



QUICK SERVICE RESTAURANT SECTOR ACTION PLAN REPORT 2026

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Executive Summary

Food waste is a significant global and national challenge associated with economic losses, environmental impacts and food insecurity. In Australia, 7.6 million tonnes of food is wasted annually and 70% is edible, costing the economy \$36.6 billion (FIAL 2021b). Food waste contributes 3.5% of the nation’s greenhouse gas emissions, using 2,600 gigalitres of water and 27.3 million hectares of land (FIAL 2021b). Meanwhile 33% of Australian households are experiencing food insecurity (Foodbank 2025b). End Food Waste Australia’s Sector Action Plans brings together food industry stakeholders to identify hotspots for targeted, collaborative action against food waste. The Quick Service Restaurant (QSR) Sector Action Plan was developed for foodservice businesses that offer fast or quickly prepared food with minimal table service, including burger chains, pizza shops, sushi bars, salad outlets, juice bars, and frozen dessert stores.

The QSR sector is a major part of the Australian hospitality industry, generating nearly a quarter of the industry’s revenue (EMR 2025; IBIS World 2025). The sector is large and fragmented, with extremes in market share concentration, business types, and locations. Business types include multinational-chain, Australian-chain and family-owned. The eastern seaboard, the most populated region of Australia, contains the highest concentration of QSR business. As of January 2025, there were 26,630 QSR businesses nationally, employing 226,000 people (IBIS World 2025). Major fast-food chains comprise the five largest QSR businesses, commanding 43.2% of the sector’s market share (IBIS World 2025).

The Australian foodservice and hospitality industry generates 1.2 million tonnes of food waste annually, with the majority disposed to landfill (FIAL 2021a) – over 324,000 tonnes are generated in hospitality. Of the total Australian hospitality sector, takeaway food outlets (incl. quick service restaurants) contributes 40% (130,600 tonnes) of food waste per year with 95% disposed to landfill (ARCADIS 2019, p. 76). Sector-wide action to reduce food waste is needed. This research project identified food waste hotspots within the Australian QSR sector to create a sector-wide action plan. The research scope was pre-consumer (back-of-house) food waste that occurs prior to consumer (front-of-house) food waste. Reducing food waste will benefit businesses, decrease environmental impacts and help Australia to meet its objective of halving food waste by 2030 (Commonwealth of Australia 2017).

Methodology

The project adopted a mixed-methods approach:

- **Literature review** of research reports and academic studies in Australia and internationally.
- **In-person Stakeholder interviews** (n = 4).
- **Onsite observations** of food practices and waste for a QSR chain in Melbourne (n = 4).
- **Survey 1:** individuals who work at QSRs across Australia (n = 136).
- **Survey 2:** managers and owners of QSRs across Australia (n = 110).
- **Data Analysis** and writeup of interviews, observations and surveys to identify root causes and solutions.

Hotspots and Root Causes

The research insights highlighted food waste hotspots and root causes, which have been used to target key recommendations. Six stages of food handling (back-of-house) are common across QSR enterprises with all reporting food waste hotspots (refer to Table 1). Out of the six stages, the top three stages expected by managers to produce the most food waste are ‘pre-preparation’, ‘service-ready’, and ‘stock storage’.

Table 1: The six stages of food handling in QSR to map food waste hotspots and root causes.

Handling Stage	Hot Spot	Root Causes
Stock Ordering	Overstocking and Digital Management Tool Limitations	Excess inventory from over-ordering and inaccurate forecasting. Digital tools fail to forecast external factors (e.g. weather, public events) that can cause sudden shifts in demand.
Stock Delivery	Poor-quality produce and delivery timing	Increased risk of spoilage and waste due to substandard fresh items (e.g. produce), and due to poor handling or temperature control (e.g. not put into cool room) during out-of-hours deliveries.
Stock Storage	Short shelf-life, large pack sizes, and poor temperature control	Strict usage policies for opened products, and poor temperature control in storage areas (e.g. lack of air conditioning units in ambient areas) contribute to waste and operational inefficiencies.
Pre-Preparation	Overordering, waste, and cooking errors	Lack of portion options, unused trimmings, and out-of-specification preparation contribute to food waste and inefficiency.
Service-Ready	Food safety, human error, and miscommunication	Strict discard policies, order mistakes, spillage, and unclear menu descriptions lead to food waste and customer dissatisfaction.
End-of-Shift Practices	Strict rules to discard food and poor food waste tracking. Poor equipment maintenance	Unsold, prepared food is discarded and food waste monitoring is insufficient. Aging equipment with inadequate upkeep, failure to replace or upgrade faulty equipment.

Emergent Solutions

The QSR sector is diverse in business size, operations, locations and facilities. This Sector Action Plan recommends actions that can be adopted by businesses across this sector, to maximise uptake and impact. Preventing food waste is prioritised, followed by diversion.

The six key solutions to reduce food waste in QSRs are:

1. Staff Empowerment & Training

- Empower staff to make real-time decisions.
- Co-design solutions with store teams.
- Avoid rigid adherence to digital predictions.
- Introduce food-waste-specific training modules.
- Align training with the food recovery hierarchy.
- Address training gaps between managers and frontline staff.
- Invest in staff training and retention.
- Increase staffing during peak times.

2. Food Donation & Redistribution

- Expand food donation programs.
- Increase staff awareness and provide clear guidance.
- Diversify donation-eligible items.
- Use apps to redistribute surplus food.
- Separate donation and food waste data in reporting systems.

3. Technology & Digital Systems

- Improve forecasting algorithms to reduce overproduction and spoilage.
- Enhance point-of-sale system communications with staff.
- Invest in AI for inventory management and waste tracking.
- Support sector-wide collaboration for technology development.
- Provide government incentives for small operators to adopt waste-reducing technology.

4. Infrastructure & Equipment

- Maintain and upgrade equipment regularly.
- Improve refrigerated prep equipment to reduce spoilage.
- Address storage issues like warm storerooms.
- Fix faulty equipment (e.g., intercoms) to prevent order errors.

5. Policy & Risk Management

- Review and revise rigid food safety policies that drive waste.
- Encourage safe repurposing of surplus food.
- Promote food donation as a viable solution.
- Advocate for regulatory reform to reduce liability concerns and enable sustainable practices.

A visual summary version of this report is available on the End Food Waste Australia website:

Quick Service Restaurant (QSR) Sector Action Plan Industry Summary Report.

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1. Introduction

1.1 The Australian Quick Service Restaurant (QSR) industry

The Quick Service Restaurant (QSR) sector is a major player in the Australian hospitality and food service industry. In 2024, the Australian QSR sector generated \$25.3bn in revenue, accounting for nearly a quarter of the total revenue in the wider hospitality industry (EMR 2025; IBIS World 2025). QSR is a term with a muddled definition, leading to some perceptions of the types of businesses that fall into the category. For this project, QSR refers to foodservice businesses that serve quickly prepared food with minimal table service, including fast food and takeaway outlets but not cafes. Included businesses may operate under a corporate franchise model and may provide food delivery through online platforms.

QSR businesses in Australia serve a wide range of foods. Aside from burgers and chips, offerings include pizza, burritos, sushi rolls, rice paper rolls, salads, and grilled proteins. The sector also includes juice bars, smoothie bars, bubble tea shops, and ice-cream and frozen yogurt shops. This diversity reflects the sector's responsiveness to consumer demand for speed, convenience, and variety across dietary preferences and cuisines.

The Australian QSR sector is large but fragmented, with extremes in the concentration of market share, business types, and business locations. As of January 2025, there were 26,630 QSR businesses in Australia, employing 226,000 people (IBIS World 2025). Yet the five largest QSR businesses commanded 43.2% of the sector's market share in 2024 (IBIS World 2025). The largest QSR businesses in Australia are the parent companies of major fast-food chains. While QSR businesses are located across Australia, over three quarters of these businesses (specifically fast-food outlets) are concentrated in three states — Victoria, New South Wales and Queensland. New QSR businesses are also more likely to open in these three states. This distribution corresponds to the most highly populated states in Australia, where a larger population allows these businesses to access a larger consumer pool and gauge market acceptance more easily. The fragmented nature of the QSR sector makes it distinct from other hospitality and food service industry sectors in Australia.

1.1.1 Challenges affecting the QSR industry

The sector has remained strong despite significant challenges in recent years, including the COVID-19 pandemic, increasing food costs, the growth of online delivery, and competition from the wider hospitality and food retail sectors (IBIS World 2023). Continuing competition and inflation will drive businesses to seek ways to maintain profitability and minimise costs, while higher consumer consciousness about health and environmental concerns will continue to drive the industry uptake in sustainability initiatives (IBIS World 2023, 2025).

1.1.2 Effects of COVID-19

The Australian hospitality industry was significantly affected by the COVID-19 pandemic, bringing change to both the industry and consumer practices. The impact to QSRs has been mixed. Lockdowns meant that restaurants needed to pivot their offerings to include takeaway and home delivery options. The QSR sector was comparatively less affected as most providers had always operated under a takeaway business model. However, the competition to retain customers intensified as restaurants began to capture a large share of takeaway sales away from QSRs. There were additional challenges when lockdowns lifted. Continued remote work and online learning meant that foot-traffic to physical stores, a major source of revenue, was slow to recover but has risen since 2023 (IBIS World 2023). A widespread adoption of self-service kiosks across major QSR chains helped to minimise server–consumer interactions and increase service turnaround (Kisok Marketplace 2021; QSR Media AU 2021).

Since the pandemic, consumer use of online food ordering and delivery platforms has continued to support the QSR industry with a sustained source of revenue. QSRs recognise that online food delivery platforms form a crucial part of their business, with many larger businesses developing websites and mobile apps to improve the online ordering experience for consumers. However, a reliance on external platforms has also constrained QSR revenue due to high commission charges. Up to 35% of the order value is paid to the platform, an especially significant amount for smaller QSR businesses (IBIS World 2023).

Food costs increased during the pandemic and have continued to do so due to inflation. QSR businesses have responded by examining cost saving measures such as waste reduction (IBIS World 2025). Even so, increasing inflation has necessitated QSR businesses to raise their prices to consumers to cover food ingredient and labour costs. QSR businesses raising prices has had a mixed effect. While it has helped to increase revenue in the QSR sector, consumers are also choosing to moderate their spending amidst rising cost-of-living pressures.

Overall, the QSR industry has fared well despite the various challenges faced since the start of the pandemic, with revenue rising over the past 5 years at an average rate of 1.2% annually (IBIS World 2025).

1.1.3 Competition from restaurants, cafes, supermarkets and convenience stores

Restaurants, cafes, supermarkets and convenience stores are the key competitors to QSR businesses. Restaurants captured a large share of takeaway sales away from QSRs during the pandemic, but this is now easing due to cost-of-living pressures faced by consumers. Cost-of-living pressures have driven consumers to moderate or reduce their spending, trading down to favour more economical options. This trading down would ideally benefit QSR businesses. However, it has resulted in rising competition from supermarkets and convenience stores, with consumers opting for their ready-meal and takeaways options (IBIS World 2025). Cafes are another key competitor to QSR businesses, competing in the space of healthier food options. Demand in this space has increased due to heightened awareness by consumers over the nutritional content of food when eating out and a conscious effort to choose healthier options (IBIS World 2025). The QSR sector is responding by increasing the number of salad bars, juice bars, and sushi stores. Individual QSR businesses are responding by improving the nutritional content of their offerings and expanding their range of healthier options. By increasing the number of plant-based options offered to consumers, QSR businesses are also meeting a broader consumer demand for more environmentally friendly food options (Statista 2024). The QSR sector therefore continues to adapt to shifting consumer preferences and increased competition from the wider hospitality and food retail sectors.

1.2 Food waste in the QSR sector

1.2.1 Overview of food waste by quantity and type

There is currently a limited body of research that reports what and how much food is wasted in QSRs in Australia and internationally. At the time of writing this report, a search of publications from the past decade yielded only 7 studies with information specific to food waste in QSRs (ARCADIS 2019; Austin Resource Recovery 2012; Drewitt 2013; Filimonau and Ermolaev 2021; Gunders 2012; Jayasekara et al. 2024; McAdams et al. 2019). Of these publications, two relate to Australia (ARCADIS 2019; Jayasekara et al. 2024). Additional publications beyond this set included information on food waste in the wider hospitality sector or in the restaurant and café subsectors (FIAL 2021a; NSW EPA 2017; SRA 2010; Sustainability Victoria 2021).

The Australian foodservice and hospitality sector is responsible for 16% or 1.22 million tonnes of food waste per year (FIAL 2021a). Figures from the 2019 National Food Waste Baseline indicate that of the total Australian hospitality sector, takeaway food outlets (incl. quick service restaurants) contributes 40% (130,600 tonnes) of food waste per year with 95% disposed to landfill (ARCADIS 2019, p. 76). This 40% estimate likely does not fully represent the full extent of what is wasted, as it does not mention dine-in options from QSR outlets¹. The Baseline was updated in 2021 with information for the hospitality sector (FIAL 2021a), but it does not provide separate figures for the QSR industry due to limited data. The most recent Australian study published in 2024, covering 2 QSR outlets, reported a 25kg daily average of pre-consumer food waste (Jayasekara et al. 2024). Given the lack of published research on food waste in QSRs operating in Australia, there is a pertinent need for more research to understand the food waste hotspots in QSRs. Hence the importance of this project.

Food waste in the QSR sector can be divided into two main categories: front-of-house or consumer food waste, generated after the food is sold to consumers; and back-of-house or pre-consumer food waste, generated before food is sold to consumers (Figure 1).

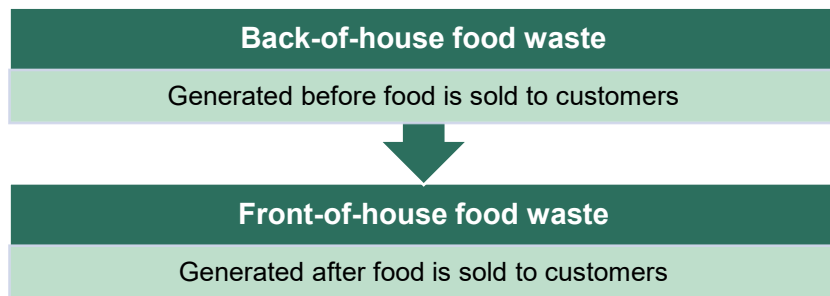


Figure 1: Division between front-of-house and back-of-house food waste

The focus of the QSR Sector Action Plan is to identify actions that QSR businesses can implement to reduce back-of-house food waste.

¹ The hospitality and food services sector in the 2019 National Food Waste Baseline is defined as including restaurants and cafes, hotels, catering, food courts and take-away food from quick service outlets.

1.2.2 Drivers of food waste identified from the literature

There are multiple stages of food handling that can lead to food being wasted back-of-house in QSRs. In the literature, the most mentioned stage associated with food waste was the ‘pre-preparation’ stage, followed by ‘service-ready’ stage, and finally the ‘stock storage’ stage (Figure 2).

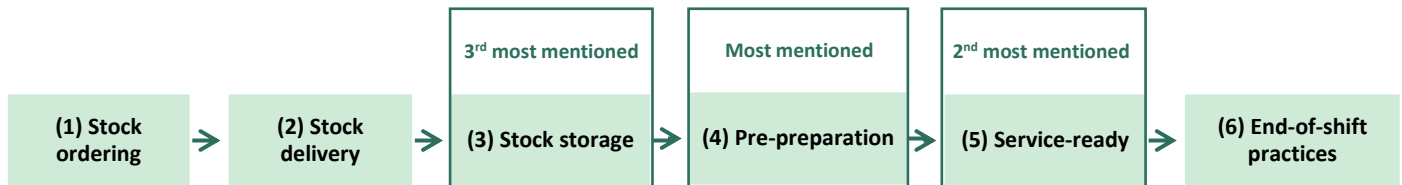


Figure 2: The food handling stages most mentioned in the literature in association with back-of-house food waste.

Reasons for food waste at the pre-preparation stage (most mentioned) included unused off-cuts or trimmings and imperfect cooking (Filimonau and Ermolaev 2021; Jayasekara et al. 2024). For the service-ready stage (2nd most mentioned), reasons for food waste included food safety and hygiene concerns (Hirth et al. 2021) that are embedded in company policy. For example, a major fast food chain ordered staff to dispose of fries within 7 mins of preparation (Gunders 2012). Human error was another reason for food waste. In the service-ready stage, human error affected hot food the most (Whitehead 2020). In the delivery and storage stage (3rd most mentioned), human error included team members inaccurately predicting the shelf-life of products (Kisok Marketplace 2021). Equipment failure, including mechanical breakdowns of freezers, was another challenge at the storage stage (Dzumbunu 2018).

Back-of-house food waste in QSR businesses can be grouped into five categories. From the most to least mentioned in the literature, these categories are ‘forecasting’, ‘hygiene’, ‘process’, ‘staff’, and ‘packaging’. Under the forecasting category, the most mentioned reason for food waste was ‘preparation of too much food’ (Dhir et al. 2020; Jayasekara et al. 2024), followed by ‘ordering too much stock’ (Filimonau et al. 2019; QSR Media AU 2022). In the ‘hygiene’ category, the reasons of food waste related to storage period (Hirth et al. 2021), storage temperature (Emerson 2020), spoilage (Dzumbunu 2018), food recalls or faulty stock, and dropped or spilled food (Dzumbunu 2018).

In the ‘process’ category, preparation offcuts (Jayasekara et al. 2024) and imperfect cooking (Filimonau and Ermolaev 2021) were the two most mentioned reasons for waste. The amount of preparation waste generated at a particular restaurant is dependent on what is considered edible and inedible, which has a number of cultural connotations (Jayasekara et al. 2024). Other process related reasons included poor storage (Marx-Pienaar et al. 2020), mistakes in preparing food orders (Cherryh 2019), inability to donate food (Jayasekara et al. 2024), and machine maintenance issues (Dzumbunu 2018).

The action or inaction of staff also plays a role in back-of-house food waste in QSRs, with staff training or lack thereof a key driver (Dzumbunu 2018; Kisok Marketplace 2021; McAdams et al. 2019). Investment in further staff training (McAdams et al. 2019) or training staff on equipment that saves them time (Kisok Marketplace 2021), can result in less food waste (Dzumbunu 2018). However, there are challenges in providing further training to staff in the hospitality sector due to high turnover rates and increasing costs of training (McAdams et al. 2019). Lesser-mentioned staff-related reasons for food waste was management or staff direction issues (Filimonau and Uddin 2021; Noone and Coulter 2012).

Packaging was least mentioned of the identified categories for back-of-house food waste in QSRs. The most mentioned packaging reason was date labelling. This includes outdated date labelling practices, such as relying on staff to memorise the exact shelf life of products (Kisok Marketplace 2021). Although this literature review has not identified packaging as a frequently mentioned reason

for back-of-house food waste in QSRs, the impact of packaging on reducing food waste is known (Wohner et al. 2019). Packaging’s role in reducing household food waste has also been explored in recent years (Chan 2022a, 2022b). Packaging’s role in generating/reducing food waste in the QSR and wider food service sector is an under researched area.

1.2.3 Suggested solutions to reduce food waste

The solutions suggested in the literature to reduce food waste in QSRs relate to tweaking existing practices across all the different back-of-house processes. As guided by the food recovery hierarchy (see Figure 3), solutions to prevent food waste or surpluses should be prioritised where possible (FIAL 2021b, p.3; Fight Food Waste CRC 2019). Most of the currently suggested solutions fall into this category, possibly owing to promoting good business sense where reducing food waste reduces money wasted (Hanson and Mitchell 2017).

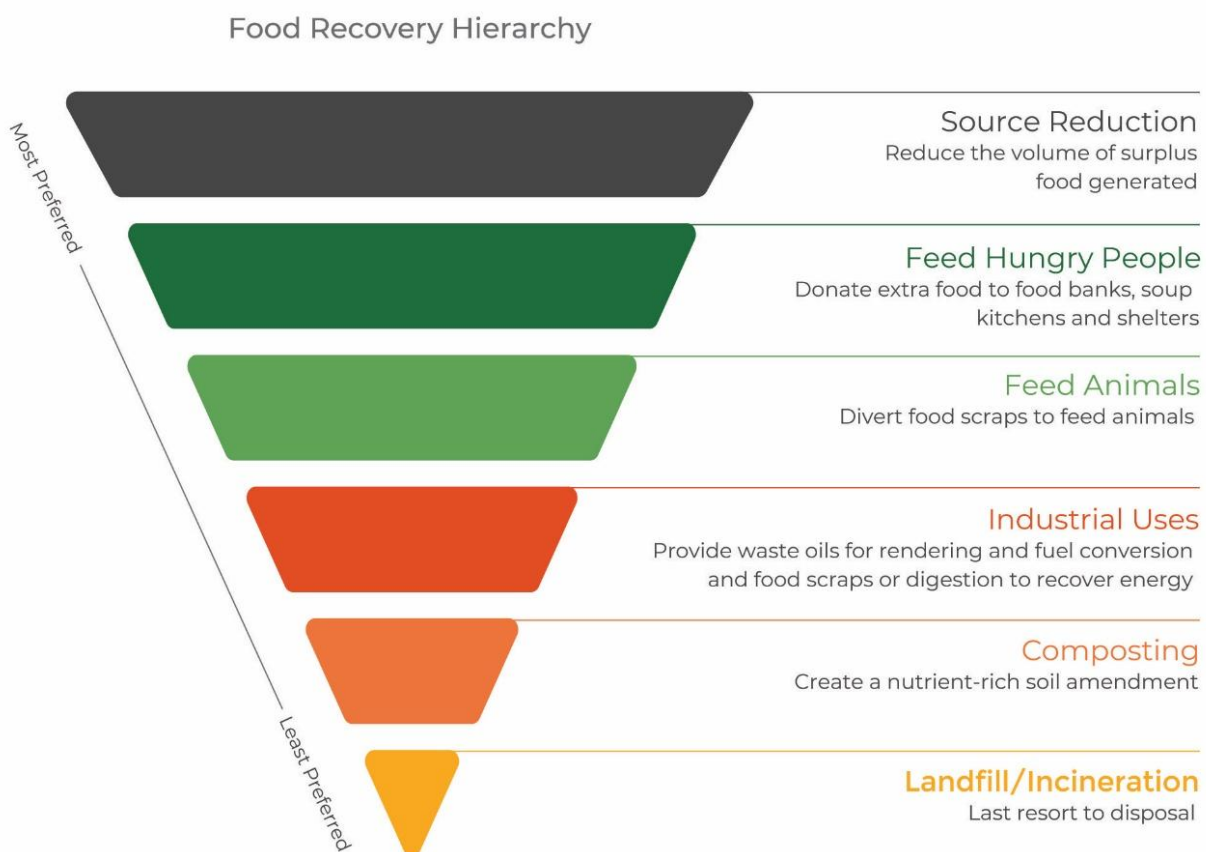


Figure 3: The Food Recovery Hierarchy, from Fight Food Waste CRC (2019)

The most suggested solutions or strategies to reduce food waste include forecasting for pre-preparation (Oches 2018; WRAP and Guardians of Grub 2020), regulation of stock ordering (Dzumbunu 2018; Filimonau and Ermolaev 2021) and waste audits (Aytaç and Korçak 2021; Hollis 2019). These strategies assist in reducing food waste with the added benefit of reducing costs. Other waste reduction strategies pertain to proper management and efficient use of existing stock, including processes to improve storage practices (Dzumbunu 2018; WRAP and Guardians of Grub 2020), hygiene practices (Lal et al. 2021; Whitehead 2016), packaging (Martin-Rios et al. 2018; Marx-Pienaar et al. 2020), smart menu design (Dhir et al. 2020), stock rotation/labelling (Oches 2018; WRAP and Guardians of Grub 2020), protein cut to specification (WRAP and Guardians of Grub 2020), nose-to-tail cooking (NSW EPA 2017; Principato et al. 2021), machine guards to prevent spillage (Dzumbunu 2018), and dark kitchens to streamline production processes (WRAP and Guardians of Grub 2020). Staff play a crucial role as human behaviour is a factor behind the many ways food is wasted, so staff training (Hollis 2019; Marx-Pienaar et al. 2020) and employing a food waste manager (Principato et al. 2021) have been suggested to address this.

Where food waste cannot be avoided, the suggested solutions focused on increasing food waste diversion away from landfill or lower in the waste hierarchy, in favour of food donation (Martin-Rios et al. 2018; Sustainability Victoria 2021). Solutions include discounting surplus food (Jayasekara et al. 2024; Thong and Anich 2022) and tax benefits for doing so (Michalec et al. 2018; Thong and Anich 2022).

There are technological options available to help QSRs to implement several of the abovementioned solutions to reduce food waste. In fact, adoption of technology was the most mentioned solution category (68% of relevant publications), with many of these technological options promoted in QSR industry publications. These technological solutions are wide ranging, from artificial intelligence (AI) and cloud-based solutions to smart technology. Following the adage of 'what gets measured gets managed' for food waste reduction (Champions 12.3 2020), cloud-based platform solutions can provide auditing capabilities for QSRs to track waste (QSR Media AU 2023a). Smart scales can give real-time feedback on what items are being wasted and in what quantities so businesses can adjust accordingly (Clowes et al. 2019; Daninhirsch 2022). Menu and recipe engineering capabilities offered by cloud-based AI platforms can help QSRs reduce waste through efficient use of food ingredients (QSR Media AU 2023b). Internet-of-Things (IoT) based AI systems can be trained to prevent food preparation and spoilage waste by up to 10% (Aytaç and Korçak 2021). Predictive AI can combine previous sales data and real-time weather forecasts to predict food preparation amounts and timings, reducing surplus (Groene and Zakharov 2024). Furthermore, modern robotics technology can assist production management and reduce order errors in QSRs (Noone and Coulter 2012). When there are surplus, mobile apps such as Too Good to Go (QSR Magazine 2023; Vo-Thanh et al. 2021) offer a platform for QSRs to redistribute this surplus through discounted sales and donation. Existing technological solutions therefore offer QSRs options to tweak their practices across the different back-of-house processes. As these technological solutions have been promoted in QSR industry publications as a 'quick fix', there is an opportunity for research to explore their effectiveness in practice.

1.3 Knowledge gaps identified from the literature review

A review of the current literature on food waste in QSRs published in Australia and overseas revealed gaps in current knowledge (Chan et al. 2026a). These gaps represented research opportunities that guided the data collection of this research project. This research project responded to opportunities to conduct research specific to the Australian QSR sector, to better understand what foods are wasted, where waste hotspots occur, the reasons for waste, and the effectiveness of current solutions. By addressing these gaps, this research project contributes to building a more comprehensive overview of food waste in the Australian QSR sector, to inform targeted approaches to waste reduction. In particular, this research project focused on identifying food waste hotspots and root causes, supporting the development of a sector-wide action plan to reduce food waste across the Australian QSR sector.

1.3.1 Research specific to the QSR sector in Australia

This research project responded to an opportunity to conduct a greater number of food waste research studies that focus specifically on the QSR sector. To date, limited research has been conducted on food waste generated in the QSR sector, especially within the Australian context (ARCADIS 2019; FIAL 2021b). Existing research studies have mostly focused on the wider hospitality industry. This lack of distinction is an issue as the QSR sector has specific practices that set it apart from the other sectors in the hospitality industry (IBIS World 2023). Sector-specific studies are valuable in that the generated insights are deeper and more nuanced, useful to tailor solutions to reduce food waste across the sector — essential to develop this sector action plan.

1.3.2 Data on what foods are wasted and how much

This research project responded to an opportunity to identify the specific types of food wasted in the Australian QSR sector and quantify this waste. Current national data on food waste in QSRs is limited, lacking detail on food types and quantities wasted (ARCADIS 2019). Gathering such data aligns with a recommendation by FIAL (2021b, p. 28) to track waste volume and costs in the hospitality sector. Understanding the scale of a problem is an important step in managing it (Champions 12.3 2020). The additional nuance of understanding what foods are wasted forms a stronger foundation to identify hotspots and recommend solutions.

1.3.3 Information on what factors drive food waste

This research project responded to an opportunity to identify the reasons why food is wasted in the Australian QSR sector. Current information on food waste drivers is from studies conducted internationally, so this project responded to an opportunity to examine whether these drivers apply to the Australian context. This included exploring the role of kitchen staff in the processes across different food handling stages. The project also responded to an opportunity to explore whether the factors that drive food waste differ across multiple types of QSR businesses. Gathering this information helped to identify root causes to tailor targeted solutions.

1.3.4 Information on the effectiveness of current solutions

This research project responded to an opportunity for research that engages QSR businesses in dialogue about what strategies they have used to reduce food waste and perceptions of their effectiveness. While there are recommendations within academic and industry literature on ways to reduce food waste within hospitality settings (WRAP and Guardians of Grub 2020), there is currently limited information on the effectiveness of these solutions, especially within the QSR sector. Such research provides insights into the challenges QSR businesses experience when implementing solutions to reduce food waste, enabling a more nuanced and context-sensitive approach to recommending appropriate solutions.

2. Methodology

2.1 Overview of methodology

The purpose of this research project was to develop a food waste reduction action plan for the Quick Service Restaurant (QSR) sector in Australia. The overarching aim is to reduce the national food waste generated by the sector through utilisation of the Review-Plan-Do framework endorsed by the Australian National Food Waste Steering Committee (FIAL 2019). The first focus of the framework is to identify food waste hotspots, followed by investigating the root causes of the waste. A range of practical solutions are then identified and recommended, guided by the food recovery hierarchy (Fight Food Waste CRC 2019).

Our research for this Sector Action Plan focussed primarily on food waste generated back-of-house in QSR businesses across Australia, as this represents an area of waste within the control of QSR businesses. This enabled the project to specifically tailor recommendations to reduce food waste that QSR businesses may see as more feasible and achievable to implement. At the same time, the research team aimed to capture the realities for the sector in terms of constraints and barriers to change. While consumer or 'front-of-house' food waste and supplier food waste are important concerns, they are distinct sub-categories, each requiring specific approaches and strategies to address effectively, and therefore beyond the immediate scope of this research project. Figure 4 shows the system boundary of this research project.

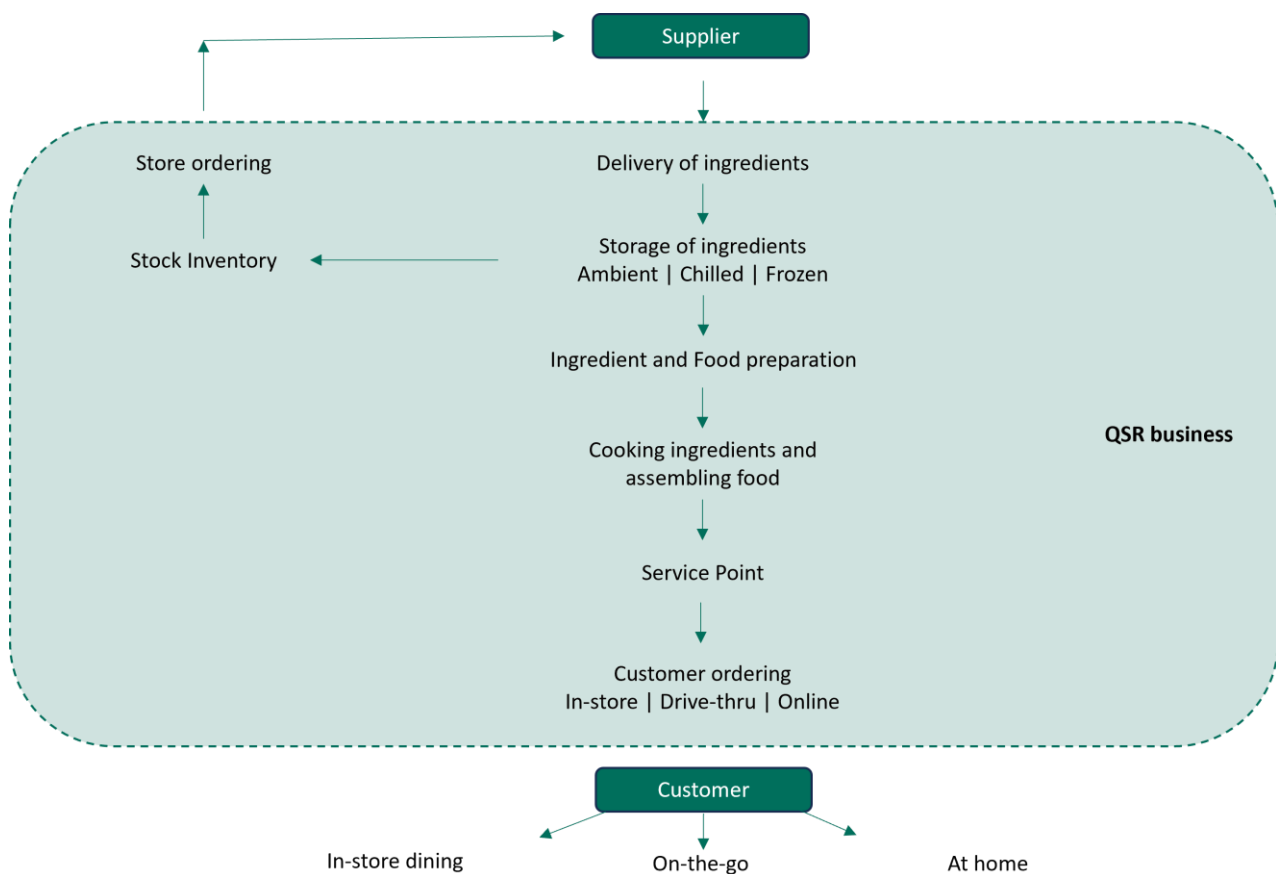


Figure 4: QSR system boundary for this research project

This research project used a mixed methods methodology to conduct the research and to triangulate the key findings (

Figure 5). Recommended actions for the QSR sector to reduce food waste were then prepared based on these key findings. Ethics approval was provided by the Human Research Ethics Committee at RMIT, approval number 2024-27340-24094 for the *Quick Service Restaurants (QSR) Sector Action Plan Chapter (Project 1.1.7)*.

The methodology included the following:

- Literature review of existing research on food waste generated in QSRs, published in Australia and internationally (n = 69).
- Stakeholder interviews – in-person (n = 4).
- Onsite observations of a Melbourne QSR chain’s food practices and waste (n = 4).
- Survey of individuals who work at QSRs across Australia (n = 136).
- Survey of managers and owners of QSRs across Australia (n = 110).
- Data Analysis and writeup of interviews, observations and surveys to identify root causes and solutions.



Figure 5: Triangulation of research findings to develop the QSR Sector Action Plan

2.2 Literature review

To establish a baseline of what is currently known about back of house (BOH) food waste generated in the QSR sector, the research team conducted a systemised literature review of relevant research publications and industry publications. See Quick Service Restaurant Sector Action Plan — Literature Review (Chan et al. 2026a).

The review scope included English language publications, published nationally and internationally from March 2010 to March 2024, for a 14-year overview of key QSR sector developments within academic and industry research and practice. The main search terms used were ‘food waste,’ in combination with; ‘QSR’, ‘quick service restaurant’, ‘on the go’, ‘take away’, ‘fast food’, ‘franchise’, ‘food delivery’, ‘reduce’ and ‘mitigate’.

Publications were screened using inclusion criteria based on seven specific food waste identifiers considered relevant to the project. Table 2 lists the food waste identifiers or inclusion criteria. A total of 69 publications were identified as of interest to this project, including 29 research publications and 40 industry publications. The relevant research publications included 16 journal articles, 1 conference paper, 2 theses and 10 industry research reports. The relevant industry publications included 5 white papers and 35 press releases.

Table 2: Food waste identifiers used as inclusion criteria for the reviewed publications

Food waste identifiers used as publication inclusion criteria	
1	Pre-consumer / back of house food waste at QSRs
2	Quantifies food waste at a QSR establishment
3	Identifies what food is wasted at QSRs
4	Identifies reasons for food waste at QSRs
5	Identifies key actors associated with producing or reducing food waste at QSRs
6	Suggests strategies for reducing food waste at QSRs
7	Identifies barriers for implementing food waste reduction strategies at QSRs

The inclusion of industry publications in the review provided an industry-insider view into perceptions and attitudes toward food waste within the QSR sector, providing contextual information relevant to developing a sector action plan. Topically relevant industry research reports and white papers were identified by searching the websites of key governmental, non-governmental, and research organisations that have published food waste related research. This included reports published by Champions 12.3 and WRAP (Waste Resources Action Program) in the UK; ReFED in the USA; and NSW EPA (New South Wales Environment Protection Authority), FIAL (Food Innovation Australia Limited), and End Food Waste CRC (formerly Fight Food Waste CRC) in Australia. QSR Australia, QSR Web, and QSR Magazine were chosen as the online magazine platforms or websites to source these industry press releases, as they have published information and news on industry developments pertaining to food waste management and reduction. The readily accessible online archive of industry press releases for these platforms enabled a systematic search (and analysis of publications) in a similar manner to the research publications.

The Systematic Quantitative Literature Review (SQLR) method (Pickering and Byrne 2014) was used to carry out a comprehensive analysis of the publications in the literature review, providing a detailed overview of what is reported in extant literature relevant to the QSR sector. The SQLR method is a pragmatic and systemised approach that quantitatively identifies trends in a group of literature. The method involved using a spreadsheet to map the number of publications relevant to different categories or themes identified within the group of literature (Pickering and Byrne 2014). A benefit of using this approach was that the results clearly

showed the knowledge gaps in relation to food waste in the QSR sector. In recent years, this approach has been used in a comparative literature study of packaging solutions for household food waste (Chan 2022a).

The results of the literature review enabled the research team to understand the state of research pertaining to food waste in QSRs, and to identify research opportunities which are pertinent to address. See section 1.2 for an overview of food waste in the QSR sector. See section 1.3 for an overview of gaps in the current knowledge.

2.3 In-person fieldwork

The research team conducted in-person fieldwork through site visits to 4 different branches of a major QSR chain in Victoria during August 2024 (Chan et al. 2026c). These site visits encompassed semi-structured interviews followed by observations of the back-of-house areas, for an in-depth insight of the operational practices and challenges faced at the ground level within a QSR environment. Participation was voluntary and informed consent was provided. See Quick Service Restaurant Sector Action Plan — Interview and Observations Report (Chan et al. 2026c) for details.

2.3.1 Semi-structured interviews

Each site visit began with a 1-hour semi-structured interview with the on-site manager. Semi-structured interviews combine pre-determined questions with the opportunity for follow-up questions, enabling a deeper understanding of the participants' experiences, perceptions, and perspectives on a specific topic (Creswell and Creswell 2022). A total of 21 questions were asked during the interviews.

The research team asked the participants questions that related to:

- Overall perceptions of food waste
- What food products are wasted back-of-house and how much
- What food handling processes and stages are associated with food waste
- Employee roles and responsibilities in relation to food waste
- Strategies currently used to reduce food waste

The interview audio was recorded with permission and transcribed. Members of the research team read through the transcripts and compiled detailed notes and insights. These were further refined into the key insights presented in this report.

The semi-structured interviews established rapport and trust with the site managers prior to conducting on-site observations.

2.3.2 On-site observations

The second part of the site visits involved observations of the back-of-house areas, including the kitchen, storerooms, and waste areas. The observations lasted 3 hours each, to enable the research team to observe a variety of processes (e.g. start of shift preparations, waste management) the duration of processes (e.g. cooking of raw ingredients) and to witness any fluctuations (e.g. in order volumes).

In alignment with the semi-structured interviews, the research team focussed the observations to the categories of:

- What food products are wasted back-of-house

- What food handling processes and stages are associated with food waste
- Equipment and digital technology used to manage kitchen processes
- Employee roles and responsibilities in relation to food waste
- Strategies currently used to reduce food waste

Photos were captured, with consent, of food waste, kitchen equipment, and storage areas, and waste management areas. The back-of-house area was mapped out, with areas associated with food waste noted, to assist the research team with noting the physical contexts in which food waste was generated. Members of the research team then assessed the field notes and photos to compile and insights. These were further refined into the key insights presented in this report

2.4 Online surveys

To understand how food waste is perceived and managed within QSRs, the research team gathered insights from individuals from QSRs across Australia. Two online surveys were carried out, focussing on (1) individuals who work in QSRs and (2) individuals who manage or own QSR businesses, for a system-wide overview.

2.4.1 Survey of individuals who work at QSRs

To understand how food waste is perceived and managed within QSRs, it was essential to gather insights from individuals working in these establishments across Australia. While the survey was open to anyone working at a QSR, 76% of the respondents were crew staff. Crew staff are directly involved in food preparation within a QSR kitchen and can provide valuable perspectives that may not be as evident to higher management or corporate decision-makers. The remaining respondents included store managers (16%) and crew trainers (13%), supply chain staff (7%) and other roles (3%).

The design of survey 1 was informed by the literature review (Chan et al. 2026a), which identified employees and managers as key actors in back-of-house food waste generation in QSRs. The literature review also highlighted that managers often attribute food waste to employees' lack of skill (McAdams et al., 2019). Given this, an anonymous survey was designed to allow employees to freely express their perspectives on food waste without managerial influence.

The survey was conducted during July–October 2024 and aimed to collect insights from 200 participants currently or previously employed in the QSR sector. The research team used the online survey platform Qualtrics XM to conduct survey 1. Qualtrics supported the research team with participant recruitment, survey distribution and data collection. Qualtrics recruited participants from its existing database, screened to meet the study's eligibility criteria:

- Compliance with the project's Human Research Ethics Approval (2024-27340-2409)
- Aged 18 or older
- Currently or previously working (limit of 2010) in a QSR setting.

Qualtrics initially provided 220 responses to account for potential exclusions due to low-quality data. After reviewing the dataset, the research team identified 83 responses as low-quality and omitted them from analysis. The final dataset included 136 responses:

- 125 respondents who identified as Employees (current or former).
- 11 respondents who identified as Employers (current or former).

- Of the 136 respondents to survey 1, 88% had worked for a QSR in the last 10 years, 70% in the last 5 years.

Following data collection, the survey responses were exported into Excel for data checking and cleaning. This process removed low quality responses (such as straight-lining and gibberish text) and ensured consistency in the spelling of business names or terminology. These refined data were then analysed via both Qualtrics and Excel to highlight valuable insights about the participants and attitudes and actions with regards to food waste in QSRs.

2.4.2 Survey of QSR managers and owners

To gain deeper insights into organisational decision-making and operational challenges within the QSR sector, the research team built upon survey 1 to conduct a second survey that focussed on managers and owners. As key stakeholders responsible for workforce management and overall business decision-making, their perspectives were critical in contextualising data from the initial survey of general staff (survey 1). This targeted approach allowed for a comparative analysis and a more comprehensive understanding of the factors influencing food waste in the QSR sector.

The survey was conducted during October–December 2024 and aimed to collect insights from 200 participants currently managing or owning a business in the QSR sector. The research team used the online survey platform Qualtrics XM to conduct survey 2. Qualtrics supported the research team with participant recruitment, survey distribution and data collection. Qualtrics recruited participants from its existing database, screened to meet the study’s eligibility criteria:

- Compliance with the project’s Human Research Ethics Approval (2024-27340-2409)
- Aged 18 or older
- Currently managing or owning a business in the QSR sector.

Qualtrics initially provided 220 responses to account for potential exclusions due to low-quality data. After reviewing the dataset, the research team identified 110 responses as low-quality and omitted them from analysis. The final dataset included 110 responses:

- 98 respondents who identified as Managers
- 19 respondents who identified as Owners

Following data collection, the survey responses were exported into Excel for data checking and cleaning. This process removed low quality responses (such as straight-lining and gibberish text) and ensured consistency in the spelling of business names or terminology. These refined data were then analysed using a combination of descriptive statistics and thematic analysis, for an overview of managerial and owner perspectives on food waste in the QSR sector. See the Quick Service Restaurant Sector Action Plan — Survey Report (Chan et al. 2026b) for a fuller overview and description.

3. Results

Data analysed as part of the Sector Action Plan identified several key themes across the sector. The emerging themes have been organised into hotspots (where the waste occurs) and root causes (why food waste occurs). Quick Service Restaurants generate food waste in two main areas: pre-consumer (back-of-house) and consumer (front-of-house). This Sector Action Plan focuses on back-of-house food waste, identifying key hot spots and root causes that QSR businesses can consider as opportunities for positive change (Figure 6).



Figure 6: Focus of QSR Sector Action Plan

3.1 Hotspots across food handling stages

Food handling practices within back-of-house areas of QSRs can be classified into six stages: stock ordering, stock delivery, stock storage, pre-preparation, service ready and end-of-shift practices. The quick service nature of QSRs brings challenges to employees where time is the essence in preparing customer orders. Fluctuations in customer numbers across a day, or week, needs to be balanced with inventory management including ordering of stock and correctly rotating stock to ensure that 'first in is first out'. The preparation of ingredients is a critical stage in conjunction with the service ready stage where meals are assembled and sold to the customer. The six stages of food handling are summarised in Table 3, each with specific activities and related food waste root causes identified across the research (interviews/observations and surveys). While food waste can occur across all food handling stages, the identified top three hotspots from the research (observations/interviews and surveys) were: Pre-preparation (stage 4), Service Ready (stage 5), and Storage (stage 3). These top three hotspots align with the literature (Figure 2).

Table 3: The different food handling stages used by QSRs and root causes of food waste. Food is most wasted at the pre-preparation stage, followed by the service ready stage and storage stage.

Food Handling Stage	Stage	Activities	Root Causes
STOCK ORDERING	Stage 1	<ul style="list-style-type: none"> Stock ordering 	<ul style="list-style-type: none"> Overstocking of Ingredients and Beverages — occurs when restaurants order more stock than needed, leading to surplus items that may expire or go unsold. Limitations of AI Prediction in Digital Tools — current tools struggle to account for unpredictable external influences (e.g. sudden changes in customer demand, weather, events).
STOCK DELIVERY	Stage 2	<ul style="list-style-type: none"> Stock delivery 	<ul style="list-style-type: none"> Delivery of poor-quality fresh produce — reported issues with lettuce and other fresh items arriving in poor condition leading to waste. Food temperature fluctuations — slow transfer from delivery trucks with cool room doors left open due to low staffing results in loss of food.
STORAGE	Stage 3	<ul style="list-style-type: none"> Stock storage Stock moved to prep area and unpacked 	<ul style="list-style-type: none"> Limited Shelf-Life After Opening — Corporate shelf-life guidelines restrict how long opened or prepared items can be kept, causing waste. Mismatch between Pack Size and Demand — Low-demand items are ordered in quantities too large to be used before spoilage. Equipment Maintenance Gaps — Inadequate support for timely maintenance and replacement of equipment to avoid malfunctions.
PRE-PREPARATION	Stage 4	<ul style="list-style-type: none"> Ingredients prepared Premade foods cooked 	<ul style="list-style-type: none"> Unused edible food — Off-cuts or trimmings not used. Imperfect cooking — due to equipment malfunction, unsupervised cooking times, temperature-related issues, food damage or spoilage. Smaller portion sizes — not offered or customers enticed to upsize and overorder.
SERVICE-READY	Stage 5	<ul style="list-style-type: none"> Meals prepared & delivered to front counter Meals served to customers at POS or drive-through 	<ul style="list-style-type: none"> Food safety hygiene policies — discard unsold food by a set time. Human error — Staff incorrectly taking or delivering orders causing returned cooked food. Spillage — rushing to deliver food and food is dropped or spilled.
END-OF-SHIFT	Stage 6	<ul style="list-style-type: none"> Unused items returned to the fridge and labelled Expired foods disposed End-of-day store clean and measuring of waste 	<ul style="list-style-type: none"> Discarding all unpurchased food — due to company policies. Poor food waste tracking methods — food waste not measured or incorrect estimations.

3.1.1 Stock ordering

Each QSR business will use specific digital management tools to manage inventory levels for daily operations, from stock ordering to waste reporting. Finding a balance of ordering sufficient ingredients and maintaining adequate stock inventory is a constant challenge in conjunction with predicting future customer sales. Excess stock can result in food wastage if items expire or cannot be sold.

3.1.2 Stock delivery

Stock can be received at any time throughout the day, before or after closing time, or during opening periods. One or more staff will assist in unloading stock and transferring it to the relevant back-of-house area for storage. Some businesses may receive daily deliveries of certain ingredients, e.g. fresh meat; while other items such as vegetables and bread may be delivered every 2-3 days.

3.1.3 Stock storage and rotation

To maintain freshness and food safety, food ingredient deliveries are immediately stored according to corporate/business issued guidelines for food storage (e.g., refrigerators, freezers). A key part of this process involves rotating inventory using the FIFO (first-in, first-out) principle. In some cases, staff may label deliveries with arrival dates in addition to the manufacturer's best-before / expiry dates. Staff move older stock up the front of storage and push the newer stock to the back. Under this principle, open packages and older stock should be prioritised to be used first when staff prepare food. Corporate-issued shelf-life guides determine how long all food can be kept after packaging has been opened or once prepared.

Poor storage practices including improper storage, food past the use-by-date and stock take are the most mentioned reasons for food wasted during the 'storage' stage. Along with ensuring that freezers and refrigerators are operating at correct temperatures, ambient storage areas can become too warm, affecting the shelf life of foods ordinarily stored outside of the cold room (e.g. bread buns). This highlights the importance of regulating the temperature of all ambient and cold storage areas. Interventions such as air-conditioning and temperature monitors in ambient zones, especially during the warmer seasons, can help maintain food quality and minimise spoilage. Good storage practices that minimise food waste not only relies on well-trained staff, but also on QSR management (including owners) providing appropriate and well-maintained equipment and infrastructure.

Most of the waste occurring in storage is considered preventable, so there are opportunities to align solutions with the food recovery hierarchy by prioritising preventative action.

3.1.4 Pre-prepare menu items

Quick service is a defining feature of QSR establishments, and pre-preparation of menu items is essential to deliver this service efficiently and reliably. Food pre-preparation processes operate on multiple levels. Ingredients may be delivered pre-cut, pre-marinated, or in ready-to-use forms such as frozen patties, pre-cut frozen vegetables, and pre-prepared salads, reducing handling time and streamlining kitchen operations. However, many QSRs — from small takeaway outlets to large fast-food chains — still prepare vegetables from scratch, generating peels and offcuts that are often wasted. A further level of pre-preparation involves pre-cooking menu items to place into temperature-controlled holding bays, which requires forecasting customer demand. Inaccurate forecasts can lead to waste downstream at the service-ready stage when excess pre-cooked food remains unsold.

3.1.5 Preparing and serving customer orders (service-ready)

At the ordering and service stage, several factors drive food waste. During peak hours, staff working under pressure may drop items or prepare orders incorrectly, leading to waste. Corporate issued shelf-life guidelines for holding times for pre-cooked food also contribute, as items must be discarded once limits are reached. In addition, failures in communication with external delivery platforms can result in cancelled orders not being relayed to the store, leaving meals uncollected and wasted. This means that even with pre-preparation efficiencies, operational pressures contribute to human error that leads to food wasted at the point of service

3.1.6 End-of-shift practices

End-of-shift practices include stock-take and waste categorisation reporting. End-of-shift waste stems from unsold food items that cannot be retained due to time-temperature regulations. Although donation programs alleviate a portion of this waste, limitations in storage and staff awareness can prevent comprehensive adoption. Stores that do participate in food donation need to follow strict guidelines to ensure that donated food is palatable and safe for consumption.

3.2 Food waste tracking

3.2.1 Food waste tracking practices

QSR businesses ranked methods to track and report on food waste (survey 2, n=110) (see Figure 7). Digital tools (70%) are the greatest adopted method compared to manual methods requiring pen and paper (26%) QSR businesses use multiple digital tools to track and report on food waste, shown in Figure 8. The top three digital tools included digital spreadsheets, digital food waste tracking technologies, and inventory management software. Spreadsheets (e.g. Excel) were the most used tool (20%) for recording or reporting food waste. However, the data must be collected manually before it can be entered, similar in process to pen-and-paper methods.

When tracking and recording food waste, information related to food type (57%), handling stage (57%) and number of items (37%) was more likely to be collected and recorded than weight (12%) and reason for waste (7%) (see Figure 9). This may reflect the practical constraints of busy kitchens, where time, labour limitations and perceived complexities over tracking food waste may dissuade staff from collecting more detailed information (Ezeanaka and Tran 2024; Filimonau and Uddin 2021).

The majority of QSR respondents did not quantify food waste, with 7% of respondents reportedly using scales to weigh food waste and 7% conducting 'bin audits' waste (Figure 8). Among those that did quantify, family-owned businesses were most likely to do so. Decisions to weigh waste or audit bins may also reflect closer financial accountability by family-owned businesses, where inefficiencies are felt directly at the ownership level. For chain QSRs, the weight of wasted items were often estimated by dividing the package weight by the original number of items it contained. This explains why 12% of respondents said they recorded item weight (Figure 9) despite only 7% of respondents reportedly using scales (Figure 8).

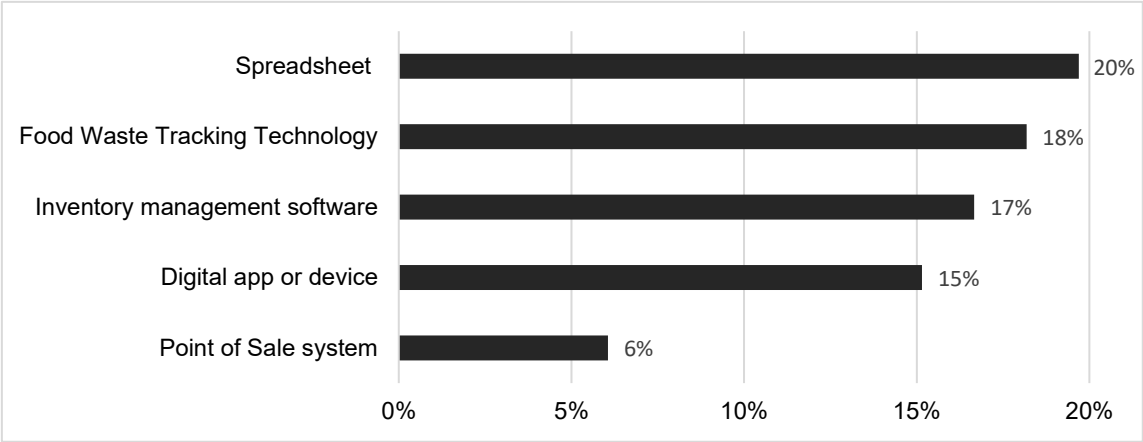


Figure 7: Methods adopted by QSRs to track and report on food waste (Survey 2, n=110)

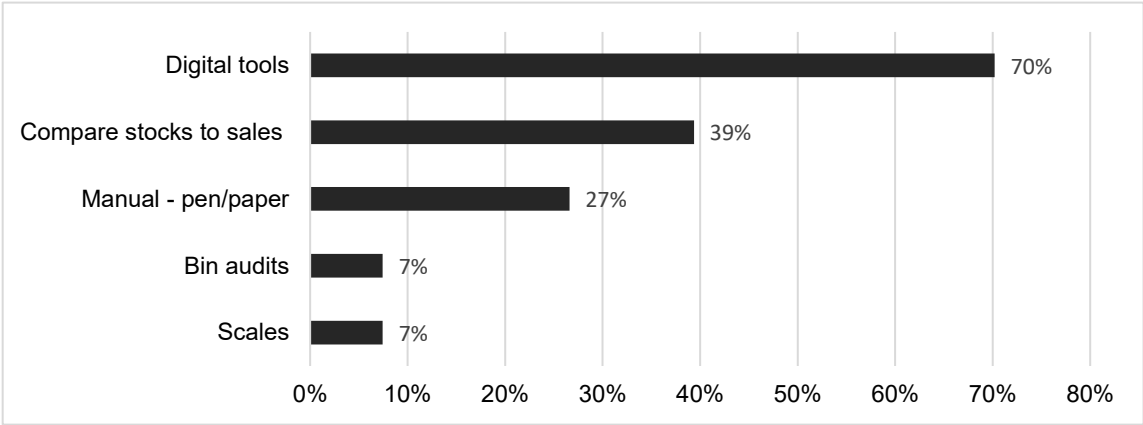


Figure 8: Types of digital technologies used by QSRs to track and report on food waste (Survey 2, n=110)

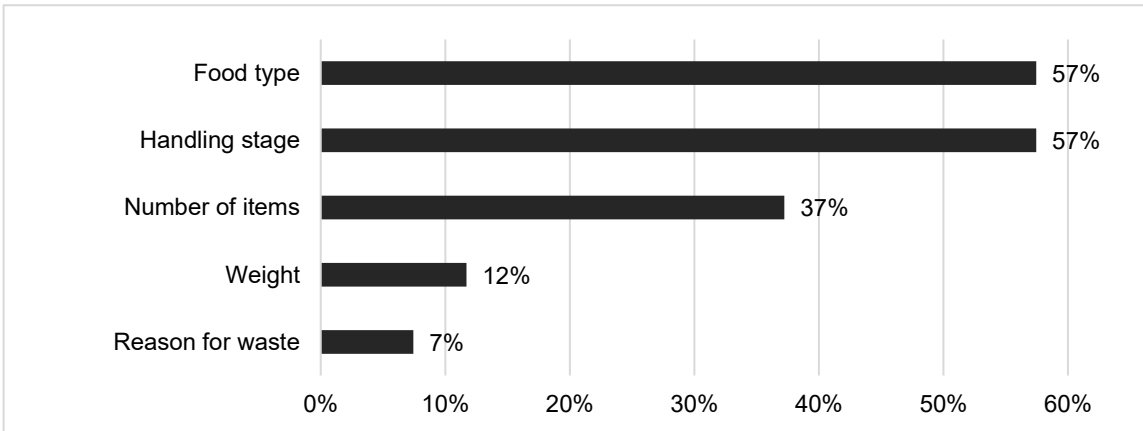


Figure 9: Food waste data recorded by QSRs (Survey 2, n=110)

3.2.2 Wasteful times of the day

Fluctuations in patronage, especially during peak periods, contribute to various drivers of food waste. Both busy times and quiet times were considered the most waste-prone (Table 4). Busy periods were associated with overproduction and mistakes, whilst quiet times were also associated with overproduction. These findings suggest that food waste interventions need to be sensitive to the rhythms of QSR operations, addressing both the challenges of overproduction associated with both busy and quiet periods.

Table 4: Times of day with highest food waste generation, ranked 1=most wasteful) to 6=least wasteful (Survey 1, n=136).

Variable	Average
Busy times	2.68
Quiet times	2.82
Normal mealtimes	3.02
Unexpected rushes (e.g. a bus load of people)	3.36
Hours just before closing	4.44
Hours just after opening	4.68

3.3 Root causes of food waste in QSRs

3.3.1 Common causes of food waste

Aligning with the literature, the survey of staff (n=136) found that forecasting issues were a major reason for back-of-house food waste, including 'prepared too much food' and 'ordered too much stock' (Table 5). Process-driven or staff-driven reasons for edible food waste such as 'mistakes in order' or 'poor handling' were less evidenced in literature, yet these issues were highlighted by Survey 1 respondents. Less prevalent causes of food waste included 'poor storage', 'inadequate stock rotation', 'technology costs', and 'management oversight'. 'Infestation' and 'temperature' issues were the least mentioned causes, highlighting that Survey 1 participants felt that more food waste stemmed from preventable operational practices rather than infrastructure failure.

Table 5: Common causes of waste ranked (Survey 1, n=136)

Causes of food waste	Agree	Disagree	Unsure / N/A
Mistakes in order / customer returns	68%	16%	15%
Lack of time to consider saving food	63%	20%	17%
Ordered too much stock	62%	16%	22%
Poor handling (dropped / spilled food)	59%	26%	15%
Prepared too much food (oversupply and expired)	58%	26%	16%
Lack of motivation to save food	57%	27%	16%
Training Issue	53%	31%	16%
Edible off cuts not used	52%	27%	22%
Cannot donate leftover food	52%	30%	18%
Poor storage	50%	37%	13%
Lack of rotation of stock (date labels not checked)	49%	35%	16%
Too expensive to implement new technologies	49%	27%	24%
Management of staff issue	47%	32%	21%
Imperfect cooking	44%	38%	18%
Temperature Issues (freezer burnt ingredients or burnt foods)	39%	42%	19%
Infestation	19%	60%	21%

Survey 2 reports identified QSR managers and owners insights on key reasons for food waste across the different food handling stages (see Figure 10).

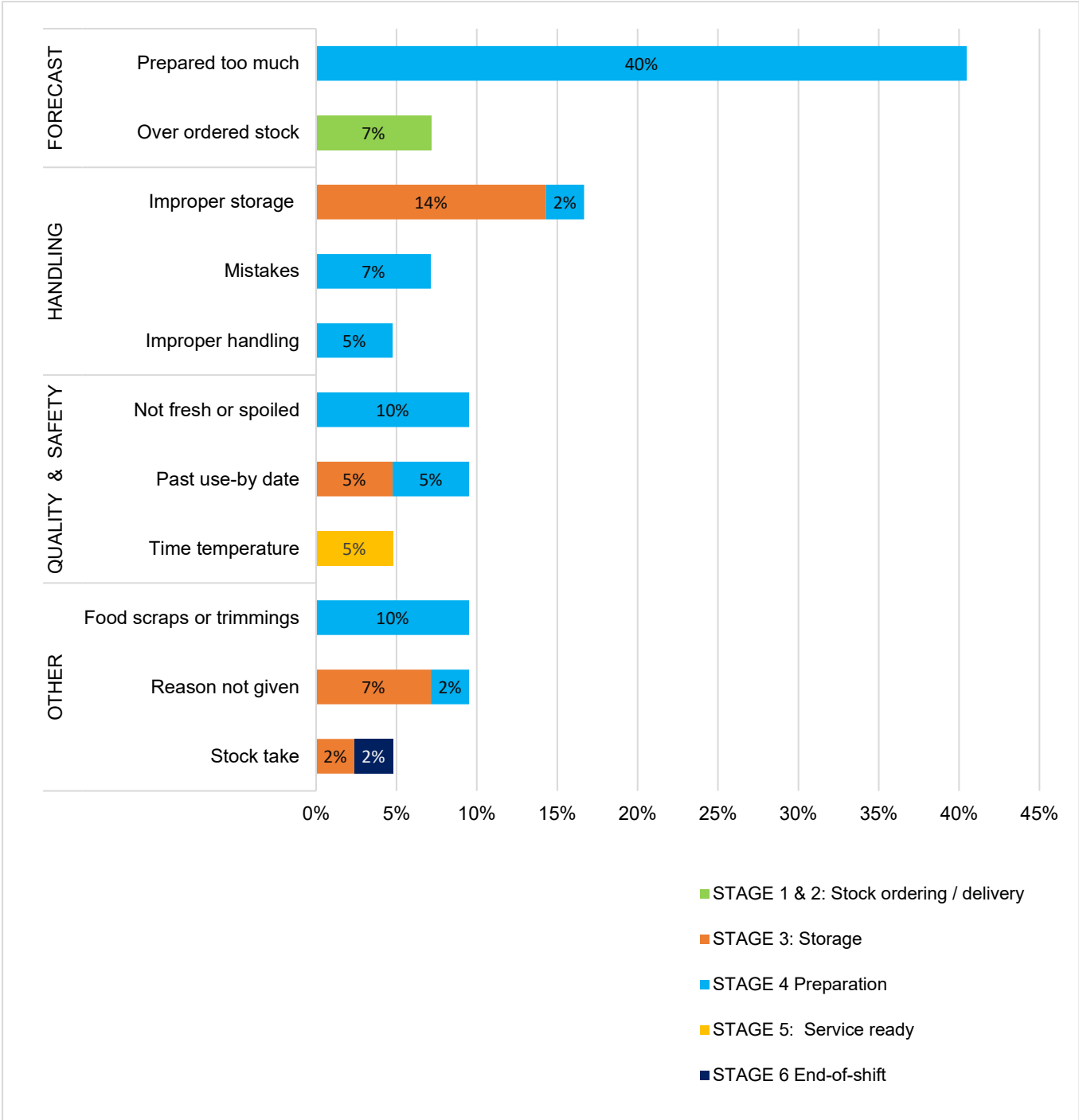


Figure 10: Reasons for food waste by food handling stage (Survey 2, n=94).

3.3.2 Food waste reported by respondents who track waste

Survey 2 respondents who indicated that their QSR tracks food waste provided information on the most-wasted foods. Table 6 lists specific food items wasted within each category and Figure 11 shows this information by food category. Figure 12 shows reasons for waste per food category. The top three most-wasted food categories were 'bakery', 'cooked food' and 'fresh produce', with issues concerning quality/safety and forecasting being the most-mentioned reasons for waste.

Table 6: Most wasted food items reported from food waste tracking in QSRs (Survey 2, n=94).

Fresh Produce		Fresh Meat		Dairy & Eggs		Bakery		Cooked Food		Other	
Vegetables	15%	Meat	2%	Milk	2%	Buns	16%	Fries	11%	Pickles	1%
Lettuce	10%	Chicken	1%	Cheese	2%	Wraps	1%	Cooked food (unspecified)	9%	Food scraps	1%
Tomato	9%			Eggs	1%	Cakes	1%	Chicken	5%		
Fruit	4%					Cookies	1%	Pizza	2%		
Salad	3%							Rice	2%		
Cucumber	2%							Fish	1%		
Bok choy	1%							Pasta	1%		
Capsicum	1%							Refried beans	1%		

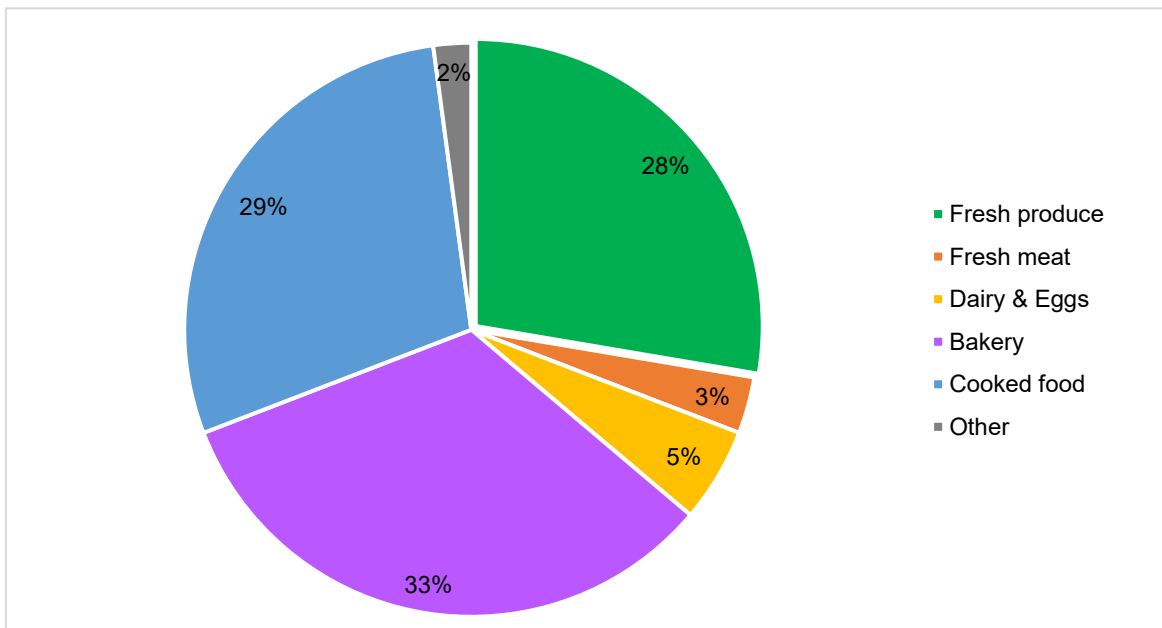


Figure 11: Most wasted food categories based on waste tracking in QSRs (Survey 2, n=94).

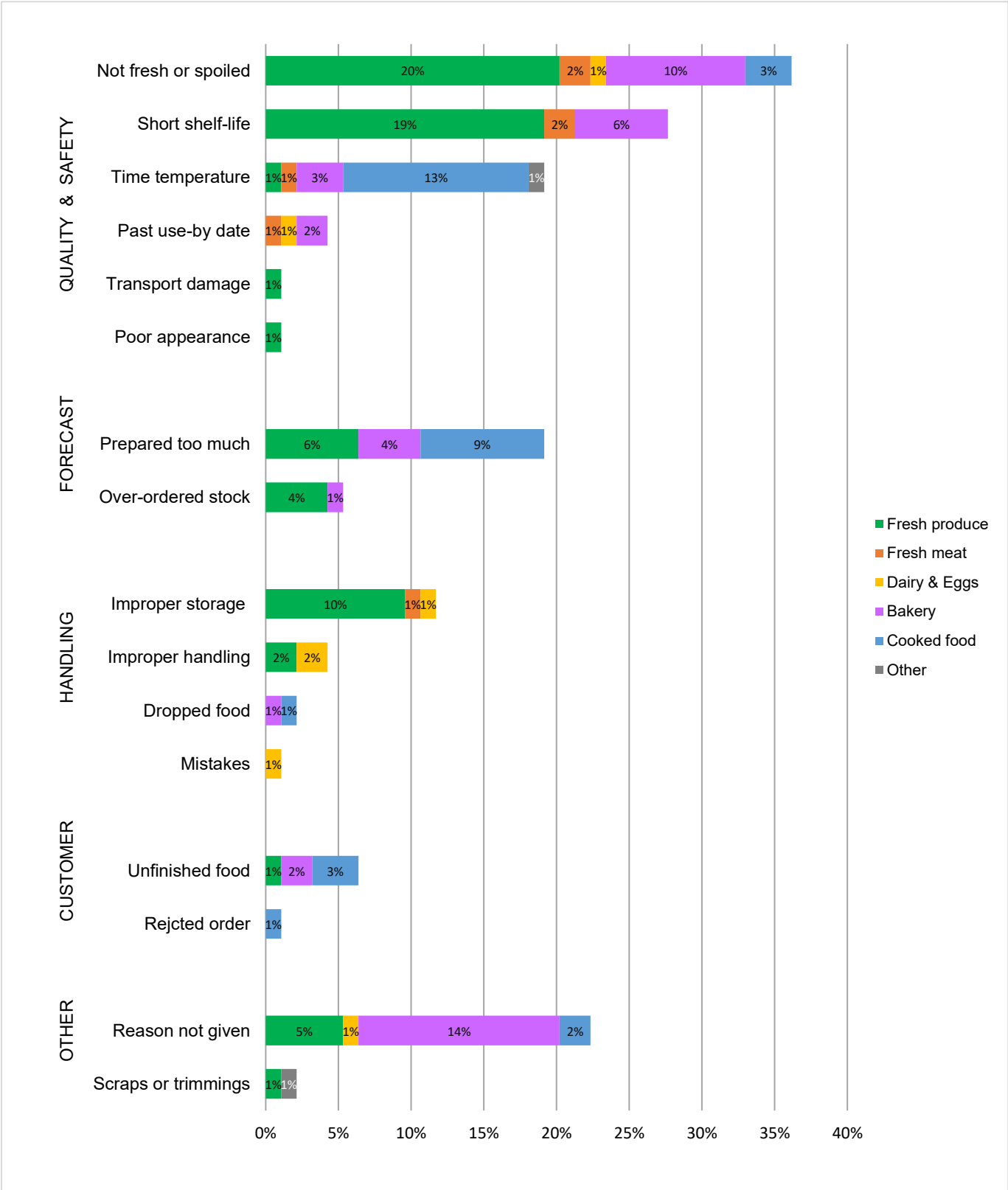


Figure 12: Key reasons for most wasted food categories in QSRs (Survey 2, n=94).

The category of 'Bakery' (33%) was the most represented (Figure 11), with buns (16%) being perceived by respondents as the most-wasted item in the category (Table 6). The top three perceived reasons for waste within the 'Bakery' category (aside from reason not given) were 'not fresh or spoiled' (10%), 'short shelf-life' (6%) and 'prepared too much' (4%) (Figure 12). This pattern of waste reflects broader issues recorded in the literature in relation to aligning production output with fluctuating demand (Jayasekara et al. 2024; Marx-Pienaar et al. 2020). Bakery items that are ready-made or baked on-site are nonetheless prone to staling and spoilage, so are often discarded if not sold within a certain timeframe. Even so, extant research suggests the waste of bakery items in hospitality sector is mainly avoidable (SFWA 2022; WRAP 2014). Interventions such as improved forecasting and storage strategies could help reduce losses in this category.

'Cooked food' (29%) was the second-most represented category (Figure 11), with 'fries' (11%) being perceived by respondents the most-wasted item in the category (Table 6). The top three perceived reasons for waste within the 'cooked food' category include 'time-temperature' (13%), 'prepared too-much' (9%) and 'not fresh or spoiled' (3%) (Figure 12). High wastage of cooked food items highlights the tension between speed and quality in QSRs, where maintaining strict holding times (time-temperature) for hot food such as fries can lead to waste when turnover slows (Drewitt 2013; Gunders 2012).

Aside from issues related to demand forecasting, food quality and safety are also central to the waste of cooked food. Strict procedures require staff to dispose food that has past the holding time out of caution, even if it is still edible. This aligns with Survey 1 findings, where staff mentioned hygiene risks and rigid protocols as common reasons for disposal, particularly during busy service periods.

'Fresh produce' (28%) was the third-most represented category (Figure 11), with 'vegetables' (15%), 'lettuce' (10%) and 'tomato' (9%) perceived by respondents as being the most-wasted items in the category (Table 6). The most wasted fresh produce ingredients are often used in menu items commonly served in QSRs, from burgers to salad. Maintaining adequate stock and pre-prepared ingredients is therefore necessary, yet their perishability makes them vulnerable to spoilage if not tightly managed (Filimonau et al. 2019). The top three perceived reasons for waste within the 'fresh produce' category (aside from reason not given) include 'not fresh enough or spoiled' (20%), 'short shelf-life' (19%) and 'improper storage' (10%) (Figure 12).

Other reasons for waste included over-ordering stock, improper handling and preparing too much, aligning with extant research (Filimonau et al. 2019; SRA 2010). These reasons for waste highlight the high perishability of items in this food category and an opportunity to implement storage strategies. Strategies to extend freshness of in-storage and service-ready produce ingredients could include proper temperature regulation in cool rooms, tighter stock control and the addition of chilled storage in food preparation areas.

The literature on packaging and food waste supports that specially designed packaging and different product-packaging combinations can help to extend the freshness of ingredients, including modified atmosphere packaging, smaller packs or resealable packs (Chan et al. 2023; Lockrey et al. 2019). Even so, packaging was not mentioned by the survey respondents as a strategy to reduce food waste, possibly due to lack of awareness. An opportunity exists for staff training on food waste to include the role of packaging in protecting and extending the shelf life of food, with a focus on how packaging is used. This could include not opening packaged fresh product prematurely and firmly reclosing opened food packages. An opportunity also exists for QSR head office or owners to consult with food suppliers on potential changes to packaging, to optimise packaging size and formats to minimise food waste (Francis et al. 2024). Packaging changes could be possible for major Australian and multinational QSR chains, as food is produced and supplied by manufacturers to specifications set by QSRs (Ottenbacher and Harrington 2009; Setiawan and Ellitan 2023). QSRs could benefit from integrating category-specific food waste reduction strategies that account for the distinct causes of food waste.

3.3.3 Motivations and agency to reduce waste

Understanding what drives food waste reduction behaviour among QSR workers is critical to design interventions that resonate with frontline staff. Survey 1 responses revealed that motivation to reduce food waste was high among workers across all business types, but this motivation is not always matched with the tools, training, or support needed to act. Respondents consistently rated themselves as more motivated to reduce food waste, compared with their managers. However, a substantial portion of participants (52%) indicated they lacked the knowledge or resources to act on that motivation (Figure 13).

Between 46% and 60% of respondents said they were motivated but did not know how to reduce waste. A smaller proportion, between 20% and 39% of respondents across business types, reported that they were both motivated and actively working to manage food waste. This proactive group likely reflects those with access to training, management support, or more formalised waste reduction procedures. At the lower end, 13% to 20% of respondents said they were not motivated to reduce food waste, indicating that a portion of the workforce remains disengaged on the issue.

Importantly, there were slight differences across QSR types. Family-owned businesses had the highest relative proportion of staff who were motivated but lacked the know-how, and the lowest proportion of staff actively managing food waste. This highlights a key challenge: while the will to reduce waste exists in independent venues, these businesses may lack access to structured training, organisational capacity, or dedicated food waste systems that larger chains are more likely to implement. It should still be noted though that the difference in motivations and level of ability to execute food waste reduction is quite level across the board. Despite having the resources to support staff motivation and training, chain-based businesses may not be fully leveraging these advantages. The gap in staff knowledge between family-owned stores and multinational/Australian based chains, while present, was not insignificant.

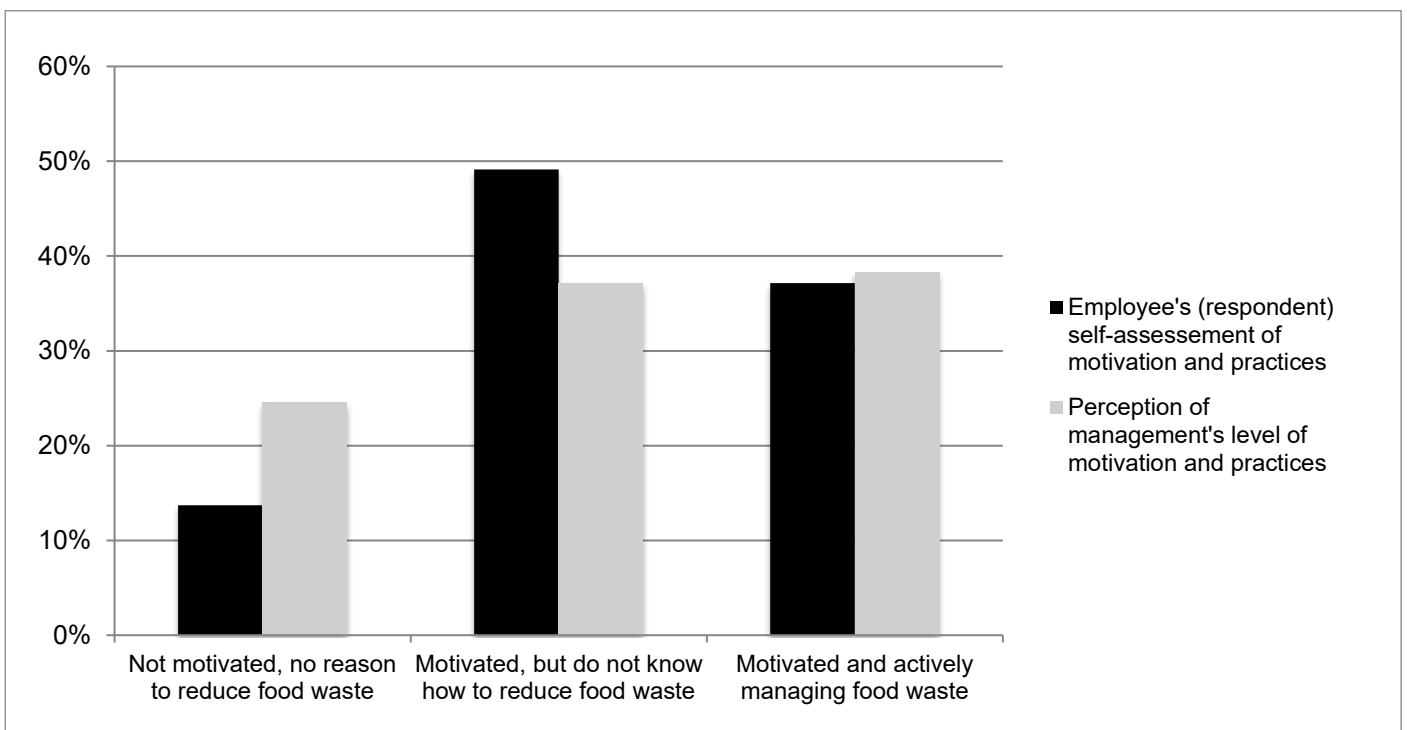


Figure 13: Levels of motivation and know-how to reduce food waste — Employee self-assessment vs their assessment of QSR managers (Survey 1, n=136).

3.3.4 Impact of training on food waste

Training plays a pivotal role in shaping how QSR workers respond to food waste. The ability to act on the motivation to reduce food waste was heavily dependent on whether respondents had received appropriate training and whether that training was ongoing. Overall, 70% of respondents reported receiving some form of food waste training. However, only 21% said they received ongoing or refresher training after the initial onboarding. Interestingly there was some correlation between the amount of training received and ensuing motivation to act on food waste. Among those who had received both initial and ongoing training, over 60% reported being both motivated and actively managing food waste, with no respondents stating they were not motivated to act. Those who received no training were much more likely to ‘not be motivated to reduce food waste’ and less likely to be ‘motivated and actively managing food waste’ (see Table 7). Training also had a clear influence on action (see Table 8); respondents who received thorough training were more likely to report food waste issues to managers, follow established procedures, and contribute to improved waste practices at their workplace. Respondents with no training or only one-time induction training were more likely to either ignore waste issues or be unsure how to respond. This disparity was especially evident when comparing crew staff (e.g., cooks, servers, drive-through attendants) to other roles (e.g., ‘store manager’, ‘crew trainer’, ‘supply chain staff’, ‘executive staff’).

Table 7: Respondents’ level of motivation to reduce food waste (column) against whether they received food waste specific training. Percentages ranked against the level of training (rows) (Survey 1, n=136).

	Not motivated, no reason to reduce food waste	Motivated, but do not know how to reduce food waste	Motivated and actively managing food waste
No training	24%	54%	22%
Yes, only when I started	13%	58%	28%
Yes, when I started the position and I received ongoing training	0%	39%	61%
Not applicable for my role	25%	25%	50%

(Note: Colour grading indicates frequency of answers. Green = more frequently, red = less frequent)

Table 8: Levels of training against waste response behaviour. Percentages calculated by row (Survey 1, n=136).

	No training	Yes, only when I started	Yes, when I started the position and I received ongoing training	Not applicable for my role
I ignore the issue	78%	22%	0%	0%
I follow my training but do not report it to my line manager	35%	65%	0%	0%
I follow my training and report it to my line manager	14%	59%	24%	3%
I document issues when they occur and look to headquarters for strategies	7%	60%	33%	0%
I document issues and make new processes, providing training to others	7%	33%	53%	7%
Not applicable for my role	72%	17%	6%	6%

Figure 14 illustrates that crew staff were far more likely to be motivated but lacked the knowledge to act. Nearly 58% of crew staff fell into the category of 'motivated but do not know how to reduce food waste', compared to only around 34% of non-crew staff. In contrast, over 56% of non-crew staff were actively managing food waste, while only just under 27% of crew staff reported doing the same. This suggests that crew staff — who are often the frontline workers directly handling food and managing service flow — are less equipped with the knowledge or tools to deal with food waste, despite being motivated to do so. The findings reflect a gap in training provision by role type: crew staff were more likely to receive no training or only initial training, while non-crew staff (e.g., 'supervisors, managers, corporate roles) were more likely to receive ongoing or in-depth training. Table 9 presents the amount of training received by role type. These insights underscore the need for QSRs to invest in targeted, ongoing food waste training for crew-level staff, not just management. Given that crew staff are the ones preparing, handling, and disposing of food, empowering them with practical knowledge and clear procedures could lead to significantly better waste outcomes across the sector.

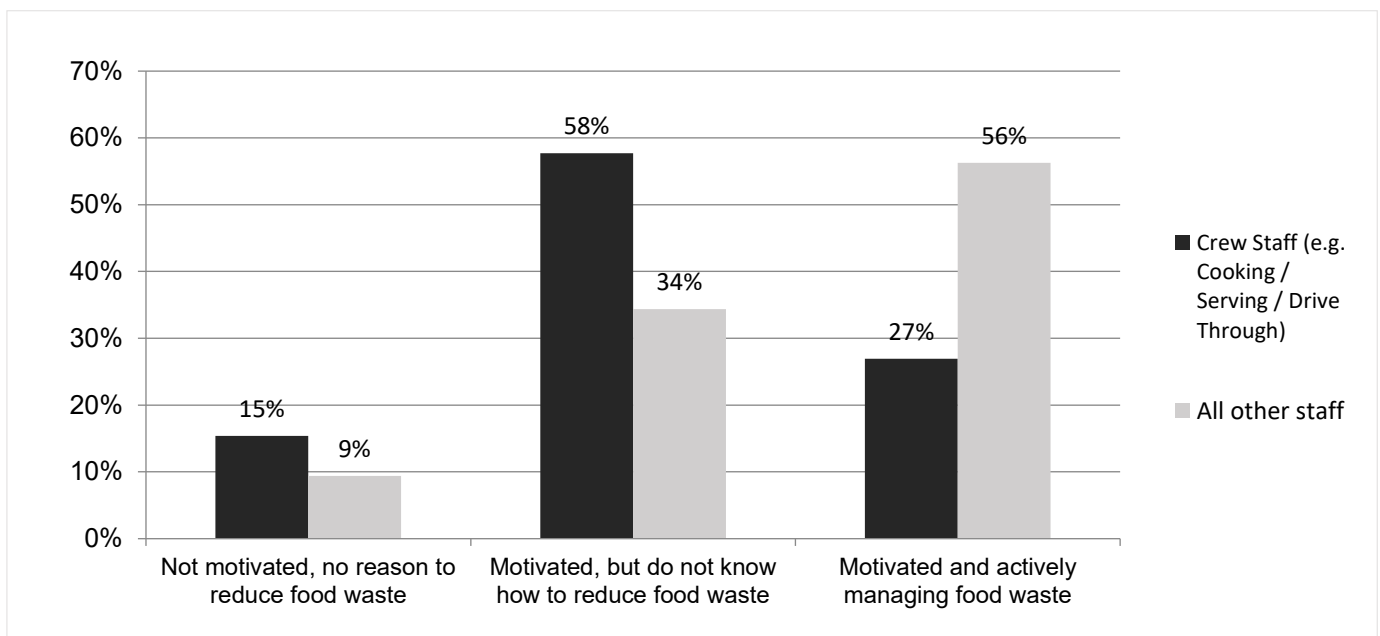


Figure 14: Motivation to act on food waste – crew staff vs. other staff (Survey 1, n=136)

Table 9: Amount of training received by role type. (Survey 1, n=136)

	Crew Staff (e.g. Cooking / Serving / Drive Through)	All other Staff
No training	30%	19%
Yes, only when I started	52%	41%
Yes, when I started the position and I received ongoing training	15%	38%
Not applicable for my role	3%	3%

3.3.5 Technology implementation in QSRs

Technology is increasingly promoted as a solution to reduce food waste in commercial kitchens, with innovations such as Internet of Things (IoT) sensors, Artificial Intelligence (AI)-based forecasting tools, and real-time stock monitoring gaining attention in global food service literature (Aytaç and Korçak 2021; Groene and Zakharov 2024). However, the Survey 1 responses highlight that in practice, for the everyday QSR worker in Australia, the implementation of some of these technologies appears far more limited.

Table 10 presents the listed types of technologies used in QSR establishments to help manage or reduce food waste. The technology types identified from literature review were listed, and respondents were asked to select all the technologies used at their QSR. The findings revealed very low uptake of advanced or ‘smart’ technologies. Tools such as IoT devices, AI, and geofencing-based systems were rarely reported by participants. Instead, most respondents described manual or semi-digital methods, such as random sampling, smart menu design, and both online and DIY management systems to augment how food waste is managed.

While food waste technologies may be prominent in industry facing literature (Cherryh 2015; QSR Magazine 2022; QSR Media AU 2023b) they have not yet been widely adopted in the QSR sector, especially at the crew or store level. These technologies may be more frequently used at the management level or higher levels than what the crew/store level realise, due to a lack of exposure, training, or unfamiliarity with the technical vocabulary required to recognise or articulate their use. It also reinforces that food waste tracking and management is still largely driven by manual routines and organisational policies rather than automated systems.

Table 10: Technologies currently adopted to manage and reduce food waste in QSRs. (Survey 1, n=136)

What technologies do QSRs use to reduce food waste?	Percentage of respondents
Food waste audits (e.g. statistics - random sampling of food bins)	32%
Smart menu design (e.g. changes to promote meals using up high stock items)	29%
Online All-in-One Management Software Packages (for stock ordering, management, waste auditing, menu planning)	26%
Fridge door opening time tracker (e.g. alerts when the fridge is left open too long)	26%
Management Software dedicated to food waste	24%
DIY Management Systems (e.g. Microsoft Excel spreadsheets, Google Sheets)	21%
Forecasting Software (to track and predict trends of demand and supply)	18%
Internet of Things (IoT) (in store digitally connected packaging and systems)	11%
AI based solutions (e.g. mapping past sales to weather conditions or holidays)	10%
E-commerce (e.g. consumers pre-order through a website or an app)	10%
Geofencing and cameras around store (advance warning of incoming customers)	7%
Other / Unsure / Not applicable	15%

4. Discussion: Emergent Solutions and Structural Enablers

Food waste in Australian QSRs is a multifaceted challenge influenced by operational inefficiencies, behavioural gaps, and structural limitations. Preparation and storage stages have been identified as critical hotspots, while time-poor staff and rigid corporate policies exacerbate the issue. Addressing these drivers requires a holistic approach across four key domains: staff capability, technology adoption, infrastructure upgrades, and company policy reform.

4.1 Staff capability

Frontline staff are motivated to reduce waste but 58% say they lack the necessary skills and autonomy. QSR managers report delivering training, but staff often fail to recognise or apply it, indicating a disconnect between policy and practice. Chronic understaffing during peak periods compounds the problem, as time pressure leads to rushed preparation and errors. Even so, 0% of staff who receive recurrent training ignore food waste, highlighting the importance of appropriate training.

- **Training gaps:** Many QSRs provide generic onboarding but omit food waste-specific modules. Without clear guidance on why processes matter, staff default to speed over sustainability.
- **Behavioural barriers:** Staff awareness of the link between poor handling and waste is low. Staff often see waste as an inevitable part of the process rather than preventable.
- **Agency and flexibility:** Rigid adherence to digital forecasts prevents staff from making real-time adjustments when demand fluctuates.
- **Retention and ROI (return on investment):** The NSW government's Business Food Waste mandates will take effect from July 2026. Combined with strong financial returns from waste reduction, this makes staff investment timely and strategic for QSR businesses.

Recommended solutions:

- **Introduce Food waste-specific training modules:** Cover practical skills like stock rotation, portion control, and waste tracking, aligned with the food recovery hierarchy.
- **Empower staff for real-time decisions:** Provide guidelines to staff to allow for flexibility when real-time conditions are different to forecasts.
- **Co-Design solutions with store teams:** Engage staff in developing waste-reduction strategies to increase ownership and compliance.
- **Assign a food waste manager:** Assign responsibility for monitoring and improving waste practices across outlets, ensuring accountability.

4.2 Technology adoption

Technology offers significant potential for waste reduction through predictive analytics, real-time tracking, and redistribution platforms. However, adoption is slowed by cost, complexity, and lack of sector-wide coordination, particularly for smaller operators.

- **AI and IoT potential:** Predictive systems can align prep with demand using sales and weather data, reducing overproduction.
- **Real-Time feedback:** Smart scales and real-time inventory management systems provide visibility into waste hotspots, enabling corrective action.
- **Redistribution apps:** Platforms like the *Too Good To Go* app demonstrate emerging potential for surplus food resale, reducing disposal to landfill.
- **Barriers:** High upfront costs and technical complexity deter smaller QSRs, necessitating government incentives and industry collaboration.

Recommended solutions:

- **Pilot AI and IoT-based systems:** Validate predictive tools for demand forecasting and spoilage prevention before full-scale rollout.
- **Implement smart scales:** Enable real-time waste feedback and centralised auditing for better decision-making.
- **Leverage mobile apps for redistribution:** Use apps to redirect surplus food to consumers, reducing waste and generating goodwill.

4.3 Infrastructure upgrades

Poor storage conditions and faulty equipment are major contributors to waste. Warm storerooms, inadequate refrigeration, and broken communication systems lead to spoilage and order errors, even when staff follow correct procedures.

- **Storage hotspots:** Warm storerooms accelerate spoilage, particularly for perishable items like salads and dairy.
- **Cold chain integrity:** Refrigerated prep stations are essential in hot kitchens to maintain freshness and reduce salad waste.
- **Equipment reliability:** Broken intercoms and malfunctioning machinery cause order mistakes and production errors, increasing waste.
- **Structural solutions:** Centralised kitchens can streamline production, reduce duplication, and optimise stock management.

Recommended solutions:

- **Upgrade refrigeration and preparation equipment:** Maintain cold chain integrity for perishables and salads in high-temperature environments.
- **Improve storage practices and labelling:** Use clear stock rotation systems, efficient packaging, and machine guards to prevent spills.
- **Maintain and upgrade equipment regularly:** Implement preventive maintenance schedules to avoid operational disruptions.
- **Reconfigure kitchens to reduce food waste:** Streamline the kitchen's layout to ensure staff's production processes are well designed for cooking and serving ease, reducing complexities, spillage and food damage.

4.4 Company policy reform

Rigid company policies and liability concerns regarding food safety often force QSRs to discard surplus food rather than repurpose or donate it. Regulatory complexity and risk aversion hinder sustainable practices, despite proven models for safe redistribution.

- **Policy constraints:** QSR chains (Australian and multi-national) typically enforce strict time-temperature rules related to food safety. E.g. hot fries can be sold for up to 10 minutes, cooked meat for 2-4 hours, and bread buns until the end-of-day, after which it must be withdrawn. Such leftovers are usually disposed or sometimes donated. In contrast, independent businesses are more flexible in allowing staff to repurpose leftovers, such as for staff lunches, which can help to reduce food waste.
- **Donation Potential:** Food donation remains underutilised despite its practicality. Apps like *Too Good To Go* show promise for resale of surplus food.
- **Regulatory barriers:** Australia has a complex food safety regulatory framework. While the FSANZ food safety rules apply nationally, it is up to multiple regulatory agencies in each state and territory to interpret, apply and enforce these rules, leading to complexity and confusion (Fegan and Vaskoska 2025; Parliament of Australia 2025). Moreover, this is a lack of donation-specific guidelines in the FSANZ food safety rules. Therefore, the risk of non-compliance can discourage QSRs from donating, even when actual food safety risks can be mitigated through training and clear protocols.
- **Cultural shift:** Embedding waste reduction into KPIs and reporting systems can normalise sustainable practices across the sector.

Recommended solutions:

- **Embed waste reduction in KPIs:** Make food waste metrics part of performance evaluations for managers and staff.
- **Diversify donation-eligible items and use apps to redistribute:** Expand donation programs and integrate digital redistribution platforms for surplus food.
- **Simplify food safety regulations:** Advocate for reforms in the FSANZ food safety rules that include specific guidelines for food donation. Clear guidelines would reduce confusion and concern around non-compliance and assist QSRs in conducting risk assessments. An additional recommendation is for industry bodies to drive a communication campaign about how food donations can be done without concerns about liability in different jurisdictions.
- **Separate donation in reporting:** Track donated food distinctly to encourage compliance and transparency.
- **Advocate for government incentives:** Secure rebates or grants to support smaller operators in adopting advanced technologies.

5. Recommendations

This discussion synthesises insights from both surveys, the interviews and observational research to identify key opportunities and challenges for reducing back-of-house food waste in Quick Service Restaurants (QSRs). Drawing on the food recovery hierarchy framework, it examines how waste prevention, reuse and redistribution can be supported through targeted improvements in staff engagement, infrastructure, digital systems, and company policy. The findings highlight that effective food waste reduction requires a balance between operational efficiency and the empowerment of frontline staff, supported by strategic investments in technology, infrastructure and training.

5.1 Focusing on food waste hotspots

Food waste in QSRs is most concentrated at two key points and can be understood in terms of both food preparation stages and customer demand levels: The pre-preparation stage and food service stage were the food preparation stages where the most waste occurred, while the most and least busy times of the day were also generated significant waste. These are consistently identified as critical intervention points across the data (interviews/observations and surveys) and align with previous studies (Drewitt 2013; Principato et al. 2021; SRA 2010). Targeting interventions at these hotspots is the most practical way to reduce back-of-house waste, given the time-poor and high-pressure environments typical of QSRs. Programs should also be designed to account for the most and least busy times of the day, as waste patterns often fluctuate with customer flow. Focusing training and monitoring efforts around these periods can help staff anticipate surpluses and shortages more effectively, further reducing unnecessary waste.

Awareness of how food handling stages influence waste generation remains limited, with surveys showing that 62% of respondents did not recognise this connection. To address this, QSRs can benefit from educational campaigns modelled on initiatives such as WRAP's "Guardians of Grub," which couple awareness raising with simple, actionable guidance. Waste tracking systems that highlight waste by food handling stage can further strengthen this link, enabling QSRs to apply the *Target–Measure–Act* approach promoted by Champions 12.3 (Hanson and Mitchell 2017).

Ultimately, hotspot identification is only effective when paired with strategies that address the operational and behavioural causes of waste, including time pressure, skill gaps, and infrastructure limitations. Further discussion now focuses on the 4 contributing areas being: Staff; Technology; Infrastructure; and Risk Management (Figure 15). By enabling staff agency, improving infrastructure and equipment, increasing efficiency and streamlining processes through technology, and addressing risk management. The recommendations consider the operational realities and unique constraints of QSR restaurants, designed to be feasible within this scope.

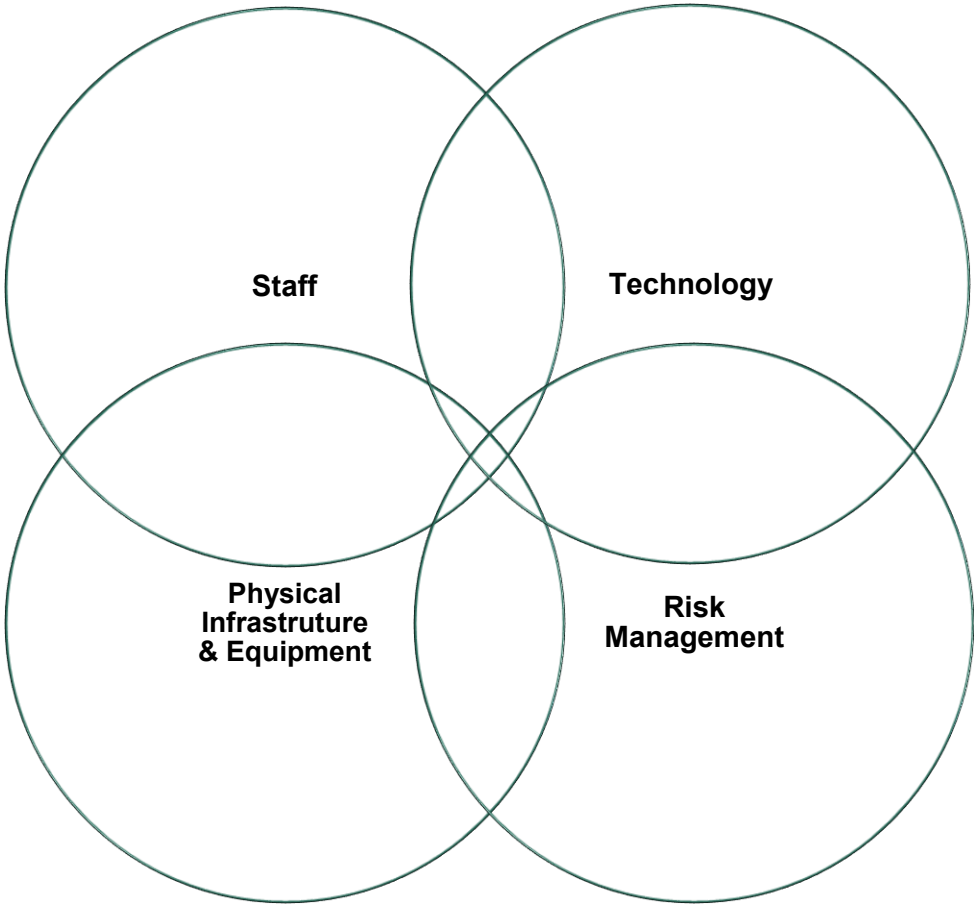


Figure 15: Key factors to address food waste hotspots to reduce back-of-house food waste in QSRs.

5.2 Empowering people and strengthening staff capability

A central finding from both the survey and observation phases is that QSR staff are motivated to reduce food waste but often lack the training or autonomy to act effectively. Although QSR managers report providing food waste-related training, many frontline workers indicated they had not received or retained this knowledge, revealing a disconnect between corporate intent and on-the-ground delivery. Importantly, none of the staff who received recurring training ignored food waste, highlighting the importance of regular food-waste-specific training.

Food waste-specific training should go beyond procedural instruction to explain why certain actions reduce waste, helping staff make informed, real-time decisions. Training modules can be embedded in existing staff management portals, ensuring consistency across stores and ease of access. In NSW, forthcoming Source Separation Mandates and the FOGO Recycling Bill will make food waste separation compulsory for many QSRs (NSW EPA 2024). This regulatory change presents an opportunity to integrate enhanced training modules that build compliance capability while strengthening waste literacy across the workforce.

Overly rigid operational protocols can limit staff agency. While digital forecasting and strict operational protocols are vital to consistency, they can overlook the realities of fluctuating demand, equipment issues, or staff shortages. Empowering staff to exercise judgement such as adjusting food preparation quantities during atypical trading periods can prevent unnecessary waste.

Corporate management should consider co-designing process improvements with store-level staff to balance automation with human insight. Such collaboration builds ownership and cultivates a culture where food waste prevention is seen as a shared responsibility rather than an administrative task.

Time pressure and understaffing were repeatedly cited as major contributors to waste, particularly during peak periods. Investing in better staffing predictions and adequate staff levels is both a productivity and waste-reduction strategy. Although QSRs face high staff turnover, research indicates a 7:1 return on investment for training and engagement programs that target waste reduction (Clowes et al. 2019). Reframing staff investment as a retention and performance strategy may also strengthen long-term workforce sustainability in an industry facing chronic labour shortages.

5.3 Leveraging digital solutions

Technology can play a transformative role in reducing food waste, though uptake in the QSR sector remains limited. Only 19% of surveyed managers reported using AI or smart technologies for waste management.

AI-based platforms and Internet of Things (IoT) systems can enhance demand forecasting, inventory management, and task prioritisation during peak trading periods (Groene and Zakharov 2024; Whitehead 2020) and have already been implemented by major Australian and multinational QSR chains. The systems rely on previous customer levels or sales data to forecast customer levels, but the forecast can be unreliable when the predictive models fail to incorporate external factors that can cause sudden changes in customer levels (i.e. spillover traffic from nearby events). Improving predictive models to integrate real-time sales and environmental data would enable QSRs fine-tune preparation volumes and reduce surplus.

Digital waste tracking systems should differentiate between food disposed and food diverted through donation or resale. Establishing this distinction would enable QSR store managers and corporate leadership to better recognise the operational and social value of diversion activities. Introducing a dedicated reporting category for donation and reuse would enhance transparency, strengthen accountability, and highlight measurable achievements in food waste reduction.

Collaboration between QSR operators, technology developers, and regulators can help identify scalable, cost-effective digital tools suited to fast-paced environments. Smaller, independent QSRs could benefit from financial incentives such as the NSW EPA's Bin Trim Rebates Program, which supports investments in waste-reducing technology.

5.4 Optimising infrastructure and equipment

Reliable and well-maintained infrastructure is fundamental to effective food waste prevention. The data highlighted that equipment failures and poor storage conditions contribute directly to product spoilage and operational errors.

Storage conditions are a critical control point. While stock rotation practices, such as FIFO, aim to use food before spoilage, this may be undermined by inadequate temperature and humidity control. To remain compliant with national food safety standards (Safe Food Australia 2025), QSRs must ensure storerooms and cold rooms are appropriately cooled and maintained. Investments in environmental control including air-conditioning and refrigeration upgrades can simultaneously reduce waste and safeguard food safety.

Refrigerated bain-maries and other temperature-control technologies can prevent spoilage of cold ingredients during preparation, particularly in hot kitchen environments. Reconfiguring kitchens to separate hot and cold zones, and maintaining equipment that regulates temperature, supports both efficiency and waste minimisation.

Faulty drive-through intercoms and digital order systems contribute to incorrect orders, which are a common cause of waste. Regular maintenance and equipment upgrades can reduce these losses while improving service quality. Viewing infrastructure upkeep as part of a waste prevention strategy reframes maintenance as an operational investment rather than an overhead cost.

5.5 Risk and policy review

Part of reviewing policy is reconsidering food donations. Food donation remains an underutilised but essential strategy for managing unavoidable surplus. Observational findings revealed inconsistent awareness and implementation of donation programs across QSRs. Embedding food donation modules within staff training can standardise understanding of donation protocols and safe handling. Additionally, digital systems could include separate reporting for donated food, reframing donation as a positive sustainability outcome rather than waste. Leveraging consumer-facing resale apps like Too Good To Go app can further reduce surplus while improving brand reputation and customer engagement.

Company policies concerning food holding time limits (e.g. time-temperature for cooked food, open times for packaged food), donation and a strong culture of risk aversion (e.g. food safety and reputational) were identified as major structural barriers to food waste reduction. Multinational chains often restrict donation or staff consumption of leftover food due to perceived food safety and liability risks. (See section 4.4 for further detail). While these concerns are understandable within large franchise systems, they can lead to unnecessary disposal of safe, edible food. There is an opportunity for QSR head offices to review corporate policies and strike a better balance between risk management and sustainability. Simplified, nationally consistent food safety guidelines for donation could help overcome these barriers (Addison-Smith et al. 2024; Parliament of Australia 2025). Building food safety competence among staff through training would further mitigate perceived risks.

5.6 Collaborative pathways forward and enablers

Reducing food waste in QSRs requires shared responsibility across the sector. Future efforts should include cross-industry collaboration to co-design solutions that integrate staff insights, management priorities, and technological innovation. Establishing working groups between QSR operators, suppliers, government agencies, and research partners can accelerate sector-wide progress and knowledge sharing.

6. Conclusions

This study examined back-of-house food waste in the Quick Service Restaurant (QSR) sector through a combination of surveys, site observations, and interviews across family-owned, Australian-chain, and multinational QSRs. Across all methods, several consistent themes emerged. Food waste frequently occurred during the preparation, pre-preparation, storage, and service stages of operation. Food was also most likely to be wasted during the most and the least busy periods. The analysis indicated that these waste “hotspots” were not simply unavoidable by-products of fast-paced service environments but were closely linked to factors such as limited staff training and agency, inaccurate production forecasting, inadequate infrastructure such as cool rooms, and rigid company policies.

Root cause analysis across both studies highlighted that technological and procedural systems alone are insufficient to address food waste. Reducing waste requires a more integrated approach that values the human, physical, and digital elements of QSR operations equally. Key opportunities for improvement include empowering staff with greater decision-making autonomy, implementing targeted training on food waste awareness and prevention, maintaining and upgrading equipment and storage infrastructure, and refining digital tools to improve demand forecasting and real-time responsiveness. Expanding and standardising food donation programs across stores would also help ensure safe, surplus food is diverted for human consumption rather than disposal.

Achieving meaningful reductions in food waste will require a cultural and organisational shift across the QSR sector — one that prioritises sustainability alongside efficiency, safety, and profitability. Managers and owners must recognise that investment in staff capability, infrastructure, and technology is not only an operational expense but a strategic pathway toward improved performance and brand resilience. By embedding waste prevention principles at all levels of operation, QSRs can enhance efficiency, reduce costs, and contribute to broader environmental and social sustainability goals.

Ultimately, food waste reduction in QSRs depends on more than procedural compliance. It requires empowered teams, well-maintained infrastructure, adaptive systems, supportive policy frameworks, and a workplace culture that treats waste prevention as central to operational excellence. Through these actions, the QSR sector can move toward a more efficient and sustainable future.

7. Impact and Ongoing Monitoring

This project comprised a mixed methods study that identified hot spots and root causes of waste across the QSR sector in Australia. Implementation of its recommendations at various levels of government and across diverse government, education and industry domains can contribute to long-term change in broader cultural narratives and practices around food waste in Australia.

Over time, this project will contribute to the following key impact areas:

- Food waste reduced
- Industry profitability gained
- Rescued food distributed
- Greenhouse gas emissions saved
- Industry people trained

It is estimated that the implementation of the above recommendations may achieve the following possible impacts:

- A reduction of food waste by 20,772 T by 2033 and 45,700 T by 2048, when assuming a 5% reduction.
 - This is based on a baseline of 402,844 T (33% of total foodservice establishments in Australia (McGrath 2021), fractioned from total food waste of Consumer Food Services of the 2021 National Food Waste Baseline (FIAL 2021a)
 - The 5% projection reflects long-term savings achievable through adoption of the recommended strategies.
- Industry profitability gained at the rate of \$0.98 billion by 2033 and 2.82 billion by 2048, when assuming 5% reduction in food waste.
 - The annual cost of food waste to the hospitality and food services industry is estimated by FIAL to be \$6.455 billion (FIAL 2021a). QSRs are at least 38% of the market (McGrath 2021). Therefore, their part of the cost of food waste is estimated at \$2.453 billion, and 5% of that cost is \$0.122 billion per annum.
 - QSR businesses can reduce food costs and increase profitability by applying concrete measures to address food spoilage and preparation waste, starting with food-waste-specific staff training. These measures can improve ongoing food stock management practices and avoid preventable food wastage. Subsequent reduction in food disposal costs also leads to higher profitability for QSR businesses.
- Rescued food distributed at a rate of 7,270 T by 2033 and 14,540 T by 2048.
 - Food relief organisations such as Foodbank distribute 51,000 tonnes of food per year (Foodbank 2025a). To meet the known need, this would need to increase to at least 75,000 tonnes. Food rescue from QSRs can contribute to this.
 - A projection of 7,270 T by 2033 and 14,540 T by 2048 conservatively assumes that 35% of the total estimated reduction in QSR food waste (when assuming 5% reduction) is in the form of safe, edible surplus redirected to

food relief organisations. It also accounts for the hesitancy of QSRs to donate food, which requires addressing safety and reputational concerns.

- There is a valuable opportunity for a coordinated approach, collaborating with QSR stakeholders and food rescue organisations to distribute high quality, edible food to Australians experiencing food insecurity. This would help to address the nationwide food hunger crisis whilst diverting food from landfill.
- Greenhouse gas emission savings at an estimated rate of 126,309 T CO₂-eq by 2033 and 445,900 T CO₂-eq by 2048, when assuming 5% reduction in food waste.
 - The Australian Foodservice sector generates a staggering 2315 kT CO₂e of food waste (FIAL 2021a). An estimated \$6.4 billion worth of food waste is attributed to the commercial foodservice sector, most of which is disposed to landfill. Food waste in landfills produces methane and contributes to climate change. The resulting environmental cost from food waste is significant, estimated at USD 700 billion globally (FAO 2014).
- Industry people trained at an estimated rate of 22,600 people by 2033 and 45,200 people by 2048, when assuming 10% and 20% of the Australian QSR workforce is trained.
 - Increased awareness of food waste within the sector is driving QSR businesses and staff to adopt measures to address food waste in their day-to-day operations. Structured food-waste-specific training will embed these practices, leading to measurable reductions in waste and improved profitability.
 - The Australian QSR sector is large but fragmented, with 26,630 businesses employing 226,000 people (IBIS World 2025). Training approximately 10% of the workforce by 2033 (approximately 22,600 people) and 20% by 2048 (approximately 45,200 people) represents a feasible and proportionate initial target for sector-wide impact. Scaling this up would be transformative to reduce food waste across the QSR industry.
 - Concentrating food waste training within the largest QSR businesses in Australia, of which the 5-largest occupies 43.5% of the market share (IBIS World 2025), is an efficient way to accelerate uptake and ensure broad influence across the sector. Training 10% of the total QSR workforce is equivalent to 23% of the work force at the 5-largest QSRs. Training 20% of the total QSR workforce is equivalent to 46% of the work force at the 5-largest QSRs.

These estimates were produced via the End Food Waste CRC Impact Assessment Tool and assume a conservative reduction in food waste from implementing the recommendations in this report. It is important to note that these figures are extrapolative, as manually capturing food waste measurements was beyond the scope of this project. When appropriate and efficient, more accurate measurement data will be collected at a larger scale in subsequent projects.

Formal training for industry people (training or demonstration sessions, workshops, web materials) is a proposed strategy in the implementation plan. The next step is to develop training materials as an ongoing resource for sustained use and training of future staff. The outcomes of this training (i.e. uptake and impact on practices) could be tracked through additional research.

It is anticipated that the full benefits of implementing the recommendations will emerge gradually, reflecting the time required for recommendations to diffuse through the sector and for widespread behavioural uptake to occur.

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