



UTS: INSTITUTE FOR SUSTAINABLE FUTURES

LOVE FOOD HATE WASTE: FOOD FESTIVALS AND FARMERS MARKETS

Background Research



JULY

2016

ABOUT THE PROJECT

The **Love Food Hate Waste: Food Festivals and Farmers' Markets** project aims to reduce the amount of avoidable food waste currently being discarded at festivals and markets in the City of Sydney. The project will achieve this by conducting desktop research and engaging with stakeholders to understand the opportunities and challenges to reducing avoidable food waste and producing a suite of education resources. These resources will then be tested and implemented with food festival and farmers market organisers and stallholders.

ABOUT THE AUTHORS

The Institute for Sustainable Futures (ISF) was established by the University of Technology Sydney in 1996 to work with industry, government and the community to develop sustainable futures through research and consultancy. Our mission is to create change toward sustainable futures that protect and enhance the environment, human wellbeing and social equity. For further information visit: www.isf.uts.edu.au

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Smart Locale
Ultimo Pyrmont



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This project is supported by the Environmental Trust as part of the NSW Environment Protection Authority's Waste Less, Recycle More initiative, funded from the waste levy.



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SUMMARY: KEY RESEARCH FINDINGS

Precedents

- Few precedents exist for Australian-specific resources or projects that have assisted organisers and stallholders to **avoid** food waste
- No current farmers market-level initiatives or resources were identified that target food waste avoidance by either stallholders or consumers.
- The majority of past projects and existing resources are designed for **large events/festivals** in the UK. Resources generally cover the management of all waste with small sections on food waste focused primarily on recycling of food waste only and secondarily on food rescue.
- Only a couple of identified projects targeted farmers markets, these focused specifically on managing surplus food through **food rescue** and other means.
- Festival organisers are building participation in waste initiatives into stallholder contracts.

Terminology

- Stallholders, particularly those who grow their own fresh produce, consider “food waste” to only be **food that ends up in landfill**. Food that is diverted from landfill to reuse or recycling is not considered “waste”.
- Using **the word “waste” has negative effects on engagement**, either because of its connotation of non-use (i.e. landfill), or because it engenders feelings of guilt/shame. More effective language may include “lifecycle of food”, “fate of food”, “surplus food”.
- The distinction between avoidable and unavoidable food waste is difficult to communicate to stallholders. Using ‘edible’ and ‘inedible’ is easier to convey.
- Organisers think about organics recycling holistically: collapsing avoidable and unavoidable food waste plus compostable food packaging/serving ware into one category.

Volumes of food waste

- Market organisers believe there is very little stallholder or consumer food waste at farmers markets (though they feel consumer waste is greater than stallholder waste).
- The majority of stallholders **believe they don’t create food waste** (avoidable or unavoidable).
- Visual inspections of farmers markets bin appear to confirm perceptions, revealing only limited food waste, much less than found in other areas of the food retail and hospitality sector.
- Some small amounts of avoidable food waste are created across the full lifecycle of stallholder food products, i.e. including pre- and post-stall. These differ depending on the type of food product/stall.

Main sources of avoidable food waste

- All stallholders may be affected by unforecasted severe weather – with less customers comes the potential for more waste.
- Fresh produce (for sale or input into processed goods) is sometimes (though rarely) bruised or damaged during transport/handling by stallholders.
- Stalls selling processed/packaged food goods sometimes have leftover samples or sample remnants.
- Hot food stallholders at festivals may generate more avoidable food waste if they are not aware of direct competition for their food product at the same festival.

Reasons for limited food waste

- Stallholders are very small businesses who can't afford to waste food – the majority stated "it makes good business sense to use all food/ingredients".
- Stallholders are so small that demand usually exceeds supply, so there is rarely excess food leftover.
- Stallholders tend to be very experienced, they know exactly how much is needed (either through formal or informal 'tracking'). Only a few stalls have casual untrained staff.
- Large proportion of food stalls sell packaged/processed goods with long shelf life (6+months), so the majority of edible food will not spoil quickly if unsold.

Barriers to food waste avoidance

- Stallholders are very time-poor and under pressure: this was the biggest barrier.
- Market organisers and stallholders perceive that food rescue is not an appropriate or reliable channel for surplus food.
- As organisers are time-poor and lack specific funding, they are unable to address food waste in a targeted manner – there are already existing initiatives to manage food waste (such as food donation or composting) and to address the general sustainability of their events (such as goals like zero waste).

Solutions to food waste

- Most stallholders have fine-tuned their product selection and stock quantities to bring just the right amount of product to market.
- Most stallholders have fine-tuned their infrastructure to ensure that food does not spoil while on display for sale.
- Many stallholders of both perishable and packaged/processed goods often have additional channels for on-selling surplus, including other markets or retail/wholesale businesses.
- Fresh produce stallholders generally either give away small surplus to customers, other stallholders, staff or take home to eat themselves.

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1 INTRODUCTION

Background

The **Food Waste at Festivals and Farmers' Markets project** is a Love Food Hate Waste project targeting small food retail and food service businesses, which aims to reduce the amount of avoidable food waste currently being discarded at festivals and markets in the City of Sydney.

Full of fresh and delicious food, farmers' markets and food festivals are places where people interested in local and sustainable food gather. A unique aspect of these markets and festivals is that they connect food stallholders who represent the entire food life cycle chain (from production and processing to food retail and food service) to consumers.

This makes them a unique place to target food waste avoidance activities, where effects could reach all aspects of the food system and impact on all stages in the food lifecycle.

Market /festival food stallholders are a specific subset of food retail and food service businesses

This project looks at food waste avoidance opportunities before, during and after markets and festivals, by both stallholders and consumers.



	Pre-Market	At Market	Post-Market
Stallholders			
Consumers			

Project partners

The project is a joint initiative between the Total Environment Centre, Smart Locale and the Institute for Sustainable Futures (ISF) at the University of Technology Sydney.

The project is supported by the Environmental Trust as part of the NSW Environmental Protection Agency's Waste Less, Recycle More initiative, funded from the waste levy.



Aims of the project

The project plans to develop a suite of useful educational materials aimed at festival/market organisers and their stallholders, before engaging directly with a food festival and series of farmers markets to trial the use of the education materials in helping stallholders reduce food waste, and hopefully by association, help organisers and stallholders reduce their food and waste bills.

The focus of this project is on avoidable food waste:

AVOIDABLE WASTE (EDIBLE FOOD)



Food that could have been eaten by humans, except that it spoiled, was damaged or was surplus to requirements.

UNAVOIDABLE WASTE (INEDIBLE SCRAPS)



The parts of food that are generally considered to be inedible, such as fruit and veggie peels, meat and fish bones, egg shells, etc.

The project has 3 phases:



This report sets out the results of Phase 0: Background research: Desktop research and Stakeholder Engagement, completed Feb -- April 2016.

2 APPROACH & METHODS

RESEARCH APPROACH

The background research had two parts, desktop research and stakeholder engagement, split into four components:

Desktop research

- A. Behaviour change theory:
 - **Literature review:** A review of relevant literature was undertaken to uncover relevant behavioural insights relating to creating change at festivals and farmers markets.
- B. Precedents (existing projects and resources):
 - **Internet search:** A desktop internet search was undertaken to identify similar projects in Australia and overseas to gather learnings and insights for avoiding food waste at farmers markets and festivals.
 - **Personal communications with similar projects:** Email correspondence and phone calls were conducted with representatives from key identified projects that are also seeking to address the issue of avoidable food waste from festivals and farmers markets to gather additional detail to help guide the design of the resources and engagement approach.

Stakeholder engagement¹

- C. Market organisers:
 - **Formal interviews:** Semi-structured phone interviews with local market organisers to get a feeling for the similarities between farmers markets in the target area of the City of Sydney, and the markets, festivals and events identified in the background research into precedents; and to test the ideas for the resources and engagement approach developed from the desktop research.
 - **Visual inspections:** photos of the contents of waste bins were undertaken at two farmers markets to gather physical evidence of the amount and type of food waste found at farmers markets.
- D. Market stallholders:
 - **Informal interviews:** Brief, informal conversations were held face-to-face with stallholders on location at four farmers markets in order to understand: stallholder perceptions of the size/importance of food waste; main sources and reasons for food waste by different types of stalls; what stallholders are already doing to minimise creation of food waste pre-market, and what they do with surplus food after the market; and stallholder responses to a food waste avoidance initiative.

¹ The original intention was also to engage festival organisers and stallholders in the background research. However due to delays experienced in getting in contact with festival stallholders, preliminary research was conducted with festival stallholders are the first stage of the pilot.

RESEARCH QUESTIONS

Market Organisers

- How long have they been organising markets? (Commitment and turnover)
- How is waste dealt with at their market? Is waste and recycled separated? Are organics separated? Do they know what happens to the waste (is it separated offsite)? Which waste contractor do they use?
- Who pays for the waste costs? Is it by volume? What proportion is waste cost out of total cost of running?
- How interested would their market be in a project to help reduce total waste, through avoiding food waste? If yes, would they need any specific incentives? If no, what would it take for their market to be interested?
- Can they think of any barriers to implementing food waste management changes at their markets? (With stallholders and consumers)
- What would they want to see in an Organisers' toolkit? How would they want this information delivered? Online, hardcopy
- Would it be possible for us to do a bit of a bin audit at the end of one of their markets?

Market Stallholders

- What type of food/produce do they sell? Where do they get it from – grow/harvest, collect or order?
- How often do they do stalls at markets or festivals? How long have they been doing them?
- Is food waste something they think about? What, why? Is minimising the creation of food waste something they think/do much about? (as opposed to managing food waste with compost or feeding to livestock)
- Do they track how much stock they take to market, how much they sell and how much they take home/return home with or waste/re-distribute?
- What are the main sources of/reasons for avoidable food waste for their particular food/stall type? When is this waste generated? Before the market, At the market, After the market?
- What do they do with their excess food at the end of the market? Throw it, eat it, sell it next time?
- What solutions might work for them (for minimising food waste)? What are they already doing to reduce? What else could they do if they were more supported or incentivised? Have the experience with food rescue organisations?
- What are the barriers to reducing avoidable food waste? Motivation, Time/effort, Cost, Knowledge, Legal issues around food safety?
- What could incentivise food waste reduction activities?
- How do they feel about participating in a food waste avoidance initiative? If they were to be involved what would they want to see in the toolkit? How would they want to receive the information?
- How well do they understand the food waste concepts addressed in the initiative?

STAKEHOLDERS ENGAGED

Precedents

The following key representatives of similar projects were engaged:

- Jacqui Reeves, CEO, Fair Share Southwest (UK)
- Eleanor Morris, Wrap (UK)
- Jack Fargher, Planzheroes (UK)
- Sophie Marguliew, Espace Environnement (France).

Market Organisers

The following four farmers' market organisers were interviewed by phone:

- Carriageworks Farmers Market: Mike McEneaney, Markets Creative Director
- EQ Village Markets: Bianca, Beaches Markets Manager (Past EQ organiser)
- Taylor Square Sydney Sustainable Markets: Cathy Willis, Market Facilitator
- Marrickville Organic Food Markets: Jim Grimes, Market manager.

Market Stallholders

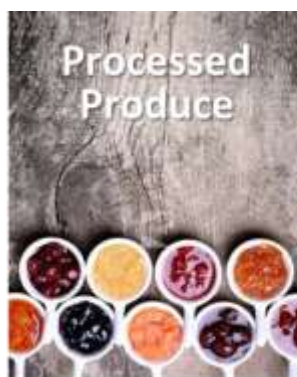
Stallholders were broken down into 4 categories:



e.g. fruit & veg, buts, eggs, honey, etc.



e.g. dairy products, oils, relishes, confectionary, etc.



e.g. fresh baked goods (i.e. breads, cakes, etc.)



e.g. take away hot (or cold) food/drinks

A total of 29 stallholders from 4 markets were informally interviewed. The following table shows the breakdown of stallholders interviewed by product type and market.

Market	Fresh produce	Processed produce	Perishables products	Prepared (hot) food	Market total
EQ	5	1	3	1	10
Carriageworks	2	2	4	1	9
Marrickville	5	0	0	0	5
Kings Cross	0	1	2	2	5
Total	8	4	7	4	29

3 FINDINGS

A. BEHAVIOUR CHANGE THEORY

A number of behaviour change theories have been reviewed for relevant project design considerations including community-based social marketing, social practice theory, behavioural economics and learning journeys.

Community based social marketing provides a framework for approach behaviour change initiatives. The other theories provide specific insights into particular aspects of the behaviour change initiative.

Community Based Social Marketing (CBSM)

The CBSM framework² is a sequential process that identifies behaviour(s) to change, and then requires research to uncover the barriers and benefits related to the new behaviour(s) and the existing behaviour(s) (see figure below). It is only then that appropriate change 'tools' are matched to overcome the specific barriers identified. These are then piloted and evaluated to ensure their effectiveness.

CBSM emphasises a sequential process of research into barriers to change prior to developing strategies (McKenzie-Mohr & Smith, 1999)



CBSM is an effective approach to adopt for behaviour change initiatives because they rely on extensive research prior to determining a strategy. It offers an alternative to the common approach where organisations wanting to implement behaviour change programs make assumptions about which intervention strategies are the best means to achieve more sustainable behaviour.

CBSM is challenging in an environment where organisations wanting to implement behaviour change programs do not have the resources to undertake barrier research *before* applying for funding. As such funding applications must make assumptions about which behaviour change strategies will be the most effective in the chosen context.

CBSM is therefore used as the basis of the approach for this project, which begins with research of the literature and with stakeholders, before developing the behaviour change strategy and tools. The project will then pilot and evaluate the approach, before rolling out more broadly.

² Sweeny, D. Show me the Change: A review of evaluation methods for residential sustainability behaviour change projects, Swinburne University of Technology National Centre for Sustainability, 2009

Other behaviour change insights

The following are some of the insights offered by the theories reviewed.

- **Social practice theory:** 'practices' (such as food waste avoidance actions) are a combination of processes/infrastructure, meaning and skills as follows:
 - **Processes: is it possible?** e.g. time and means to identify and reduce food waste
 - **Skills: can they do it?** e.g. knowledge of strategies to reduce food waste
 - **Meaning: do they care?** e.g. perceptions of no/low food waste.
- **Intrinsic/extrinsic motivation:** most food retail food waste programs focus on extrinsic motivation in the form of reduced food/waste costs. Stallholders appear to have a strong intrinsic motivation because of their passion for, and connection to, their product. Activating this and linking to participation may increase effectiveness and long-term change.
- **Behavioural economics:** people respond more to avoiding loss, than they do to increasing gain, so incentives for stallholder participation should focus on reducing costs rather than increasing profits. Penalties for creating food waste may be more effective than incentives for avoiding it.
- **Trusted messenger/social norms:** engaging stallholders via their market/festival organiser and having examples from other markets/festivals and stallholders is an effective way to enable change
- **Creating behaviour change:** regular, iterative contact personalised for each stallholder and creating shared ownership (agreement on vision/aims, and on process) is important
- **Barriers:** behaviour change will not succeed unless it addresses barriers – in this particular case stallholders are time poor and see food waste as a low priority therefore solutions should be simple and build awareness of the importance of the issue of food waste and the urgency for action
- **Learning journey:** a behaviour change program should move stallholders through the following stages: awareness/recognition of problem, taking ownership (people change behaviour when it connects with identity and purpose), identifying and increasing learning power, building knowledge and finally taking action.

B. PRECEDENTS

A review of literature and related projects found there were few Australian-specific precedents for avoiding food waste at festivals and farmers markets. Most related projects are: in the **UK**, for **large events/festivals**, and focus on **food rescue** as the main avoidance action.

Other identified projects focus on: food waste avoidance in **traditional food retailers**, **general waste management** at events, or food waste **recycling at events**. The only identified examples of projects at farmers markets are individual market initiatives on surplus food redistribution (UK) or food recycling (UK and SA).

Insights into engaging stallholders: festival organisers are building participation into stallholder contracts (UK); text can be a better communication method compared to phone/ email/ online (UK).

Past projects

An online review of past projects, and interviews with key representatives identified only limited precedents.

A number of initiatives were identified that focused on general waste management at large festivals and other events (not specifically food festivals or farmers markets). Some of these included food waste management examples, e.g.

- Glastonbury Festival: Food waste composting (50-70 tonnes food waste).

Only a few specific food waste project examples were identified, which almost always focus on food rescue /redistribution rather than food waste avoidance, e.g.

- Fareshare 2014 Festival food rescue trial (164 traders, 12 tonnes surplus food)
- Festival Food Waste Scheme + Surplus Supper Club (NCASS/Fareshare, UK)
- Every Crumb Counts @ Roskilde Festival (Denmark)
- PlanZheroes @ London's Boroughs Markets (UK).

Only one project specifically mentioned food waste avoidance activities with stallholders³:

- Festival Food Waste Scheme (NCASS/ Fareshare).

WRAP UK also gave examples of specific businesses who undertake food waste avoidance activities, e.g.

- Poco Loco/Poco Morocco: Use suppliers local to each event so that food can be ordered as needed if the festival is busy, avoiding the need to over-order, and if there is any surplus at the end of the festival, sauces are made out of fresh vegetables and meat is frozen for the next event.

³ The key stakeholders for the project have left the respective organisations. Researchers were therefore unable to track down information on what this initiative involved /achieved.

Existing resources

An online review of existing food waste resources identified many sustainability and general waste resources for events and festivals, but few resources specific to food waste at festivals and farmers markets.

The following table sets out the resources identified and demonstrates their coverage across key areas of relevance to the project.

Relevant resources identified

	Food waste	General waste	Other	Food waste avoidance	Food rescue	Food waste management	Festivals, markets, events	Traditional food service	Other	Aus	UK	US	Other
Food waste for events													
Eighth plate surplus food guide	x				x		x				x		
General waste for events													
Zero Waste SA - Waste minimisation guide for events and venues	x	x	x			x	x			x			
Zero Waste SA - Events biodegradable products guides		x					x			x			
Sustainability/other resources for events													
Good Food Guide for Festival/Street-food Caterers	x	x	x	~	x	x	x				x		
Boots for change farmers market resource			x				x			x			
Food waste for businesses													
FAO Food wastage toolkit - Reducing the food wastage footprint	x			x		x			x				x
WRAP Hospitality and Food Service - getting started on waste prevention	x	x		x		x		x			x		
WRAP Taking action on waste: The business case for hospitality and food	x			x		x		x			x		
WRAP Reducing food waste - starting off	x			x		x		x			x		
Food Waste Alliance: Best Practices & Emerging Solutions Guide	x		x	x		x		x				x	
Foodsave DIY Food Waste Audit	x			x		x		x			x		
Reducing food waste - Advice from chefs and catering professionals	x			x		x		x			x		
LFHW - How to conduct a food waste audit	x			x		x		x		x			
LFHW - How to avoid food waste, food preparation	x			x		x		x		x			
LFHW - How to Manage Excess or Unavoidable Food Waste	x				x	x		x		x			
LFHW - Food donation toolkit	x				x	x		x		x			
NSW Food Authority - Donating food to charities	x				x	x		x		x			
Fareshare toolkit	x				x			x		x			
Canada Bay food waste avoidance checklist	x			x				x		x			
Unilever food waste management tools	x			x				x		x			

Key findings from precedents

Volume of waste

- No available estimates of food waste from farmers markets or food festivals in Australia or internationally.

Sources of waste

- Planned vs actual demand: Demand for food lower than expected at a festival or farmers market (due to weather, other events, etc.).
- Food spoils at the market: Unexpectedly hot weather can affect unrefrigerated products.
- Confusion or concerns over liability when donating food to food rescue charities.

Importance of tackling food waste (key messages)

Some organisers may be engaged through emphasis of the cost benefit, whilst others may be more engaged by the environmental and/or waste reduction benefit. Develop messages with 'multiple resonators'.

Environmental key messages include:

- Wastes food and the resources used to produce food.
- Food waste is usually wet and when mixed with other waste spoils (contaminates) waste that could otherwise be recycled.
- When food waste rots in landfill it produces greenhouse gas emissions.

Food waste minimisation solutions

Organisers

- Conduct waste audits to determine the amount and source of food waste.
- Incorporate requirements (such as questionnaires and sustainability checklist) into the stallholder tender process.
- Provide training to stallholders and ensure they relay information to staff.
- At the festival ensure that food stallholders are sticking to food waste standards.
- Work with food rescue charities to redistribute edible surplus food.
- Provide stallholders who are minimising food waste with a certificate, displayed for all festival-goers to see.
- Award stallholders that meet or exceed sustainability targets – including cash prizes, or discounted stall fees for the following year (though note that behaviour change literature suggests penalties are better at incentivising behaviour than rewards).
- Publically rate or recommend stallholders who are doing the right thing.

Stallholders

- Use local suppliers so that more food can be ordered if the festival is busy, avoiding the need to over-order and reducing the potential for spoilage or damage from transporting food over long journeys.
- Develop secondary markets/by-products for surplus food (e.g. making sauces out of vegetables).

Challenges to avoiding food waste

Very little was identified regarding barriers to undertaking food waste avoidance activities, by either organisers or stallholders.

One project listed the following barriers to donating surplus food by event caterers:

- they fear they might be sued for donating contaminated food
- they face challenges of keeping the prepared food at the right temperature
- it takes time to recover the food and safely store it appropriately
- they lack access to contacts at local shelters
- it requires time and dedication to logistically coordinate with local shelters how they get the food to the rescue in a timely manner.

Food waste recycling

Stallholders

- Collect waste oil in sealed drums for recycling into bio-diesel.

Consumer waste

- Have signage on bins that describes the food waste collection scheme purpose and what happens to the waste, plus environmental benefits of using the right bin.
- Delegate staff or volunteers to act as waste advisors at recycling stations.

Food-related waste management

Organisers

- Use reusable cups and cup deposit systems.
- Switch to recyclable, compostable/biodegradable, or non-disposable serveware.⁴
- Provide stallholders with a selection of recommended or approved sustainable serveware retailers.
- Ban sachet portions, plastic⁵ and polystyrene.
- Include provisions in contracts with stallholders for properly managing food- (and food-related) waste, such as the above initiatives, with penalties for non-compliance.
- Charge stallholders an initial 'recycling' bond that is refunded if the stallholder adheres to all policies. (Note: this is likely to be more effective than providing positive incentives.)
- Include information on what is the correct behaviour, the benefits of correct waste behaviour, and what happens to waste if it is put in the right and wrong bin - on websites, brochures and tickets.

⁴ See [Good Food Festival Guide](#), p.17 for more information

⁵ Note: Some large festivals have found that rPET plastic cups (recycled and recyclable) may be more effective than compostable corn starch cups

C. MARKET ORGANISERS

Semi-structured phone interviews were held with four farmers market. The following summarises the findings from the interviews.

Market structure and waste management practices

Market 1

- Approximately 70 stallholders, stallholders must be producers
- Approximately 250kg of waste per market
- Have two bins: red-lidded general waste and yellow-lidded comingled recycling for consumers, plus back of house general waste skip and blue paper recycling skip bin for organisers (and stallholders).
- Allows stallholders to put waste in back-of-house bins
- Contamination is an issue. Facilities management actively inspects and addresses contamination prior to waste pickup.
- Interested in the idea of source separating organic waste and taking to Wollongong using Soil Co

Market 2

- Approximately 75 stallholders (not all food), majority of food must be certified organic. Approximately 10,000-12,000 market attendees
- Have two bins: red-lidded general waste and yellow-lidded comingled recycling for consumers. Recycling is collected by Remondis
- Contamination is a big issue (food waste into recycling waste stream). Bins are returned if contamination is too high. Either sorted by hand or sent to landfill. Interested in moving to compostable packaging and banning plastic bags.
- Requires stallholders to take away their own waste (sometimes not adhered to). Stallholders can make use of the onsite composting (at Addison Road Community Garden) to dispose of food waste –collect and transport it themselves at the end of each market
- Some on-the-ground initiatives to divert waste from landfill, including coconuts and plastic bottles collected by HoboGRO and coffee cups collected in spring as pots for seedlings.

Market 3

- Approximately 60 stallholders (not all food)
- Have 3 bins: General rubbish, comingled recycling, paper/cardboard. Bins managed by Entertainment Quarter.
- Allows stallholders to put waste in bins. Generally have 3 bins worth of general rubbish (to landfill), including one almost wholly dedicated to orange peels from the juice stall.

Market 4

- Small market: 12 stallholders, approximately 200 market attendees.
- Have 3 bins: general waste (landfill), recycling, compost. The compost bin helps with the problem of recycling being contaminated.

Understanding and perspectives on food waste

Terminology

Event organisers use 'food waste' as synonymous with 'organics recycling', i.e. covering avoidable and unavoidable food waste plus compostable food packaging/serving ware. They do not distinguish 'avoidable food waste' from unavoidable food waste or food-related waste.

Contamination of recycling bins by consumers and stallholders (including by consumer 'plate waste') was considered to be a higher priority than food waste in the general rubbish stream, likely due to the financial implications from dealing with contamination.

Perceptions of volume of food waste

All organisers engaged believe that their stallholders don't have much avoidable food waste.

Organisers report that more food is wasted by consumers ('plate waste') than stallholders ('preparation waste').

Appetite for engaging in project

Market organisers were all very interested in the initiative and keen to participate in the future phase focusing on farmers markets. However, most repeatedly indicated that they considered participation would include all issues related to organics recycling as identified above (avoidable food waste, unavoidable food waste, food-related waste, food waste contamination of recycling).

When discussing the different elements that might form part of the initiative, there was some doubt about incorporating food rescue. A perception by some organisers was that food rescue is not a reliable channel for avoiding food waste from markets, because charities may not prioritise pickups due to the small volume of food compared to other sources.

Perspective on stallholders' appetite for engaging

Some market organisers believe that stallholders will not respond to emails, or value phone calls, and believe that the main channel should be brief on-site interaction at the market. One organiser went so far as to say, 'they don't want to read, [they] just want a mechanism they can jump straight on board with'.

Existing solutions to food waste

Avoiding food waste

No organisers mentioned existing solutions or actions to reduce avoidable food waste.

Diverting food waste from landfill

Organisers raised a number of solutions regarding recycling of food (and organics) waste:

- One market is located on the same site as a community garden, therefore market organisers have developed a process whereby stallholders take their food waste to the community garden for composting at the end of the market (though the large majority of this is **unavoidable** food waste).
- Another market is considering implementing an organics collection and recycling service with EarthPower in Wollongong.

Stallholders collecting and delivering food waste to onside community garden compost



Bin inspections

Volumes of stallholder avoidable food waste in farmers markets bins are likely to vary between markets depending on whether stallholders are responsible for removing their own waste or can place their food waste in market bins.

Visual inspections of bins were undertaken to identify avoidable food waste quantities at two farmers markets where stallholders:

1. may place their rubbish in market bins
2. are technically responsible for disposing of their own waste.

Visual inspections of bins at two markets appear to confirm the above perceptions of organisers, with relatively⁶ little avoidable food waste (by stallholders or consumers) being identified in bins. Rough estimates of the inspected bins range from 0-5% of the volume of the bin. However it should be noted that even where an organiser reported there to be NO avoidable food waste by stallholders, visual inspections of the bins at a market where stallholders can put their own waste in market bins did find evidence of a small amount of discarded edible product in one two out of five bins.

The majority of waste observed across all bins was not avoidable food waste but rather food packaging/serving ware, such as coffee cups, plates, serviettes, etc. from consumers. This aligns with the finding from organiser interviews that 'organics' waste rather than 'avoidable food waste' is the focus for market organisers.

Market 1

Consumers (front of house) – Red rubbish bins



Consumers (front of house) – Yellow recycling bins



⁶ Compared to traditional food retail/service or consumer waste, e.g. the 2013 National Waste Report states that 37% of waste sent to landfill by the food retail sector is food waste, and that 25-50% of corporate catering food ends up in landfill, while WRAP reports that 32% of waste sent to landfill by the Hospitality and Food Service industry is food. (Note however, that these figures are based on weight, not volume.)

Market 2

Stallholders (back of house) – Red rubbish bins



Stallholders (back of house) – Yellow recycling bins



Consumers (front of house) – Red rubbish bins



Consumers (front of house) – Yellow recycling bins



D. MARKET STALLHOLDERS

Informal conversations were held with 29 stallholders from four farmers markets. The following summarises the findings from the conversations.

Understanding and perspective on food waste

Terminology

Stallholders, particularly farmers, consider “food waste” only to be **food that ends up in landfill**. Food that is diverted from landfill to reuse or recycling is not considered “waste”. Common responses include: “It’s not wasted, I feed it to the pigs” “There’s no waste, it all goes into compost”.

Stallholders **do not recognise the terms ‘avoidable’ and ‘unavoidable’ food waste**. More clarity was achieved by talking about ‘edible’ and ‘inedible’ parts of food. Furthermore, stallholders are **unfamiliar with the concept of a waste hierarchy**. Furthermore, the inclusion of ‘Avoid’ as a step in the waste hierarchy is confusing when paired with the term of ‘avoidable’ waste. More clarity was achieved by using the phrases ‘minimise’ or ‘reduce’ food waste.

Using **the word “waste” has negative effects on engagement**, either because of its connotation of non-use (i.e. landfill), or because it engenders feelings of guilt/shame. More effective language includes “lifecycle of food”, “fate of food”, “surplus food”. Due to the informal nature and time constraints of the interviews with stallholders there was no opportunity to test the FAO definition of “food loss” as food ultimately not consumed by humans.

Perceptions of volume of food waste

The majority of stallholders **believe they do not create food waste** (avoidable or unavoidable). The main reasons given are that they are too small to be able to afford waste, and/or because they have been operating for so long they have become very efficient at maximising the use of their product so no avoidable food waste is produced. Stallholders at farmers markets stated that they know their customers well and can accurately predict demand for each market. (Note that some stallholders who also do festivals report the opposite: that it is difficult to accurately predict demand for one-off events.)

Sources of avoidable food waste

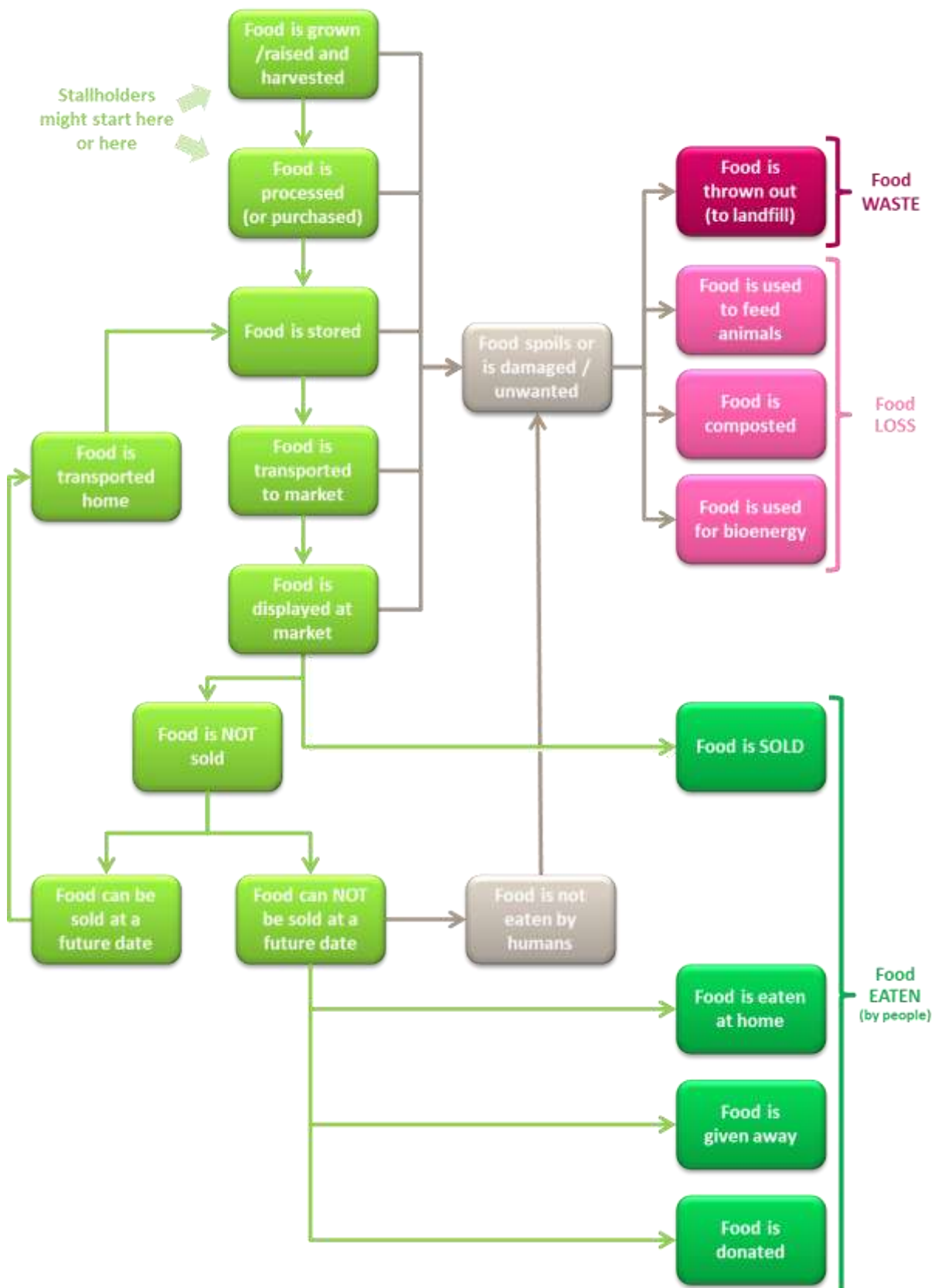
Deeper enquiry with stallholders reveals that despite perceptions, there are sources of avoidable food waste within the full lifecycle of their food products, i.e. including pre- and post-market. As expected, these differ depending on the type of food product/stall.

Fresh produce stallholders have products that can spoil or get damaged during storage and transport pre- and post-stall. All stallholders reported some extent of this, but most also reported being too busy to track the amount. The estimated quantity is small and considered acceptable. Pre-market food waste by ‘processed’ or ‘prepared’ stallholders has not been identified at this point.

Identification of waste during the market was generally limited to leftovers from ‘samples’. In some cases, extreme heat leads to spoilage at the markets, but most stallholders have strategies to respond to this.

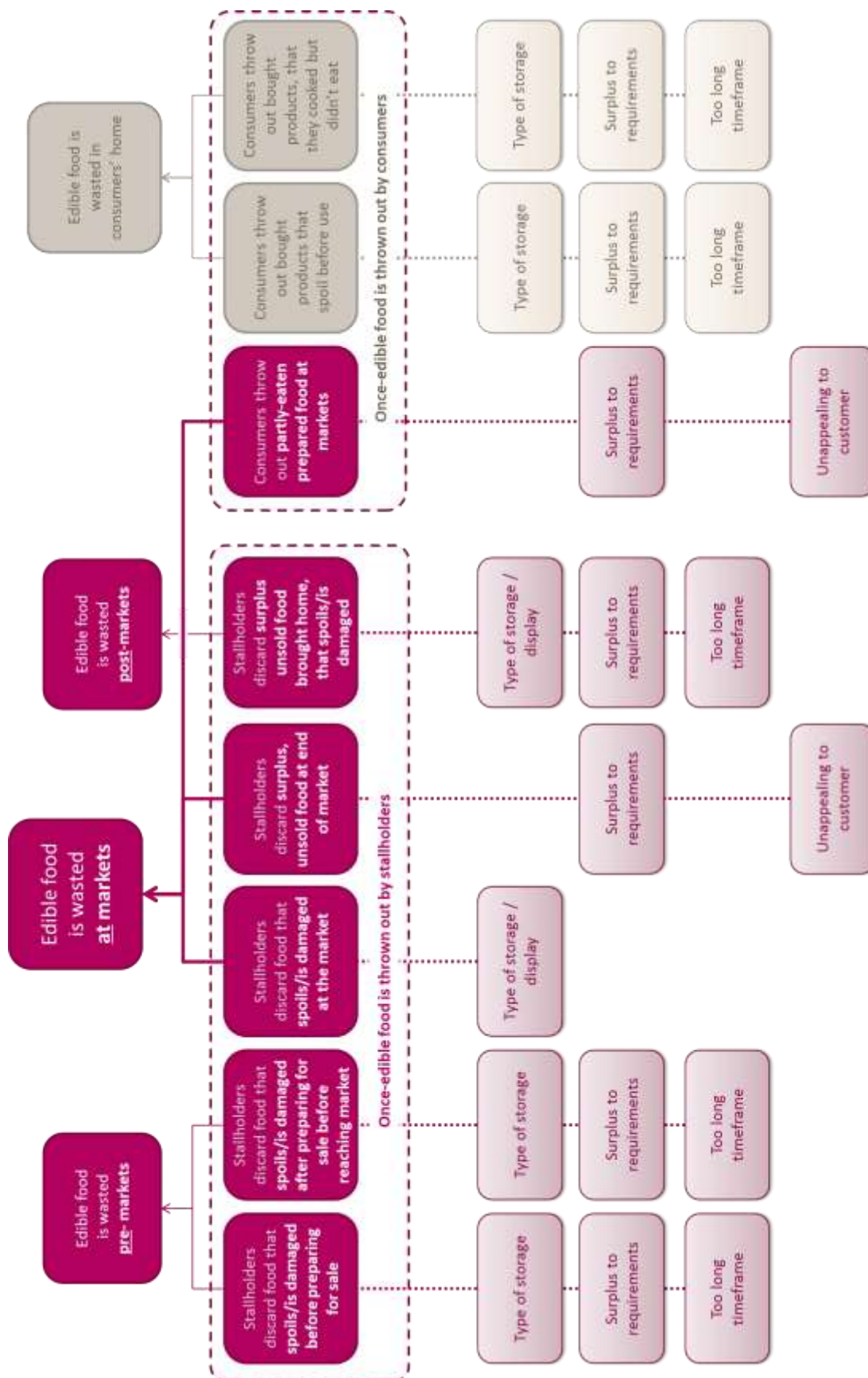
Surplus unsold food is limited at farmers markets, apparently because demand is fairly predictable and usually exceeds supply. Bad weather leading to lower market attendance may increase surplus.

The fate of food products at farmers markets



Source: ISF, 2016

Potential sources of food waste at markets



Source: ISF, 2016

Barriers to avoiding food waste

All stallholders indicated some form of time-constraint which limits their engagement with the issue of avoidable food waste

Some stallholders indicated they do not have transport infrastructure for taking home any surplus.

There is a perception amongst most stallholders that most surplus food would not be appropriate for donation to food rescue charities. If food rescue is to be considered as part of the food waste avoidance approach for this project, then this perception needs to be confirmed with food rescue project partner OzHarvest before implementing.

Existing solutions to food waste

Avoiding food waste

Pre-market

No specific solutions were reported by stallholders.

At market

Most stallholders have fine-tuned both their product selection and their infrastructure to ensure that food does not spoil during display for sale. For example, one stallholder with perishable goods keeps ice-buckets at the back of the stall and rotates the food on display in and out of the buckets to avoid spoiling/melting.

Post-market

Market stallholders often have additional channels for moving surplus. Many stallholders either do a number of markets a week and/or are part of businesses with traditional food retail outlets (e.g. cafes) or wholesale channels. However many stalls also report simply taking surplus food back to home base - more research is needed to understand what happens to this surplus food once it is taken off-site by stallholders.

For small amounts, or in the absence of other channels, stallholders give their leftover products to their last customers of the day, staff or other stallholders.

Some stallholders have channels for creating secondary products (e.g. breadcrumbs out of stale bread; smoothies out of over-ripe, bruised fruit).

Diverting food waste from landfill

Stallholders who sold fresh or processed produce frequently reported practices of composting food waste or feeding to livestock. This included a number of stallholders who routinely delivered their food waste to neighbouring farms. In one case, a commercial arrangement actually existed, based on the reduced cost of feed for livestock.

4 CONCLUSIONS

The background research with farmers market organisers and stallholders in the City of Sydney suggests that avoidable food waste at farmers markets may be particularly low compared to traditional food retail or household waste. Anecdotal evidence from some stallholders suggest that festivals may be bigger sources of avoidable food waste and, therefore, a more appropriate target for food waste avoidance initiatives. The preliminary research to be conducted as part of the following phase: Pyrmont Festival pilot will seek to confirm this.

Furthermore, no tested approaches to engaging stallholders in food waste avoidance activities were identified upon which the pilot's approach could be based. However the background research uncovered a number of key findings that can help inform the design of the festival pilot project and educational resources, as follows.

Implications for design of pilot engagement approach

Organiser engagement and initiatives

- Approaches from general waste management at festivals can be adapted to the food waste context, such as building participation into stallholder contracts.
- Expanding the scope of this project to holistically address organisers' general waste management concerns is important for effectively engaging organisers.
- When avoidance specifically is being addressed, communications need to ensure that food waste avoidance is clearly demarcated from food waste management.
- Market organisers may need to be convinced that there is sufficient avoidable food waste to make it worth addressing.

Stallholder engagement and initiatives

- Stallholders are very time-poor and under substantial pressure as a small business. It appears they have limited time and headspace to engage in anything they consider non-critical. Approaches to engaging stallholders must therefore focus on ensuring the relevancy and ease of participation for stallholders.
- Stallholders need to be convinced that participation in an initiative to address avoidable food waste is appropriate and relevant to them. Highlighting that the initiative needs to identify and communicate examples of 'good practice' is one successful strategy for overcoming this perception that food waste avoidance initiatives are not relevant for those with no perceived waste.
- Terminology needs to be both clear and inviting for stallholders. Particularly the phrase 'stallholder waste' should be avoided in the initial engagement phase.
- Anecdotal evidence suggests that the amount of avoidable food waste is likely to be less for processed goods stallholders than fresh produce or prepared food stallholders. Efforts should therefore be focused on where they have the greatest potential for change.
- Efforts to include food rescue in a food waste initiative will need careful planning and implementation to overcome negative or doubtful perceptions.

Implications for design of education resources

- Developing educational resources focusing on food waste avoidance for festivals and markets will fill an existing gap. However many of the resources focusing on general waste at festivals/events, and food waste avoidance for small food service businesses will be relevant, and should be utilised and linked to from the developed guide.
- Educational resources need to make sure that they strike the best balance between containing sufficient detail to be useful and not overloading users with information. Layering information is a good way to achieve this. Furthermore information-dense resources are required for stall owners, complemented by information-light resources for stall staff.
- The design of the online portal needs to ensure that organisers and stallholders have very easy entry points in order to enable them to get to exactly where they want.
- Organisers and stallholders are motivated to engage for different reasons. Messages need to include 'multiple resonators'.

