

***Survey of Existing Consumer
Products and Services which
Reduce Food Waste***

WRAP

LOVE
FOOD
hate waste

Formerly
We Are What We Do

Shift

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Introduction

Food waste is a major environmental problem in the UK and over half of it is generated in the home. Preventing avoidable food waste could save the equivalent of 17 million tonnes of CO₂ emissions annually.¹ These greenhouse gases are produced both when the food rots and in the production, transport and storage of food, so its important that unnecessary food doesn't go to waste. Despite the fact that it costs the average household around £60 a month, 50% of people think about the cost of this wastage (both to themselves and the environment) 'a little' or 'not at all'.²

No one plans to waste food. Many of the behaviours that lead to food waste are semi-automatic, undertaken without conscious intent. They are shaped by habit, which in turn is influenced by the products and services that surround planning meals, purchasing food, storing and preparing food for eating, serving, eating and finally disposing of food that is not eaten. As in other areas of behaviour change, small changes to these products and services have the potential to significantly influence food waste habits, facilitating changes to this important environmental behaviour.

This document provides an overview of existing consumer products and services that have an influence on behaviours linked to food waste in the home and provides an analysis of which behaviours they target. The products are grouped according to the following six stages of the domestic food cycle, as identified by WRAP:

- Planning
- Shopping
- Storage
- Preparation
- Consumption
- Disposal

Along with a companion document (Food Waste: Impact Report), this survey is intended to inform the development of products or services to facilitate behaviours that reduce food waste.

This document was created by Shift, formerly known as We Are What We Do, in partnership with WRAP, as part of the research phase of a product/service development process aimed at reducing domestic energy consumption in the UK, commissioned by The Ashden Trust, JJ Charitable Trust and Mark Leonard Trust.

For more information see shiftdesign.org.uk

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¹ Quested, T., Ingles, R. & Parry, A. (2013) Household Food and Drink Waste in the United Kingdom 2012, Banbury: WRAP ² WRAP (2007) Understanding Food Waste, Banbury: WRAP

Planning



What is it?

Physical products that help people write shopping lists, such as chalk boards, wipedown boards and notebooks.

How does it reduce food waste?

With an accurate list there is less chance of buying food that isn't needed and won't be used.

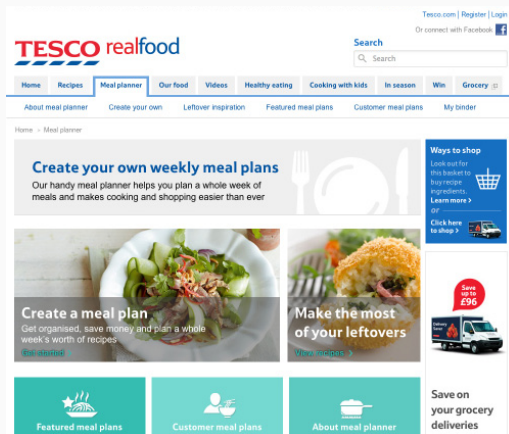


What is it?

Physical products that help to plan the menu for the week ahead, such as meal planning templates, chalk boards and wipedown boards.

How does it reduce food waste?

Knowing what meals are going to be cooked makes it possible to buy ingredients only for those meals and not buy food that may not be used.



What is it?

Websites and apps where you can choose recipes for the week and from this the website/app creates a shopping list of all the ingredients needed. Some sites have menus especially for families with children.

How does it reduce food waste?

By being given the ingredients of the meals for the week you can buy only the food needed for the meals, in the right quantities.

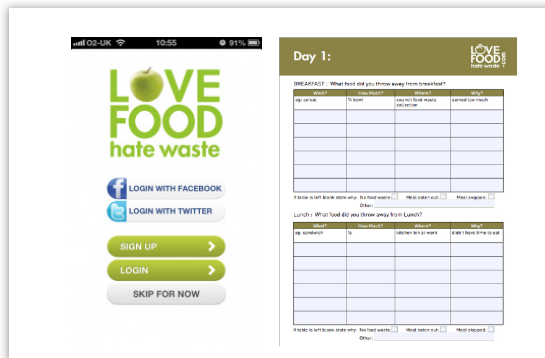


What is it?

Shopping list websites and apps where items can be added to a list during the week and shared between other devices and family members.

How does it reduce food waste?

With an accurate list there is less chance of buying food that isn't needed and won't be used.



What is it?

The Love Food Hate Waste app helps users keep track of food planning, shopping, cooking meals and making the most of leftovers. It also has recipe ideas and tips for using forgotten foods and leftovers. Their downloadable diary helps track food waste.

How does it reduce food waste?

It encourages food waste reduction across all six stages of the food cycle.



What is it?

The Wise Up On Waste app created by Unilever helps professional kitchens to track when and where they are generating the most waste and what their potential cost saving could be.

How does it reduce food waste?

It encourages better planning.

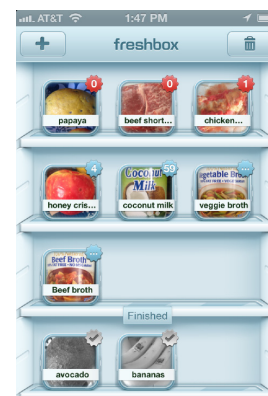


What is it?

Recipe books and food magazines.

How does it reduce food waste?

Recipes give precise quantities of food needed, encouraging people to buy and cook the correct amount of food.

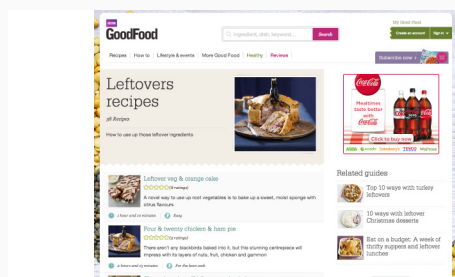


What is it?

Fridge monitoring apps keep track of what food is in the fridge, how much is left, and when it will reach its sell-by date.

How does it reduce food waste?

Knowing what is in the fridge prevents people buying food that they already have.



What is it?

Websites and apps that give recipe advice on using leftovers.

How does it reduce food waste?

Using up leftovers means less gets thrown in the bin.

Case Study: Menus4mums



For the Week of: 2nd October 2006

Weekly Planner

menus4mums

Monday	Tuesday	Wednesday	Thursday	Friday
Spaghetti Bolognese	Chicken Fajitas	Cheese, Onion & Potato Mince Sausages and Peas	Lean & Mean One-Pan	Cheesy Fish Pie with Carrots & Broccoli
Notes: You can make a double portion of Bolognese sauce, or freeze for next week's Lasagne	Notes: Use Sainsbury's special offer on two packs of chicken breasts - we'll use the other for a mild curry for week	Notes: Use Sainsbury's special offer to buy two packs of TTD sausages for £4 - next week use the other pack next week for Sausage Casserole	Notes:	Notes: Frozen fish was a real winner with this recipe and is cheaper than fresh

What is it?

Menus4Mums is a UK based website and online service. For £6.95 per month or £60 a year it provides weekly meal plans of family dinners (Monday to Friday), together with easy recipes and a corresponding shopping list. The menus are planned to include products that are on special offer in supermarkets.

The shopping list is linked to an online comparison website so all items on the list can be ordered cheaply online.

How it prevents food waste

The menu planner ensures that all the ingredients bought at the start of the week are used up in the meals. It also sometimes includes leftovers from one meal in the next e.g. including mince from a bolognese in a lasagne recipe.

Motivations/pressures it addresses

- By providing menus and shopping lists the service reduces the time and effort parents have to put into meal planning. The meal plans also save time by including batch cooking where extra portions are frozen and then used in a subsequent day's meal.
- The service saves parents money on their food bill by planning the menu around supermarket deals. It also saves money by ensuring that all ingredients bought at the start of the week are used up in the meals made, with no food going to waste.
- In a survey conducted by Menus4Mums 90% of members thought the service saved them time and money in the kitchen.
- Parents are reassured that the meals are all healthy and nutritionally balanced as the menu is designed by an ex-chef with qualifications in nutrition.
- By saving time in the kitchen parents then have time to spend doing what they want to do.

The key selling points of the service were summed up in a member's quote used on the Menus4mums website:

"I am loving your service...I am making great savings, healthy food and saving time and stress in the kitchen!"

Barriers to using the service

- Members have to pay between £5 – £6.95 per four weeks for the service (depending on the length of subscription bought). This cost could prevent people signing up as they may not see it as a priority area of spending, especially for families with small budgets.
- The service is online so can only be used by people with access to the internet and are comfortable using it.
- The service doesn't cater for changes in a family's schedule. For example, if a family eat out one night and miss a meal on the planner then they may not use up all the food that has been bought for that week, unless they shift the fifth meal to the weekend. Similarly, there is no option to choose a meal plan for less than five days.
- People may not want to commit to making meals from scratch every night, and not occasionally being able to resort to "quick fixes" like beans on toast.
- People may want to make their own meals, and not always follow other people's recipes.
- Recipes may not cater for their children's tastes.

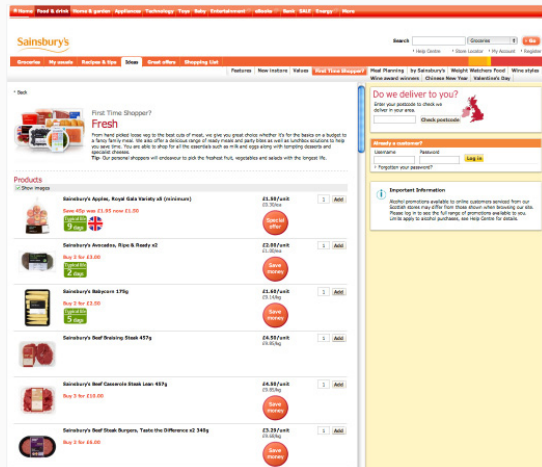
Scale/ Impact:

- Around 16,000 followers on Twitter
- Around 900 likes on Facebook
- Positive feedback from members on the website

Website:

- www.menusformums.co.uk

Shopping



What is it?

Online shopping.

How does it reduce food waste?

Buying online you are less likely to impulse buy and buy food that isn't needed and won't be used.



What is it?

Grocery box delivery.

How does it reduce food waste?

Receiving a grocery box discourages impulse buying or buying more than is needed.



What is it?

Shops that sell unpackaged food.

How does it reduce food waste?

Customers can buy as much, or as little, of a product as they need.



What is it?

Single portions.

How does it reduce food waste?

Customers don't have to buy more than they need.



What is it?

The Resourceful Chef.

How does it reduce food waste?

A Swedish initiative at ICA Malmborgs Tuna supermarket. In-store chefs transform discolored fruits, wrinkly vegetables and goods approaching their expiration dates into meals which customers can purchase directly from the store. The meals are healthy and low price. Since 2007 the store has reduced its food waste by 80% and sells 350 hot lunches a day. It is now available in six stores.

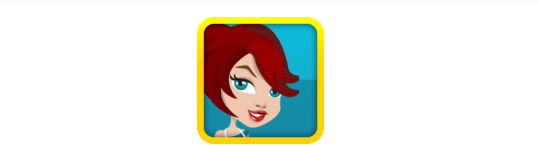


What is it?

Diet takeaway services, high quality frozen meals and services like MealKu, which allow you to choose from dishes being made that day by individuals in their own homes.

How does it reduce food waste?

They provide specific meals and portions and therefore reduce chance of over-ordering.



What is it?

Share Your Meal is an enterprise where you see what people in your area are cooking and can order a portion or two of their meal.

How does it reduce food waste?

Some of the meals offered are additional portions of food that would have otherwise gone to waste.

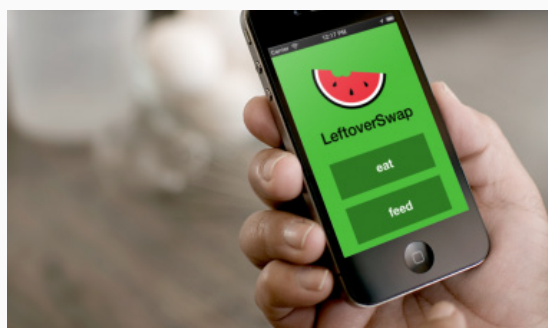


What is it?

FoodStar is a platform that alerts shoppers of large discounts at their local grocery store on imperfect or already-ripe produce.

How does it reduce food waste?

The food sold through the platform would otherwise be thrown away.



What is it?

Leftover Swap is an App that lets you post a photo of any leftovers you have.

How does it reduce food waste?

Anyone else who has the app can then come and collect the leftovers. See also Foodsharing.de in Shopping.



What is it?

CropsMobster is a platform (website and facebook) where farmers can sell off their produce very cheaply as it can't be sold to shops. For example, produce could be too near its use-by date, or be visually damaged but still fine to eat.

How does it reduce food waste?

The food sold through the platform would otherwise be thrown away.



What is it?

Gousto is a service in the UK which allows people to select recipes for three weekly meals, and then have the recipes and corresponding ingredients delivered to their home. The cost ranges from £5.58 per person per meal for four people (£67 per box) to £6.99 per person per meal for two people (£42 per box). Each week there are new recipes to choose from, including recipes tailored to children.

How it prevents food waste

Matching the amount of ingredients to the recipes means there is little food that is not used.

Motivations/pressures it addresses

- This service saves time for busy parents and young professionals with hectic lifestyles as it delivers the recipe ingredients direct to their door.
- It is also convenient, removing the need to get to the shops, search for ingredients, queue at the supermarket or carry the food home.
- Parents can feel assured their children are eating healthily as the recipes are made with a balance of food groups and vitamins and minerals. The health conscious can also be confident that there are no additives or e-numbers in each meal as they make them from scratch.
- For people who eat out on some nights of the week there is flexibility on when they can make the Gousto meals as recipes and ingredients are provided for 3 meals in the week.
- It caters to people who enjoy cooking and trying new recipes. On its website, Gousto emphasises the fun that can be had making new dishes saying "Follow the simple, fun instructions and enjoy our exciting new recipes each week".
- The recipes provided would make impressive dishes that could get praise from others - a partner or family. This praise may particularly appeal to parents, especially mothers, who often feel that providing daily meals for their children can be a thankless task. On its website, Gousto argues that people should get the recognition they

deserve for making healthy, creative and quick meals on a regular basis which, they argue, is not an easy task.

- The website claims that taking food waste into account, Gousto is 16% cheaper than supermarket meals based on a comparison done at mysupermarket.com.

Barriers to using the service:

- The cost of the service may be too high for some people to afford.
- People within a family may not all want to eat the same meal.
- People may worry about having their food box left outside their home if they are not in when the delivery arrives, and don't have a safe place for the food box to be hidden.
- Gousto is an internet-based company, with recipes shown and orders being processed online. Those who can't access the internet or don't feel comfortable with using it may not be able to use Gousto without help from others.

Other benefits

The produce used in the food boxes is sourced, where possible, from UK-based farms, reducing carbon emissions from transport. It is nearly all organic and the meat is free-range and high-welfare.

The recipes also use produce that is in season, meaning that the food can be sourced from the UK rather than flown in from abroad, reducing carbon emissions.

Scale/impact:

- It has expanded rapidly over the last year, and is now in a partnership with the online retailer Ocado.
- Around 7,000 likes on Facebook
- Around 2,000 Twitter followers

Website:

- www.gousto.co.uk



What is it?

Foodsharing is an internet platform that gives individuals, traders and manufacturers the opportunity to offer or collect leftover or unwanted food for free. People can also meet up and cook meals together from food that would otherwise have been thrown away.

Motivations/ pressures it addresses

- It is well known that the motivation to get "something for nothing" is a strong one, and therefore getting food for free can provide people with a sense of satisfaction.
- Those people who place importance on being socially and environmentally aware may be motivated to dispose of food in a way that both helps others and doesn't damage the environment.
- The service also allows people to increase their social networks if they want to meet new people and share cooking ideas. It may be a particularly good way of meeting people who share similar ideas around sustainability and the importance of community networks.

Barriers to using the service

- It takes time and effort to look for available food on the site.
- There is no choice over what food is offered, making it difficult to plan meals in advance.
- It requires effort to collect food from a person/area.
- If collecting food, a person has to trust the safety of the food that they have collected.
- There are personal safety issues for both the people collecting food, and those who are offering it. Especially if the exchange is done at someone's house.

- The site is online so those who can't access the internet or don't feel comfortable with using it may not be able to use foodsharing without help from others.
- People may worry that others will judge them, either because their food tastes are not sophisticated or healthy enough or, if they are donating sophisticated or healthy items, that they are not using such quality items. Anonymous donation may be a solution to this.

Scale/Impact:

- The Foodsharing site originated in Germany and there are now Foodsharing sites in Austria and Switzerland. Groups from other countries including the Netherlands, Belgium, France, Spain, Denmark, the Czech Republic and the US are all working on adaptations of the idea for their respective countries.
- In Germany there are over 35,000 users of the Foodsharing platform. There have been around 7,000 successfully exchanged baskets/ items of food which equates to 30,000kg of food that has been saved from being thrown away thanks to Foodsharing. This represents 0.4% of Germany's annual food waste.
- The German Foodsharing site has over 3,500 comments and the German Foodsharing facebook site has over 42,000 likes.

Website

- www.foodsharing.de

Storage



What is it?

Smart labels are activated when the pack is opened and change colour from green to red over 1-4 weeks.

How does it reduce food waste?

By knowing the shelflife of a product, people can make sure they eat it before it goes off.



What is it?

Packaging/containers with "windows" to see how much food is left.

How does it reduce food waste?

By seeing the amount of food left it is easier to plan how it can be incorporated into a meal.



What is it?

Resealable packaging on products like cheese and dried fruit.

How does it reduce food waste?

Keeps food fresher for longer.



What is it?

Polar Fresh.

How does it reduce food waste?

The filter is put in the fridge to reduce humidity and absorb ethylene gas. This reduces the rate of food spoilage.

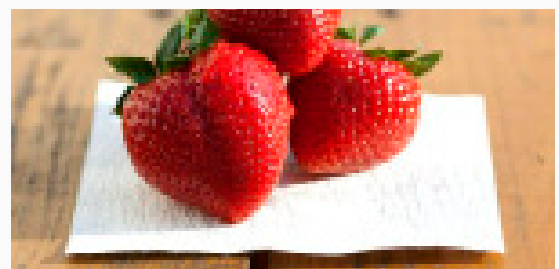


What is it?

Food Huggers are a set of silicon caps that fit onto the end of cut fruit and vegetables.

How does it reduce food waste?

It creates a protective seal that keeps them fresh for longer.



What is it?

Fresh paper is a sheet of paper infused with herbs and spices which keeps fruit and vegetables fresh for 2-4 times longer.

How does it reduce food waste?

The spices inhibit bacterial & fungal growth, as well as enzymes that cause over-ripening.



What is it?

Well packaged food.

How does it reduce food waste?

Packaging protects food during transit and storage in the supermarket and home, keeping it fresher for longer.



What is it?

Smart fridges.

How does it reduce food waste?

It makes it easier to see what you've got before you go shopping by increasing visibility.



What is it?

Freezer.

How does it reduce food waste?

Allows food that won't be eaten to be stored for a much longer period of time.



What is it?

Fridge thermometer.

How does it reduce food waste?

Ensures fridge is at right temperature so food stays fresher for longer.



What is it?

Freezer separators are put in between food items before freezing allowing you to defrost desired portions rather than everything.

How does it reduce food waste?

Individual portions allows people to use only the amount they need, meaning they are less likely to have leftovers.



What is it?

Vacuum packing machines allow you to preserve food for longer and to store food in individual portions.

How does it reduce food waste?

Individual portions means people use only the amount they need, so are less likely to have leftovers.



What is it?

Bag clips.

How does it reduce food waste?

Seals air out of packets to prevent spoiling



What is it?

Bread bins, loaf bags and vegetable bags.

How does it reduce food waste?

Provides environments that naturally help to preserve food.



What is it?

A banana hanger.

How does it reduce food waste?

Reduces bruising and keeps bananas away from other fruit to discourage their ripening.

Case Study: Wall hanging storage



What is it?

Jihyung David is a Korean designer who has built prototypes of wall hanging food storage which incorporates traditional food storage techniques into the design.

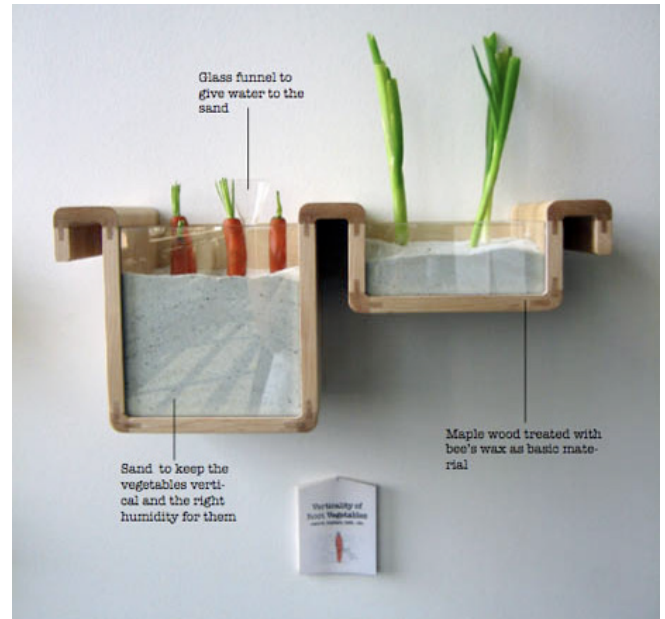
The solutions often make use of traditional home economics knowledge.

For example, apples naturally release ethylene gas, which suppresses sprouting in potatoes, but which would accelerate ripening in other fruits. Using this knowledge, Jihyung designed a storage box which placed potatoes in a dark box, and apples in holes on the top of this box where they would produce ethylene, preserving the potatoes below.

Another example is a storage unit that is filled with sand. Root vegetables like carrots can be placed vertically in the sand allowing the organisms to save energy and keeping them fresher for longer. The sand also helps to keep the proper humidity of the vegetables. There is a funnel going into the sand to keep it damp.

These products are not yet on the market.

Note this product goes against WRAP's advice about storing fruit and vegetables (except potatoes and bananas) in the fridge.



Motivations/pressures it addresses

- For people with concerns over the use of preservatives and additives, the unit offers a natural way of keeping food for longer.
- For those who are concerned with aesthetics of their kitchen, the units are visually pleasing and of good quality.
- The units could save the owner money in the long term by preserving food for longer, resulting in less being thrown away. It also could save money as, unlike a fridge, it doesn't use any electricity or fuel.
- Once the storage is installed, it is easy to use and takes little upkeep.
- Parents may like the products as a fun way for their children to interact with and learn about fruit and vegetables.

Barriers to using the product:

- Popularity may depend on how much the wall storage costs.
- Products take up a lot of space compared to the number of items they hold.
- People may not have the space on their walls for storage, or the ability to attach it to their wall.
- It takes time and effort to store food items in separate storage containers.

Preparation



What is it?

Spaghetti serving measure.



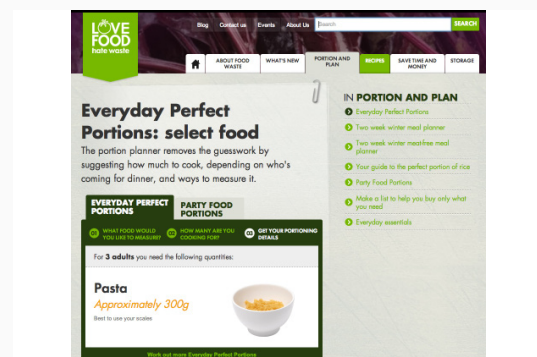
What is it?

A cook's measure.



What is it?

Scales.



What is it?

Love Food Hate Waste online portioning tool.



What is it?

Measuring spoon set.



What is it?

Pan showing portion sizes.



What is it?

The multi-serving pasta basket allows you to cook individual portions of pasta and shows how much pasta is needed per portion.

How do these reduce food waste?

By cooking accurate portion sizes there is less likelihood of cooking too much and having to throw uneaten food away.



What is it?

Food timer.

How does it reduce food waste?

Reduces food spoilage in cooking.



What is it?

Rice cooker.

How does it reduce food waste?

Reduces food spoilage in cooking.



What is it?

Food mixer and blender.

How does it reduce food waste?

This allows you to use up old fruit and vegetables, that might have been thrown away, to make smoothies, soup, jam or stews.



What is it?

MamaBake is a movement where mothers come together regularly in their local neighbourhoods and cook one big batch meal each. At the end of each session the big batch meal is divided up amongst each mother who then goes home with a range of freshly cooked meals for the week.

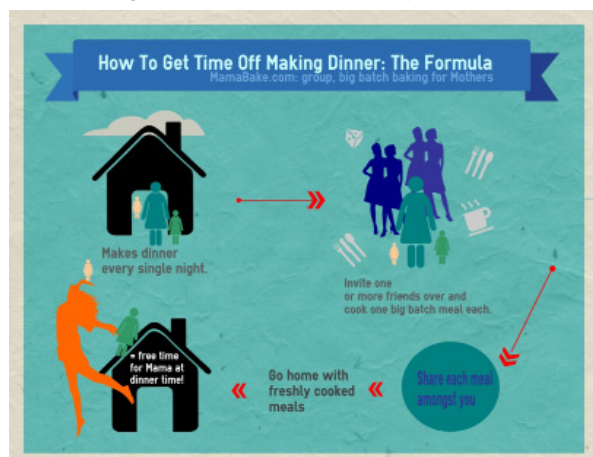
It is free to set up a Mama Bake group, but there is the option to sign up to a MamaBake Baking Club for 20 Australian dollars a year, which provides access to weekly recipes and recipe archives, as well as an online personalised recipe box.

How it prevents food waste

As each mother has their meals for the week they are less likely to buy additional food that could go to waste.

Motivations/pressures it addresses

- By coming together with other mums and batch cooking, mums can save time and effort as they only have to cook once but still have meals prepared for the rest of the week.
- With the time saved by having prepared meals, mums have more time to do activities that they want to do in the evening. This is a benefit that is highlighted on the MamaBake website and portrayed in the Mamabake tagline "Liberation for Mothers through group, big batch baking".
- Mothers can save money with some groups clubbing together and buying food in bulk reducing the cost of each meal per person.



- Mums know that the meals they are serving their children throughout the week are homecooked.

Barriers to using the service

- To be part of the movement people have to form MamaBake groups, or seek out one to join through the MamaBake facebook group or website. This might feel like a prohibitively large amount of effort.
- Setting up or joining a group also requires social interaction, in some cases with people who are relative strangers. This may be intimidating for some people.
- Advice on how to set up a group, and where to go to join a group is provided on the website and the facebook page. Both of these rely on someone being able to access the internet and feel comfortable with using it.
- As a member of Mama Bake you rely on other people also providing food. People may feel uncomfortable with spending money on buying enough food for a large batch of a dish if they are not totally confident that other mums will show up and provide their share of the food.
- People may feel their kitchen is too small to host a MamaBake.
- People may worry they will end up having to buy expensive ingredients to provide "nice" meals for the other mothers.
- The meals cooked by other mums may not be meals that the children of the family like or will eat.

Other benefits

The MamaBake groups can be a way for mums to create social networks with other mums. As Mamabake explains in an article on their website "The social side of our lives can really hit the skids when little ones arrive in our lives". MamaBake provides a way to meet other people whilst making food. This building of social networks is especially useful if a mum is new to an area and doesn't know many people.

Scale/impact

- Over 100 real life groups across Australia, the UK, Europe, Africa and North America
- Around 19,000 likes on facebook
- Around 2,000 Twitter followers
- Over 7,000 subscribers to the MamaBake Baking Club service

Website

- www.mamabake.com

Consumption



What is it?

Tupperware and lunchboxes, some with features like compartments to keep different foods separated, others with attractive designs.

How does it reduce food waste?

Facilitates using up leftovers. Compartments prevent foods mixing and can increase popularity.



What is it?

Plastic bibs.

How does it reduce food waste?

Falling food is captured by the bib and can be eaten rather than thrown away.

Serving sizes



What is it?

The Healthy Steps serving spoons each have a mark showing exactly one portion of starch. The cereal scoop ensures one portion of cereal.

How does it reduce food waste?

With accurate servings of food there is less likely to be food left over on people's plates or bowls.



What is it?

These plates have flowers of different sizes painted on them indicating the portion that should be served up. For example, the large flower should be covered by vegetables.

How does it reduce food waste?

With accurate servings of food there is less likely to be food left over on people's plates or bowls.



What is it?

Smaller plates.

How does it reduce food waste?

Research has shown that food served on small plates appears larger in quantity than if it is served on large plates. The smaller the serving, the lower the likelihood of food being leftover on the plate.



What is it?

Child size plates.

How does it reduce food waste?

Children eat less than adults so should be given smaller portions that they can finish. The smaller the serving, the lower the likelihood of food being leftover on the plate.



What is it?

Food thermoses and containers with spoons and forks attached.

How does it reduce food waste?

These keep food hot and make it easier to eat leftovers outside of the home.



What is it?

Kitchen facilities, like a microwave, in the workplace.

How does it reduce food waste?

This encourages people to bring in food from home, and could encourage the eating of leftovers from the previous night's meal.



What is it?

Music and eating games for children.

How does it reduce food waste?

These could encourage children to finish the food on their plates.

Funny Food

365 Fun, Healthy, Silly, Creative Breakfasts



by Bill and Claire Wurtzel

What is it?

Funny Food book that has lots of fun designs you can make on a plate with food before you eat it.

How does it reduce food waste?

These could encourage children to finish the food on their plates.

Case study: Too Good To Waste doggy bags



TOO GOOD TO WASTE



What is it?

On average, a UK restaurant produces 21 tonnes of food waste annually, and an estimated 30% comes off diners' plates (as opposed to food spoiled or produced in preparation).

The Sustainable Restaurant Association with 3663 and One Water, created a campaign under the slogan "Too Good To Waste" and a facilitational tool - a "doggy box" to encourage diners to take home a meal they enjoyed but couldn't finish, trying to make it not just acceptable but positive for diners to ask to take their leftover food home.

The special bio boxes are made of 100% recycled and biodegradable materials making them suitable for recycling and composting.

An interactive online map shows participating restaurants. These display stickers with the Too Good To Waste slogan in their windows.

How it prevents food waste

The project facilitates diners taking their leftovers home at the end of a meal at a restaurant.

Motivations/pressures it addresses

- Often at a restaurant you can feel like you are wasting good food and money if you don't finish it.
- Taking food home prevents you having to spend time and money on food for the next meal as you can eat the leftovers instead.
- The campaign surrounding the doggy box makes it more socially acceptable for customers to ask to take leftovers home and for restaurants to take part.
- Celebrity endorsement also makes it more socially acceptable. Supporters include food critic Giles Coren, Hugh Fearnley-Whittingstall, Antony Worrall Thompson, Henry Dimbleby (Leon) and Thomasina Miers (Wahaca).

Barriers to using the service:

- People may not always be going straight home so it can be awkward to carry food with them.
- The amounts of food left may not be seen as worth the hassle of taking the food home.
- Different food groups may get mixed together in the box on the journey home, potentially resulting in an unappealing meal.

Other benefits

- The project provides additional publicity for restaurants, who are seen as participants on the Too Good To Waste online map.
- It could potentially discourage over-eating as customers know that they are able to take home what they don't finish rather than feeling they should eat it or it will be wasted.

Scale/impact

- The campaign is aiming for a reduction of 20% of food waste from plates at restaurants across London, which is the equivalent of a 42,000 tonne reduction in food waste.
- 25,000 doggy boxes were given away by the SRA to participating restaurants. Many of the participating restaurants have exhausted their supplies of boxes and have re-ordered directly from the supplier.
- Assuming 25,000 boxes have been used, it is estimated that this would have saved 3600kg from being thrown away, and instead being consumed by the customer at a later date.
- Widespread coverage in national, regional and local media, including being the fifth most viewed item on the BBC website on the day of coverage.
- Around 800 Twitter followers.

Website

- www.toogood-towaste.co.uk

Disposal



What is it?

Wormery.

How does it reduce food waste?

Food waste is anaerobically digested by worms, diverting it from landfill.



What is it?

Smart Caddy.

How does it reduce food waste?

Stores food waste so it can be added to an outdoor compost or collected by local authority, diverting it from landfill.



What is it?

Stickers for decorating for food bins

How does it reduce food waste?

Decorates unsightly bins, therefore encourages their use, storing food waste so it can be added to an outdoor compost or collected by local authority, diverting it from landfill.



What is it?

Fresh Air Odor-Free Kitchen Compost Collector features a wind flume system which means that food decomposes more slowly and stays drier. This results in less mess and less smell.

How does it reduce food waste?

Decomposes food waste, diverting it from landfill.



What is it?

An organic freezer bin.

How does it reduce food waste?

By keeping food waste frozen it won't smell or attract flies, encourages use of food bins.. These store food waste so it can be added to an outdoor compost or collected by local authority, diverting it from landfill.



What is it?

Garden compost.

How does it reduce food waste?

Diverts food waste from landfill.



What is it?

The Hot Bin garden compost bin.

How does it reduce food waste?

By heating up contents, compost can be made from food waste more quickly and all year round. Composting food diverts it from landfill..



What is it?

Hello Compost is a service which incentivises families to collect their food waste by giving them credits towards fresh produce for each pound of food waste they bring to a proper centre. It is going to be piloted in Harlem, New York.

The service starts by giving nicely designed collection bags to low-income families for them to fill with food waste. The collection bags, made by youth volunteers, are suitable for freezing which reduces any bad smells.

The families then deliver the food waste to a community project centre where they earn credits based on the weight of the bag. They can then use these credits to buy locally grown produce at the centre. The project centre then turns the food waste into compost which it can sell commercially to help fund the service.

An iPad application has been designed to track the weight of food waste collected and how many credits each user has until they are able to redeem credits. The data collected in this process will be used to visualize the positive impact residents are making in their community.

How it prevents food waste

Although the service does not reduce the production of food waste itself, it does reduce the amount of food waste that reaches landfill sites.

Motivations/pressures it addresses

- The pilot is being run in a low-income area where people may not have a large budget to spend on food. The prospect of receiving food for free or at a reduced price could be particularly appealing, especially as the fresh produce being offered is often relatively expensive in shops compared to less healthy alternatives.
- Those who want to eat healthy food, or want their families to eat healthily, may want to join the scheme to have access to fresh and local produce.

- Those who feel connected to or identify with their community may want to join the community-led project to give back to their community.
- The service provides the opportunity to meet people in the community, especially in the project centre where there are young volunteers. People may be motivated to join to extend their social network.

Barriers to using the service

- It takes effort to collect food waste and then to deliver it to a project centre. Carrying food waste can be odorous and unpleasant.
- The opening hours of the project centre will dictate who can deliver the waste - if someone works all day it might be difficult to make the delivery.
- It may take a large amount of waste to gain enough credits to buy a substantial amount of food.
- It is quite a public activity, and some people may not want to be seen to be taking part in the project if they feel it implies they are struggling financially to buy food.

Other benefits

- The project aims to have an educational element to it which raises awareness in the area about the importance of food waste and food systems.
- Young people can volunteer at the project centre. This could increase community cohesion and social capital of these young people.
- By providing cheap access to fresh produce the project could help to improve the diet of some members of the community.

Scale/Impact

- Around 120 Twitter followers
- Around 900 Facebook likes

Website

- www.facebook.com/hellocompost

Trends across the six stages of the domestic food cycle

Planning

Products and services across the Planning stage harness traditional home economics behaviours and are primarily focused at those wanting have an aesthetically-pleasing, well-managed home, as well as those wanting to save money. They are largely aimed at women, who tend to do the bulk of home organisation and shopping in families.

Whilst recipe books and magazines, which fall into this stage, can help people plan and buy exactly what they need, they can also leave users with fractions of unusual items they do not have further use for and can make it difficult to portion correctly, for example if the recipe is for eight people and only three people are eating or vice versa.

There are both physical and digital versions of many products, for example shopping lists and meal planners. These might be improved by including dates, so users can adjust their meal plan according to use-by dates of food they've bought, allowing them to take better advantage of close-to-date offers.

Integration with other services increases user value, for example websites that give recipe advice using leftovers that integrate with online shopping services.

Shopping

There has been an expansion in the ways people get food into their homes.

Gousto delivers exactly the right proportions of raw food for home cooking.

Veg box schemes (a return to traditional methods of purchasing), high quality frozen meals, diet-focused takeaways and food cooked by individuals all can reduce food waste by supplying specific meals and portions and therefore reducing the chance of over-ordering. They do have drawbacks though: for example, veg box schemes can leave users with foods they don't like.

Services like Share Your Meal, Leftover Swap, Food Star, Crop Mobster and Food Sharing are more direct ways of reducing food waste as they facilitate the supply of food that would otherwise be going to waste. One barrier to food sharing initiatives identified is the user fear that donated food will be judged by recipients - if it is unsophisticated or unhealthy, this reflects badly on their food tastes, if it is sophisticated or healthy it reflects badly on their inability to use it.³ Anonymous donation would help overcome this, but raises the issue of whether people trust it has been hygienically prepared. Swapping meals or donating food may also lead to dependency on such routes and limit the incentive to reduce waste.

Shopping online could reduce food waste as it reduces 'whim purchases' and the pester power of kids, but can lead to people reordering the whole of their usual shopping list with one click, without checking what they actually need. People also report the quality of perishable goods as lower than when self-selecting in store. Overall, 30% of households that do shop online feel that it reduces food waste, and just 13% of people feel it increases food waste.⁴

These alternative methods of shopping are increasing in market share but still represent relatively small numbers. Internet food shopping represents less than 10% of shopping in the UK.⁵

In supermarkets, single portions and unpackaged food that allows customers to buy as much or as little as they need, can reduce food waste. Conversely, well packaged food that protects it and keeps it fresher for longer can also play a key role (see Storage). Supermarkets selling food near its use-by date in the form of meals cooked by an in-store chef is successful, but reduces supermarkets' waste rather than domestic food waste. The initiative could however inspire domestic behaviour change.

Storage

Storage solutions are dominated by physical products, and there are hundreds more than we have included in this survey.

Within storage, we can differentiate between packaging innovations in food products and food storage products.

WRAP, supermarkets and food and packaging suppliers are doing a lot of great work to increase the

³ Binning, gifting and recovery: the conduits of disposal in household food consumption, Evans D. 2010 ⁴ WRAP (2007) We don't waste food! A household survey, Banbury: WRAP ⁵ ibid

prevalence of the former, and features like ziplock sealers, smaller portion sizes and modified air inside plastic containers are increasingly common and help keep food fresher for longer.

Food storage products are more than just a discardable layer, but are an item bought in their own right. They facilitate both the storage of food items in the home and the eating of leftovers outside the home, such as in schools and offices for lunch (hence overlapping with the Consumption stage of the Food Cycle). They are often found in the homeware section of department stores and often appeal to those wanting an aesthetically-pleasing, well-ordered, home. The design of the kitchen is also relevant, for example, Smart fridges make it easier to see what you've got before you go shopping and freezers are very useful in allowing food that won't be eaten to be stored for a much longer period of time.

Preparation

The wide number of the items used by cooks for centuries (measuring devices such as scales, jugs) and devices that aid using up older food (such as blenders for soups) fall into this stage of the food cycle. Some of these are basic and functional, others more consciously designed to be a pleasing addition to the kitchen. WRAP's online portion planner tool is a digital tool assisting people at this stage. Batch cooking could reduce food waste, provided people do not buy additional food later in the week, meaning the batch-cooked food goes to waste.

Consumption

The products and services associated with this stage primarily either encourage eating smaller portion sizes (smaller plates, special serving spoons, serving dishes so not all food made is put onto plates) or eating of leftovers (storage containers, microwaves in public places etc).

A specific area relevant to families with young children are products and services that encourage children to eat all the food on their plates.

Disposal

This stage is facilitated mostly by physical products associated with composting and local authority food waste collection schemes. There are a number of products which make composting food less odorous, more compact and less of an eyesore.

It is worth noting that composting has a smaller impact on greenhouse gas emission reduction than preventing food waste. One tonne of food waste prevented leads to 4.02 tonnes of CO₂e avoided, whereas one tonne of food waste diverted from landfill to anaerobic digestion leads to just 0.5 tonnes of CO₂e avoided⁶

Other options for the disposal of unwanted food include meals for pets (though people often prefer to give them "proper food") or other people. For notes on food sharing initiatives, see under Shopping.

What is driving innovation?

Traditional practices

Some products and services are based on traditional home economics principles, for example measuring devices like scales and jugs or shops selling unpackaged food.

There are also new innovations based on these traditional principles, such as Jihyung David's design for wall hanging storage.

Digitally-enabled connectivity

There are a number of solutions to food waste which has emerged over the last 20 years which can be seen to be the result of new ways that individuals, local businesses, suppliers and organisations are interacting with each other, enabled by innovations in digital technology.

⁶ Quested, T., Parry, A., Easteal, S. & Swannell, R. (2011) Food and drink from households in the UK, Nutrition Bulletin, 36, 460-467

These include:

- New methods of food delivery (for example Gousto, veg boxes, diet take aways)
- Collaborative consumption (for example Food Star, Crops Mobster, Mama Bake and Share Your Meal)
- Leftover sharing initiatives (for example Food Sharing)

It is interesting that although food waste behaviours tend to be distant in time and place from time spent online, these online services can be effective and popular.

A drawback of online shopping and services is that their use is limited to those comfortable online, though this is becoming an increasingly large percentage of the population.

Scientific Innovation

Scientific advances has brought about a number of products which reduce food waste. Examples include smart labels which change colour indicating the remaining time to eat it, fridge filters that reduce humidity and absorb ethylene gas, home-use vacuum packing machines and food packaging which contains modified air to keep food fresher for longer.

WRAP's Resource Efficient Innovations Database which aims to showcase resource efficient technologies such as machinery, tooling, materials and design from across the world is an excellent source of examples.

Consumer culture

The ongoing rise in mass-produced goods and distribution channels means an increasing number of physical consumer products are widely available at low prices. The homeware product sector is large and growing.

Impact

All the products and services surveyed here can be seen to have some impact on food waste reduction, but their exact impact is very difficult to assess accurately.

The two primary factors which affect the impact of any particular product or service are:

- The product or service's effectiveness at reducing food waste
- Scale of user uptake

Effectiveness

There is very little evidence available for the products and services surveyed on the effectiveness at reducing food waste.

This is due to the fact that food waste reduction isn't the primary measurement of success for many of the examples featured, so it is not assessed by the manufacturers or designers. Those that did want to measure this would also face difficulties and high costs because measuring food waste, a private activity that takes place in the confines of the home, is not easy.

A small number of initiatives, set up with the sole purpose of reducing food waste by socially minded organisations, have a certain amount of impact data - see for example the Too Good To Waste case study, but even this is based on estimates and is exceptional.

Scale of user uptake

Again, there is a lack of data on the scale of user uptake of the majority of products and services surveyed. Many items are generic and made by several brands (for example food storage container, or composting bins), making it difficult to assess the total number of users.

Some digital services are able to track user numbers more accurately. Food Sharing, for example, reports its progress on its website and at time of writing stated it has around 35,000 users of the foodsharing platform, that there have been 7,000 successfully exchanged baskets/items of food, equating to around 30,000 kg of food saved from being thrown away. Mama Bake has over 7000 subscribers to the MamaBake Baking Club service.

Twitter followers and Facebook likes can act as an indirect way of measuring uptake. For example:

	Twitter Followers	Facebook Likes
Menu for Mums	15,000	900
Mama Bake	2,000	19,000
Gousto	2,000	7,000
Food Sharing		42,000
Too Good to Waste	800	
Hello Compost	120	900

User Needs

One important observation across the products and services surveyed is the range of user needs they meet and the varying extents to which they do this.

Some products and services are primarily focused on fulfilling the user need to waste less food. The Love Food Hate Waste app is a good example, as are some of the fridge monitoring and list making apps and recipe books giving weekly plans aimed at using up leftovers from previous meals.

We can place all the products and services on a continuum, with those only fulfilling the user need to waste less food on one side and those that fulfill other needs stretching across to the other side.

Research by ethnographers has shown most people don't want to waste food but face a myriad of social pressures which are often barriers to food waste reduction activities. For example, people over-buy fresh fruit and vegetables out of a desire to encourage their family to be healthy, or overbuy at supermarkets not wanting to risk running out of provisions for their family, or throw away food being over-cautious over date labels out of fear of giving their family food poisoning. For a more detailed exploration of this idea, see Food Waste Insights Report, Section 2, The Nature of the Issue.

As not wanting to waste food is often trumped by other conflicting pressures, needs and desires, we can see for the majority of people, food waste reduction is often rather low in a hierarchy of user needs.

Therefore, products and services which only rely on the desire to reduce food waste are less likely to succeed with a large mainstream audience.

Products and services which add to these pressures and require additional time, effort and cost are even less likely to succeed, unless they can fulfill additional user needs.

For example, services like Hello Compost, which require a large alteration of routine (collecting kitchen food waste and delivering it to a centre) or the Grocery IQ app, which adds extra steps to the daily routine (having to scan in every food item into a fridge monitoring app after each shop) or Menu for Mums, which necessitate reorganising areas of your life (as every meal is pre-planned at the beginning of the week), will only be successful if they can fulfill additional user needs, such as receiving free food (in the case of Hello Compost) or saving time and hassle (in the case of Menu for Mums).

Cost will be a barrier to sale and uptake of products and services unless they are genuinely useful or desirable. For this reason, items like a fridge dehumidifier might not reach a large mainstream audience, but products which help the user have an aesthetically-pleasing, well-run household, such as some of the beautifully designed tupperware are more likely to be featured in lifestyle magazines and blogs and be stocked in homeware stores, and therefore have larger scale uptake.

Amongst the products and services surveyed, the following user needs, beyond the desire to reduce food waste can be seen to be met:

- save money
- save time
- have an aesthetically-pleasing home
- have a well managed home
- meet people
- spend time with friends
- be a good parent

- keep children quiet or entertained
- eat/provide tasty food
- eat/provide healthy food
- be more involved in local community
- be part of innovative new schemes
- keep your baby clean (bibs)

It's important to note that different audiences will have different user needs, for example the desire to provide healthy meals for one's family may not be relevant to young professionals but is very relevant for families with young children. For more information on the user needs of families with young children, see Food Waste Insights Report, Section 4, Meet The Waster.

We can also draw a distinction between products and services which are explicit about the fact they help reduce food waste and those that are implicit about this. Marketing something as being environmentally-focused risks disengaging those who are not motivated by this. With one third of people considering any kind of 'green behaviour' to be part of an 'alternative lifestyle', this may limit appeal for many people.⁸

Some products and services are solely designed to reduce food waste, whilst others are designed for other purposes and food waste reduction is almost an incidental benefit. For example Yo Gabba Gabba's children's book and CD is principally a tool to discourage fussy eating whilst entertaining toddlers, but can be seen to also encourage children to finish the food on their plates. Similarly, dieting services are designed for people wanting convenient, healthy meals, yet their tailor-made portion sizes can reduce food waste.

Additional social benefits

Some products and services are able to deliver benefits beyond food waste reduction. Examples amongst those we surveyed include:

- Encouraging/facilitating healthy diets (for example Menu for Mums, Hello Compost)
- Increasing local social capital (for example Mama Bake and Food Sharing)

Notes on best practice

Setting up measurement mechanisms for both the effectiveness of reducing food waste and scale of user uptake of the product or service will allow the impact on food waste reduction to be properly assessed. This is best built into early prototype stages and should inform whether a concept is rejected or improved. An iterative approach to the design process allows these impact measurements to inform the final product or service.

Avoid relying on a desire to waste less food as a primary motivation.

Avoid adding to the pressures which currently impede food waste reduction.

Aim to design products and services which have additional motivations, beyond reduction in food waste, to use them so they are genuinely useful or desirable.

Market products and services based on the user needs they meet beyond food waste reduction in order to reach audiences with no pre-existing appetite for pro-environmental behaviours.

Any product or service should not ignore food safety issues. It is advisable to work in accordance with FSA guidance, for example recommending not to eat food past its use-by date, even though some people regularly do this others, as some people, particularly those with weak immune systems, could get seriously ill from doing so. Risks should therefore not be taken in this area.

⁸ DEFRA, A framework for Pro-environmental Behaviours, 2008.