation processes.

In order to keep staff motivated, supermarket operators could:

1. Foster a food waste reduction culture
2. Set food waste reduction goals
3. Encourage innovative solutions for food waste reduction
4. Make adoption of food waste reduction practices a key performance indicator for employee evaluations
5. Recognise staff who undertake food waste reduction initiatives

PARTNERSHIP

To ensure and improve on the effectiveness of food waste reduction initiatives, supermarket operators could partner various organizations. Possible partnerships involve the government, suppliers and retailers, food distribution organisations as well as food waste treatment systems suppliers.

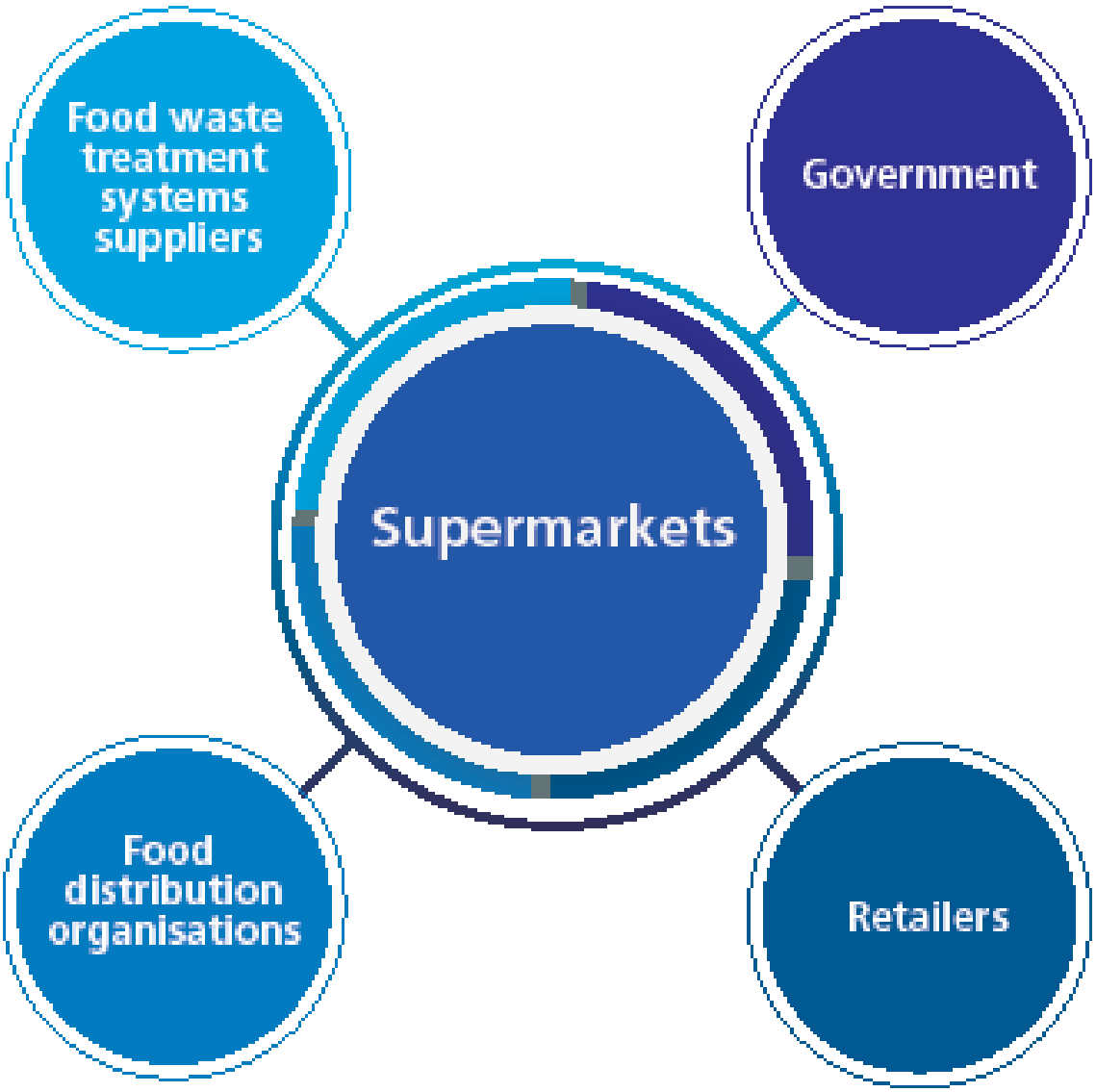


Figure 10: Supermarket operators can collaborate with various organizations to reduce food waste

FOOD RETAILERS

In managing their stocks, apart from their suppliers, supermarket operators can work with other retailers in achieving food waste reduction. Supermarket operators usually have protocols regarding the "display until" of products or products close to expiring. Unsold food that has passed their "display until" date will be disposed of even if they are still suitable for consumption. It is a common practice for supermarket operators to return products past their "display until" date to their suppliers.

In these cases, supermarket operators can look to collaborate with food retailers to better manage their products. For instance, supermarket operators can sell slightly blemished food or overly ripe food to restaurants at a competitive rate. Slightly blemished fruits may be hard for supermarket operators to sell but can be easily used by restaurants. In addition, food products that are nearing their expiry dates could be passed to food retail establishments (e.g. restaurants) where they are more likely to be used. Supermarket operators also stand to gain as it helps recuperate some capital as compared to disposing the food and wasting them. Alternatively, products near their expiry dates can be used to prepare meals for staff.

CHAPTER III: REDISTRIBUTE

FOOD DISTRIBUTION ORGANISATIONS

Apart from overstocked products, supermarket operators may sometimes also receive unused goods from food retailers a few months before they expire. Passing their display until dates or having slight blemishes might result in the disposal of these edible food items. Hence, supermarket operators can look to partner food distribution organisations to reduce food waste effectively by donating the excess food products to the needy. Some supermarket operators in Singapore are already donating to these food distribution organisations on a daily basis. Examples of food distribution organisations are listed below:

Food distribution organisations	Examples of acceptable types of food	Contact
Food Bank	Canned food, discontinued food types, mislabelled foods	Tel: 6831 5395 Website: foodbank.sg Email: enquiries@foodbank.sg
Food from the Heart	Bread, groceries	Tel: 6280 4483 Website: foodheart.org Email: info@foodheart.org
Fei Yue Community Services	Canned food and non-perishables items	Tel: 6563 1106 Website: www.fycs.org Email: admin@fycs.org
Willing Hearts	Groceries, non-perishable items	Tel: 6476 5822 Website: www.willinghearts.org.sg Email: willingheartsingapore@gmail.com

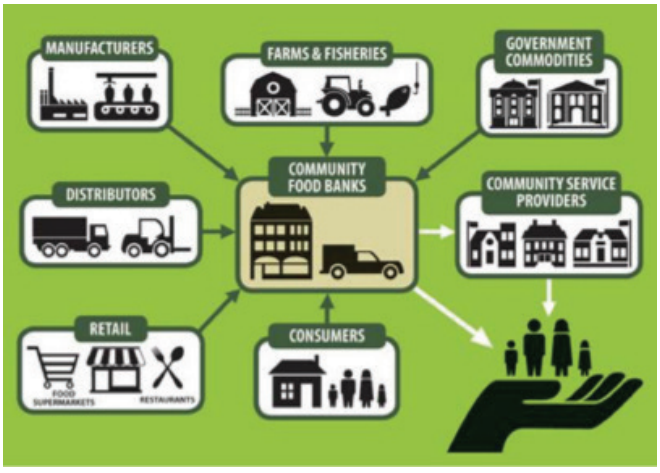


Figure 11: Food services are an important source for food banks

Case Study - NTUC FairPrice

In 2015, NTUC FairPrice started on a long-term partnership with Food from the Heart (FFTH) to increase the amount of food product donated. NTUC FairPrice now donates $20,000 worth of unsold but still safe for consumption canned food and groceries each month from its 138 stores island wide to FFTH.

For more information relating to safety guidelines for food donations, please refer to the Singapore Food Agency's webpage (https://www.sfa.gov.sg/docs/default-source/tools-and-resources/guidelines-for-food-donation.pdf.)

CHAPTER IV: RECYCLE

FOOD WASTE TREATMENT SYSTEM SUPPLIERS

While supermarket operators try to reduce food waste as much as possible, some waste is inevitable. There are times when food items cannot be donated for human consumption. In such cases, supermarket operators can consider recycling the food waste instead.

Supermarket operators may consider installing on-site food waste treatment systems to manage food waste. These systems convert food waste to non-potable water or compost/fertilizers, thereby helping supermarket operators cut down on disposal costs.

A list of companies that provide on-site food waste treatment systems is included in the table below. More information about the individual systems can be found in Annex 2.

On-site food waste treatment system suppliers	Contact
Biomax Green Pte Ltd	Mr Jeffrey Yap Tel: 6274 8606 Website: www.biomaxgreen.com Email: jeffrey.yap@biomaxgreen.com or info@biomaxgreen.com
Eco-Wiz (SG) Pte Ltd	Ms Renee Tan Tel: 9112 1291 Website: www.eco-wiz.com Email: renee@eco-wiz.com
Flexi Systems (Singapore) Pte Ltd/ Enerprof Pte Ltd	Mr Owen Yeo Tel: 6468 9008/ 6368 5177 Website: http://enerprof.com.sg/ Email: owen.yeo@enerprof.com.sg
Westcom Solutions Pte Ltd	Ms Jina Chua Email: jina_chua@westcomsolutions.com.sg

Disclaimer: The list of companies and organisations are compiled to provide reference for users to facilitate food waste treatment and recycling. It is a non-exhaustive list of suppliers of on-site food waste treatment systems which operates in Singapore. Users should refer to the NEA Food Waste Management Webpage for the updated contacts of the suppliers.

CONCLUSION

Food waste in Singapore has been increasing consistently over the years and supermarket operators have the potential to reduce food waste along their supply chain and to encourage their customers to reduce food wastage.

Through proper storage and handling of food supplies, supermarket operators can help to minimise unsold food produce and prevent food produce from turning bad easily. Supermarket operators can also help customers to avoid buying too much food by educating consumers and cutting back multi-buy promotions on perishable items. Additionally, innovation during the retail process and closer partnership with the government, suppliers, other retailers, food distribution organisations and food waste treatment system suppliers will help in ensuring that food waste is minimised.

We hope the guide has been helpful in supporting supermarket businesses in formulating a plan to achieve food waste minimisation goals. With a better understanding of the areas to be focused on in reducing food waste, supermarket operators could share their knowledge, reach out and engage their stakeholders, especially consumers, to achieve greater success in reducing the amount of food waste disposed of in Singapore.

CHECKLIST

1. PLANNING

- Conduct waste audit
- Assess the cost of food waste

2. PURCHASING

- Improve inventory management

3. STORAGE

- Inspect all incoming goods to ensure quality
- Label the food received with expiry dates
- Control storage conditions
- Adopt first-in-first-out (FIFO) and first-expire-first-out (FEFO) policies

4. HANDLING

- Adopt cold chain management

5. SALES AND SERVICE

- Consider demand-based production
- Consider display and sale of food products
- Encourage customers to reduce wastage

6. STAFF TRAINING

- Ensure that staff are knowledgeable about food handling
- Ensure high levels of hygiene standards
- Keep staff motivated by setting waste reduction goals

PARTNERSHIP

- Explore possible cooperation with the government through funding
- Improve communication with industry partners (suppliers, retailers)
- Explore ways of working with food distribution organisations to donate surplus and edible food safely
- Explore food waste recycling options

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6. P. X. Qiang, "Supermarket chain NTUC FairPrice produced less food waste last year," 22 April 2016. [Online]. Available: http://www.straitstimes.com/singapore/supermarket-chain-ntuc-fairprice-produced-less-food-waste-last-year.
7. Winnow Solutions, [Online]. Available: http://www.winnowsolutions.com/.

Food waste audit template

Audit Period (week/month):													
Location/ Area:													
Date	Time	Recorded by	Description of food waste (e.g. vegetable trimmings, chicken/ fish bones)	Amount (kg)	Sources of food waste (to tick)					Amount of food redistributed (kg)	Amount of food waste treated/ recycled (kg)	Amount of food waste disposed of (kg)
					Preparation waste	Over-production	Spoilt / Expired products	Plate waste	Others, please state			
			TOTAL						TOTAL			
Recipient(s) of redistributed food: Treatment/recycling of food waste (e.g. on-site food waste treatment to convert to compost, recycling into animal feed):													

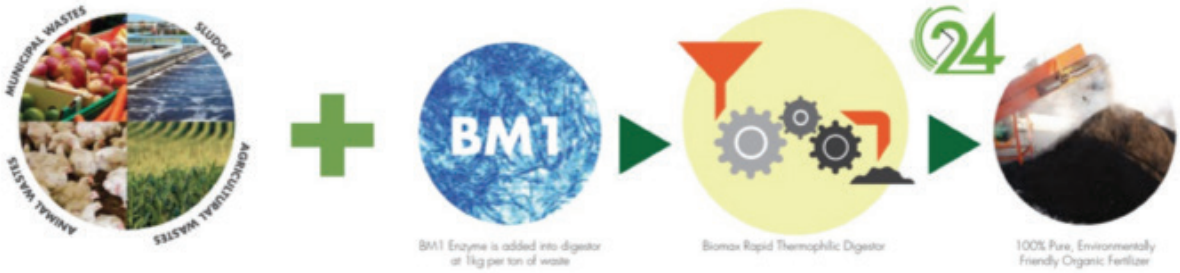
ANNEX 2

Biomax Technologies Pte Ltd

Biomax Technologies Pte Ltd, a Singapore-based green high technology company, provides an environmentally-friendly and sustainable solution to recycle organic waste (such as food, horticulture, paper and other forms of organic waste) into organic fertiliser within 24 hours.

The output produced is odourless and pathogen free and can be directly applied to plants, rejuvenating the soil. In addition, the technology is fast and compact and the process does not create any environmentally harmful substances or any residual waste as all the organic matter will be converted into organic fertiliser.

The following diagram describes the Biomax Technology system flow.



Eco-Wiz Group Pte Ltd

The Eco-Wiz ecoDigester system provides an on-site food waste management solution by converting food waste into an end product that can be recycled on site. Digestion occurs under a controlled internal environment with proprietary formulated microbial bacteria which decomposes food waste into greywater within a short period of 24 hours.

The system may also include a customized sludge management system which separates the sludge from the water. Through further filtration, the water can be recycled into the ecoDigester system or reused for non-potable uses such as washing floors and watering plants.

Depending on the type of food waste, 3 to 5% of organic solids will also be produced as by-products of the system. The organic solids may be disposed of as general waste or reused as compost if they have been processed according to composting guides and requirements.

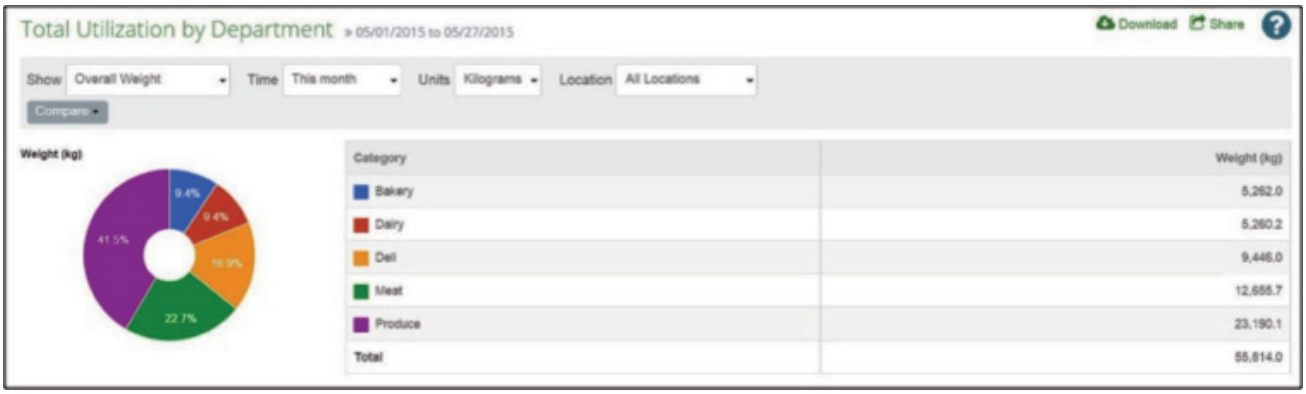
The ecoDigester system has been adopted in more than 20 developments, which includes mixed development malls, schools, hotels, supermarket chains, hawker centre etc. Some examples are JEM, Changi Airport, Amara Singapore and 100AM, Mandarin Orchard, Singapore Polytechnic, Resorts World Sentosa, several NTUC FairPrice outlets and Ang Mo Kio Blk 628 Market.
The ecoComposter system is an alternative solution offered by Eco-Wiz for managing food waste on-site. It is capable of generating 20% to 30% of compost with each throw of food waste, with the remaining food waste being digested by the microbes in the system. The compost can be directly applied to plants in small amount as a soil conditioner or further processed into plant fertiliser. The ecoComposter system has been adopted at premises such as Swissotel the Stamford, Pioneer Junior College and Koufu at Singapore Polytechnic.

Flexi Systems (Singapore) Pte Ltd/ Enerprof Pte Ltd (BioHiTech digester)

Manufactured in USA, the BioHiTech Eco-safe food waste digester converts food waste to non-potable water via aerobic digestion by microorganisms and their enzymes. The enzymes break down complex compounds into smaller compounds for the microorganisms to digest. Working in tandem, the conversion of food waste into greywater occurs within 24 hours and the resulting effluent is passed through a locally designed wastewater treatment system for the end product to be suitable for reuse or for safe discharge into sewers.

The food waste digester comes equipped with in-built load cells and can be connected to a Cloud-based portal, which allows users to quantify the amount and record the origin of food waste deposited into the digester. Basic data is stored and accessed on the control panel while advanced data analytics can be obtained via the Cloud-based portal. Users can select the Cloud-based portal option to compare waste data across all their sites via a single portal. The portal provides real-time notifications of the system's performance, leading to faster service response time.





Winnows Solutions

Developed in the UK, Winnow Solutions' smart food meter tracking system allows users to measure food waste in their kitchens and from the customers' plates. The system is able to track the amount and types of food discarded. With pre-programming from the user, the system is also able to indicate the associated monetary value of the food that is disposed of. Through tracking the volume and value of food waste disposed, the system aims to raise awareness of food wastage and spur users to adopt changes to reduce their food waste generation.

The smart meter system incorporates an electronic scale and an accompanying tablet app which is linked to a computer. The tablet enables staff to log food that is thrown away via tapping on customisable pre-defined categories. Thereafter, the food waste date is uploaded to Winnow's cloud platform to be aggregated and analysed. The resulting analysis can be sent to chefs via daily reports detailing the top areas of waste by value.

The obtained information provides users the insight needed to make adjustments to their operations. For instance, restaurants can adjust their purchase of ingredients accordingly to avoid over-purchasing, which could help save up to 50-60% of ingredient costs, adding up to significant savings for the user.