CATERING SECTOR ACTION PLAN REPORT 2024

ENDFOODWASTE AUSTRALIA

Australian Government
Department of Climate Change, Energy, the Environment and Water

Government of South Australia
Green Industries SA

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Glossary of terms and acronyms

- **AFAB** - Australian Foodservice Advocacy Body
- **Client/customer** - Person/organisation using services of a catering company
- **Consumer** - Person/people eating the food
- **FIFO** – First in, first out
- **FLW** - Food Loss and Waste
- **GHG** – Greenhouse gas
- **Plate Waste** - Food that is wasted after reaching the customer/ diners. This includes leftovers, food not eaten etc.
- **Preparation Waste** - Food that is wasted during the preparation stage. This may include items like peels, gristle, bones, eggshells, excess trim, unused portions of perishable ingredients etc.
- **EFWA** – End Food Waste Australia
- **SAP** – Sector Action Plan
- **SOP** – Standard operating procedure
- **Served Waste** - Food that is wasted after it is prepared and offered to the consumer but is not taken by the consumer. This can include bain-marie waste and over production.
- **Spoilage Waste** - Food that is wasted prior to kitchen preparation due to overordering, spoiling, exceeding use-by date, damaged product etc.
- **WRAP** - Waste and Resources Action Program

Executive Summary

Food loss and waste has significant environmental, social and economic impacts. Australia produces enough food to feed 75 million people every year, yet 1 in 6 Australians go hungry regularly (Foodbank 2022). In Australia, 7.6 million tonnes of food go to waste each year (enough to fill the Melbourne Cricket Ground ten times), and 70% of which is edible. 10% of global greenhouse gas emissions come from the food we throw away. Food waste costs total $36.6 billion each year in Australia. The Australian Government has a goal to reduce food waste by half by 2030 in line with Sustainable Development Goal (SDG) 12.3.

Food waste happens at every stage of the food supply chain, with the hospitality sector responsible for 16%, 1.2 million tonnes of Australia's annual food waste (FIAL, 2021).

The catering sector wastes 20% of food it serves (Malefors, 2022, Silvennoinen, et al., 2015). Reducing food waste in the catering sector will have positive impacts for businesses, the food industry, reducing environmental impact and is important to achieving the Australia's stated goal of halving food waste by 2030.

Sector Action Plans (SAPs) are developed by engaging with key stakeholders across a food industry sector or along a food commodity supply chain to understand where food waste is generated, why it occurs and what can be done to reduce it. By taking a sector-based approach, multiple stakeholders can come together in pre-competitive collaboration to address specific food waste challenges that are too significant for individual organisations to solve alone.

This SAP, one of a suite of SAPs in the overall Foodservice SAP, was funded by Green Industries South Australia (GISA) and developed by End Food Waste Australia (EFWA) with partners across the supply chain, including catering companies, the Australian Foodservice Advocacy Body, City of Adelaide, OzHarvest, waste contractors and clients of catering companies. Rawtec was engaged to collect data to provide a better understanding of food waste volumes and origins in the Australian catering sector.

The project methodology included the following steps:

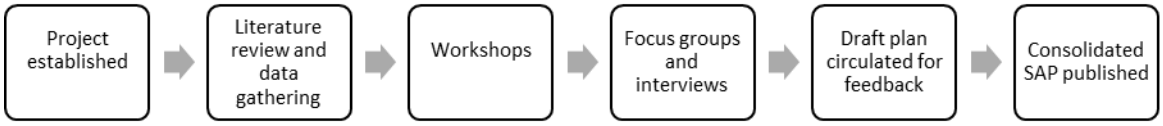


Figure 1. Project methodology for Catering SAP

The research team completed a review of national and international literature and best practice guides for the catering sector.

This knowledge was taken into a series of workshops. The workshops had three primary objectives:

1. Identification and ranking of hotspots.
2. Collaborative exploration of root causes for each hotspot.
3. Discussion of potential solutions to address the causes.

Engagement through focus groups and one-to-one interviews provided further knowledge to shape the action plan which was subjected to stakeholder feedback prior to publication.

After identifying hotspots and exploring root causes, key solutions were identified and shortlisted in workshops and with focus groups, before being prioritised according to their potential impact on reducing food waste and feasibility. Targeting high impact and most feasible food waste reduction interventions will help businesses reduce more food waste and address their sustainability goals.

The recommended actions either **enable** food waste prevention, **prevent** it from happening or **repurpose** it.

Enablers are the overarching actions required to respond directly to root causes of food waste in the catering system and foundational interventions required to enable change. These make it easier for businesses to implement food waste solutions in their control from planning, preparation, and plate waste.

Enable

- Embed an organisational culture around food waste prevention.
- Measure and review food waste.
- Consumer behaviour change campaign.
- Develop policy to drive food waste reduction.

Prevent & Repurpose

Contacts and Forecasting

- Build food waste into contract design.
- Develop more accurate forecasting systems.

Preparation & Storage

- Training on food waste prevention.
- Use standardised recipe and procedures.
- Ensure good inventory management.

Service

- Optimise food service to minimise food waste.
- Donation to food rescue.

Consumer

- Minimise plate waste.
- Raise consumer awareness.

The catering sector is extremely diverse in terms of business size, operations, locations and facilities. This SAP has prioritised actions that can be adopted by businesses across this broad range of services and so have greater impact on reducing food waste in the Australian catering sector.

A summary version of this report is also available: Catering Food Waste Action Plan Summary 2024.

1. Introduction

1.1 Australian Catering Sector

Catering businesses primarily provide catering services at specified locations or events. The sector is complex with venues including hotels, restaurants, bars, take-away services, cafes, sporting and event stadiums. Large scale food preparation also occurs in establishments such as mining camps, defence sites, schools, canteens, in-house catering, and flight catering. A wide variety and styles of food are offered such as buffets, finger food, canteens, snack bars and menu service. Food may be prepared to be consumed elsewhere, sometimes requiring the involvement of a satellite kitchen.

The catering sector accounts for 3% of foodservice businesses in Australia (McGrath, 2021). In the year 2021-2022, the catering sector generated $9.45 billion in revenue with 5405 businesses employing 70314 people. There is expected to be a 9.4% growth in revenue in 2023 (IBISWorld, 2022).

The major products and services in the sector

- On-premises catering (catering for individual organisations, corporate or private events, airline catering and function catering)
- Takeaway meals (quick, often pre-cooked meals, for consumption at stadiums, canteens, hospitals, and sites where management have outsourced food preparation)
- Liquor and other beverages
- Other goods and services (e.g., renting and leasing property and equipment, consulting services, cleaning, facilities management, accommodation services).

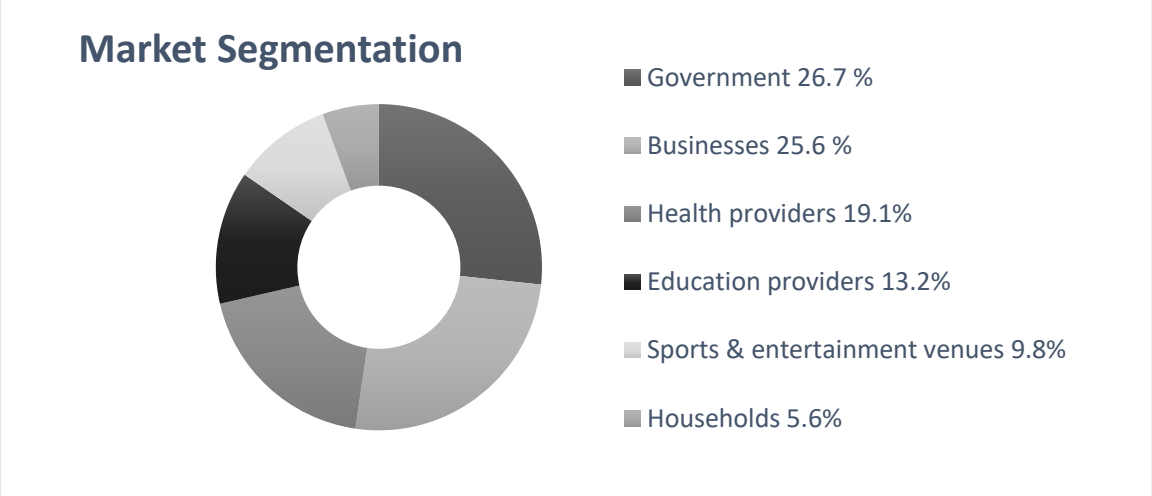


Figure 2. Market Segmentation (IBISWorld, 2022)

The sector has a low level of market concentration with just a few dominant major companies accounting for under 30% of revenue. These businesses are generally global companies and provide food to government departments, the energy and resources sectors, health and education providers and sporting stadiums. The companies may be diversified and offer other services such as building management, security, and cleaning services.

Outside of these larger companies, the industry is extremely heterogenous. Over 90% of industry operators employ less than 20 people (ABS, 2018). These small businesses regularly enter and exit the market due to the industry's low barriers to entry and low overhead costs. They typically focus on catering for small events and functions. These businesses do not compete with the major players and have much tighter profit margins due to significant price competition.

Effects of COVID-19

The global pandemic had devastating effects on the sector. Prohibited air travel, cancelled events, social distancing, reduced capacities of venues and working from home have all contributed to a decline in business growth in recent years.

Industry revenue has almost returned to pre-pandemic levels (IBISWorld, 2022) as restrictions have eased and travel has restarted. In the 2021 Benchmarking Report, the Restaurant and Catering Association (R&CA) noted an optimism for the future, with most operators confident that their sales, number of employees and profitability would go up. This was completely opposite to the previous year, where the outlook had been extremely pessimistic. However, international visitor arrivals are unlikely to return to pre-pandemic levels until 2025 (AFAB, 2023).

The COVID-19 restrictions have irreversibly changed the way that Australians purchase food and the way that operators sell it. Businesses initially moved to takeaway services and delivery platforms to cope with restrictions, but many are now seeing it as a permanent change. Such services from restaurants are in direct competition with services offered by the catering sector in some market segments.

Catering companies serving the corporate sector have had to adapt to changing work patterns, workers are spending less time in the office with hybrid working conditions and flexible hours. A survey found that 72% of office workers want premium food services (Sodexo, 2022) and customers are demanding more flexibility and home delivery.

Skills and Staff Shortages

Staff shortages and skills shortages are a major concern for the catering industry, with 51% of food businesses struggling to find suitable staff to fill jobs (ABS, 2022). Nearly three-quarters of businesses indicated that it was harder to fill positions during 2020-2021 than during the previous financial year (R&CA, 2022). The COVID-19 pandemic has exacerbated the current problems with staff shortages due to the lack of overseas labour. Hospitality is facing a labour shortage of up to 100,000 workers (AFAB, 2023), the reintroduction of working restrictions on international students, limiting working hours, will reduce numbers of available staff. The shortages are most acute amongst the highly skilled occupations of chefs and cafe/restaurant managers and has increased dramatically in recent years (R&CA, 2022). Chefs are ranked at number 8 of the top 20 in demand occupations nationally (AFAB, 2023).

Even with the lack of skilled workers, in-house training of hospitality workers remains limited. Nearly 60% of businesses do not have a structured or formal staff training program (R&CA, 2022) although 58.2% would use a low-cost online induction/training course if it was available to them when hiring new staff.

1.2 Food Waste in the Catering Sector

Food waste in the catering sector remains an insufficiently studied issue throughout the world. There is a lack of research using quantitative assessments of food waste. Most data are qualitative and published case studies of specific venues are not necessarily representative of the sector. Catering business owners can be unwilling to disclose data fearing that such information may be inappropriately used (Tomaszewska, et al., 2021) and often there is a perception gap with food service businesses believing that they do not generate waste. Only 22% of foodservice businesses in Australia have conducted a food waste audit or assessment (McGrath, 2021).

The National Food Waste baseline (FIAL, 2021) found that 16% of Australian food waste is generated by the hospitality sector. International studies have shown that the catering sector wastes 20% of food it serves (Malefors, 2022, Silvennoinen, et al., 2015).

Some of the most common reasons, repeatedly identified for catering food waste in the literature, are errors in forecasting leading to over-production, portion sizes, lack of cooperation along the supply chain and food quality requirements. Fruit and vegetables and side dishes are the most commonly wasted food groups (Dhir, et al., 2020).

According to (WRAP, 2013), 21% of avoidable food waste in the UK hospitality sector arises from spoilage; 45% from food preparation and 34% from consumer plates with a daily average of 220g/cover (LRS Consultancy & Sustainable Restaurant Association (SRA), 2013). These figures can be further broken down by establishment type.

Table 1. Food Waste in UK Hospitality Sector

	Spoilage waste %	Preparation Waste %	Plate Waste %	Total Waste g/cover
Basic dining	22	32	46	170
Casual dining	21	50	29	380
Fine Dining	16	61	23	310
Catering	26	38	36	150
Average	21	45	34	220

Studies have shown a wide range of figures for food waste per serve across different types of catering establishments, from approximately 50 g/portion in canteens to 190 g/portion for restaurants (Malefors, 2022). The International Food Waste Coalition (IFWC) recently reported that food waste in contract catering in Europe has decreased from 133 grams/meal in 2019 to 95g/meal in 2022. The corporate sector showed the biggest reduction, mainly due to the normalisation of working from home. It has become harder to predict number of guests, hence canteens have adapted their offerings with fewer choices and limited buffets. It is believed that this change has been responsible for this dramatic reduction in food waste (International Food Waste Coalition, 2023).

Food waste for the catering sector may be classified by where it occurs in the process.

- **Spoilage waste -** Food that is wasted prior to kitchen preparation due to overordering, spoiling, damaged product etc.
- **Preparation waste -** Food that is wasted during the preparation stage. This may include items like carrot peels, gristle, bones, eggshells etc.
- **Served waste -** Food that is wasted after it is prepared and offered to the consumer but is not taken by the consumer. This can include bain-marie waste and over production.
- **Plate waste -** Food that is wasted after reaching the customer/ diners. This includes leftovers, food not eaten etc.

Spoilage Waste

Spoilage waste occurs prior to preparation of food and may be generated during the procurement and storage of ingredients.

Uncertainty about customer demands and inaccurate forecasting are major issues for the catering sector (Wu, et al., 2021), leading to the excessive purchase of ingredients. Purchasing raw materials constitutes 35% of the average monthly operating costs of a catering establishment (Tomaszewska, et al., 2021). Hence, over purchasing has economic ramifications as well as generating food waste.

A caterer is primarily a service provider and good communication, within the organisation and externally, is an essential part of the planning process. Event agencies may be involved, meaning there is no direct communication between the caterer and the customer, which can make attempts to mitigate food waste even more challenging. The level of experience of the caterer can have a significant impact on the amount of waste (Monteiro, et al., 2020), not only by accurately working out the quantity of food required, but also by considering factors such as the season, weather, time of day and previous history.

When receiving supplies, a lack of inspection of goods upon receipt may allow poor quality ingredients or short dated stock to be accepted. Unopened products passed their expiry date are one of the most frequently discarded items (Tomaszewska, et al., 2021). Poor stock rotation and disorganised stores can lead to food spoilage. Having systems in place, such as first in first out, can reduce this issue. Regularly inspecting ingredient storage areas can also help identify short-dated items and items that need using first.

Storing ingredients incorrectly (e.g., wrong temperature, not sealed) can result in products spoiling more quickly. Opened products with signs of spoilage are another item regularly thrown away. Fruit and vegetables are a major component of avoidable food waste in hospitality (Papargyropoulou, et al., 2016). The amount of wilted fruit and vegetables discarded could be reduced by ensuring correct storage, improving ordering practices or finding alternative uses. Ordering stock is part of good planning; choosing suppliers that can deliver as close as possible to required use can help reduce waste.

Preparation Waste

Preparation waste is generated during the preparation of food and can include edible and non-edible components. It includes peelings, trimmings and unused portions of perishable ingredients. The types of ingredients used, and dishes served, also affects the amount of food waste. Fruits and vegetables are the largest component of avoidable hospitality food waste followed by, cereals, fish and seafood, and meat (Papargyropoulou, et al., 2016).

Quality and safety requirements also have a large impact on food waste during preparation (Wu, et al., 2021). The quality of prepared items can be affected by poorly trained employees, poor communication from management to employees or lack of equipment. Human error can also contribute, for example by over or under cooking food and recipe mistakes. Food items that have breached safety regulations must be discarded to avoid health issues.

Peeling, cutting and trimming of ingredients generates food waste, some of which is inedible and unavoidable (e.g., bones, eggshells). Training staff to correctly prepare ingredients can reduce the avoidable component of food waste. Whether a kitchen buys in preprepared ingredients or uses more raw and whole products will affect the amount of food waste generated. Buying in prepared items, such as peeled vegetables, will reduce the amount of waste generated by pushing this component further upstream with overall food waste volumes dependent on whether the ingredient supplier practices methods to prevent food waste.

Staff training and their attitude to food waste plays a role in food waste generation. Employees that have not been trained generate more food waste due to errors, incorrect storage of food and poor preparation of ingredients. A lack of knowledge about reusing or repurposing leftovers, can also increase the amount of wastage.

Serving Waste

Serving waste is food that is wasted after it is prepared and offered to the consumer but is not taken by the consumer. Serving too much food, linked to uncertainty about customer demands, is one of the biggest causes of food waste in the catering sector. Inaccurate forecasting, as well as contributing to over purchasing of ingredients, also results in overproduction.

The type of establishment can affect the amount of food waste generated. Buffet offerings have large amounts of waste due to inaccurate predictions, needing to keep the offerings topped up and not being able to serve leftovers the following day. Venues, such as cafes or coffee shops, that pre-prepare offerings generally have more food waste than those that make food to order.

Food safety requirements often mean that once food has been offered for a certain period of time it can no longer be safely reused or repurposed, and hence must be discarded.

Poor communication between management and kitchen staff can result in food waste through incorrect numbers, getting the date wrong and mishandling (Charlebois, et al., 2015). Companies relying on temporary staff booked through employment agencies face another layer of communication. The agencies and their personnel may not be aware of the caterers' processes regarding food waste and may not be invested in company policies to tackle food waste.

Plate Waste

Plate waste in catering makes up just over one third of total food waste (WRAP, 2013) and generally cannot be reused. The main cause of plate waste is portion size (Betz, et al., 2015). Poor taste or appearance, over ordering, and contamination also create plate waste. Salads and side dishes, such as potatoes, are the most commonly wasted items (Silvennoinen, et al., 2015).

The type of diner can affect the plate waste generated. Female diners and young diners leave more plate waste than male diners (Collison & Colwill , 1987). Restaurants catering for tourists produce more plate waste than those serving a resident population (Wang, et al., 2018).

Casual dining venues generate more plate waste than fine-dining restaurants, although, the total waste per customer is higher for fine-dining (Dhir, et al., 2020) due to larger amounts of preparation waste. The higher amounts of plate waste could be explained by the relative affordability of food in casual restaurants or the larger serving sizes.

Plate size and shape can influence plate waste. Smaller plates lead to less plate waste (Kallbekken & Saelen, 2013) and in one study oval plates led to less plate waste (Richardson, et al., 2021). Removing trays from canteens also leads to a reduction in diner food waste (Rajbhandari-Thapa, et al., 2018).

1.3 Waste Destinations

Despite the fact that food waste makes up almost two thirds of restaurant and café bins (NSW EPA, 2016) only a small number of hospitality businesses separate organic waste and food waste generally ends up in landfill. A UK study looked at barriers to separating organic waste (Michalec, et al., 2018). They concluded that those businesses already separating thought cost and convenience were the main barriers. Those not separating their waste cited lack of food waste or lack of space as barriers.

Only 0.2% of Australia's surplus food across the supply chain is donated to food charity organisations (FIAL, 2021). Food rescue operations are currently focused on retail collection and mainly in major metropolitan areas. There are huge opportunities to rescue greater volumes of food across the supply chain, and closer to the source across Australia.

2. Methodology: Developing a Sector Action Plan

2.1 Project Outline

The aim of developing an SAP is to understand where the hotspots for food waste occur, why they occur and generate an action plan to reduce this waste.

A review of literature and published best practice guidance documents was conducted to understand where food waste hotspots and associated root causes have previously been reported in the catering sector, and which potential solutions have been identified to be effective. This initial research was used to provide a background for the workshops, focus discussions and understand the Australian context.

EFWA engaged Rawtec to gather and analyse data from catering companies and waste contractors.

This knowledge was taken into a series of workshops. The workshops had three primary objectives:

4. Identification and ranking of hotspots.
5. Collaborative exploration of root causes for each hotspot.
6. Discussion of potential solutions to address the causes.

Participants included the catering companies who had provided data, EFWA, GISA, City of Adelaide, Oz Harvest, AFAB and waste contractors. The catering companies were represented by chefs, senior management and members of contracts, operations, procurement and sustainability teams. The discussions were informed by a Competition Law statement to allow frank and open conversations.

Once a draft action plan had been developed, further consultations were held with clients of larger catering companies and with other catering companies of varying sizes who had not participated in the data collection or workshops, to ensure a greater breadth of input.

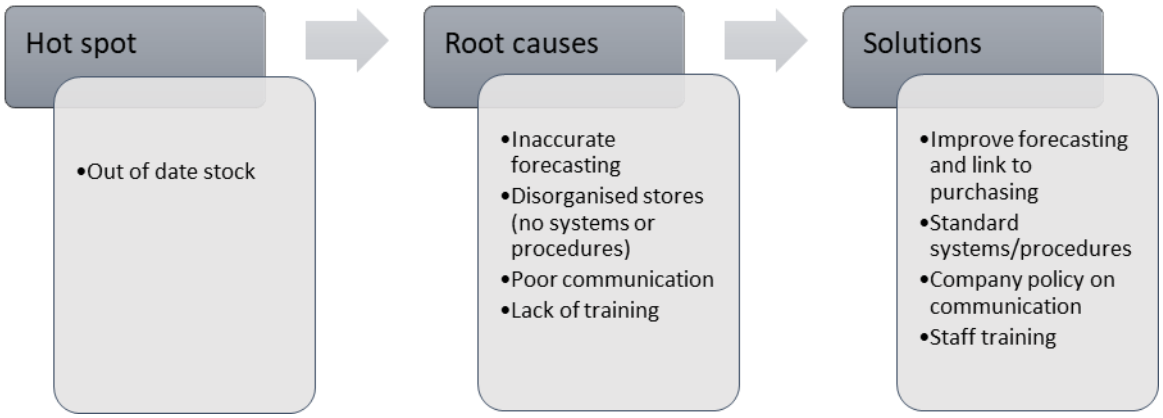


Figure 3. Example of exploring root causes of a hot spot and possible solutions.

2.2 Data Collection

Rawtec conducted two surveys with participants to understand food waste in the Australian catering sector. The consultants met with all the data providers prior to collecting the data to confirm the project scope and advise on the data collection.

Survey one gathered information about the type of catering business and the sites that were being included in the study (number of meals served/month, number fulltime employees, frequency of catering and numbers of diners). Information was also gathered about management of food waste and a visual breakdown of the composition of food waste by food type.

Survey two involved measuring the weight of food waste for a one-week period; participants were asked to a select a week that was typical for that particular site. As well as recording information about the weight, source and composition of the food waste, number of meals served were recorded to be able to normalise the collected data.

<table>
<tr>
<td>Market segments
Events (sporting and private)
Mining
Education
Other sectors with on-site catering
Aviation industry and institutions were not represented.</td>
<td>Food types
Bread and bakery
Cereals
Coffee and tea
Complex food
Dairy
Eggs
Fruit
Pork
Poultry
Red meat
Seafood
Vegetables; brassicas
Vegetables; root
Vegetable; non-root
Not identified</td>
</tr>
<tr>
<td>Food waste sources
Spoilage
Preparation
Serving
Plate</td>
<td rowspan="2">Collection Summary
4 organisations
41 sites
4.9 million meals served
171 tonnes food loss and waste
Up to 211 days of operation per site
Data was extrapolated to estimate Australia-wide food loss and waste volumes</td>
</tr>
<tr>
<td>Destinations
Non-waste:
Charitable donations
Animal Feeds
Waste:
Compost
Energy recovery
Landfill
Other recycling streams</td>
</tr>
</table>

Table 2. Data Collection by Rawtec

3. Results

3.1 Catering Food Waste Account

In this study mining sites accounted for approximately 60% of catering facilities collecting data, and hence contributed to the largest volume of food waste due to its over-representation. The proportion of waste generated by events is proportionally slightly larger due to the nature of the type of service provided. Fine dining functions generate more waste and a higher proportion of plate waste compared to the other styles of catering.

	Metric	Units	Mining	Education & Other	Events	**Total**
Meals	Estimated meals served	Meals/yr. (millions)	63.0	28.6	15.3	**106.9**
Volumes	Total potential food loss & waste	Tonnes/yr.	10,700	3,400	3,800	**17,900**
Source	Spoilage	% weight	22%	11%	7%	**17%**
	Prep	% weight	24%	13%	39%	**25%**
	Served	% weight	35%	42%	7%	**30%**
	Plate	% weight	19%	34%	48%	**28%**
Food Types	Top 3 wasted foods (excl. not identified)	List	1.Fruit 2.Complex* 3.Vegetables	1.Fruit 2.Meat 3.Bread &bakery	1.Vegetables 2.Meat 3.Fruit	**1.Fruit** **2. Complex** **3.Vegetables**
Destination	Food repurposed	Tonnes/yr. (%)	<100 (1%)	<100 (2%)	<100 (0%)	**100 (1%)**
	Food to waste destination**	Tonnes/yr. (%)	10,700 (99%)	3,300 (98%)	3,800 (100%)	**17,800 (99%)**

Table 3. Food Waste in Australian catering facilities

* Mixed food products not included elsewhere

** Donation to food rescue/animal feed

Considering the total amounts of food waste generated, the consumer facing stages (serving and plate), account for almost 58% of total food waste and the spoilage and preparation percentages are less than previously reported in international data. The consumer facing stages may be more challenging for a foodservice company to control due to involvement of actors external to the business.

Figure 4. Percentage food waste at each stage

The most commonly wasted foods were found to be fruit, complex items and vegetables. Most uneaten food ends up at food waste destination, primarily landfill, with less than 1% being directed towards food donations or animal feed. Donations to charitable organisations may be limited by adherence to safety regulations and the logistics of remote locations.

The following data gaps and limitations apply to project estimates:

Upstream supply chain spoilage waste. Volumes of upstream (offsite) spoilage waste was unable to be quantified by organisations in the project and is excluded from estimates.

Incomplete data sets. Some data sets did not cover the full scope of food waste sources. For example, some sites only reported prep and spoilage waste. Where this was the case, we estimated missing waste volumes, filling gaps based on literature values and averages from other complete datasets.

Incompatibility with literature data. We reality-checked reported data on food waste volumes (grams per meal) against published literature, and found it was low in many cases. Some organisations that reported data were unable to confirm whether the data provided represented the full dataset or a sample of dataset for the given reporting period. Where food waste generation values were low, we used literature values.

'**Take away' food waste**. Anecdotally, consumers often take to spaces outside of the catering company's control (e.g., meal boxes or 'crib waste' at mining sites). Volumes of this waste were unable to be quantified in this study and is excluded from estimates.

Aviation industry /inflight catering was not represented in the project.

3.2 Hotspots and Root Causes

In the first of the series of workshops, participants were asked about the hotspots of food waste in the four areas of spoilage, preparation, serving and plate waste. This created a long list of hotspots (see appendix 1). This long list was then ranked by importance so that the discussion around root causes could focus on the most relevant hot spots.

Stage	Ranked hotspot
Spoilage	• Purchasing practices • Out of date stock • Menu too complicated
Preparation	• Not using all parts of ingredients • Staff competency • Overproduction (advanced prep vs made to order)
Serving	• Inaccurate forecasting • Plentiful food available throughout service • Requirement for choice/options
Plate	• Portion size (plated or taken by consumer) • Food unacceptable taste/appearance • Attitude to food waste/perception food value

Table 4. Ranked hotspots.

These hotspots formed the framework for workshop 2, to uncover the root causes of food waste generation. During the discussions, it became apparent that a root cause maybe responsible for multiple hotspots. For example, poor forecasting may lead to over purchasing (spoilage), overproduction (preparation) and serving waste.

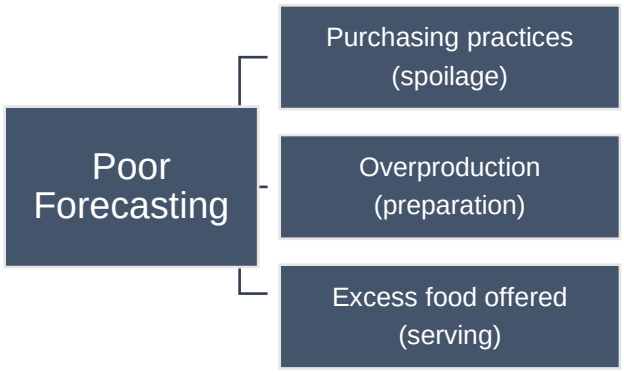


Figure 5. Root cause responsible for multiple hotspots

To generate more logical discussions and a practical action plan, the most prevalent root causes considered responsible for these hotspots were regrouped into four categories.

- Contracts
- Operations
- Human factor
- Consumer

This categorisation and the area of food waste impacted is outlined in the following table (table 5)

	Root Causes			Hotspots*			
				Sp	Pr	Sv	Pl
Contracts	Lack Flexibility	• Menu • Budget	• Unable to substitute ingredients/dishes • Contract designed by monetary budget per head rather than quantity food per head	✓	✓		
	Requirements	• Volume • Variety	• Requirement to produce certain volume otherwise contract breached • Requirement to offer sufficient choice driven by customer satisfaction/dietary needs	✓	✓	✓	
Operations	Inaccurate forecasting	• Systems • Experience	• Affects purchasing, preparation and serving • Experience of operator in forecasting	✓	✓	✓	
	Supply	• Delayed deliveries • Incorrect deliveries	• Upstream issues • Lack systems/SOPs	✓			
	Site variations	• Available facilities • Type service • Systems/organisation	• Storage capacity/available equipment • Buffet vs served • Individual site variations	✓	✓	✓	✓
Human Factor	Communication	• Internal • External	• Purchasing/prep errors • Between caterer and supplier/client/consumer	✓	✓	✓	✓
	Lack skill/knowledge	• Training, mentoring and education • Shortage skilled staff • Transient workforce	• Not part of training/curriculum • Leads to human error • Lack systems/SOPs	✓	✓	✓	✓
	Lack time	• No systems/procedures • No food waste KPIs	• Checking stock on receipt, stock rotation, organisation • Minimisation food waste not seen as part of duty	✓	✓	✓	
Consumer	Satisfaction/reputation	• Portion size • Variety/choice • Availability	• Served (one size for all) or taken • Plate waste not included in running costs • Food available throughout service, catering for walk-ins	✓	✓	✓	✓
	Menu design	• Too many choices • Dietary, nutritional and cultural requirements	• Drives prep and serving waste • Requirement for too many ingredients and items to be prepared	✓	✓	✓	✓
	Perception value	• Not all food seen as equal (sides less value) • Understanding true cost of food waste	• Sides (e.g., veg or starch more frequently wasted • Environmental impacts not understood/a concern		✓	✓	✓

*Hotspots: Sp=spoilage, Pr=prep, Sv=serving, Pl=plate

Table 5. Root causes of food waste in the catering sector

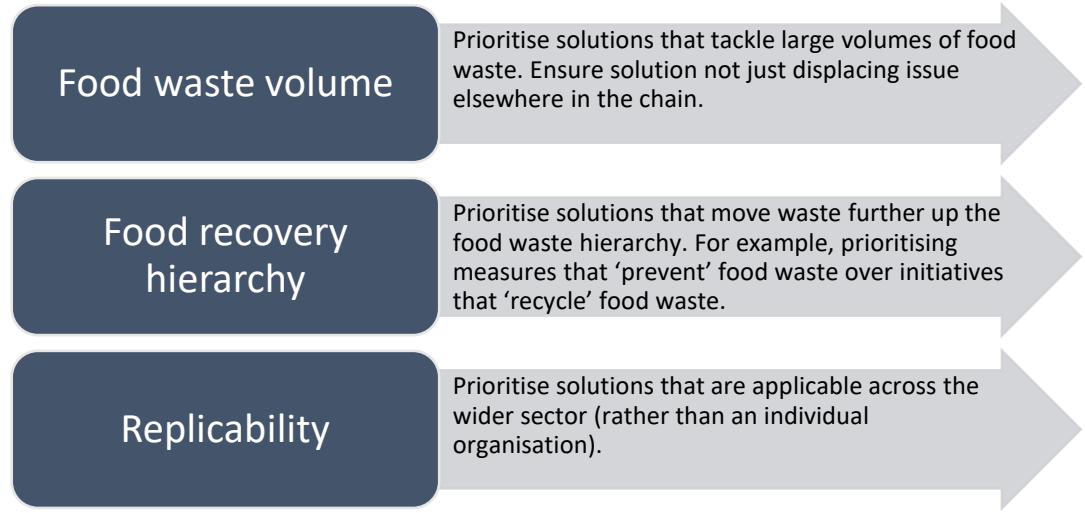
4. Discussion: Solutions

The solutions were discussed over two workshops,

- Workshop 1 – Contracts and Operations
- Workshop 2 – Human Factors and Consumer

A table of potential solutions was compiled from the literature and international best practice guides (appendix 2). This information was circulated to the workshop participants prior to the workshops. At the start of each workshop, participants were asked to vote on the areas they felt would generate the most useful solutions, bearing in mind the criteria listed below. Participants were also asked to prioritise those areas they have found particularly challenging and where there is most potential to create impact.

Expected impact on reducing food waste



Potential Feasibility

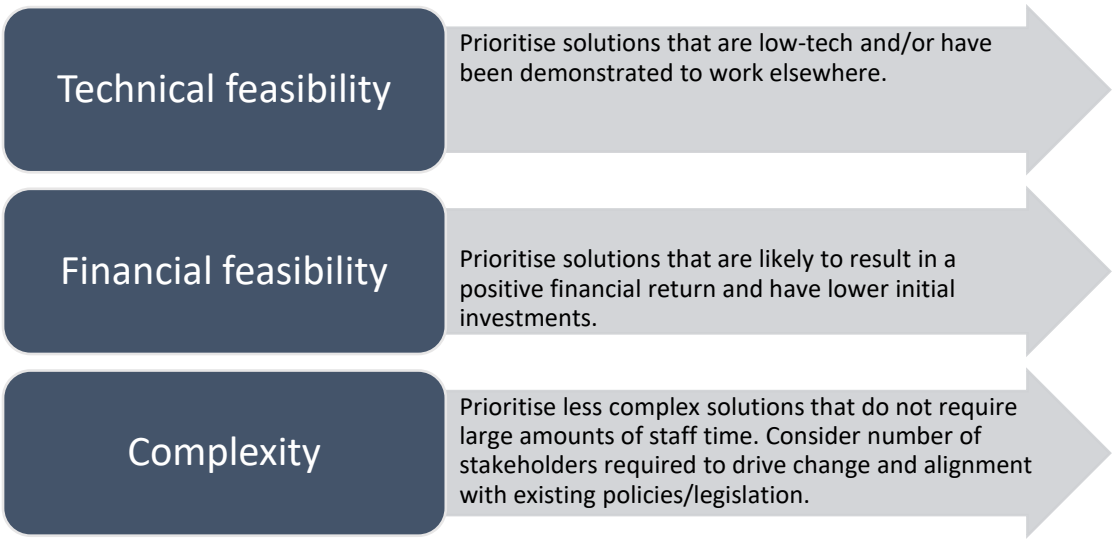


Figure 6. Solutions criteria

The vote revealed the key areas (not ranked) to find solutions for.

- Food waste targets included in contract
- Flexible contracts
- Understanding consumer profile
- Integrated systems (forecasting influencing purchasing/menu design)
- Type of service (buffet/self-service vs served)
- Practices and procedures around inventory management
- Internal communication
- Training about food waste
- Consumer education
- Plate waste not seen as a running cost.

The solutions suggested for these selected areas, and new solutions proposed during the workshops, were discussed and prioritised depending on their feasibility and likely impacts on food waste reduction, according to the experiences of the participants.

Organisational

Embedding food waste prevention as part of everyday business emerged as a strong theme. Efforts to reduce waste should be seen as an integral part of running a food business. This can be achieved by strong leadership and company policies, but needs to be supported by education, training, resources, behaviour change and positive reinforcement. All staff, clients and consumers should be aware that preventing food waste is important to the business. Training and education were thought to be vital in achieving this shift, not just at a company level, but during teaching at hospitality colleges and even earlier, as part of childhood education.

Having measurable targets can promote good practice by encouraging all staff to work together towards an achievable goal. Food waste measurements need to be normalised (e.g., waste per number of meals served) so that quieter or busier times can be accounted for.

Having a food waste champion or team can drive change within a business, and a recognition or reward system can be a valuable motivator. Addressing food waste should be seen in a positive light, and not just as an extra chore for staff already working long hours with tight schedules and demands on their time. Food waste prevention could be included in job descriptions. As employees become aware that reducing waste is part of the job, they can allocate sufficient time to tasks required for food waste mitigation. If preventing food waste becomes part of working with food and reducing food waste seen as a job done well, the problem can be more easily assessed and remedied. It will be less challenging for a manager to discuss food waste issues with staff members, and avoids employees feeling that they are being reprimanded, but instead are part of an ongoing solution.

Internal communication within a business was deemed to be extremely important. Often different departments work to different schedules with different operating hours. Understanding how each area works and effective communication between departments, can avoid errors and reduce food waste. For example, if the team responsible for taking client orders understands procurement deadlines or kitchen production schedules, unnecessary food waste may be avoided.

Contracts

Food waste reduction should be considered early in catering contract negotiations. For long term contracts, it could be possible to create a food waste baseline for each site, then setting realistic and achievable targets to reduce food waste. How to monitor whether these targets are being met is a potential challenge. However, this data could be used to modify contracts in terms of menus, choices offered, and quantities provided. Building more flexible contracts that can regularly be reviewed and modified may mitigate food loss and waste.

The ability to substitute menu items to use up short dated or excess stock would also help to reduce food waste, bearing in mind that there may still be nutritional or dietary requirements that need to be met. Trying to establish why there is excess/short-dated stock may uncover a problem elsewhere that requires attention and could reduce this cause of food waste.

Often contracts are devised on a set amount per head or a set number of choices. It may be of value to consider the consumer profile during these negotiations. Different sites will have different compositions of workers with varying energy requirements and certain sites might be more accommodating for being able to offer fewer choices.

Again, discussing food waste in a positive frame with clients, was thought to be of value. If the client is aware that the caterer is trying to prevent food waste, this can enhance the relationship and make the client more food waste aware.

Forecasting

It is generally acknowledged that the greatest potential to minimise food wastage rests in accurate demand forecasting as it prevents over-purchasing of ingredients with the reduced probability of spoilage waste, and the over-production of meals. However, accurate demand forecasting to produce the right amount of food for the correct number of consumers, whilst still offering sufficient choice and quantity, is one of the most challenging mitigation opportunities to adopt. As long as consumers expect an abundance of food and choices to be offered, establishments will make sure that they meet these expectations.

Understanding the consumer profile was identified as a key element, knowing who you are catering for and using past history. For example, the proportion of male to female diners or age group can affect quantities required, as well as knowing the number and type dietary options required. At mining camps or defence sites, understanding the proportion of consumers with more sedentary operational roles or physical jobs can affect the amount of food required.

Knowing how many people you are catering for is vital. For some sites, it is challenging to predict what proportion of those on site will actually be eating in and at what time. Using rosters and knowing if contract staff may be on site can aid forecasting. Forecasting is likely to be more accurate at remote sites where there are limited options to eat elsewhere, or at sites that are difficult to access as staff movements have to be carefully planned and sudden changes in numbers are less likely. Where forecasting is challenging, efforts need to be made to offer a flexible service that can cope with sudden fluctuations of numbers or timing. Having food prepared, that can be held under safe conditions and quickly made ready or kept for another service, can reduce the numbers of meals wasted. If a site has multiple dining facilities, it may be possible to redistribute prepared food amongst these.

Trying to predict numbers and have cut off times for changing numbers is dependent on location. It is easier for metropolitan areas, with daily deliveries, to have shorter cut off times compared with remote sites which may need to order supplies weeks in advance. In such situations, menu planning and design becomes more crucial in avoiding food waste. Building forecasting numbers into purchasing and menu planning can reduce spoilage and preparation waste. A good relationship and history with a client can make

it easier to predict numbers and buffer amounts required. If the client understands that if the caterer is informed in a timely fashion, excess prepared food can be reused or donated to charity, this may encourage better forecasting by the client.

Preparation

High staff turnover and an unskilled labour force can lead to errors in preparation and storage of ingredients, which can generate spoilage and preparation waste, and also plate waste due to customer dissatisfaction. Having in-house training and standardised recipes and procedures can help reduce this food waste. Pictures of the final product and plating of meals can provide useful guidance. Again, more education around food waste during hospitality college teaching would prepare workers to practice food waste prevention in the workplace.

Protocols around food waste can also be useful tools. Employees know whether food is safe to reuse or repurpose, how to direct to charity donation or divert from landfill. Within such guidelines, it is beneficial to include informing a manager if there is food waste, so the issue can be addressed rather than the staff member feeling at fault and trying to cover up problems.

Organised workplaces generate less food waste. Having good systems and procedures around receipt of stock, such as checking quality and shelf life, good store organisation and rotation of stock, and storing ingredients under correct conditions and with good visibility can reduce spoilage waste.

Service

Buffet style and self-service operations tend to generate more food waste than served meals. Due to operational set ups, economics and staff resources, this style of service may be difficult to avoid. Where this is the case, the workshop participants have already made changes to mitigate food waste. Using smaller plates with good communication to the consumer, displaying smaller amounts with more frequent top ups but fewer towards end of service, offering portioned items, and having stand-by, easy to be made ready food prepared for late comers, are some of the key methods employed.

Where food is served or plated, using measures for portion sizes of items such as chips and sides, can help standardise portion sizes and prevent waste. Regular customers know what size portion to expect, and hence can order more accurately.

For function catering, providing the venue with take away containers and communicating this to the consumer, not only prevents food waste but also enhances the consumer experience. People often feel awkward asking to take excess food, providing a container removes some of the embarrassment. Solutions like this may result in repeat business from consumers concerned about sustainability issues. Similarly, providing a green waste bin for venues with no organic waste separation facilities, although not preventing food waste, diverts this waste from landfill.

Consumer

The key solution around consumer plate waste was believed to be education and awareness so that the consumer understands the economic, environmental and social impacts of wasting food. Although, education plays a role, campaigns to change behaviour can be more effective (Wheeler & Xu, 2023). A study in European school canteens found plate waste trackers and awareness campaign are effective tools to reduce plate waste (Malefors , et al., 2022). Good communication with the customer about schemes to reduce or repurpose food waste can be helpful.

Offering different portion sizes avoids consumer with smaller appetites being served too much food. Good communication is required to cost these options, as although less food is served, the labour and preparation costs are equal.

Monitoring and measuring plate waste with separate bins for plate waste, allows plate waste to be tracked and inspected. Feedback from front of house staff and consumers is useful to understand what is wasted and why. Although, food has been costed before serving the customer and plate waste may not seem to be a running cost, working out how much is wasted can indicate potential savings to the business.

Government Policy

Participants held strong views that food waste generating businesses should be held accountable with mandates to measure and report on food waste. If such information was publicly available, it may guide consumer choice. Adopting the National Food Donation Tax Incentive (NFDTI) would encourage businesses to donate to charity by providing financial support and incentive.

For large businesses, the cost of food wasted may be relatively small compared with running costs of the entire business. A financial burden for food waste, such as disposal costs, might be a useful incentive to mitigate waste.

5. Conclusions & Recommendations

5.1 Prioritising Actions

The aim of a sector action plan is to collaboratively identify useful recommendations for businesses to adopt to prevent food waste. The solutions discussion and prioritisation identified key actions which can be grouped according to whether they **enable, prevent** or **repurpose** food waste. Only those solutions that met the criteria and will have a significant impact on food waste reduction have been included in the final action plan.

The solutions discussion and prioritisation led to the emergence of several overarching considerations, without which implementing interventions would be much more difficult and less impactful. These **enabling** actions either respond directly to root causes in the catering system, or more broadly are foundational interventions to enable change. Enablers make it easier to reduce food waste through better data, behavioural change management, or better policy.

The remaining actions **prevent** or **repurpose** food waste and can be grouped in these four stages:

- Contracts and forecasting
- Preparation and storage
- Service
- Consumer

5.2 Action Plan

Enable

Action	How
Embed an organisational culture around food waste prevention	• Prioritise and drive from top down. • Create food waste champions, rewards, and recognition. • Recognise reducing food waste as an expected part of working in food service, included in job descriptions, with adequate time and resources allocated. • Facilitate effective communication, especially between different departments with different priorities and operating hours, and with clients/consumers.
Measure and review food waste	• Develop a toolkit to support key activities for measuring food waste. Understanding volumes, where and why it is happening, allows the most impactful interventions to be selected. • Monitor and assess food waste data to determine whether interventions have been effective. • Join the Australian Food Pact.
Consumer behaviour change campaign	• Change consumer expectations around plentiful food and excessive variety. • Use consumer awareness to encourage catering companies to implement interventions and maintain a sustained focus on reduction of food waste.
Develop policy	• Support State Government initiatives for source separation of food waste. • Provide tax incentives for food donation.

Contracts and Forecasting

Action	**How**
Build food waste into contract design	• Discuss food waste early in contract negotiations to capture opportunities to actively reduce food waste (amounts required, choices offered, plate/portion size). • Develop sample contract specifications for the catering industry aimed at reducing food waste. • Measure a baseline for sites, create goals and food waste reduction targets. • Use food waste data to modify contracts. • Allow menu substitution to use up short-dated stock, excess stock, or supplies delivered in error.
Develop more accurate forecasting systems	• Utilise available data to predict consumer numbers more accurately (future rosters/work contracts, previous history, pre-order systems) • Reference historical food waste data to adjust predicted production amounts. • Link forecasting data to purchasing/menu design. • Consider consumer profile – use experience, historical data and communication with client to understand their requirements and expectations

Preparation and Storage

Action	How
Training on food waste prevention	• Introduce food waste prevention into curriculum at hospitality schools and colleges. • Incorporate training on food waste into staff induction and development
Use standardised recipes & procedures	• Develop standard operating procedures to reduce risks of potential issues created by high staff turnover/skill shortage. • Include yields and purchasing amounts on recipe cards to help prevent overproduction and over-purchasing
Ensure good inventory management	• Define and implement sustainability into purchasing guidelines/policies. • Maintain good practice such as checking items on receipt, rotating stock, FIFO (First In, First Out), correct storage of ingredients

Service

Action	How
Optimise food service to minimise food waste	• Consider plated service where possible to avoid buffets. • Follow best practice guidelines (e.g., offer portioned items, display smaller amounts, reduce top-ups towards end of service, use smaller plates, standardise serving sizes). • Provide takeaway containers at end of events if applicable
Donation to food rescue	• Establish relationships with food rescue organisations.

Consumer

Action	How
Minimise plate waste	• Follow best practice guidelines (e.g. offer different portion sizes, optional sides or start with a smaller side and offer free top- ups, remove or minimise garnishes, use of smaller plates). • Measure and monitor plate waste, and report back to customers on a regular basis. • Facilitate feedback from front of house staff and customers to make real time adjustments.
Raise consumer awareness	• Promote awareness campaigns e.g., plate waste trackers

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Adelaide Oval
Australian Foodservice Advocacy Body
City of Adelaide
Compass Group Australia
Green Industries South Australia
International Convention Centre Sydney
National Convention Centre Canberra
OzHarvest
Radish Events
Rawtec
Sodexo
Ventia
Veolia

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APPENDIX A – Supporting Material(s)

Appendix 1. List of all hotspots considered.

STAGE		HOTSPOT
Spoilage	Procurement	• Over-purchasing • Errors in purchasing • Supply chain disruption • Cold chain integrity • Type/size of packaging
	Operations	• Stock rotation/out of date stock • Menu design (too complicated/too many ingredients) • Advance preparation food vs made to order
Preparation	Ingredients	• Using raw vs preprepared ingredients • Not using all parts of ingredients
	Human	• Errors in prep/recipes • Staff turnover • Lack awareness of food waste
	Operations	• Type of kitchen (prep vs satellite) • Type of food served (e.g., petit fours create more offcuts)
Serving	Forecasting	• Inaccurate • Expected consumers not eating in house
	Operations	• Buffet vs served • Food safety - presented food cannot be reused • Remote locations unable to redistribute food
	Customer/consumer	• Fear of running out • Plentiful food available all opening hours even near closing • Demand for variety/multiple options • Meeting dietary/allergen/preference requirements • Fruit – expected but not eaten
Plate	Portion size/composition	• Consumers taking too much and being unable to finish • Served portions too large • Plate composition - excess sides
	Operations	• Only allowing consumers to take food once from canteen • Insufficient time to eat • Availability of trays • Correct utensils
	Consumer	• Food not meeting expected standards of appearance/taste • Perception of food value • Service of alcohol affecting food consumption

Appendix 2. List of solutions from literature & best practice guides

	Solutions	
Contract Design	Food waste targets part of contract	• Discuss business case early • Provide training for sales team regarding food waste
	Flexible terms	• Adjust numbers/dietary requirements according to need rather than to set amounts agreed
Contract Requirements	Menu design	• Reduce number of choices and optimize ingredient usage • Ability to substitute menu items • Ability to incorporate leftovers • Take in account food waste reduction not just financial requirements/customer expectations
	Volumes required	• Can buffer amounts be reduced? (Needs good communication with client/consumer) • Period over which full service required – reduce top up closer to end of service/only offer cold food to late comers
Forecasting	Preorder systems	• Use actual numbers eating in rather than number on site • Information on preferences and dietary requirements i.e., number vegetarians
	Understand consumer profile	• Information on consumer profile (gender/age/dietary requirements)
	Integrated systems	• Connect forecasting information to purchasing and menu design
	SOPs and support systems	• Use experience, previous history, holidays/events to create systems/SOPs rather than relying on knowledge held by individuals • Buffer quantities to be produced • Recipe yields
Site Variations	Supply issues	• Ensure delivery as close as possible to usage • If possible, deal with local suppliers • Order from supplier than can supply suitable sized packs • Menu design to optimize ingredient use • Share deliveries across multiple kitchens
	Buffet vs served	• Encourage staff service rather than self-service if possible • Serve already portioned (easier to top up, avoids having unappetising half eaten platters) • Display smaller amounts on smaller platters but top up more frequently (extra can be stored under correct conditions, need signage) • Train staff to rearrange toward end of services offering still looks plentiful • Offer wrapped items to prolong freshness • Avoid topping up towards end of service, could offer cold options or reheat as required for late-comers • Policies on use of leftovers with clear definitions, not just blanket rules
	Practices and procedures	• Inspect stock on receipt • Minimum requirements for remaining shelf-life on product accepted (negotiate price on short-dated stock) • Rotate stock, FIFO • Organisation of stores and inventory management • Measuring and understanding food waste
	Donation to food rescue/animal feed	• Depends on location • Tax incentive

	Solutions	
Communication	Internal communication	• Avoid operational silos • Strong leadership on food waste so staff understand reason for actions • Training for agency staff so they understand company's commitment to reducing food waste
	External communication	• Important as caterer may not have direct communication with end consumer • Ensure customer understands what they have ordered – volume/composition • Checking numbers/requirements as close to date as possible • Opportunity for feedback – volume/appearance/taste/what went first/what was left (can also be an internal debrief) • Discuss food waste with client (understand drivers for mitigation) and share data • Confirm with client OK to reduce top up of offering closer to end of service • Awareness campaigns. Provide materials for clients to use with consumer – education tools, signage, plate waste trackers • Clear description/signage so consumer can avoid dislikes/allergens • Build relationship with food rescue/animal feed contractor
Skills/training	Provide training about food waste	• Staff understand importance of reducing food waste – choose correct message • Food waste KPIs • Hospitality training syllabus to embed food waste reduction
	Skills training	• Able to prepare ingredients with minimal waste/use of entire ingredient • Able to repurpose ingredients/leftovers • Understanding of food safety – what can be saved/donated • Training on correct storage of ingredients to reduce spoilage wastage
	SOPs	• Standard recipes to avoid errors, with yields included • Hospitality has high staff turnover/use of casuals so need procedures in place • Measurements for served consistently sized served portions
Consumer	Reduce plate size/remove trays	• Signage – you can come back for more • Need to communicate with consumer
	Smaller serving platters/dishes	• Offering looks plentiful even if smaller amount offered • More frequent top ups – food can be stored under correct conditions and reused • Signage that more is available
	Reduce portion size	• Offer a variety of portion sizes • Can enhance reputation as health-conscious food provider • Let consumer choose whether they want sides/garnishes • Offer smaller sides with option to top up • Need to communicate reasons with consumer
	Offer fewer choices	• Need to communicate reasons with consumer • Encourage pre-ordering • Rotate menus – limited choices but change more frequently • Have quick to prepare back-ups if an option runs out
Perception of value	Consumer education/behaviour change	• Information on food waste to share with consumer • Understand consumer motives around food waste
	Plate waste not included in running costs	• Measure and calculate cost of plate waste

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