

**SINGAPORE STANDARD**

**Code of practice for food waste management  
for food retail, wholesale and distribution  
establishments**



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*Association of Catering Professionals Singapore*  
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*Sodexo Services Asia Pte Ltd*  
*The Food Bank Singapore Ltd*  
*Waste Management and Recycling Association of Singapore*

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## **Foreword**

This Singapore Standard was prepared by the Working Group on Food Waste Management for Food Retail, Wholesale and Distribution Establishments appointed by the Technical Committee on Food Services under the direction of the Food Standards Committee.

This standard is developed to help reduce food waste. The more food waste is being produced, the more there is to dispose of by recycling and re-using, burial (landfill) or burning (incineration). For land scarce Singapore, this poses a challenge to find land for landfills and incineration plants. Therefore, there is a need to manage food waste holistically.

This standard is intended to improve food retailing, wholesaling and distributing practices and competitiveness through a more efficient use of food resources in preparation/planning processes. This includes food waste reduction management that takes into consideration overproduction, expiration, spoilage, overcooked items, contaminated items, etc.

With food waste reduction management in place, it increases Singapore's resistance to price fluctuations in imported raw agricultural materials and reinforces the concept of sustainable production. Reduction in waste also helps food retail, wholesale and distribution establishments to save money on commodities, labour, energy and disposal costs.

In preparing this standard, reference was made to the following publications:

1. Food Loss and Waste Accounting and Reporting Standard Version 1.0, Food Loss + Waste Protocol, <http://www.wbcsd.org/contentwbc/download/1003/12937>
2. Global food losses and food waste – Extent, causes and prevention (2011), Rome, Food and Agriculture Organization of the United Nations (FAO), <http://www.fao.org/docrep/014/mb060e/mb060e.pdf>
3. Information for Food Handlers, National Environment Agency, <https://www.nea.gov.sg/our-services/food-hygiene/information-for-food-handlers>
4. SAVE FOOD: Global Initiative on Food Loss and Waste Reduction, Definitional framework of food loss (27 February 2014), Rome, Food and Agriculture Organization of the United Nations (FAO), <http://www.fao.org/3/a-at144e.pdf>
5. Sustainable Management of Food: Food Recovery Hierarchy, United States Environmental Protection Agency, <https://www.epa.gov/sustainable-management-food/food-recovery-hierarchy>
6. Technical Paper on Post-Harvest Losses and Strategies to Reduce Them (January 2014), Action Contre la Faim (ACF), ACF International, [https://www.actioncontrelafaim.org/wp-content/uploads/2018/01/technical\\_paper\\_phl\\_.pdf](https://www.actioncontrelafaim.org/wp-content/uploads/2018/01/technical_paper_phl_.pdf)

Acknowledgement is made for the use of information from the above publications.

This standard is expected to be used by food retail, wholesale and distribution establishments. Food retail establishments include restaurants, cafes, coffee shops, food courts, hawker stalls, caterers, takeaway kiosks, supermarkets, and other F&B establishments.



Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

**NOTE**

1. *Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions.*
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# Code of practice for food waste management for food retail, wholesale and distribution establishments

## 1 Scope and objective

### 1.1 Scope

This Singapore Standard gives the recommended best practices for food retail, wholesale and distribution establishments in developing their food waste management plans. It sets out recommendations and guidelines for proper food waste management at various stages in the food value chain, from the receiving of materials, to preparation, storage, packing, transportation/distribution, sales and disposal of food loss and waste (FLW) (see Figure 1).

The deletion or swapping of stages or processes is only permitted if it does not significantly change the overall conclusions of the study. Any decision to omit or swap stages or processes should be clearly stated and the reasons and implications for their omission or swapping should be explained.

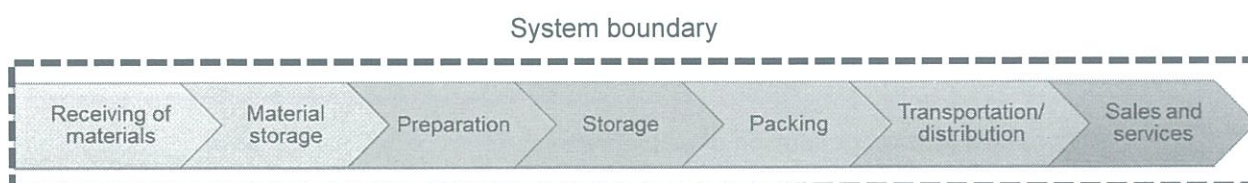


Figure 1 – Example of the food value chain

### 1.2 Objective

The objective of this Singapore Standard is to help food retail, wholesale and distribution establishments develop a food waste management plan with the goal of minimising food waste generated and move towards a zero-waste nation, as set out in the Sustainable Singapore Blueprint 2015.

## 2 Normative references

There are no normative references cited in this Singapore Standard.

## 3 Terms and definitions

For the purpose of this Singapore Standard, the following terms and definitions apply.

### 3.1 Animal feed

Reduces FLW by substituting part of the food for livestock with processed FLW.

### 3.2 Avoidable FLW

FLW that can be prevented. Typical causes include process inefficiency, poor stock management, overproduction, loss or human neglect. It can be managed with current technologies and/or changes in operations (i.e. within human control).

### **3.3 Composting/aerobic digestion**

A process to reduce FLW by decomposing it into compost/greywater.

### **3.4 Edible and avoidable FLW**

Food or drinks that are meant for human consumption, including materials involved in the production of food, as well as food that has passed its sell-by date and has become unsafe to consume. The following substances are not included: tobacco, pharmaceutical products, and food supply chain agents (e.g. water used for cleaning/cooking purposes).

### **3.5 Edible and unavoidable FLW**

FLW caused by technical, design, raw material quality or process constraint (e.g. purged soy sauce from pipe after each production run)

### **3.6 Energy extraction**

A process to reduce FLW by converting it into intermediate products then burning the intermediate products to produce energy:

- Anaerobic digestion: generation of biofuels/biogas
- Transesterification: converting used cooking oil into biodiesel

### **3.7 Equipment/process design change**

The possibility of customising, upgrading, developing or innovating tools, equipment, machines, technologies and/or modifying production processes such that waste generated from production is reduced.

### **3.8 Food handlers**

Any person who handles and prepares food and beverage in licensed food establishments.

### **3.9 Food loss**

The decrease in the quantity or quality of food. It usually happens in the postharvest and food processing stages in the food value chain.

### **3.10 Food loss and waste (FLW)**

Encompasses both food loss and food waste. Food packaging and water are not considered in this Standard.

### **3.11 Food redistribution**

The reduction of FLW by giving away excess food that is ready for sale and mainly caused by overproduction.



### **3.12 Food retail establishments**

Restaurants, caterers, coffee shops, food courts, cafes, takeaway kiosks, supermarkets, hawker stalls and other food and beverage (F&B) establishments where food is sold.

### **3.13 Food waste**

Food meant for human consumption, including food that is damaged or expired. Typical causes include sudden changes in demand, poor inventory management or substandard practices during the food production stage in the food value chain.

### **3.14 Incineration**

The reduction of FLW by burning it in waste-to-energy (WTE) plants. It is the least preferred option because food quality is retained the least here.

### **3.15 Industrial application**

The reduction of FLW by converting it into materials for other industrial processes (e.g. shredding into construction filler materials, converting into bioplastics/biopolymers, rendering fat/oil into soaps or cosmetics, etc.).

### **3.16 Inedible and unavoidable FLW**

FLW generated as a by-product of the main materials (ingredients) being consumed in a process (e.g. eggs shells from the eggs used to bake cakes). Food in this category of FLW is never intended for human consumption.

### **3.17 Material storage / Storage**

The act of keeping goods when not in use. Typical causes of food waste at this stage are the intrusion of pests, leakages, tainting, natural dehydration of food and expired food/overproduction due to poor inventory management.

### **3.18 Packing**

Materials used to wrap or protect goods, and includes weighing, labelling, sealing. Typical causes of food waste at this stage are spoilt packaging resulting in tainting, drainage or pest invasion.

### **3.19 Preparation**

The process of handling food and beverage that are meant for sale, such as the washing and cutting of raw fruits, vegetables and meat; the processing of ready to eat food (in raw or cooked form); preparation of sauces, mixing of beverages, etc.

### **3.20 Process improvement**

The reduction of FLW by improving process/production efficiency, stock/inventory management, loss or human neglect.



### 3.21 Sales and service

The serving and displaying of food and the management of returned/unsold/unconsumed/recalled food products. This includes food handling during the sale stage (e.g. scooping of food items into takeaway boxes, adding garnish to dishes, etc.).

### 3.22 Transportation/distribution

The movement of goods from a source to the customer or business user. Typical causes of food waste at this stage are inappropriate handling and transportation, which results in spoilage and loss.

### 3.23 Unavoidable FLW

Parts of food products in a food production chain that are unfit for human consumption and is not within human control.

### 3.24 Wholesale and distribution establishments

Person or entity that buys and stores quantities of goods from producers or vendors for resale or distribution.

## 4 Collection of FLW data

### 4.1 Process and FLW generation mapping

For each stage of the food value chain, it is helpful to visualise the processes and their inter-relationships using a process flow diagram (see Figure 2). Each of these processes should be initially described to define:

- where the unit process begins, in terms of the receipt of materials or waste generation;
- the nature of the transformations and operations that occur as part of the unit process; and
- where the unit process ends, in terms of the destination of the intermediate or final products.

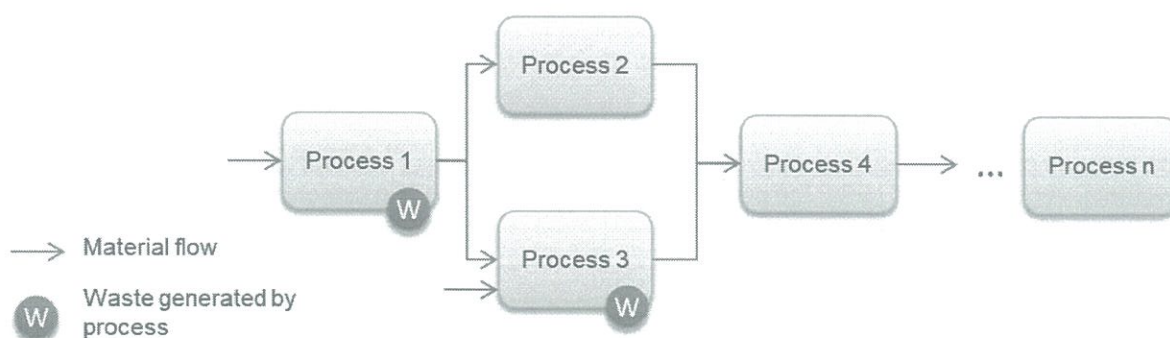


Figure 2 – Example of a process flow diagram

## **4.2 Data collection**

One of these methods shall be used to collect data on food waste:

- Direct weighing (most preferred) – use a measuring device to determine the weight of food waste.
- Mass balance calculation – do a simple mass balance calculation from the recipe to determine the weight of the food waste.
- Counting – assess the number of items that make up the food waste and use the result to determine the weight.
- Assessing volume – assess the physical space occupied by food waste and use the approximate density to determine the weight.

Data collection shall take into account the product mix (e.g. in high-mix low-volume environments). Data collected shall be consistent and representative of FLW generation pattern and/or fluctuation in the production over the reporting period.

The time horizon for each data collection period shall be 1 calendar year (i.e. for a duration of 12 months).

Data collection shall be conducted at least once a month.

Since data collection may span several reporting locations, measures should be taken to ensure consistency in the data collected. These measures should include the following:

- Draw process flow diagrams that outline all the processes for each stage covered in the scope;
- Describe briefly each process with respect to factors influencing the waste;
- Specify the units of measurement used;
- Indicate the methods used to collect the data;
- Record the date and time data is collected;
- Document clearly any special cases, irregularities or other items associated with the data provided; and
- Specify if data was collected for pre-compacted FLW or compacted FLW and make sure subsequent data collections are consistent with this.

A sample template for data collection is found in Table 1, which is designed to meet the minimum requirements for a useful study.



Table 1 – Sample template for data collection

							Reporting month: XXX	Reporting year: YYYY
Food value chain stage	Process description	Name of FLW (material)	Waste quantity for the month	Unit	Data collection method	Comment / assumption made	Observer and date	Final destination

In the event of data extrapolation, only normalised data is used in extrapolation.

Normalisation is mandatory to provide a comparable measurement of efforts in waste management. The selection of a normalisation unit shall take into account the following measures:

- The normalisation unit shall be representative of the activity/output and be able to measure efficiency and/or waste generation intensity.
- The normalisation unit shall be consistently used throughout the period of study.

Possible examples of a normalisation unit include and not limited to the following:

- Quantity/cost of input materials;
- Quantity/cost of output products;
- Total area of retail space and/or distribution centres;
- Number of food handlers per shift;
- Number of visitors; and
- Number of meals served.

Repeat data collection each month during the reporting period. When data collection is completed, the next step is to identify the hotspots of waste generation. See Annex A for examples.

## 5 Hotspot analysis of FLW

### 5.1 FLW quantification

FLW quantification shall be done to aggregate the quantities of FLW generated across all processes within the system boundary (see Figure 1) for the reporting period. The quantity of FLW should be expressed consistently throughout the entire data collection period.

The quantity of FLW generated at each process should be aggregated according to the processes (see Figure 3).

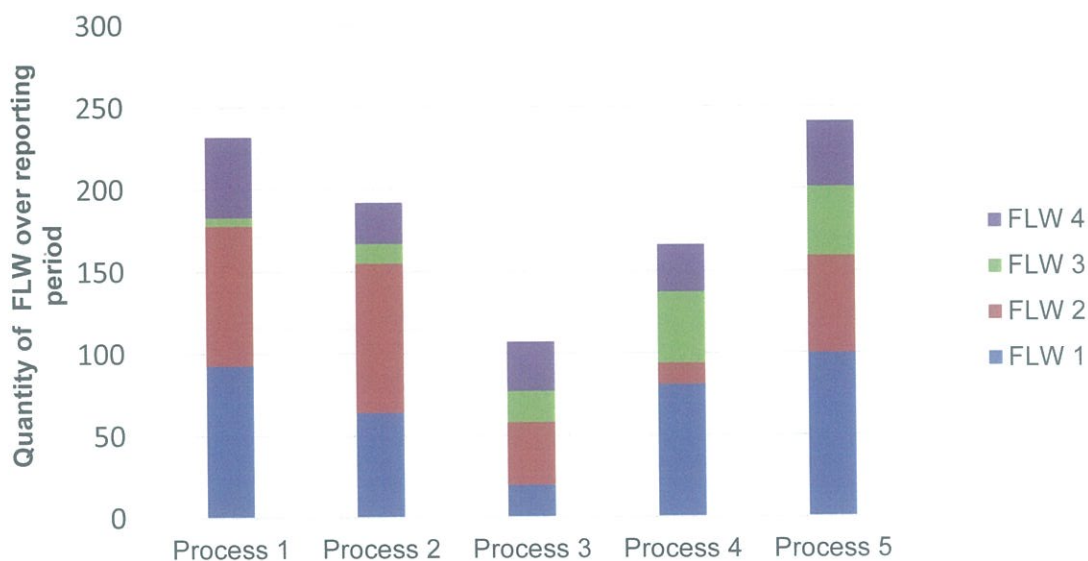


Figure 3 – Example of data quantification

## 5.2 FLW hotspot identification

The identification of FLW hotspots should be conducted to determine the processes where the largest quantities of FLW are generated. The goal is to focus FLW management efforts on the processes that generate the most significant quantities of FLW.

FLW hotspots may be identified for the targeted FLW using methods such as the 80/20 rule (see Figure 4) to identify the top processes that contribute to 80% of the total FLW generated. See Annex B for examples.

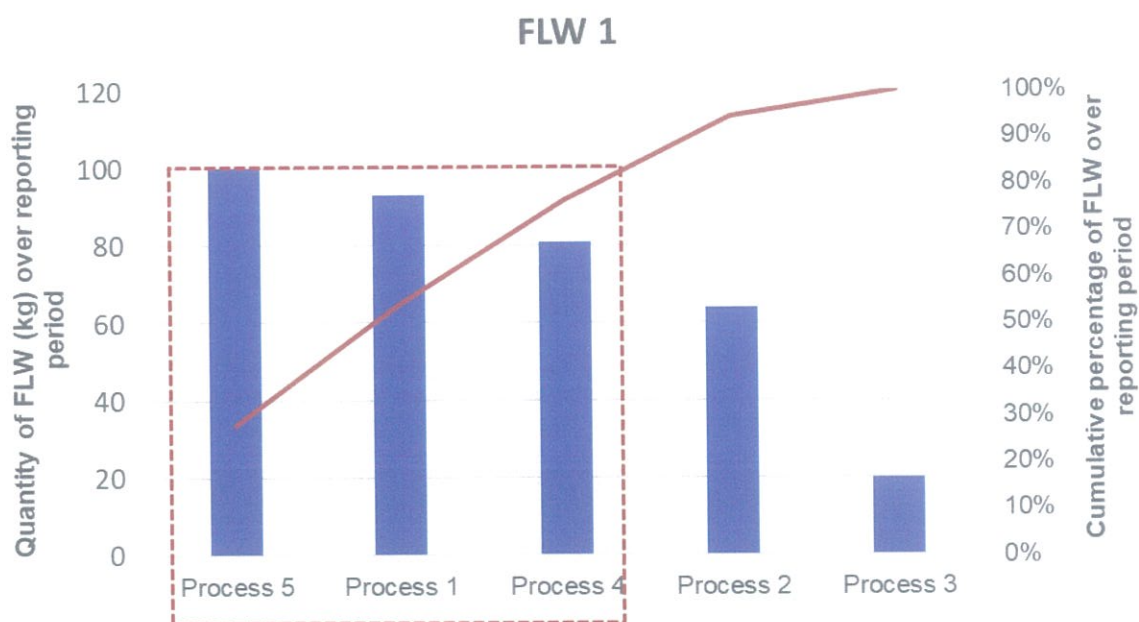


Figure 4 – Example of hotspot identification using the 80/20 rule



## 6 Planning of FLW reduction and diversion

### 6.1 FLW classification

The goal of FLW classification is to facilitate the planning of FLW management initiatives in terms of FLW reduction and diversion.

The FLW generated shall be classified with respect to their causes (see Figure 5):

- edible and avoidable;
- edible and unavoidable; or
- inedible and unavoidable.

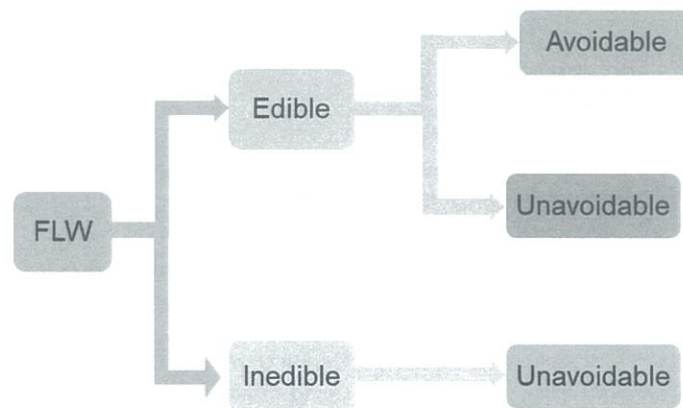


Figure 5 – Classification of FLW

### 6.2 FLW reduction at source

There are two approaches to FLW reduction at source, as follows (see Figure 6):

- Process improvement – usually requires only standard operating procedures (SOP) changes or implementation of new training programs.
- Equipment/process design change – potentially requires monetary investment in new equipment, development and installation of new waste-to-resource technologies.

Typically, process improvement requires less investment in both financing and effort as compared to equipment/process design change. Thus, opportunities for process improvement should be explored before equipment/process design change.

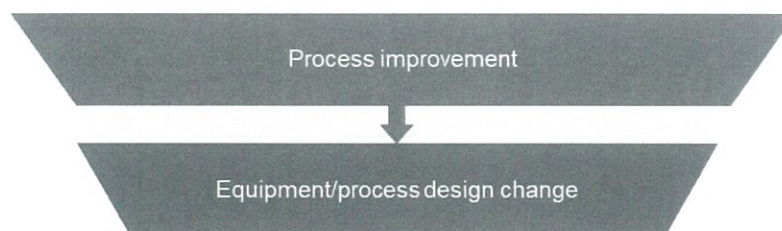


Figure 6 – Measures for reduction at source

### 6.3 FLW diversion

The hierarchy of FLW diversion (see Figure 7) is based on the retention of value in terms of food quality. This means the higher the rank of the hierarchy, the better the retention of food quality. For instance, human consumption has a higher value compared to animal consumption, which in turn has a higher value than non-food applications. Therefore, a higher rank in the hierarchy is more preferable as a means of reducing FLW that goes into incineration.

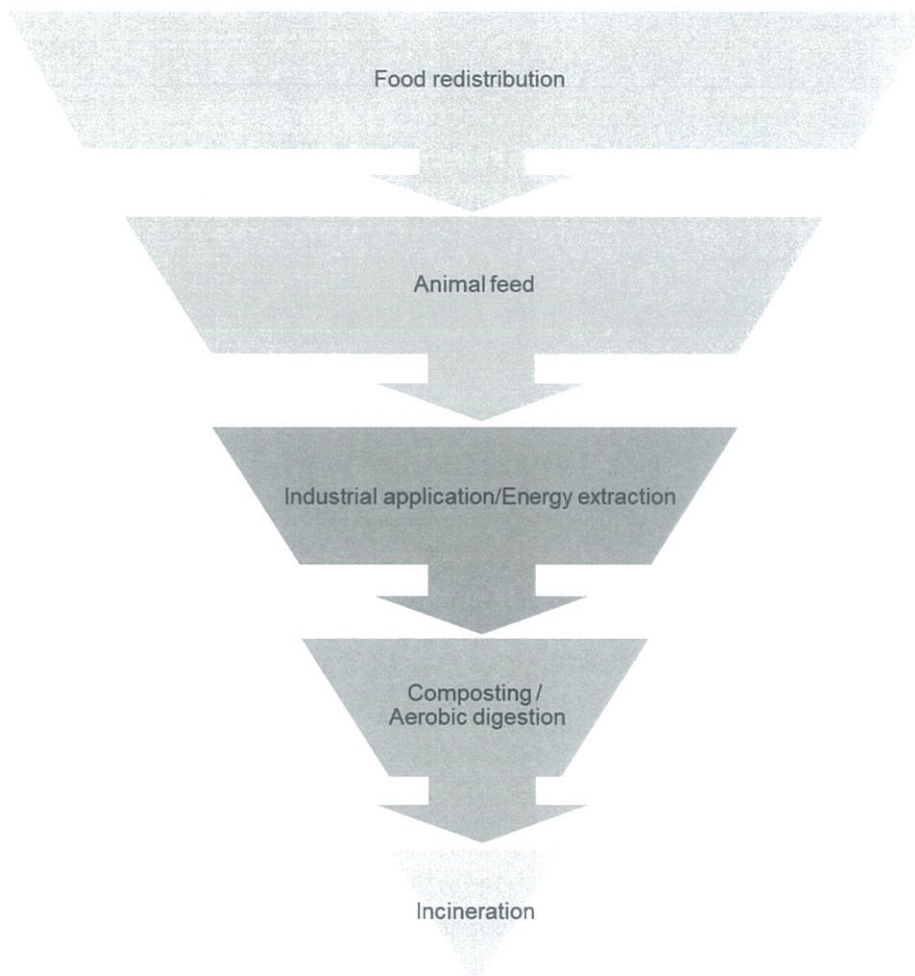


Figure 7 – Hierarchy of FLW diversion

### 6.4 FLW reduction and diversion guide

For FLW reduction at source, process improvement should be considered as a FLW reduction option first if FLW is edible and avoidable. If FLW is edible and unavoidable, equipment/process design change should be considered.

After options for reduction at source have been exhausted, remaining FLW that could not be reduced at source anymore will then need to be diverted away from incineration.

Following the hierarchy of FLW diversion, if FLW is edible and avoidable, food redistribution should be considered first as a FLW diversion option. If FLW is edible and unavoidable, FLW diversion options should be considered starting from animal feed, which is the most preferred FLW diversion option, and ending at incineration, which is the least preferred FLW diversion option.

The purpose of the FLW reduction and diversion guide (see Figure 8) is to help companies to develop a FLW management plan to reduce FLW generation at source and divert generated FLW away from incineration.

To use the FLW reduction and diversion guide, FLW hotspots shall first be classified according to:

- edible and avoidable;
- edible and unavoidable; or
- inedible and unavoidable.

To facilitate this classification and as best practice, root cause analysis methods such as the Five Whys (5 Ws) or the fishbone/Ishikawa diagram should be used. See Annex C for examples.

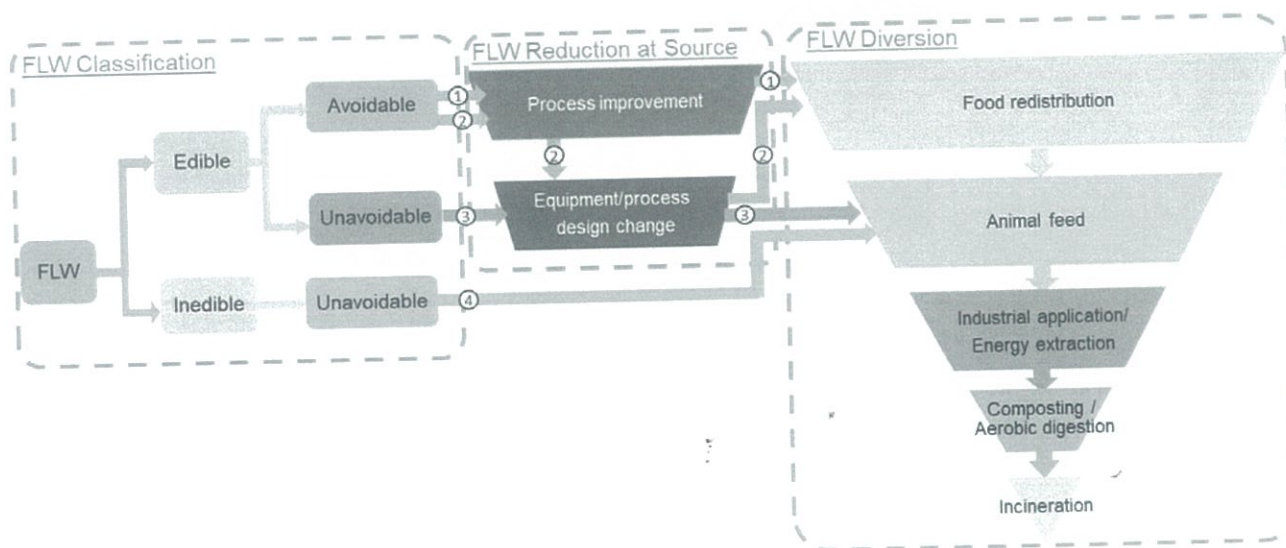


Figure 8 – FLW reduction and diversion guide

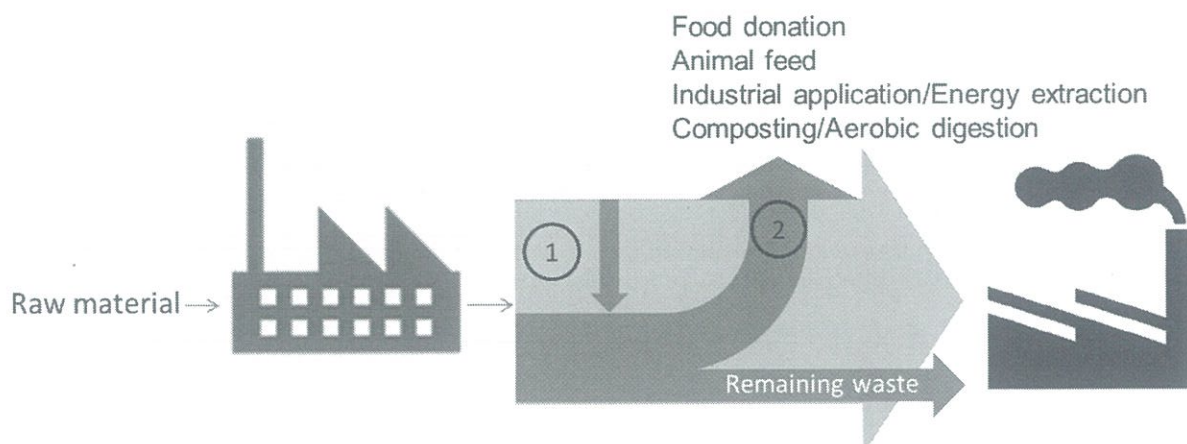
## 7 Quantification of FLW reduction and diversion efforts

### 7.1 General

The first aim is to reduce the absolute amount of FLW. This should be done through process improvement and equipment/process design change.

The second aim (with the prioritised objective being reduction at source) is to divert FLW away from incineration. This should be done through the hierarchy of FLW diversion (see Figure 9). See Annex D for examples.





- (1) Reduction of FLW is measured by looking at the absolute reduction of waste that was generated at source.
- (2) Reduction of FLW is measured by looking at the diversion of FLW away from incineration.

**Figure 9 – Concept diagram for quantification of FLW reduction and diversion efforts**

## 7.2 FLW reduction at source

The purpose of 7.1 (1) is to quantify the results of FLW reduction efforts taken in process improvement and equipment/process design change. A sample template for quantification of efforts for reduction at source is found in Table 2.

Normalisation is mandatory in order to provide a comparable measurement of reduction efforts. When doing normalisation, the following measures shall be taken to ensure the accuracy of results:

- The choice of normalisation units is entirely up to the companies as long as they are able to accurately quantify the reduction of FLW (e.g. companies may choose to normalise according to total production output or raw material input).
- The normalisation unit shall be consistent throughout the period of study (e.g. if kg/output unit is used, make sure it is used throughout the entire period of study).

Normalisation is done by taking the quantity of the waste generated from each process and dividing it by the unit the user has chosen:

$$\text{Normalised waste output} = \frac{\text{waste output from a specific process for that specific year}}{\text{normalisation unit}}$$

**Table 2 – Sample template for quantification of efforts for reduction at source**

Total quantity in year [unit]						
S/N	Food value chain	Process description	FLW name	Year 1 (waste generation /normalisation unit)	Year 2 (waste generation/normalisation unit)	Increase/Decrease in FLW generated at source
Total:						



### 7.3 FLW diversion from incineration

The purpose of 7.1 (2) is to quantify the efforts taken to divert generated FLW away from incineration. A sample template for FLW diversion tracking is found in Table 3.

$$\text{Diversion factor} = \frac{\text{FLW diverted away from incineration}}{\text{FLW produced for the year}} \times 100\%$$

If there has been an increase in the diversion factor over the years, it indicates that there has been an improvement in the diversion of waste away from incineration.

**Table 3 – Sample template for FLW diversion tracking**

Total quantity in year [unit]					
S/N	Food value chain	Process description	FLW name	Year 1 (waste diverted)/ Kg	Year 2 (waste diverted)/ kg
Total waste diverted/ kg					
Total waste produced/ kg					
Diversion factor (total waste diverted/ total waste produced) %					

## 8 Reporting of FLW

The report shall include all the filled in data sheets from data collection steps. The report should include:

- a clear explanation of any assumptions; and
- a clear justification for any optional steps.

Figure 10 depicts a summary flowchart of the entire standard.

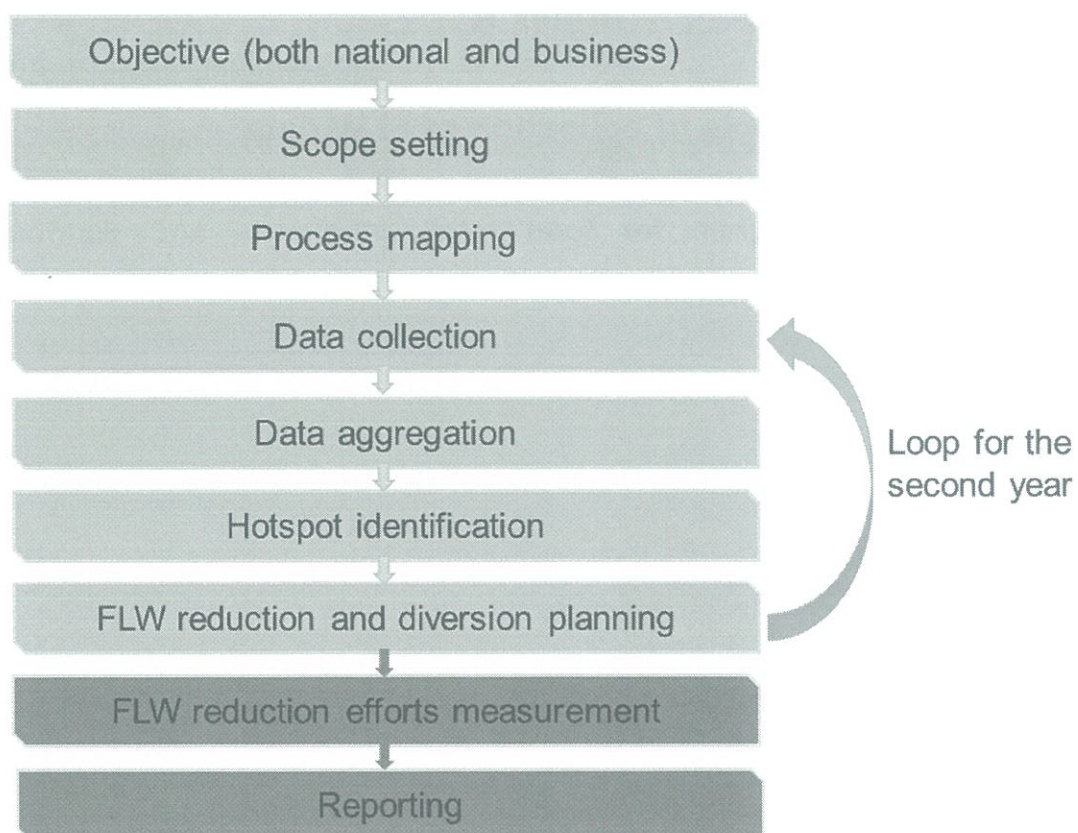


Figure 10 – Summary flowchart for FLW management standard

## Annex A (informative)

### Example of collection of FLW data

#### A.1 Process flow diagram for food retail, wholesale and distribution establishments

Figure A.1 shows the process map for food retail, wholesale and distribution establishments.

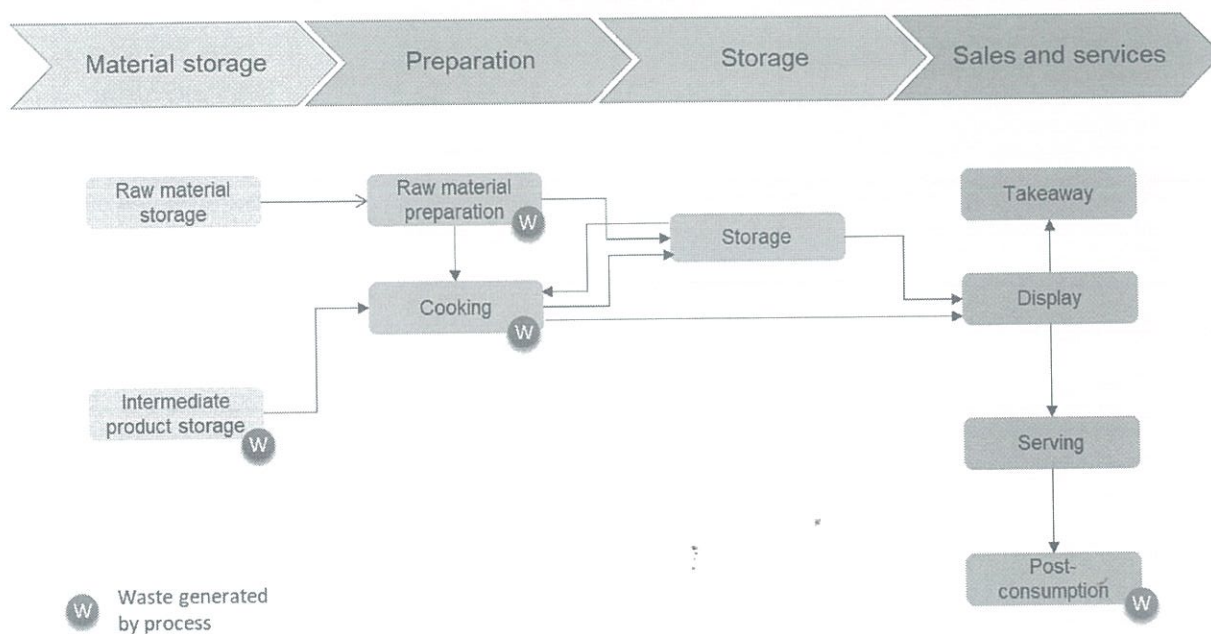


Figure A.1 – Process map for food retail, wholesale and distribution establishments



## A.2 Best practice of daily data collection for food retail, wholesale and distribution establishments

Figure A.2 shows an example of data collection according to best practice for food retail, wholesale and distribution establishments.

Reporting month: November  
Reporting year: 2017

Food value chain stage	Process description	Name of FLW (material)	Waste quantity for the month	Data collection method	Comment / Assumption made	Observer and date	Final destination
Material storage	Intermediate product storage – pre-cut vegetables	Excess pre-cut vegetables deemed unfit for consumption after 1 day	62kg	Direct weighing	Measurement was done everyday		Incineration
Preparation	Seasoning and cutting	Ugly parts/ugly fresh produce	9.3kg	Direct weighing	Measurement was done everyday		Incineration
Preparation	Cooking of prepared ingredient	Undercook/ Burnt food	108.5kg	Direct weighing	Measurement was done everyday		Incineration
Sales and services	Leftover food post-consumption	Unconsumed food	775kg	Direct weighing	Measurement was done everyday		Incineration

**Figure A.2 – Example of data collection according to best practice for food retail, wholesale and distribution establishments**

### A.3 Example of extrapolated data collection for food retail, wholesale and distribution establishments

Figure A.3 shows an example of data collection using normalisation to extrapolate data for food retail, wholesale and distribution establishments.

Reporting month: November

Reporting year: 2017

Food value chain stage	Process description	Name of FLW (material)	Normalisation unit	Value of normalisation unit [actual quantity for the day]	Quantity of waste [actual quantity for the day]	Normalised waste quantity for the day	Value of normalisation unit [actual quantity for the month]	Waste quantity for the month	Data collection method	Comment / Assumption made	Observer and date	Final destination
Material storage	Intermediate product storage – pre-cut vegetables	Excess pre-cut vegetables deemed unfit for consumption after 1 day	Number of servings served daily	500 servings	2kg	0.004	15500 servings	62kg	Direct weighing	Monthly waste quantity was extrapolated		Incineration
Preparation	Seasoning and cutting	Ugly parts/ugly fresh produce	Number of servings served daily	500 servings	0.3kg	0.0006	15500 servings	9.3kg	Direct weighing	Monthly waste quantity was extrapolated		Incineration

#### (a) Data collection using normalisation to extrapolate data for food retail, wholesale and distribution establishments (1/2)

Reporting month: November

Reporting year: 2017

Food value chain stage	Process description	Name of FLW (material)	Normalisation unit	Value of normalisation unit [actual quantity for the day]	Quantity of waste [actual quantity for the day]	Normalised waste quantity for the day	Value of normalisation unit [actual quantity for the month]	Waste quantity for the month	Data collection method	Comment / Assumption made	Observer and date	Final destination
Preparation	Cooking of prepared ingredient	Undercook/ Burnt food	Number of servings served daily	500 servings	3.5kg	0.007	15500 servings	108.5kg	Direct weighing	Monthly waste quantity was extrapolated		Incineration
Sales and services	Leftover food post-consumption	Unconsumed food	Number of servings served daily	500 servings	25kg	0.05	15500 servings	775kg	Direct weighing	Monthly waste quantity was extrapolated		Incineration

#### (b) Data collection using normalisation to extrapolate data for food retail, wholesale and distribution establishments (2/2)

Figure A.3 – Example of data collection for food retail, wholesale and distribution establishments using normalisation to extrapolate data



## Annex B

(informative)

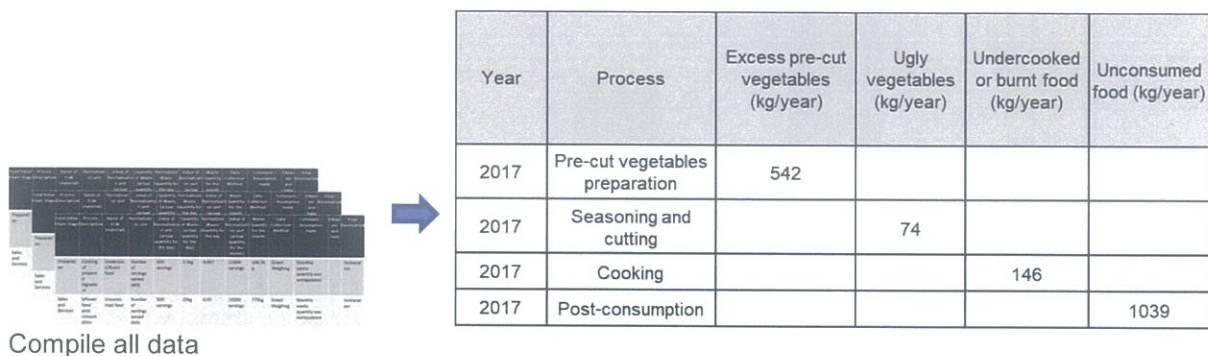
### Example of hotspot analysis of FLW

#### B.1 Example of FLW quantification and hotspot identification for food retail, wholesale and distribution establishments

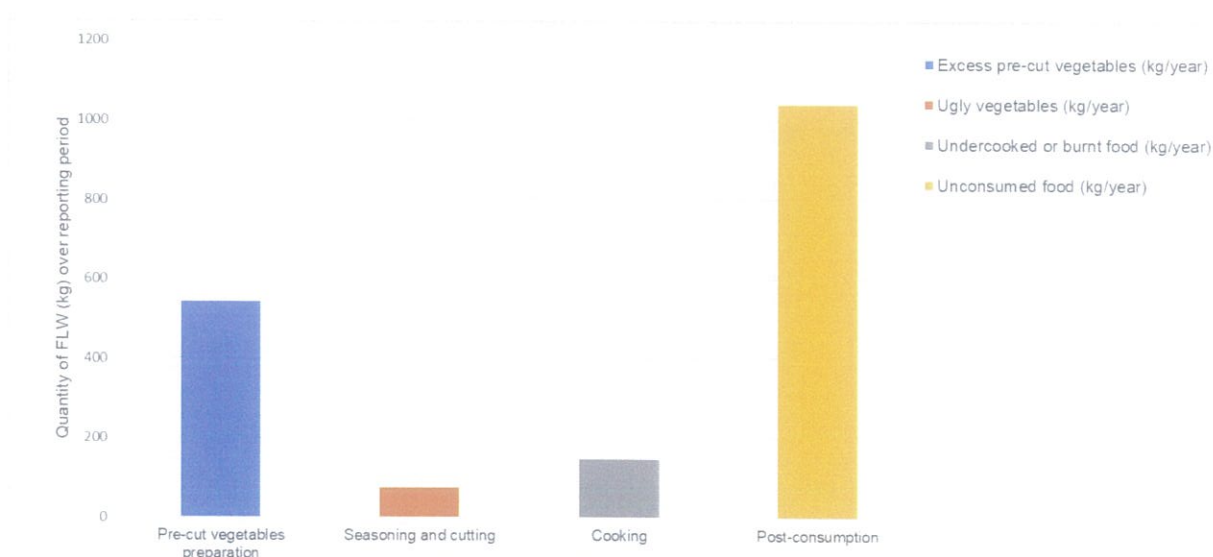
The quantification is as follows:

- Compile the completed data collection for every process and waste type (see Figure B.1).
- Create a chart based on this compilation. This shows the waste quantity.

Figure B.1 and Figure B.2 are examples of data compilation and data quantification for food retail, wholesale and distribution establishments.



**Figure B.1 – Example of data compilation for food retail, wholesale and distribution establishments**

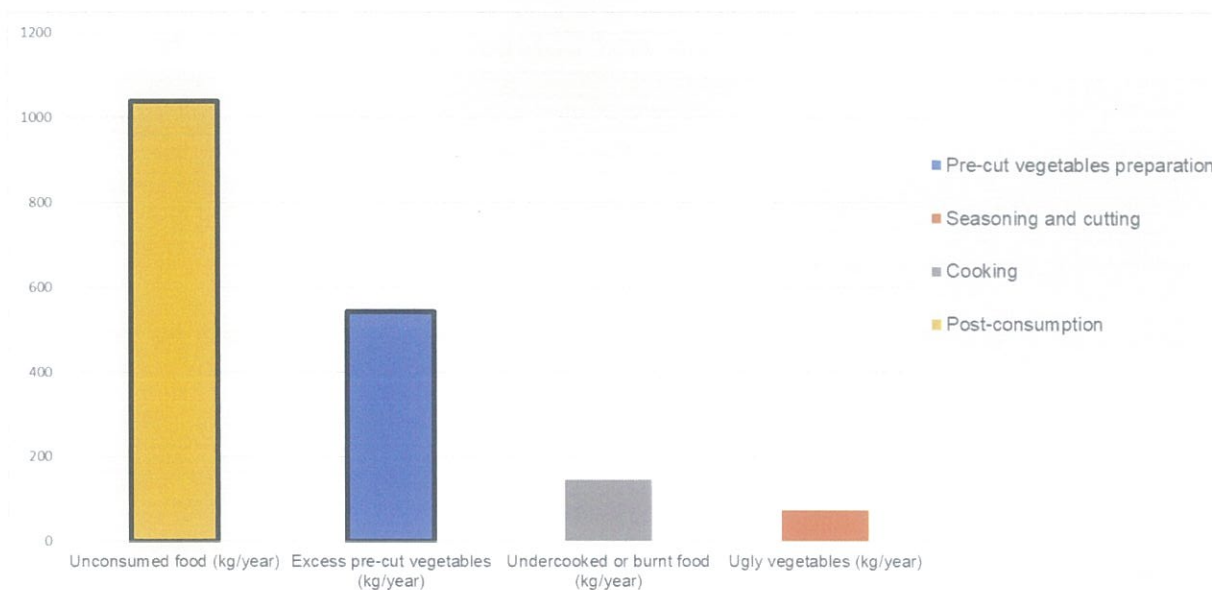


**Figure B.2 – Example of data quantification for food retail, wholesale and distribution establishments**



## B.2 Example of hotspot identification using the 80/20 rule for food retail, wholesale and distribution establishments

Figure B.3 is an example of hotspot identification using the 80/20 rule for food retail, wholesale and distribution establishments.



**Figure B.3 – Example of hotspot identification using the 80/20 rule for food retail, wholesale and distribution establishments**

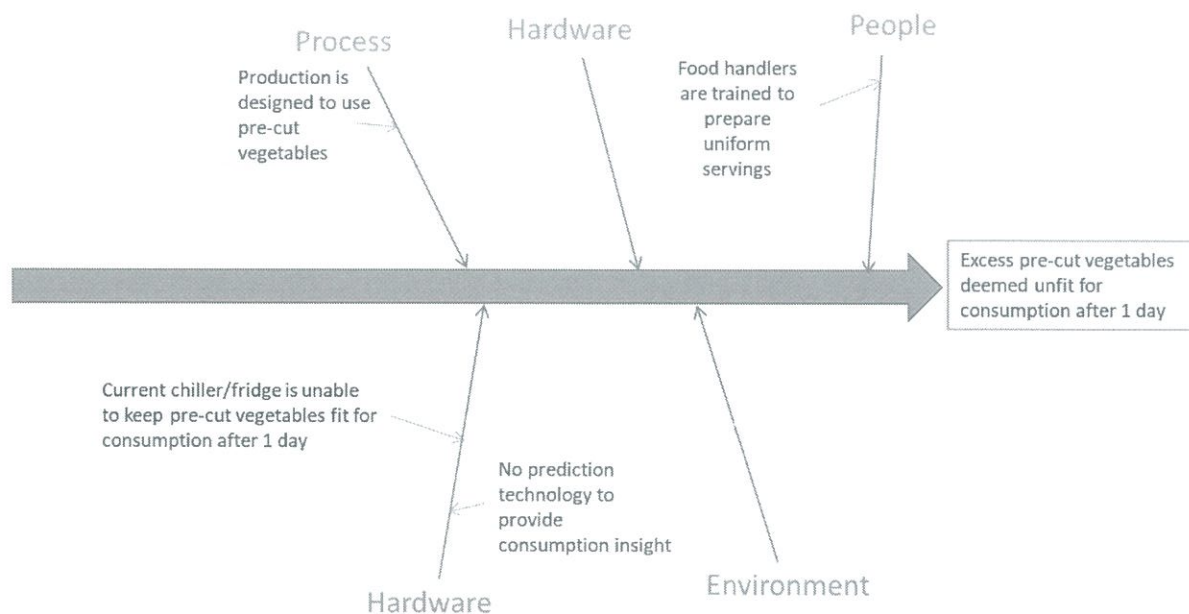
## Annex C (informative)

### Example of planning of FLW reduction and diversion

#### C.1 Fishbone diagram for food retail, wholesale and distribution establishments

Figure C.1 is a fishbone diagram example for food retail, wholesale and distribution establishments.

##### Avoidable



##### Unavoidable

Figure C.1 – Example of a fishbone diagram for food retail, wholesale and distribution establishments

## C.2 FLW reduction action plan for food retail, wholesale and distribution establishments

Figure C.2 shows a FLW reduction action plan for food retail, wholesale and distribution establishments.

Waste	Processes	Categories of causes	Manufacturing process improvement	Equipment/process design change
Excess pre-cut vegetables deemed unfit for consumption after 1 day	Storage	Edible-avoidable	Order less pre-cut vegetables and top up with orders of uncut vegetables (which is assumed to have a longer lifetime) and train workers to only use the uncut vegetables after running out of pre-cut vegetables	Invest in freeze dryer/fridge that is able to prolong the lifetime of the pre-cut vegetables
				Invest in prediction tools to obtain better insights on how much vegetables to order

Figure C.2 – Example of a FLW reduction plan for food retail, wholesale and distribution establishments

## C.3 FLW diversion action plan for food retail, wholesale and distribution establishments

Figure C.3 shows a FLW diversion action plan for food retail, wholesale and distribution establishments.

Waste	Processes	Categories of causes	Food redistribution	Animal feed	Industrial application/ Energy extraction	Composting/ Aerobic digestion	Incineration
Excess pre-cut vegetables deemed unfit for consumption after 1 day	Storage	Edible-avoidable	N/A	Send 'animal food safe' fractions to ABC company to be processed and sold as animal feed	N/A	Send to XYZ company for composting and sold as fertiliser	<b>Current practice</b>

Figure C.3 – Example of a FLW diversion plan for food retail, wholesale and distribution establishments

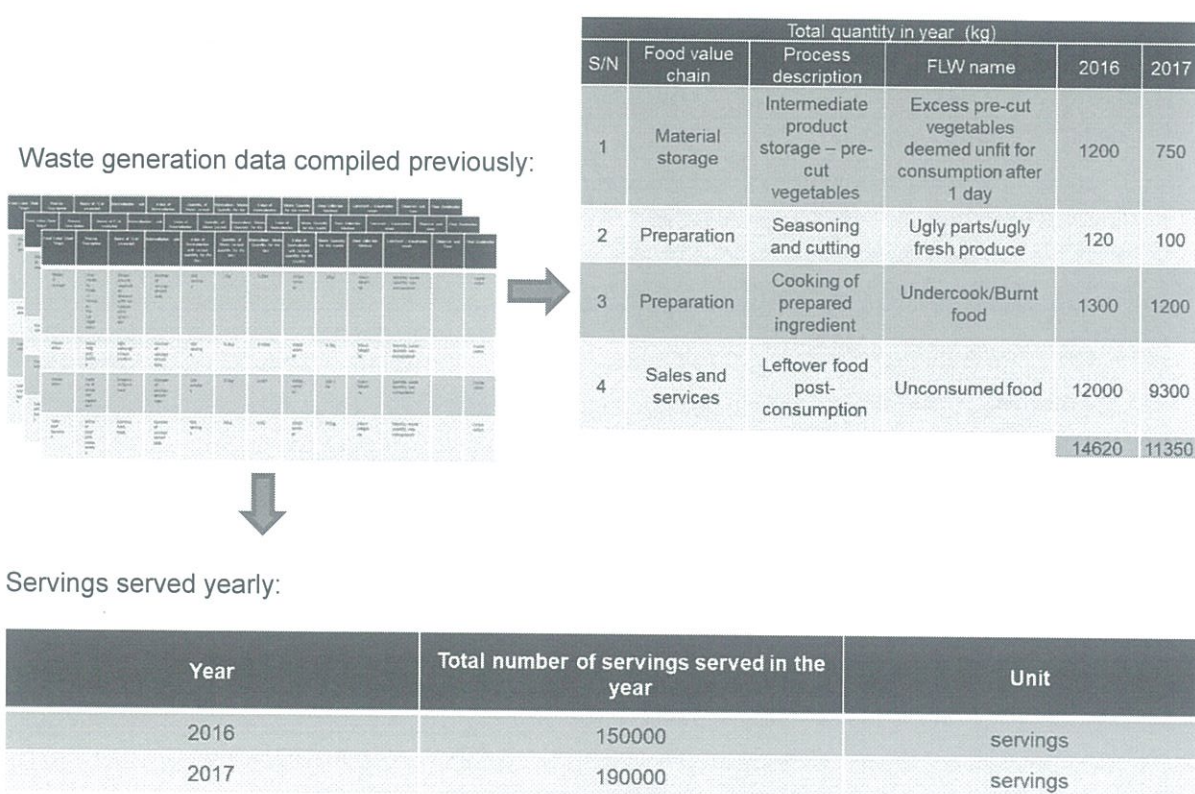


## Annex D (informative)

### Example of quantification of FLW reduction and diversion efforts

#### D.1 Example of compilation of data for food retail, wholesale and distribution establishments

Figure D.1 shows the compilation of waste generation and servings output data for food retail, wholesale and distribution establishments.



**Figure D.1 – Waste generation and servings output data compiled for food retail, wholesale and distribution establishments**

## D.2 Example of FLW reduction at source for food retail, wholesale and distribution establishments

Figure D.2 shows an example of data extracted from the aggregation of data collected every month for food retail, wholesale and distribution establishments.

Total quantity in year						
S/N	Food value chain	Process description	FLW name	2016 (waste generation /production output)	2017 (waste generation /production output)	Increase/decrease in FLW generated at source
1	Material storage	Intermediate product storage – pre-cut vegetables	Excess pre-cut vegetables deemed unfit for consumption after 1 day	0.008	0.004	-50%
2	Preparation	Seasoning and cutting	Ugly parts/ugly fresh produce	0.0008	0.0005	-38%
3	Preparation	Cooking of prepared ingredient	Undercook/Burnt food	0.009	0.006	-33%
4	Sales and services	Leftover food post-consumption	Unconsumed food	0.08	0.05	-38%
				0.1	0.06	-40%

Figure D.2 – Data extracted from the aggregation of data collected every month for food retail, wholesale and distribution establishments



### D.3 Example of FLW diversion tracking for food retail, wholesale and distribution establishments

Figure D.3 shows the FLW diversion tracking for food retail, wholesale and distribution establishments.

Total quantity in year					
S/N	Food value chain	Process	FLW Name	2016 (waste diverted)/kg	2017 (waste diverted)/kg
1	Material storage	Intermediate product storage – pre-cut vegetables	Excess pre-cut vegetables deemed unfit for consumption after 1 day	300	500
2	Preparation	Seasoning and cutting	Ugly parts/ugly fresh produce	20	100
3	Preparation	Cooking of prepared ingredient	Undercook/Burnt food	1300	1200
4	Sales and services	Leftover food post-consumption	Unconsumed food	0	50
Total waste diverted/ kg				1620	1850
Total waste produced/ kg				14620	11350
Diversion factor (total waste diverted/ total waste produced) %				11%	16%

Improvement!

Figure D.3 – FLW diversion tracking for food retail, wholesale and distribution establishments



## **ABOUT ENTERPRISE SINGAPORE**

Enterprise Singapore grows stronger enterprises by transforming industries, building new capabilities, and providing Singapore companies access to global opportunities.

We also establish Singapore as a leading global trading hub, and strengthen quality and trust in Singapore's enterprises, products and services.

Through this, we aim to create good jobs for our people and sustainable growth for our economy.

For more information, please visit ESG Website: <http://www.enterprisesg.gov.sg>.

## **ABOUT THE SINGAPORE STANDARDISATION PROGRAMME**

Enterprise Singapore is the national standards body in Singapore and we administer the Singapore Standardisation Programme. We are vested with the authority to appoint an industry-led Singapore Standards Council to approve the establishment, review and withdrawal of Singapore Standards (SSs) and Technical References (TRs). The Standards Council also advises Enterprise Singapore on the policies, strategies, initiatives and procedures for standards development and promotion.

Enterprise Singapore and the Standards Council collaborate with key stakeholders from industry and government agencies to identify and develop new standards as well as review existing standards to enhance the competitiveness of enterprises and support social, safety, health and environment initiatives in Singapore.

SSs and TRs are in the form of specifications for materials, products, services and systems, codes of practice, requirements for interoperability, methods of test, management systems, guidelines, nomenclatures, etc.

TRs are pre-SSs developed to address urgent industry demand and are issued for industry trials for a period of time. Comments received during this trial period are considered when a TR is reviewed. TRs can become SS after the trial period, continue as TRs for further industry trials or be withdrawn.

To ensure adequate viewpoints are considered in the development and review of SSs and TRs, committees and working groups set up by the Standards Council consist of representatives from various key stakeholders which include industry associations, professional bodies, academia, government agencies and companies. SSs are also put up for public comment before publication.

In the international and regional fora, Enterprise Singapore represents Singapore in the International Organization for Standardization (ISO), the Asia-Pacific Economic Co-operation (APEC) Subcommittee for Standards and Conformance (SCSC), the Pacific Area Standards Congress (PASC) and in the ASEAN Consultative Committee on Standards and Quality (ACCSQ). The Singapore National Committee of the International Electrotechnical Commission (IEC), which is supported by Enterprise Singapore, represents Singapore in the IEC.

