



Australian household food waste

Choice model findings of food waste reduction interventions



FIGHT FOOD WASTE
Cooperative Research Centre
REDUCE - TRANSFORM - ENGAGE



Australian Government
Department of Industry, Science,
Energy and Resources

AusIndustry
Cooperative Research
Centres Program

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Report background:

“Designing effective interventions to reduce household food waste” is a Fight Food Waste CRC’s research project. The project reports will provide evidence-based insights covering food waste behaviours and attitudes of Australian households, quantification of perceived and actual household food waste, advice regarding priority segments, identification of global best practise interventions, household food waste reduction interventions for priority segments, messages for selected intervention and cost-effective methodologies for evaluating the impact of selected interventions.

How to read the reports in this series:

This report is one of six reports published in the series “Australian household food waste”. A summary of the implications and evidence to support these is provided in “A summary of behaviours, attitudes, perceived and actual food waste” whilst the other five reports provide detailed results. These being: “Survey findings of behaviours and perceived food waste”, “Electronic-diary findings of recorded food waste and disposal methods”, “Kerbside bin audit findings of actual food waste”, “Focus group findings of attitudes to food waste”, and “Choice model findings of food waste reduction interventions”.

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1. Background

This research sets the baseline for the quantity and value of food waste generated in Australian homes and how the amount of waste varies with the level of knowledge, attitudes, and behaviours around household food management. The research informs the Fight Food Waste Cooperative Research Centre (FFW CRC) and other interested parties of the composition of household food waste and where most food waste occurs.

The FFWCRC is tackling the problem of food waste by investing in research that reduces the amount of food wasted through the food value chain, transforms unavoidable waste into innovative high-value co-products, and engages with industry and consumers to deliver behavioural change. There are three programs under FFW CRC – REDUCE, TRANSFORM and ENGAGE. This research is an integral part of the ENGAGE program.

The key objective of FFW CRC ENGAGE program is to provide interventions designed to tackle consumers' food waste behaviour by:

1. benchmarking national food waste knowledge, awareness and behaviours in household food management and food waste to gain a deeper understanding of the causes
2. identifying key target audiences and unpacking the barriers and opportunities for them to adopt food waste avoidance behaviours
3. increasing knowledge and skills in household best practices related to food purchasing, storage, preparation and use of leftovers
4. providing support for institutional and inter-generational transfer of knowledge and skills in more efficient food planning, purchasing, preparation and consumption
5. providing a platform for increased knowledge and awareness of food wastage in business.

This report presents choice model findings from phase three of the research *Australian household food waste* (See figure 1 and figure 2).

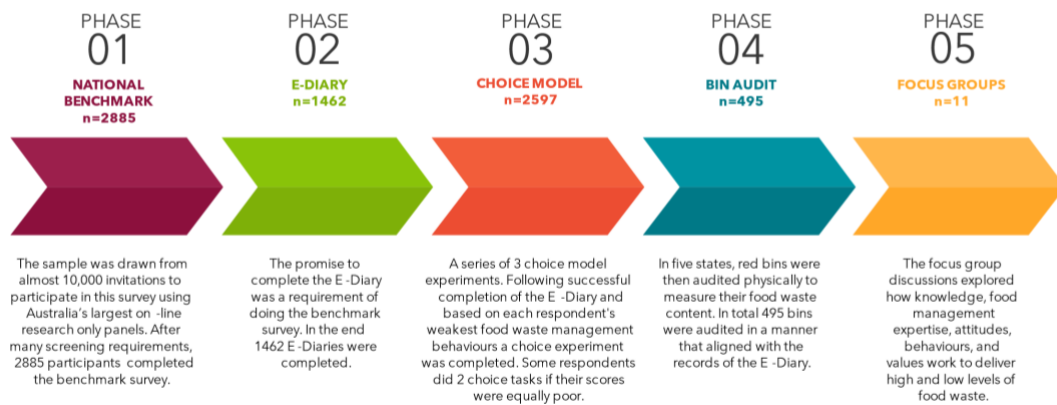


Figure 1: Research Phases

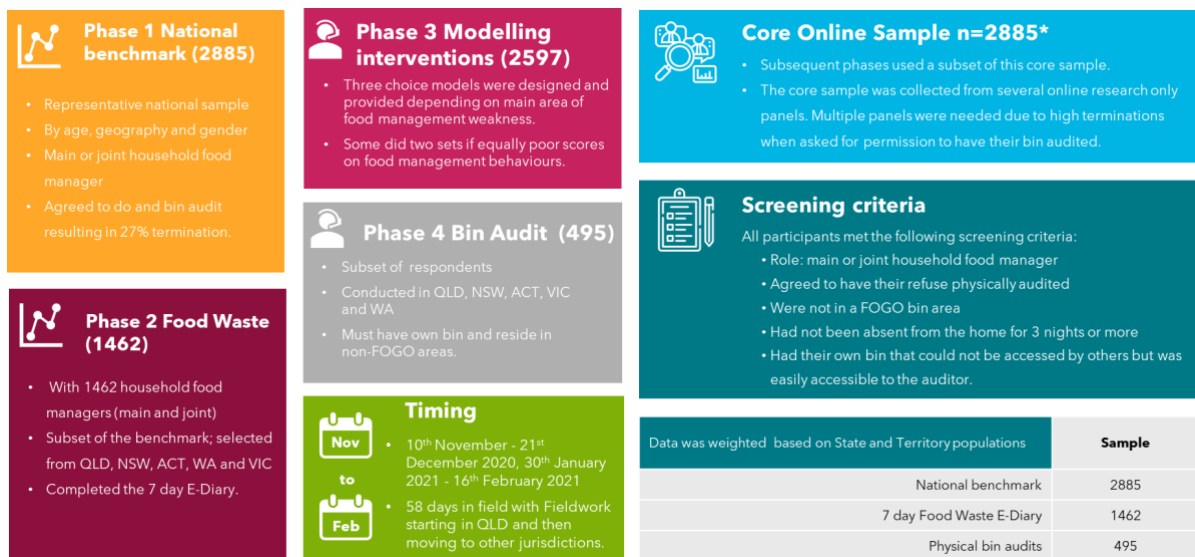


Figure 2: The methodology for the whole project

2. Methodology

The survey also includes an important component using discrete choice modelling to examine responses to a series of possible set of food waste programs and activities.

Three experiments tested interventions aimed at helping people reduce food waste.

- Planning & shopping
- Storing food
- Preparing and disposing of food

The modelling assists in understanding the key factors which underpin peoples' decision-making and the likely outcome.

A traditional survey generally relies on the 'direct question' method – asking people to make conscious decisions and individually assess the importance of certain factors in attracting them to stay or in influencing them to go. However, in the real world people make decisions based on a bundle or combination of certain things existing and some aspects of the choice can operate at an unconscious level. The traditional survey would tell us that people (at a conscious level) would prefer their community with all the benefits without considering the possible trade-offs and relative tipping points that would be made at both a conscious and unconscious level (e.g., in having certain things less than optimal providing some other things exist). It is actually hard for people to disentangle consciously and accurately what motivates them to choose one thing over another (i.e., what actually drives choice).

A choice experiment overcomes these problems. It requires that individuals be forced to make a trade-off between two or more options (sometimes also allowing 'none or neither' as a valid response) based on one scenario involving a bundle or combination of things, and then to choose again for another scenario involving another specific combination, and then again...for up to between 4 and 5 scenarios. Choice Modelling is typically used when the need is to understand the dynamics of consumer choice in a category. It relies on an integrated behavioural theory of decision-making, incorporating Lancasterian consumer thinking (from the field of psychology) and random utility theory (from economics).

3. Findings

3.1. How could we 'nudge' Australians so they avoid food waste?

Respondents were asked to choose whether this group or bundle of activities, if they were available, would help them when planning and shopping and reduce the need to dispose of food. In all cases the base case was where there were no interventions. Interestingly some respondents believed they were helped to reduce food waste just by having the issue brought to their attention.

Respondents were asked, "If this group of activities were available, do you think they would assist you when planning and shopping to dispose of less food?" Three experiments tested interventions aimed at helping people to reduce food waste.

By introducing just the three most powerful planning and shopping interventions, 49% believe they would be helped to reduce their food waste; 79% for storing food interventions and 57% for preparing and disposing of food interventions. Even higher proportions of the population felt they could be helped with more interventions with the optimal bundle of interventions showing that 61%, 79% and 73% respectively felt they could be helped to reduce their food waste.

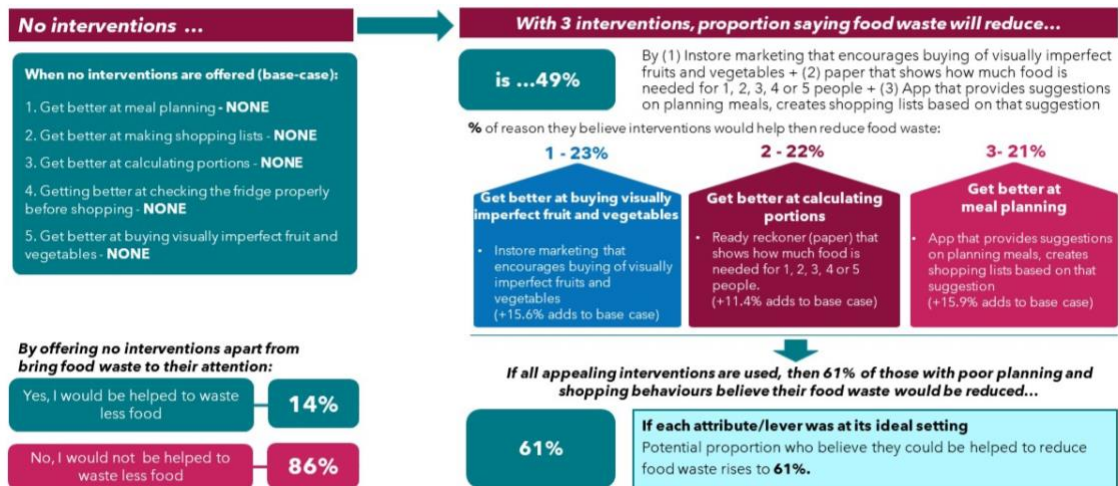
Table 1: Results (% believe interventions would help them reduce food waste)

	No interventions		Three targeted interventions		If optimal interventions delivered
Planning & shopping food (n=1065)	14	→	49	→	61
Storing food (n=683)	25	→	79	→	79
Preparing and disposing of food (n=849)	19	→	57	→	73

3.2. Choice model 1: Planning and shopping

3.2.1 What interventions help with improving planning and shopping behaviours?

While a small number (14%) claimed just bringing the issue to their attention would help reduce food waste, leveraging the three most powerful intervention led to 49% saying their food waste could be improved and 61% saying their food waste could be improved if all levers are used.



Q. If this group of activities were available, do you think they would assist you when planning and shopping to dispose of less food?

Base: People who did the planning and shopping food choice task (n=1065)

Figure 3: What interventions help with improving planning and shopping behaviours?

3.2.2 Factors that trigger the belief that food waste could be reduced (planning and shopping food activities)

Relative importance of each of five intervention strategies in reducing food waste. The optimal setting for each strategy is shown along with the proportion of the target audience likely to be helped (% shown in box adds to base case of 14%)



Figure 4: Factors that trigger the belief that food waste could be reduced (planning and shopping food activities)

3.2.3 Impact of the five strategies with the various tactics tested for planning and shopping food activities

Figure 5 demonstrates, by percentage, what happens to the base case for each setting when various tactics are used.



NB: Base case represents worst-case scenario with no intervention. These charts show the impact if tactics are changed within each strategy.

Figure 5: Impact of the five strategies with the various tactics tested for planning and shopping food activities (%)

3.2.4 Impact of the five strategies with the various tactics tested for planning and shopping food activities – by state

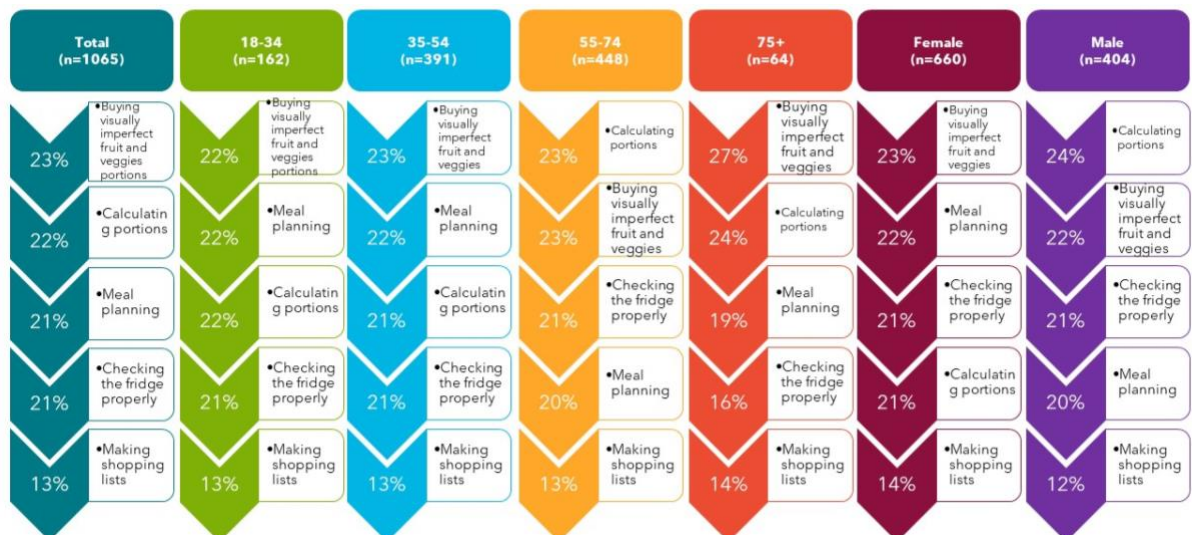


*Small same size. Interpret with caution.

Significance two tailed test of difference at a 99 per cent level of confidence [O/□ significantly less/more than the total sample]

Figure 6: Impact of the five strategies with the various tactics tested for planning and shopping food activities – by state

3.2.5 Impact of the five strategies with the various tactics tested for planning and shopping food activities – by gender and age



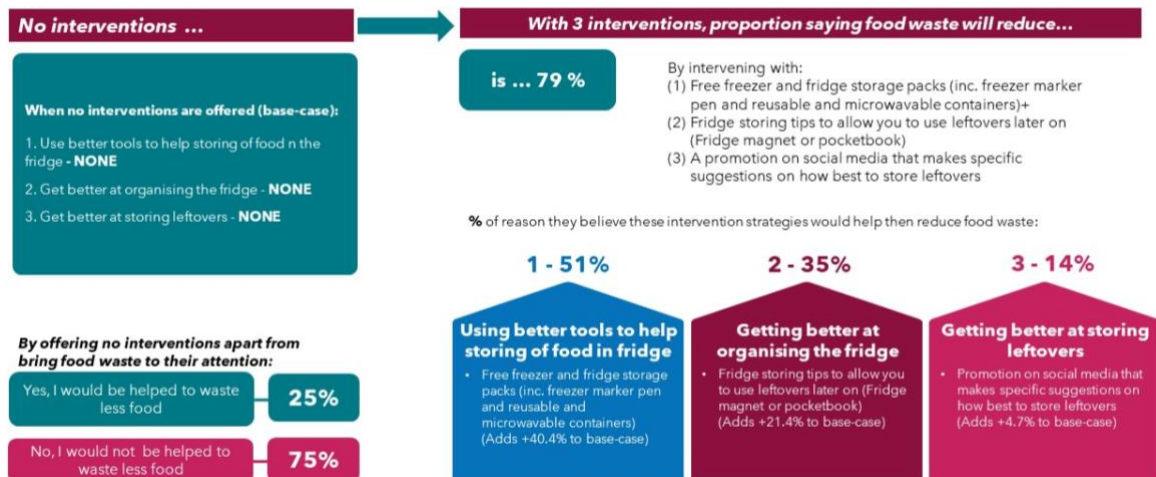
Significance two tailed test of difference at a 99 per cent level of confidence [O/□ significantly less/more than the total sample]

Figure 7: Impact of the five strategies with the various tactics tested for planning and shopping food activities – by gender and age

3.3. Choice model 2: Storing food

3.3.1 What interventions help with improved storing behaviours?

While a small number (25%) claimed just bringing the issue to their attention would help reduce food waste, leveraging the three most powerful interventions led to 79% saying their food waste could be improved.



Q. If this group of activities were available, do you think they would assist you when planning and shopping to dispose of less food?

Base: People who did the storing food choice task (n=683)

Figure 8: What interventions help with improving storing behaviours?

3.3.2 Factors that trigger the belief that food waste could be reduced (storing food)

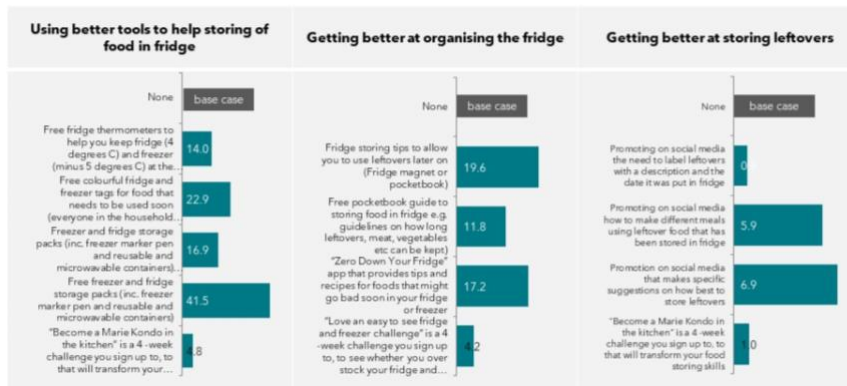
Relative importance of each of three intervention strategies in reducing food waste. The optimal setting for each strategy is shown along with the proportion of the target audience likely to be helped (% shown in box adds to base case of 25%).



Figure 9: Factors that trigger the belief that food waste could be reduced (storing food)

3.3.3 Impact of the three strategies with the various tactics tested for storing food activities

Figure 10 demonstrates, by percentage, what happens to the base case for each setting when various tactics are used.



NB: Base case represents worst-case scenario with no intervention. These charts show the impact if tactics are changed within each strategy.

Figure 10: Impact of the three strategies with the various tactics tested for storing food activities (%)

3.3.4 Impact of the three strategies with the various tactics tested for storing food activities – by state



Figure 11: Impact of the three strategies with the various tactics tested for storing food activities – by state

3.3.5 Impact of the three strategies with the various tactics tested for storing food activities – by gender and age



*Small same size. Interpret with caution.

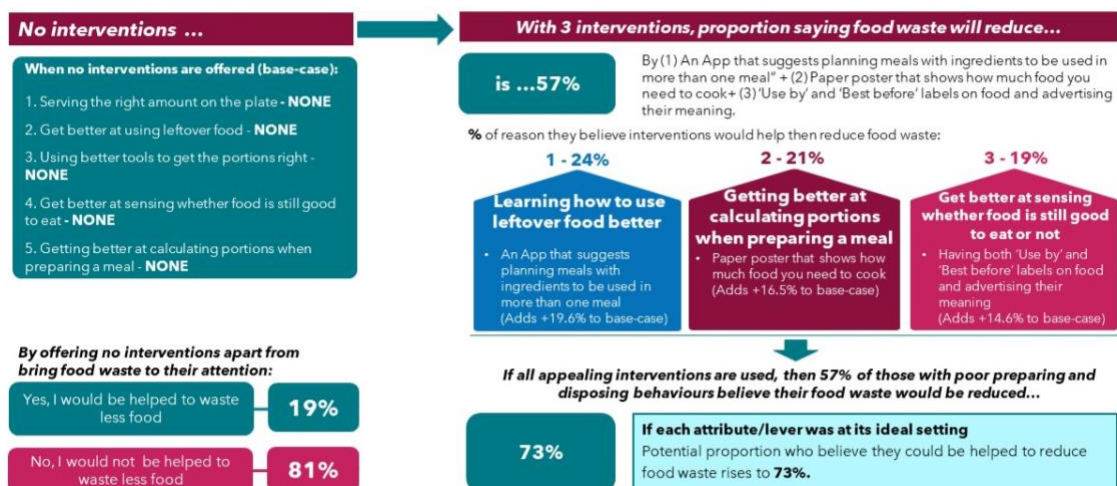
Significance two tailed test of difference at a 99 per cent level of confidence (○/□ significantly less/more than the total sample)

Figure 12: Impact of the three strategies with the various tactics tested for storing food activities – by gender and age

3.4. Choice model 3: Preparing and disposing food

3.4.1 What interventions help with improved preparing and disposing of food?

While a small number (19%) claimed just bringing the issue to their attention would help reduce food waste, leveraging the three most powerful intervention led to 57% saying their food waste could be improved and 73% saying their food waste could be improved if all levers are used.



Q. If this group of activities were available, do you think they would assist you when preparing food to dispose of less food?

Base: People who did the preparing and disposing food choice task (n=849)

Figure 13: What interventions help with improving preparing and disposing of food?

3.4.2 Driving factors for engagement of preparing and disposing food activities

Relative importance of each of the five intervention strategies in reducing food waste. The optimal setting for each strategy is shown along with the proportion of the target audience likely to be helped (% shown in box adds to base case of 19%).

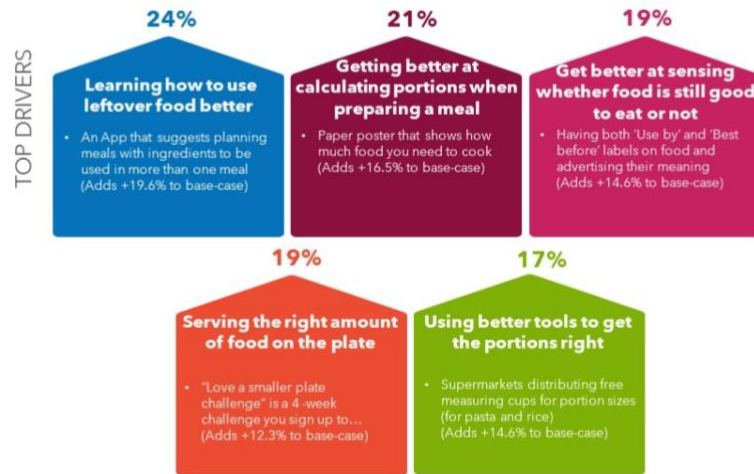
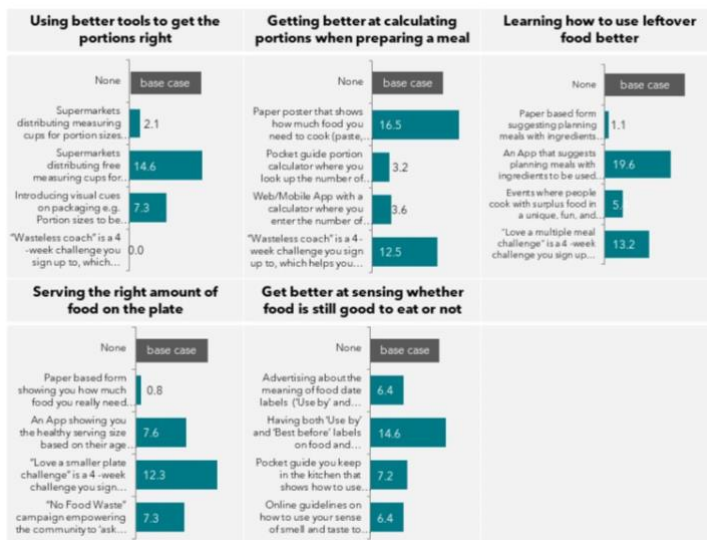


Figure 14: Driving factors for engagement of preparing and disposing food activities

3.4.3 Impact of the five strategies with the various tactics tested for preparing and disposing food activities

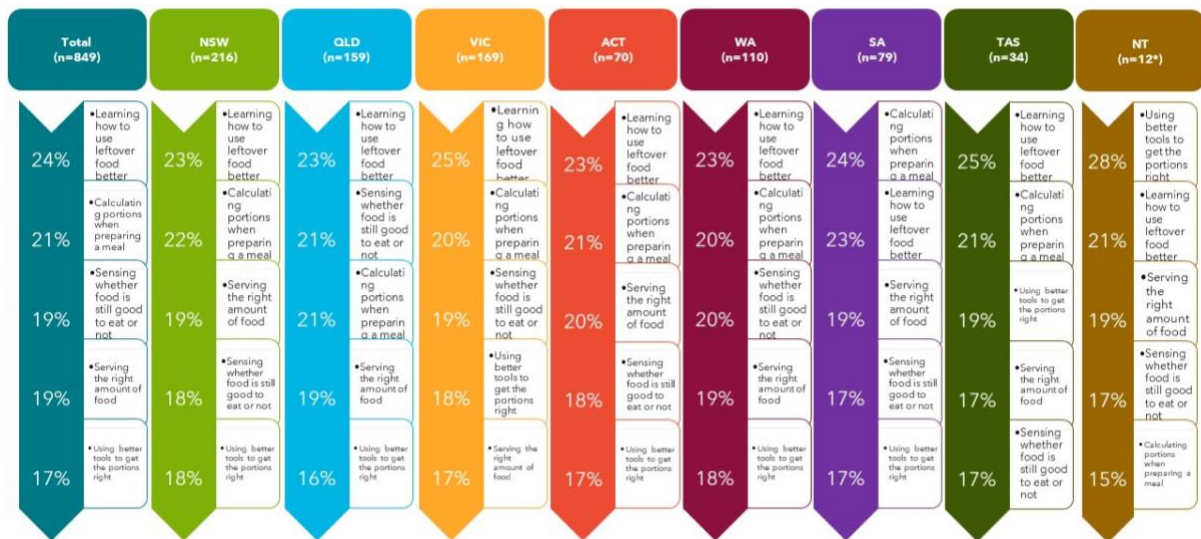
Figure 15 demonstrates, by percentage, what happens to the base case for each setting when various tactics are used.



NB: Base case represents worst-case scenario with no intervention. These charts show the impact if tactics are changed within each strategy.

Figure 15: impact of the five strategies with the various tactics tested for preparing and disposing food activities

3.4.4 Impact of the five strategies with the various tactics tested for preparing and disposing activities – by state

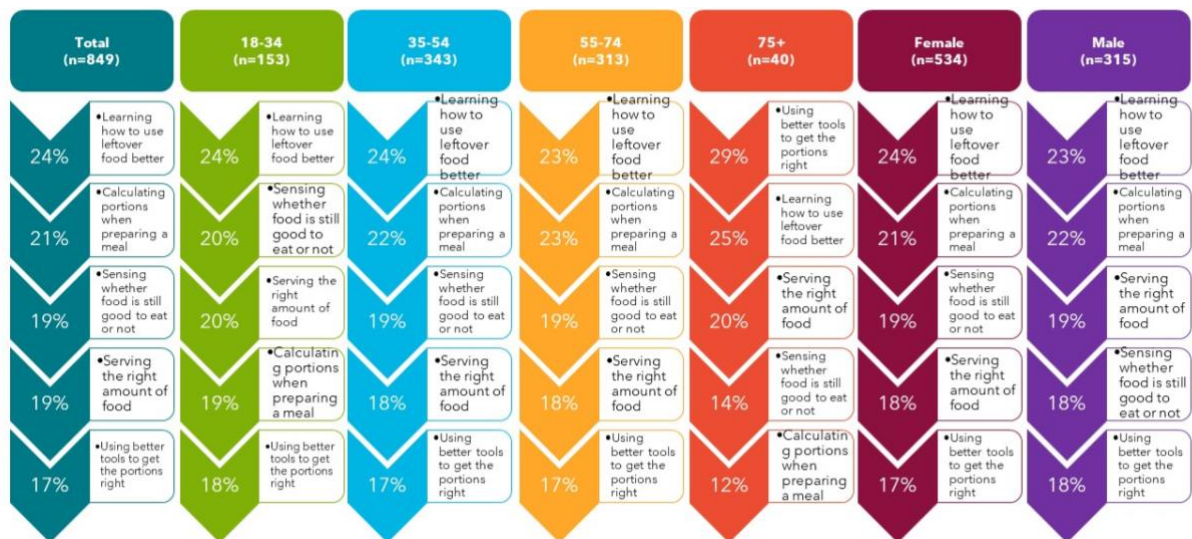


Significance two tailed test of difference at a 99 per cent level of confidence (○/□ significantly less/more than the total sample)

*Small same size. Interpret with caution.

Figure 16: Impact of the five strategies with the various tactics tested for preparing and disposing activities – by state

3.4.5 What interventions help with improved preparing and disposing of food – by gender and age



Significance two tailed test of difference at a 99 per cent level of confidence (○/□ significantly less/more than the total sample)

Figure 17: What interventions help with improving preparing and disposing of food – by gender and age

3.5. Experimental designs

3.5.1 Choice model 1: planning and shopping – factors and levels

Table 2: Choice model 1: planning and shopping – factors and levels

Behaviour to improve	Activity that would assist you				
	1	2	3	4	5
1. Get better at meal planning	None	Paper based booklet that provides suggestions on planning meals (for example, planning three dinners through to every meal for a week)	App that provides suggestions on planning meals (for example, planning three dinners through to every meal for a week), creates shopping lists based on that suggestion	App that helps plan meals, keep track of the food purchased to create a recipe selected through the app, and sends reminders about leftover ingredients from a recipe	App that helps plan meals, creates a shopping list that connects to user's favourite supermarket, keep track of the food purchased to create a recipe selected through the app, and sends reminders about leftover ingredients from a recipe
2. Get better at making shopping lists	None	Paper based form that allows you to make shopping lists based on the meals you plan for the week	App that allows you to make shopping lists based on the meals you plan for the week	App that allows you to make shopping lists based on the meals you plan for the week and add other family members view and contribute to the list and tick off items from the list.	"Love a list" challenge is a 4-week challenge you sign up to, to see how well you can stick to a list
3. Get better at calculating portions	None	Ready reckoner (paper) that shows how much food is needed for 1, 2, 3, 4 or 5 people. You look up, say spaghetti bolognaise, look at column with the right number of adults having the meal, and it tells you quantity of mince meat, mushrooms, tomatoes, etc needed	Web/mobile based App with a portion calculator when planning. Consumer clicks on an icon, say spaghetti bolognaise, adds the number of adults having the meal, and it would suggest the quantity of mincemeat, mushrooms, tomatoes, etc needed	Portion calculator when online shopping provided by major supermarkets. Consumer clicks on an icon, say spaghetti bolognaise; add the number of adults having the meal, it suggests the quantity of mince meat, mushrooms, tomatoes, etc needed	"Wasteless coach" is a 4 -week challenge you sign up to, which helps you become better at calculating amount to be purchased based on number of portions
4. Getting better at checking the fridge properly before shopping	None	Advertising on social media to remind people to look at what is in the fridge freezer/ take a photo of the fridge freezer	Paper based form that allows you to record what is in the fridge and freezer and what you need to shop for	An App that allows you to record what is in the fridge and freezer and what you need to shop for	"Love a check-list challenge" is a 4 -week challenge you sign up to, to see how well you check the fridge and freezer BEFORE going shopping
5. Get better at buying visually imperfect fruit and vegetables	None	Instore marketing that encourages buying of visually imperfect fruits and vegetables	Short videos/ posts that are shared in social media which informs visually imperfect fruits and vegetables are too good to throw away	TV advertising that encourages purchase of visually imperfect fruits and vegetables as they are too good to throw away	"Waste Heroes" is a four-week competition where you share photos and stories of how you appreciate visually imperfect fruit and vegetables

3.5.2 Choice model 2: storing food – factors and levels

Table 3: Choice model 2: storing food – factors and levels

Behaviour to improve	Activity that would assist you					
	1	2	3	4	5	6
1. Using better tools to help storing of food in fridge	None	Free fridge thermometers to help you keep fridge (4 degrees C) and freezer (minus 5 degrees C) at the ideal temperatures	Free colourful fridge and freezer tags for food that needs to be used soon (everyone in the household knows what food needs to be used next)	Freezer and fridge storage packs (inc. freezer marker pen and reusable and microwavable containers) (\$10)	Free freezer and fridge storage packs (inc. freezer marker pen and reusable and microwavable containers)	"Become a Marie Kondo in the kitchen" is a 4-week challenge you sign up to, to that will transform your food storing skills
2. Getting better at organising the fridge (so you can see what's there)	None	Fridge storing tips to allow you to use leftovers later on (Fridge magnet or pocketbook)	Free pocketbook guide to storing food in fridge e.g. guidelines on how long leftovers, meat, vegetables etc can be kept)	"Zero Down Your Fridge" app that provides tips and recipes for foods that might go bad soon in your fridge or freezer	"Love an easy to see fridge and freezer challenge" is a 4-week challenge you sign up to, to see whether you over stock your fridge and freezer, or if not	
3. Getting better at storing leftovers	None	Promoting on social media the need to label leftovers with a description and the date it was put in fridge	Promoting on social media how to make different meals using leftover food that has been stored in fridge	Promotion on social media that makes specific suggestions on how best to store leftovers	"Become a Marie Kondo in the kitchen" is a 4-week challenge you sign up to, to that will transform your food storing skills	

3.5.3 Choice model 3: preparing and disposing food – factors and levels

Table 4: Choice model 3: preparing and disposing food – factors and levels

Behaviour to improve	Activity that would assist you				
	1	2	3	4	5
1. Using better tools to get the portions right	None	Supermarkets distributing measuring cups for portion sizes (for pasta and rice)(\$10)	Supermarkets distributing free measuring cups for portion sizes (for pasta and rice)	Introducing visual cues on packaging e.g. Portion sizes to be marked with dotted lines	"Wasteless coach" is a 4 -week challenge you sign up to, which helps you become better at calculating portions when preparing a meal
2. Getting better at calculating portions when preparing a meal (to avoid cooking too much food)	None	Paper poster that shows how much food you need to cook (paste, rice, mashed potatoes etc) for various numbers of people	Pocket guide portion calculator where you look up the number of people cooking for and it tells you how much to prepare	Web/Mobile App with a calculator where you enter the number of people being cooked for and it tells you how much to prepare	"Wasteless coach" is a 4 -week challenge you sign up to, which helps you become better at calculating portions when preparing a meal
3. Learning how to use leftover food better	None	Paper based form suggesting planning meals with ingredients to be used in more than one meal (for example, mince in spaghetti bolognaise one night and tacos the next night)	An App that suggests planning meals with ingredients to be used in more than one meal (for example, mince in spaghetti bolognaise one night and tacos the next night)	Events where people cook with surplus food in a unique, fun, and musical atmosphere.	"Love a multiple meal challenge" is a 4 -week challenge you sign up to, to see how well you can use the same ingredients in more than one meal
4. Serving the right amount of food on the plate (to avoid too much plated leftover food)	None	Paper based form showing you how much food you really need to serve per person based on their age and activity level	An App showing you the healthy serving size based on their age and activity level	"Love a smaller plate challenge" is a 4 -week challenge you sign up to, that encourages the use of a smaller plate and allows you to see how well you went using a smaller plate	"No Food Waste" campaign empowering the community to 'ask what's on their plate' to show food waste is not acceptable.
5. Get better at sensing whether food is still good to eat or not	None	Advertising about the meaning of food date labels ('Use by' and 'Best before') e.g. Facebook, Instagram, Television, Magazines	Having both 'Use by' and 'Best before' labels on food and advertising their meaning	Pocket guide you keep in the kitchen that shows how to use your sense of smell and taste to recognize if food is still good to eat	Online guidelines on how to use your sense of smell and taste to recognise if food is still good to eat

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