

# Household Food and Drink Waste in the United Kingdom 2012



This report provides estimates of the amount of food and drink waste generated by UK households in 2012. It includes details of the types of food and drink wasted, why it is thrown away, and where the material goes. It updates WRAP's 2007 estimates of household food and drink waste.

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sustainable products and using resources  
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**Front cover photography:** Leftover food (WRAP)

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# Executive summary

## **Why was this work undertaken?**

Food has a central role in our lives, and food production and retail plays a key role in our economy. However, ground-breaking research published by WRAP revealed that in 2007 a staggering amount of the food and drink brought into the home was being thrown away (8.3 million tonnes, 22% of purchases). Wasting food and drink hits our pockets – spending money on food that ends up being thrown away – and is a financial drain on local authorities who have to pay for food waste collection and treatment. It has a detrimental impact on the environment, wasting the materials, water and energy used in its production. Reducing the amount of food and drink thrown away can help alleviate all of these, and contribute to a more resilient UK economy and food system.

Most of us don't want to waste food, and WRAP launched the Love Food Hate Waste (LFHW; [www.lovefoodhatewaste.com](http://www.lovefoodhatewaste.com)) campaign in 2007 to help deliver practical ways to reduce food waste. We also expanded an agreement with the food industry (the Courtauld Commitment<sup>1</sup>) to help consumers make more of the food and drink they buy, and throw less away. Our evidence on the amounts and types of food and drink wasted, and why it was thrown away, was critical to raising awareness of the issue and encouraging people to make changes that lead to less food and drink being wasted. This evidence enabled the wide range of organisations who have worked with WRAP on this important issue to target effort where it can deliver the greatest benefit.

Since that work in 2007, tackling food and drink waste has received much attention around the world: Governments, international agencies, businesses, local authorities, community groups and many others have worked with consumers to change the way we use food. Major retailers, food brands and other manufacturers have helped through innovations in products, packaging and labelling. In 2011, WRAP carried out research, funded by UK Governments, that revealed that household food and drink waste levels had reduced considerably since 2007<sup>2</sup>. However, additional in-depth research, updating the work done in 2007, was needed to identify the detail of what had changed.

This new report contains some remarkable findings. It reveals that the amount of food and drink thrown away that could have been eaten fell by 21% between 2007 and 2012. However, it also shows the sheer scale of the food and drink still being wasted in UK households – 4.2 million tonnes of avoidable food and drink is wasted each year, worth £12.5 billion.

The report offers detailed information about food and drink wasted in 2012. For example, just under half of avoidable food and drink waste (worth £5.6 billion) was classified as 'not used in time': thrown away because it had either gone off or passed the date on the packaging. This included large amounts of bread, milk and potatoes. This underlines that despite terrific efforts across the board we have not cracked the problem, with much of this essential and valuable resource still being wasted.

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<sup>1</sup> <http://www.wrap.org.uk/content/what-is-courtauld>

<sup>2</sup> <http://www.wrap.org.uk/content/new-estimates-household-food-and-drink-waste-uk>

The findings, from research funded by UK Governments, are based on three sources of data: detailed measurement of the weight and types of food and drink waste from approximately 1,800 consenting households, a week-long food and drink diary involving 950 households and a synthesis of waste data from more than 80 local authorities.

This updated detailed evidence base will allow Governments, WRAP and its partners to make strategic decisions regarding the prevention of household food and drink waste. It will enable us to refresh and target the approaches and materials aimed at delivering this – bringing benefits to individuals, communities, businesses and the UK as a whole. In addition, information on food waste disposal routes, and in particular the amounts and types of food in the 'general' bin and separately collected, will be valuable to local authorities who are looking at delivering efficient services.

The database sitting behind this report is extensive. Additional analysis is being undertaken to understand the full implications of this research and will be reported in spring 2014. This includes developing a better understanding of the food and drink waste from different types of household, and what influences this. This will help develop and target more tailored messages, guidance and solutions for different groups of people.

Food waste in the home is not the only source of food waste, but WRAP's work shows it makes the single largest contribution; around 50% of the total across all sectors in the UK. There are benefits to reducing food waste wherever it arises, and WRAP is also working with grocery and hospitality and food service businesses to reduce food waste<sup>3</sup>.

## **Key facts – what has changed between 2007 and 2012?**

### **How much did we waste overall? (see Figure A)**

There was a reduction of 1.3 million tonnes of household food and drink waste between 2007 and 2012, from 8.3 million tonnes to 7.0 million tonnes. This is a 15% reduction, despite an increase of 4% in the number of households in the UK. The waste prevented would have filled 2,600 Olympic swimming pools.

When expressed per household, the total amount of food and drink waste reduced by 19% over this time period, from 320 kg to 260 kg per household per year – this reduction of 60 kg is more than sufficient to fill a wheelie bin.

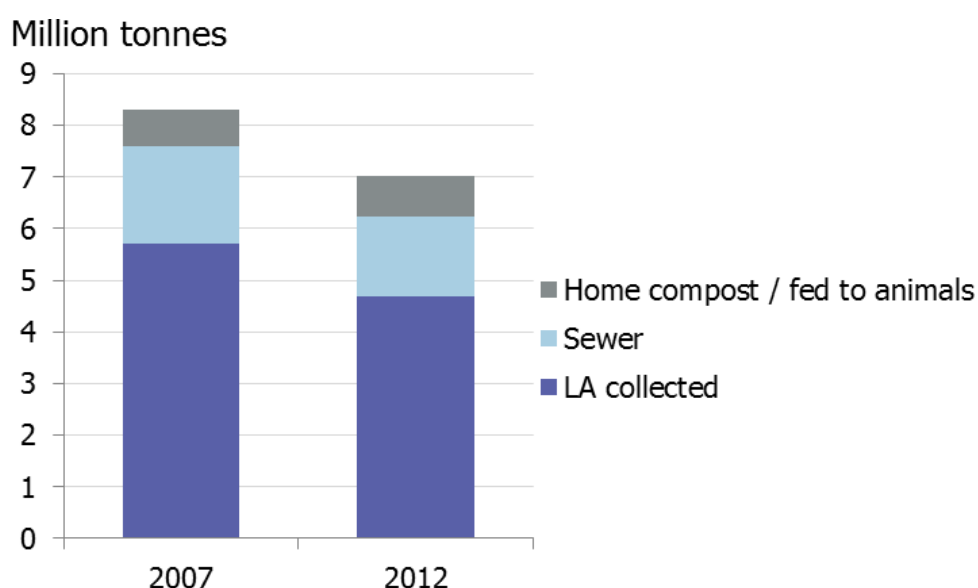
The decrease in food and drink waste is particularly evident in the waste collected by local authorities: an 18% reduction from 5.7 million tonnes in 2007<sup>4</sup> to 4.7 million tonnes in 2012.

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<sup>3</sup> <http://www.wrap.org.uk/category/what-we-offer/voluntary-agreements> and [www.wrap.org.uk/food](http://www.wrap.org.uk/food)

<sup>4</sup> This figure has been slightly restated since *Household Food and Drink Waste in the UK* (published in 2009) to ensure comparability with current research. The original figure was 5.8 million tonnes. See Chapter 4.0 for more details.

**Figure A:** Comparison of weight of household food and drink waste arisings in the UK between 2007 and 2012, split by disposal route



### Reductions in avoidable food waste, and the benefits (see Figure B)

Of the 1.3 million tonne reduction, 1.1 million tonnes was food and drink that could have been eaten (avoidable<sup>5</sup>), a 21% reduction from 5.3 million tonnes in 2007 to 4.2 million tonnes in 2012. This reduction is enough to completely fill Wembley Stadium.

When expressed per household, the amount of avoidable food and drink waste reduced by almost a quarter (24%), from 210 kg to 160 kg per household per year. This equates to a reduction of 1 kg per week for the average household.

This large reduction in avoidable food and drink waste was concentrated in five categories, each with reductions of more than 100,000 tonnes: home-made and pre-prepared meals, bakery, drink, fresh fruit, and dairy and eggs. For other categories, there were either smaller reductions (such as in fresh vegetables and salad) or very little change (such as for meat and fish).

This reduction is reflected in the equivalent number of items thrown away per day in the UK for 2007 and 2012:

- Bananas have reduced: from 1.7 million to 1.4 million wasted per day.
- Tomatoes: from 2.0 million to 1.5 million.
- Yoghurts: from 1.7 million to 1.2 million.
- Home-made meals: from 1.8 million to 1.5 million.
- Bread: from 37 million slices to 24 million slices.

The avoidable food and drink waste that was subsequently thrown away would have cost £12.5 billion across the UK, or £470 per household per year, at 2012 food prices.

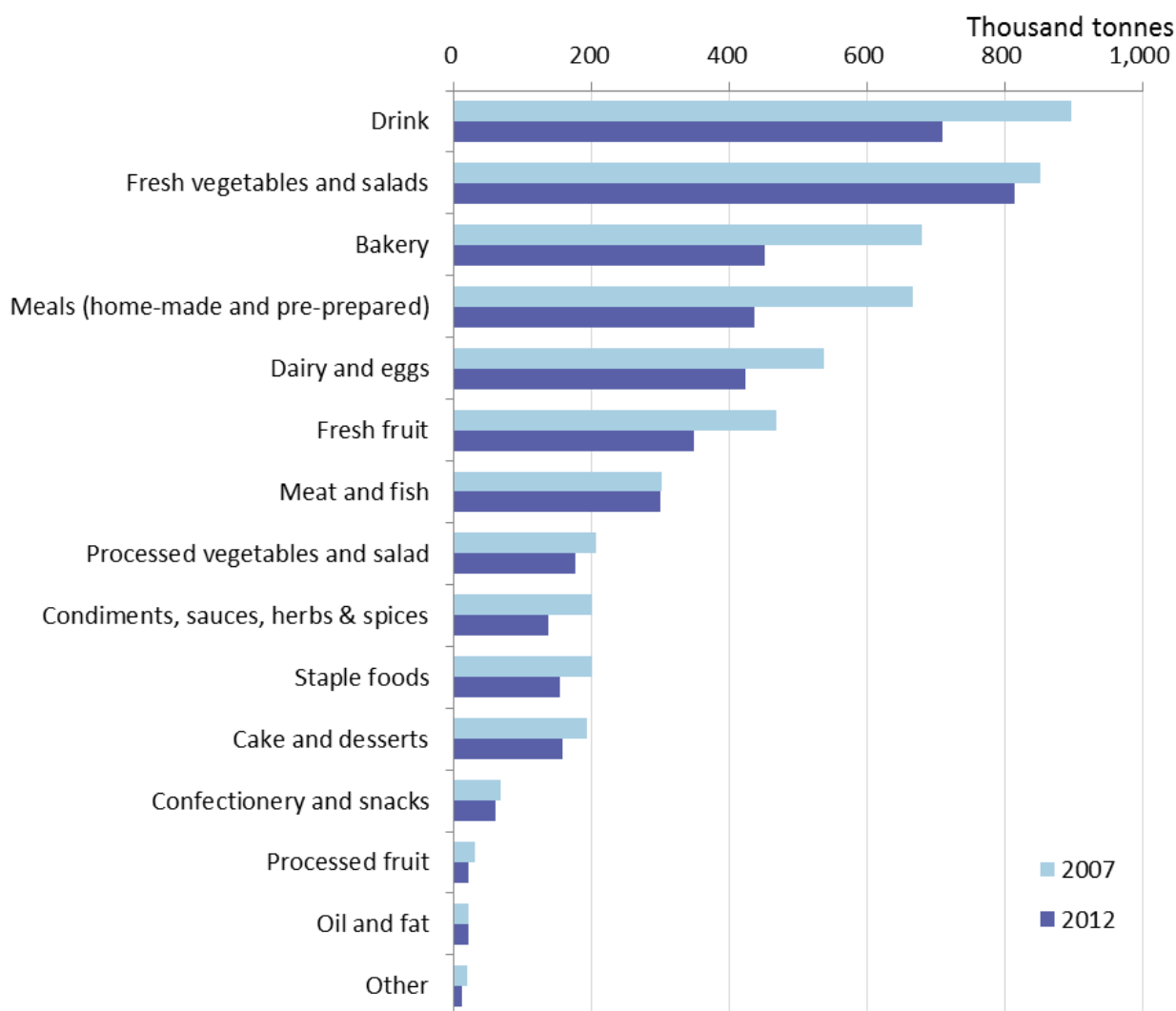
<sup>5</sup> See section 1.2.2 for definitions of the different fractions of food waste

If the amount of avoidable food and drink waste had remained at 2007 levels, this would have cost £15.8 billion to purchase at 2012 food prices. Therefore, the reduction in food and drink waste between 2007 and 2012 saved UK households £3.3 billion in 2012 alone – that's around £130 for the average household.

The reduction in food waste in our bins<sup>6</sup> will have saved local authorities around £85 million in avoided landfill tax and gate fees in 2012 alone.

The savings in greenhouse gas emissions associated with the reductions in avoidable food and drink waste amounted to 4.4 million tonnes of CO<sub>2</sub> equivalents; the same as would be saved from taking 1.8 million cars off UK roads.

**Figure B:** Comparison of avoidable household food and drink waste between 2007 and 2012 split by food group



<sup>6</sup> This refers to 'residual' or general bins, not those aimed at collecting food waste separately.

## **Key facts – household food waste in 2012: breakdown and implications**

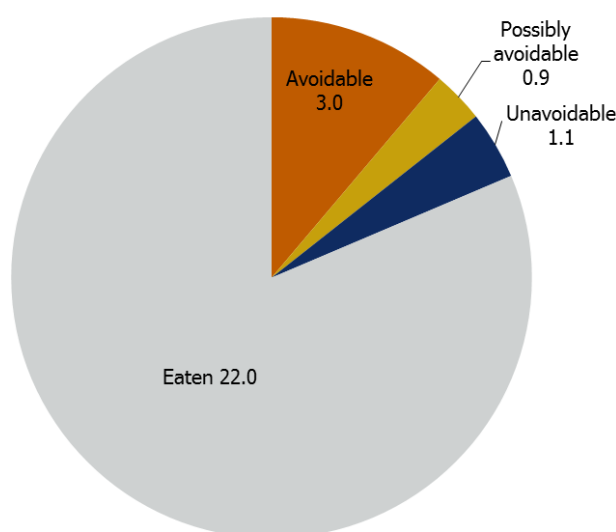
### **Overall amounts thrown away (see Figure C)**

The 7.0 million tonnes of food and drink waste thrown away from our homes in 2012 is enough to fill Wembley Stadium nine times over<sup>7</sup>. It represents 19%, by weight, of food and drink brought into the home, compared to 22% in 2007. Of this total:

- 4.2 million tonnes (or 60% of the total) is avoidable, worth £12.5 billion; the comparable figures in 2007 were 5.3 million tonnes, or 64% of the total. This avoidable waste is food and drink that would have been edible at some point prior to being thrown away, for example slices of bread, apples, yoghurts etc. This is equivalent to the average household throwing away six meals per week, down from 8 meals per week in 2007. This 4.2 million tonnes is the equivalent of 12% of the weight of edible food and drink brought into the home.
- 1.2 million tonnes (17% of the total) was considered 'possibly avoidable' (1.4 million tonnes in 2007<sup>8</sup>). This includes things like bread crusts and potato peelings that some people eat but others do not.
- 1.6 million tonnes (23% of the total) was unavoidable waste (1.5 million tonnes in 2007). Five types of waste made up 60% of this (tea waste, banana skins, poultry bones, onion skins and orange peel).

The average household of 2.4 people purchased around 27 kg of food and drink per week in 2011<sup>9</sup>. 19% of this was not consumed.

**Figure C:** Weight of food and drink waste per household – by avoidability – in comparison to a weekly shop



*Figures give amount of food purchases and waste in kg per household per week*

<sup>7</sup> This and other 'equivalents' have been calculated by WRAP as described in Appendix 4.

<sup>8</sup> This figure has been slightly restated since *Household Food and Drink Waste in the UK* to ensure comparability with current research, and was previously reported as 1.5 million tonnes. See Chapter 4.0 for more details.

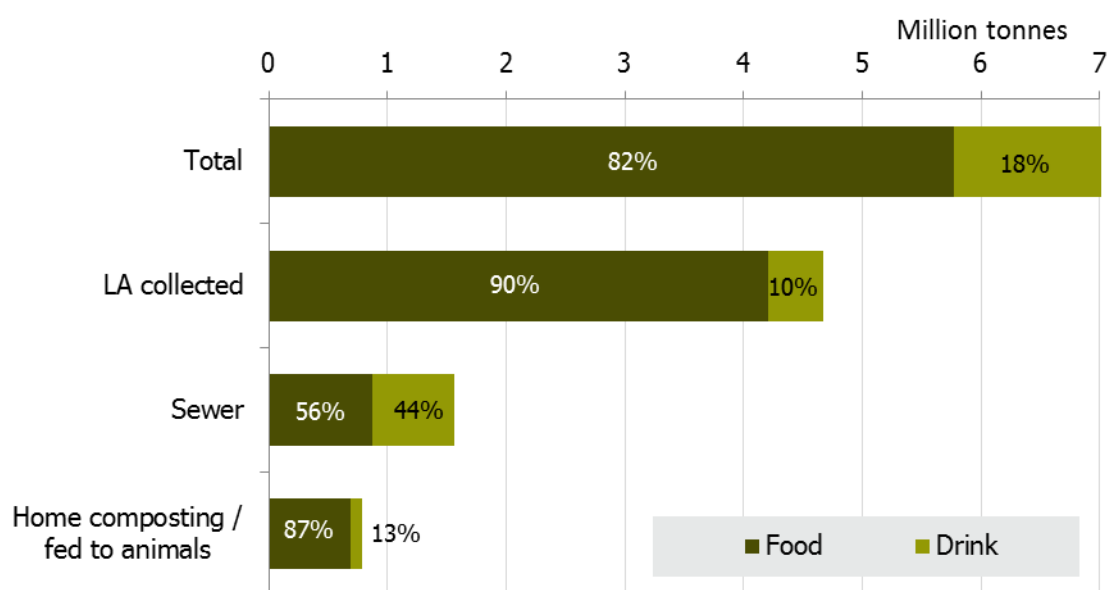
<sup>9</sup> The 2012 Family Food Survey was not published at the time of writing this report.

## Where the food and drink waste goes (see Figure D)

Two thirds (4.7 million tonnes) of household food and drink waste was collected by local authorities in 2012. Of this, most was collected in kerbside 'residual' or general waste, although more than half a million tonnes (around 11% of that collected) was in targeted collections of food waste, meaning it could be treated to generate energy and useful digestate or compost<sup>10</sup>.

Around a fifth was disposed of via the sewer (1.6 million tonnes; the kitchen sink and other drains), with drinks and dairy products making up more than half of this. The remainder was either composted at home (0.51 million tonnes) or fed to animals (0.28 million tonnes).

**Figure D:** Weight of household waste in 2012 by disposal route, split by food and drink



## What it costs us

For the average household, the price of the avoidable food and drink waste was around £9 per week, equivalent to £470 per year. This compares to an average weekly food and drink expenditure of £66 per household per week in 2011<sup>11</sup>. Therefore, avoidable food and drink waste accounted for approximately 14% of the shopping budget.

The higher the number of people in a household, the greater the amount of food waste generated, although the increase was not proportional, i.e. an average four-person household wastes less than four times the average single-occupancy household.

The cost of wasting food and drink, therefore, increased with household size, and is £700 per year (almost £60 a month) for the average household with children. This relationship – that households with more people in them find themselves wasting more food and drink – held, irrespective of whether the people in the household were adults or children (i.e. in

<sup>10</sup> For more details, please see *Synthesis of Food Waste Compositional Data 2012* (§4.1).

<sup>11</sup> The 2012 Family Food Survey was not published at the time of writing this report.



terms of overall amounts of food thrown away there was no significant difference between adults and children).

One-person households threw away, on average, over 40% more avoidable food and drink waste than the overall amount per person in the UK, worth £290 a year compared to the UK average of £200 per person.

### Types of avoidable food waste (see Figures E and F)

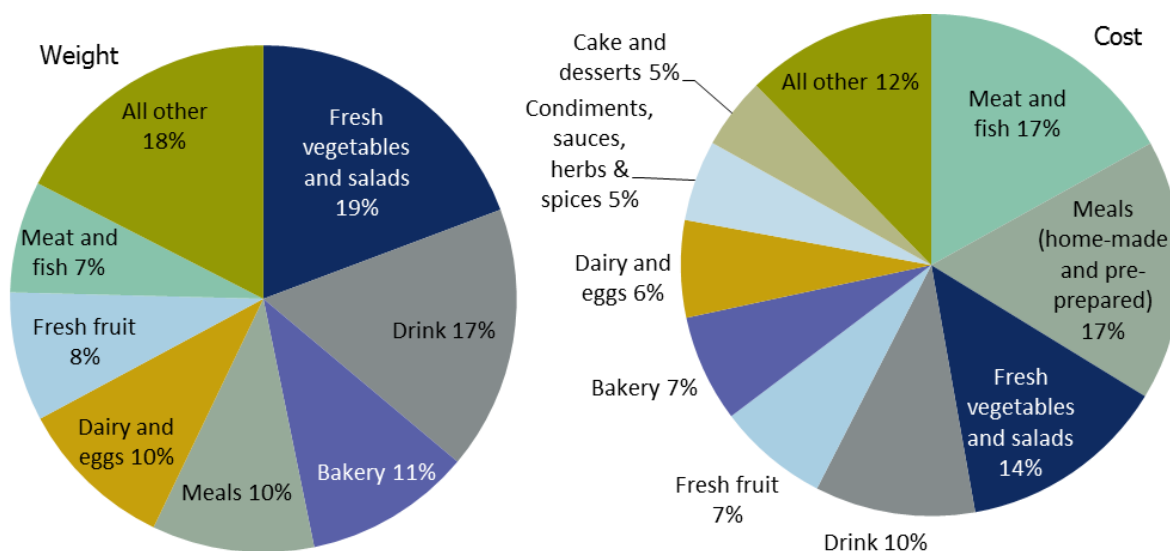
By weight, the largest contributions to avoidable food waste were from:

- Fresh vegetables and salads (19%; 810,000 tonnes).
- Drink (17%; 710,000 tonnes).
- Bakery (11%; 450,000 tonnes).
- Home-made and pre-prepared meals (10%; 440,000 tonnes).
- Dairy and eggs (10%; 420,000 tonnes).

By cost, the largest food groups wasted were:

- Meat and fish (17%; £2.1 billion).
- Home-made and pre-prepared meals (17%; £2.1 billion).
- Fresh vegetables and salad (14%; £1.7 billion).
- Drink (10%; £1.3 billion).
- Fresh fruit (7%; £900 million).

**Figure E:** Proportions of avoidable food and drink waste by food group: weight (left) and cost (right)



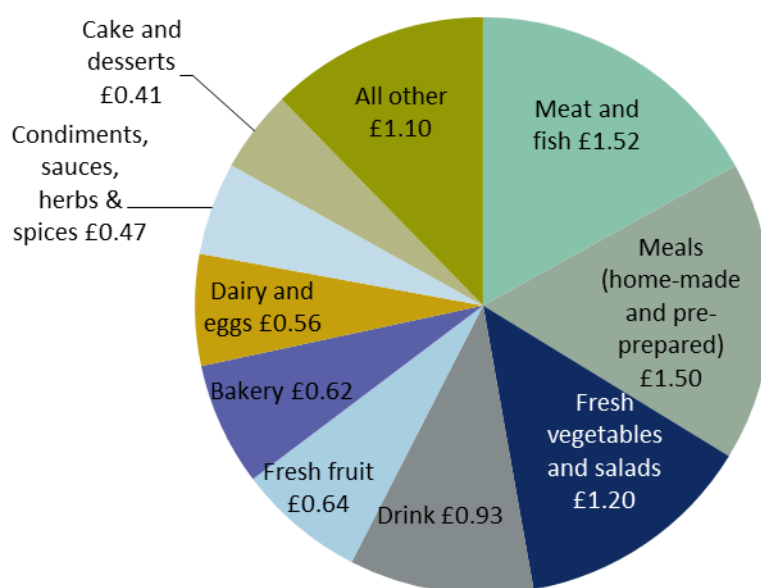
- Fresh fruit, vegetable and salads combined, amounted to 1.2 million tonnes, worth £2.6 billion.
- More than 13 billion '5 a day' portions of fruit and vegetables were thrown away in 2012<sup>12</sup>, enough to provide more than 7 million people with their '5 a day' for a year.

<sup>12</sup> As per the accepted definition of what contributes to '5 a day', fresh fruit and vegetables are included (except for potatoes) alongside processed fruit, vegetables fruit juices and smoothies.

The top ten food types thrown away within the avoidable food waste were, by weight:

1. Standard bread
2. Fresh potatoes
3. Milk
4. Meals (home-made and pre-prepared)
5. Carbonated soft drinks
6. Fruit juice and smoothies
7. Poultry meat
8. Pork meat
9. Cakes
10. Processed potatoes (e.g. chips)

**Figure F:** Cost of avoidable food and drink waste per household per week, by food group



*Figures give waste in £ per household per week*

## Environmental impact

The greenhouse gas emissions associated with avoidable food and drink waste from UK homes accounted for approximately 17 million tonnes of CO<sub>2</sub> equivalent. The carbon saving of preventing all avoidable food waste in 2012 is equivalent to taking one in four cars off the road.

Land is required to produce food and drink that is subsequently thrown away by UK households. For the first time, an estimate has been made of these land requirements: 19,000 square kilometres or an area about 91% the size of Wales.

## Reasons for throwing away food that could have been eaten<sup>13</sup> (Figures G and H)

Just under half of avoidable food and drink waste (worth £5.6 billion) was classified as 'not used in time': thrown away because it had either gone off or passed the date on the packaging. This included large amounts of bread, milk and fresh potatoes.

A further 31% (worth £4.1 billion) was classified as 'cooked, prepared or served too much': this included food and drink that had been left over after preparation or serving, such as carbonated soft drinks, home-made and pre-prepared meals, and cooked potatoes.

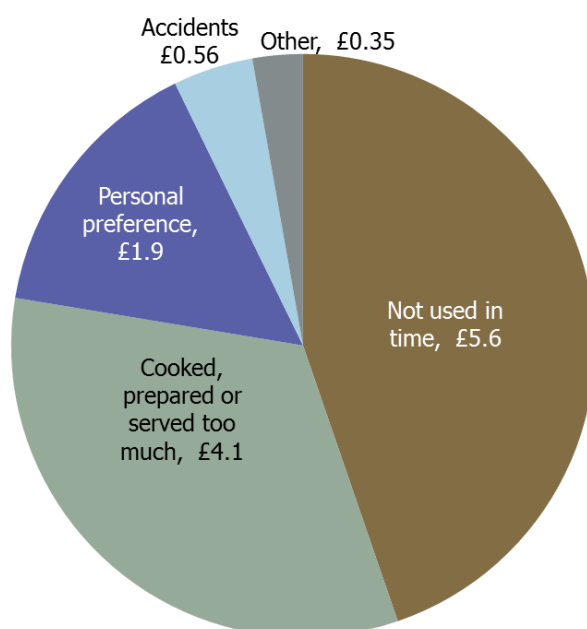
Approximately 80% of food and drink is wasted because it either wasn't used in time, or too much was cooked, prepared or served, so addressing these issues will deliver the greatest benefits.

The remaining reasons are linked to personal preferences including health reasons and not liking certain foods (£1.9 billion), and accidents, including 'food dropped on the floor' and 'failure of a freezer' (£560 million).

The reasons for disposal vary considerably by food group. For the following categories, most was wasted because it was not used in time: fresh vegetables and salads, bakery, dairy and eggs, and fruit. For example, avoidable fresh vegetable and salad wasted because it was not used in time cost £1.1 billion, approximately two-thirds of the total cost of fresh vegetables and salads thrown away.

In contrast, drinks and meal waste had high levels of waste from leftovers: too much was prepared, cooked or served.

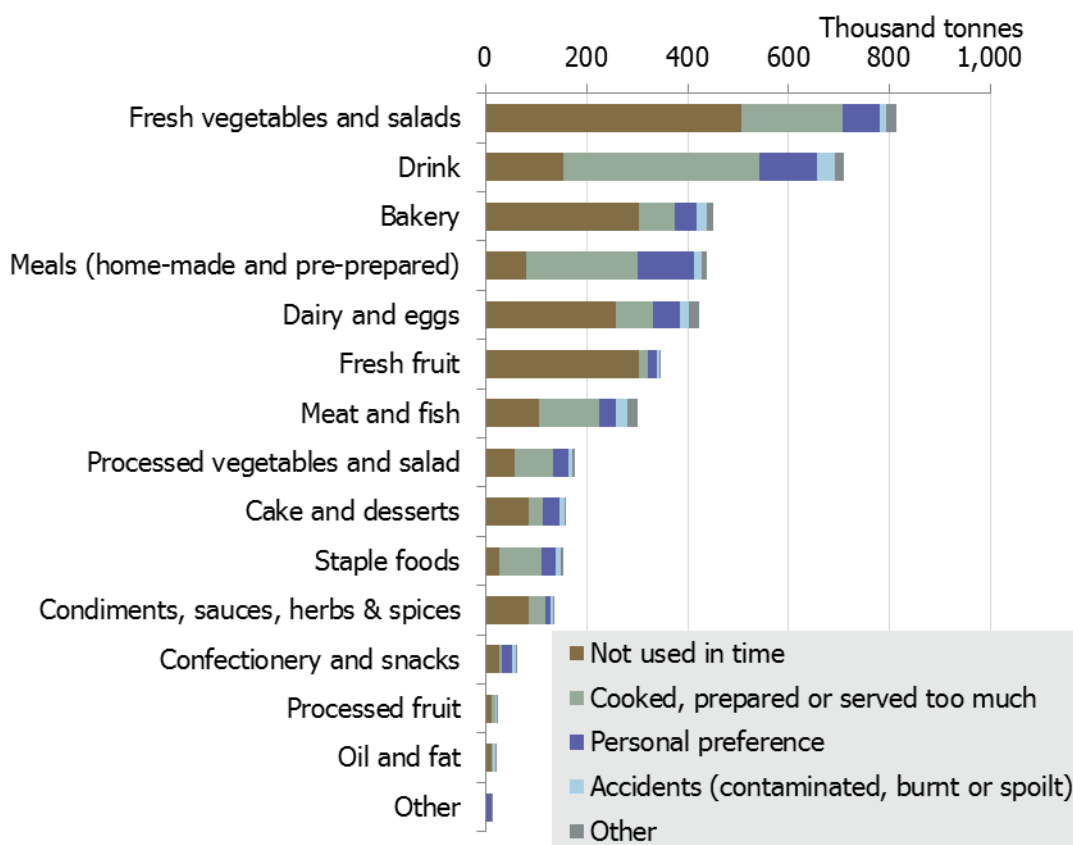
**Figure G:** Cost of avoidable household waste by food and drink in 2012, split by reason for disposal



*Figures within chart state waste in billions of pounds*

<sup>13</sup> Two additional categories of 'reasons' were added in the 2012 analysis ('personal preference' and 'accidents') meaning it is not possible to make direct comparisons in this section with the 2007 results.

**Figure H:** Weight of avoidable food and drink waste by food group, split by reason for disposal<sup>14</sup>



Alongside other research, such as the recent evaluation of the positive impact of a six-month LFHW campaign in West London<sup>15</sup> (which indicated up to a 14% reduction in avoidable food waste), this work demonstrates that change is possible: households can reduce the amount of food and drink waste they generate considerably. This may be as a direct result of engagement campaigns, in response to how food is sold and is packaged, or linked to food price inflation and other economic factors. New research by WRAP investigating the influences on food waste and food purchases will be published in winter 2013.

A range of behaviours (buying appropriate amounts, storing food under the optimal conditions, portion control, using the freezer more effectively and making the most of leftovers etc.) and technical innovations (range of pack sizes available, improved storage and freezing guidance, clearer date labelling, increased shelf-life, packaging innovations etc.) will have contributed to the reductions seen in many categories, supported by LFHW and other campaigns through a wide range of national and local initiatives.

Further analysis is in progress to understand why there were smaller, or no, reductions in other categories, and what more can be done to help reduce the waste of these types of food. For fresh vegetables and salad waste this is important as it makes up almost 20% (by weight) of the avoidable household food and drink waste. Buying the right amounts, storing produce correctly (in particular making better use of packaging, as highlighted by LFHW and Fresher for Longer<sup>16</sup>), understanding 'best before' dates and what can be done with 'tired'

<sup>14</sup> Staple foods include breakfast cereals, pasta, rice, couscous, etc.

<sup>15</sup> <http://www.wrap.org.uk/content/west-london-food-waste-campaign>

<sup>16</sup> <http://www.wrap.org.uk/fresherforlonger>; <http://england.lovefoodhatewaste.com/content/fresher-longer-0>

vegetables can all make a big difference. Similarly, retailers and brands are looking at how changing pack sizes, promotions, date labelling and shelf-life can make it easier for people to waste less.

For fresh meat and fish this is also important, due to its high value (financial, environmental and ethical). Buying the right amounts, understanding 'use by' dates and making more use of the freezer (whole packs or part contents; raw and cooked meat) can all make a big difference. Similarly, retailers and brands have a role to play, looking at pack sizes, date labelling, freezing guidance and shelf-life (e.g. through innovative packaging).

The results presented here are consistent with those found in the recent evaluation of the LFHW campaign<sup>17</sup>, where the majority of the reduction in avoidable household food and drink waste occurred in 'cooked food', with no significant change found for meat and fish, or fresh fruit and vegetables.

Importantly, there is more to do in all the categories of food waste and no one area has improved so much that further action would not deliver significant benefits.

### **What happens next?**

This report has demonstrated that there have been substantial reductions in the amount of household food and drink waste generated in the UK between 2007 and 2012, and has highlighted the magnitude of the opportunity remaining. It has provided detailed data on the types of food and drink wasted in 2012, and the reasons for its disposal.

Further analysis, in progress by WRAP, includes developing a better understanding of the amount and types of food and drink waste for different types of household, and the relationship between food and drink waste and the responses to household interviews (e.g. relating to specific attitudes and behaviours) that were conducted as part of this research. Such information will help understand the reasons why the amount of food and drink waste has fallen so substantially, and why reductions differed between categories (which is likely to reflect the different challenges faced in terms of changing behaviours and products). All of this information will help us continue to develop and target more tailored messages, guidance and solutions for different groups of people.

Detailed data on specific types of food waste will also be obtained: for instance, at the product level, how much is thrown away in the original packaging, what the dates were on this packaging, and what proportion of the pack was wasted. From the diary research, it will also be possible to determine the weight of each instance of waste: this helps identify if a lot of material is being thrown away in small amounts, or as relatively few (but large) amounts. This information will help the food industry optimise products, packaging and labelling to reduce the likelihood of a product being wasted.

There is also a need to understand how this information fits with purchasing data (e.g. Defra's Family Food survey) and consumption data (e.g. the National Diet and Nutrition Survey). Preliminary analysis suggests that the amount of food and drink brought into the home per person has declined; this is qualitatively consistent with the decrease in waste levels<sup>18</sup>. However, further analysis would be beneficial to understand how changes in

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<sup>17</sup> <http://www.wrap.org.uk/content/west-london-food-waste-campaign>

<sup>18</sup> 2012 food purchase data was not available at the time of writing this report.

population, levels of eating outside the home, and changes in diet are influencing purchases, consumption and waste.

This information will further develop our understanding of food waste specifically, as well as how it fits with other food- and waste-related issues. This deeper understanding will aid prioritisation of action to reduce food and drink waste, helping to tackle the issue in a targeted, cost effective and appropriate way. This, together with other analyses, may help forecast levels of household food and drink waste in the future, and determine how far it might be possible to further reduce it. Understanding what types of food and drink are found in different waste streams and how this might change over time, will be of interest to those involved in the management of food waste, as different types of waste could affect both processability and yield (for example in terms of energy generated) of any treatment.

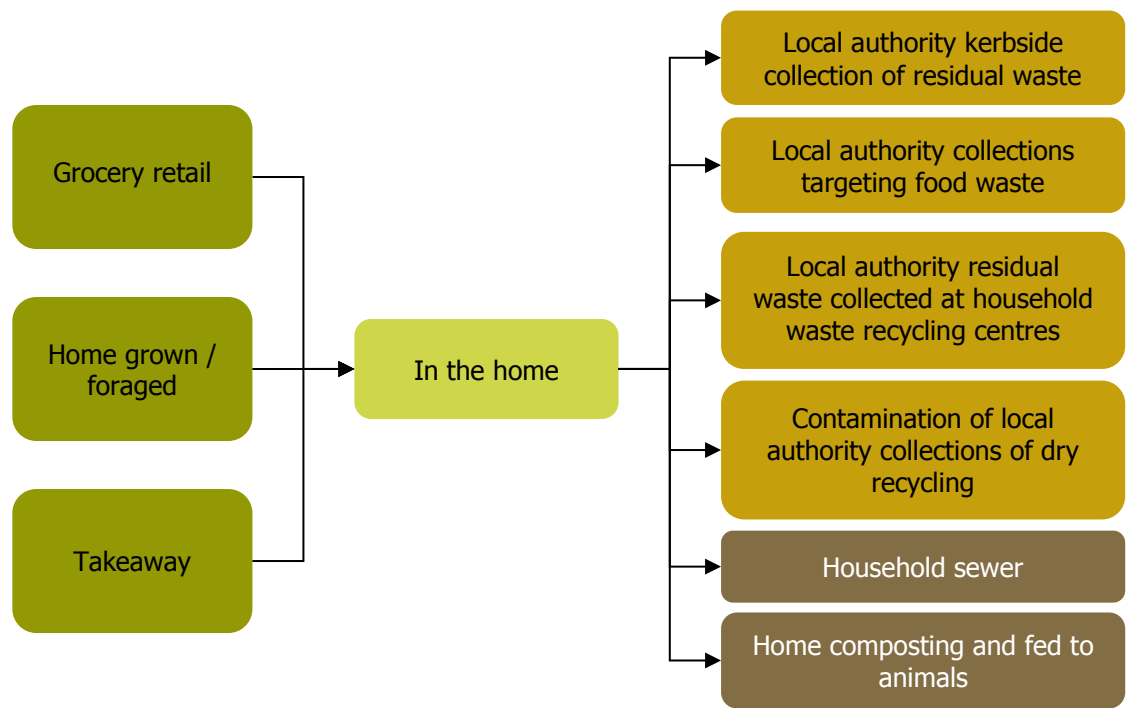
WRAP and LFHW will be updating their guidance and tools for consumers and resources for partners in the light of this research, and the planned further analysis. Links to all of WRAP’s previous research on food and drink waste, and resources available for partners can be found at: [www.wrap.org.uk/waste-resource-listing](http://www.wrap.org.uk/waste-resource-listing).

These new insights will also form the basis of discussions with Governments, local authorities, retailers, food brands and manufacturers to maximise the impact of our collective actions in the future.

**Background and methodological details**

The estimates in the main report cover the routes illustrated in Figure I, but exclude waste collected from offices, catering establishments, litter, and street sweepings. It also excludes food and drink waste from agriculture, food processors and manufacturers, retailers and wholesalers. All data is for the UK as a whole.

**Figure I:** Schematic of sources and disposal routes of household food and drink waste



The estimates for household food and drink waste are derived from three main pieces of research:

- **Synthesis of Food Waste Compositional Data 2012:** collates information from recent waste audits commissioned by local authorities and WasteDataFlow (a reporting system for waste collected by local authorities in the UK) to obtain an estimate of household food and drink waste collected by local authorities.
- **Detailed waste compositional analysis:** research quantifying the weight and types of food and drink waste from approximately 1,800 consenting households (conducted in 2013).
- **Kitchen Diary 2012 research:** use of diary keeping to record waste from all disposal routes from the home. Diary keepers also recorded why each item was thrown away.

The details of these pieces of research and how the information was synthesised to generate the results in this report are detailed in a *Methods Annex Report*, published alongside this report<sup>19</sup>. Further details of the Synthesis study are published in a separate report alongside the *Methods Annex*. The figures in the main report are generally comparable to those of a previous report, *Household Food and Drink Waste in the UK*<sup>20</sup> (published in 2009), which restates 2007 estimates.

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<sup>19</sup> <http://www.wrap.org.uk/household-food-waste>

<sup>20</sup> <http://www.wrap.org.uk/sites/files/wrap/Household%20food%20and%20drink%20waste%20in%20the%20UK%20-%20report.pdf>

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# Glossary

- Avoidable waste – a classification used in the report relating to food and drink thrown away that was, at some point prior to disposal, edible, e.g. milk, lettuce, fruit juice, meat (excluding bones, skin, etc.); c.f. possibly avoidable and unavoidable waste.
- Defra – Department of Environment, Food and Rural Affairs.
- Disposal route – the method by which household food and drink waste is collected or removed from the home; this term does not necessarily imply that the waste goes to landfill (see also Sewer, local authority collected waste, home composting and fed to animals)<sup>21</sup>.
- Food group – broad classification of food and drink (e.g. bakery, drink, fresh fruit).
- Food type – classification that subdivides each food group (e.g. fresh fruit is subdivided into types of fruit).
- Home composting and feeding to animals – a combined disposal routes considered in this report.
- LA – Local Authority.
- Local authority collected waste – in this report, this refers to the household waste streams collected by, or on behalf of, the local authorities; these include kerbside residual waste (the 'general' bin), collections targeting food waste (either separate or mixed with garden waste), and minor contributions from residual waste from household waste recycling centres and contamination of kerbside dry recycling.
- Possibly avoidable waste – a classification used in the report relating to food and drink that some people eat and others do not, e.g. bread crusts and potato skins; c.f. avoidable and unavoidable waste.
- Unavoidable waste – a classification used in the report relating to waste arising from food and drink preparation that is not, and has not been, edible under normal circumstances, e.g. meat bones, egg shells, pineapple skin, tea bags; c.f. avoidable and possibly avoidable waste.
- Sewer – one of the major household disposal routes of food and drink waste considered in the report, including material disposed of via the sink, toilet or other inlet to the sewer system.
- WRAP – Waste & Resources Action Programme.

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<sup>21</sup> The word 'disposal' is used here in its everyday sense (i.e. removal of food and drink from the kitchen / home), rather than the legal definition in Article 3 of the EU Waste Framework Directive (2008/98/EC).

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## 1.0 Introduction

### 1.1 Structure of this report

This report contains estimates of the quantity and types of food and drink waste generated by UK households in 2012. These estimates provide updates to previous publications, most notably information for 2007 in *Household Food and Drink Waste in the UK*<sup>22</sup> (published in 2009).

Published alongside this report are two other documents, which can be accessed from: [www.wrap.org.uk/household-food-waste](http://www.wrap.org.uk/household-food-waste)

- **Synthesis of Food Waste Compositional Data 2012:** a report providing estimates of household food and drink waste collected by local authorities in 2009 and 2012. The research synthesises information from waste audits undertaken by local authorities and waste statistics from the waste data repository WasteDataFlow.
- **Methods Annex Report:** detailed descriptions of the research methods and analysis that was performed to obtain these estimates. This annex also includes a statement by the peer reviewer of this research.

Where information can be found is summarised in Table 1.

**Table 1:** Where information can be found

Type of information	Chapters / sections
Background to research	§1.2
Brief methodological details	§1.3 to §1.6
More detailed methodological information	<i>Methods Annex Report</i>
Household food and drink waste in 2012: headlines	Chapter 2.0
Waste in 2012 by food group	Chapter 3.0
Changes in waste between 2007 and 2012	Chapter 4.0
Detailed results relating to specific groups of food and drink	Chapters 5.0 to 12.0
What this information means for an average household	Chapter 13.0
Details of estimates relating to local authority collected waste	<i>Synthesis report</i>

The background to this project – the details of efforts to understand and reduce household food and drink waste over the last few years – is summarised in §1.2. The remainder of Chapter 1.0 contains brief methodological details; a full account of the methods used is given in the *Methods Annex Report*.

The headline results for 2012 are found in Chapter 2.0, which include the weight, cost and environmental impact of household food and drink waste in the UK. Information is presented on how avoidable this waste is, the reason for its disposal, and the disposal route. Results

<sup>22</sup> <http://www.wrap.org.uk/sites/files/wrap/Household%20food%20and%20drink%20waste%20in%20the%20UK%20-%20report.pdf>

are also presented by the number of people living in a household and the presence of children (§2.4). Analysis of the results by other socio-demographic factors is planned in future work. Chapter 3.0 presents the results by the high-level food groups (e.g. fruit, bakery), while Chapters 5.0 to 12.0 present information for each of these groups at a more detailed level (food type, e.g. apples, bread).

Previous research quantifying household food and drink waste is outlined in Chapter 4.0. Comparisons are made between the 2007 estimates from the previous *Household Food and Drink Waste in the UK* report (published in 2009) and the 2012 estimates from the current research. Confidence intervals around these changes are also presented. The final chapter contains brief conclusions and a summary of planned future work in this area.

Appendix 1 contains information on the proportion of purchases that are wasted for selected types of food. Appendix 2 contains lists of the most wasted types of food. Appendix 3 has information combined for fresh fruit, vegetables and salads.

## 1.2 Background to research

Food waste prevention is a key priority for WRAP and the Governments of the UK. WRAP has run a consumer food waste prevention programme and consumer facing campaign, Love Food Hate Waste (LFHW; [www.lovefoodhatewaste.com](http://www.lovefoodhatewaste.com)), since 2007. LFHW operates across the UK, communicating directly with consumers to raise awareness of the benefits of reducing food waste, and to provide a wide range of support, tools and advice, primarily through a programme of cascade training<sup>23</sup>, PR, the website and social media. LFHW also, importantly, enables a wide range of partner organisations to help their customers, members, and residents to reduce food waste<sup>24</sup>.

Evaluation of recent LFHW activity in West London, which was part of a six month, London wide LFHW campaign run by Recycle for London (a partnership between the Greater London Authority and WRAP), helped West Londoners cut their avoidable food waste by 14%<sup>25</sup>. The reductions in food waste could save West London boroughs up to £1.3 million each year through avoided disposal costs and deliver up to £8 savings for every £1 spent on implementing the campaign.

WRAP also undertakes technical activity with the food industry, to change the retail environment (e.g. changing products, packaging, labelling and the way food is sold) to make it easier for consumers to waste less. Monitoring in 2011 revealed considerable progress<sup>26</sup>; for example, there was a dramatic reduction in the number of products carrying a 'display-until' date. In addition, new labelling being rolled out by retailers is making it clearer that goods don't have to be frozen on the day of purchase, but can be at any time up to the 'use-by' date.

Much of the work by WRAP on household food waste has progressed under the Courtauld Commitment<sup>27</sup>. This is a voluntary agreement aimed at improving resource efficiency and reducing the carbon and wider environmental impact of the grocery sector<sup>28</sup>. The first phase

<sup>23</sup> An evaluation of WRAP's cascade training is available here:  
<http://www.wrap.org.uk/sites/files/wrap/Evaluation%20of%20Cascade%20Training.pdf>

<sup>24</sup> <http://www.lovefoodhatewaste.com/partners>

<sup>25</sup> <http://www.wrap.org.uk/content/west-london-food-waste-campaign>

<sup>26</sup> <http://www.wrap.org.uk/content/helping-consumers-reduce-food-waste-retail-survey-2011>

<sup>27</sup> <http://www.wrap.org.uk/courtauld>

<sup>28</sup> <http://www.wrap.org.uk/content/information-sheet-courtauld-commitment>

of Courtauld (2005-2009) looked at new solutions and technologies so that less food and primary packaging ended up as household waste, which helped bring household food waste onto the agenda of the grocery sector. Phase 2 (2009-2012) expanded the focus to include waste in the supply chain – both food and transit packaging. Phase 3 was announced in May 2013 and runs until December 2015, and aims to further reduce the weight and carbon impact of household food waste, grocery product and packaging waste, both in the home and the UK grocery sector.

The Courtauld Commitment is paid for by the UK governments and supports their policy goal of a 'zero waste' or more 'circular' economy<sup>29</sup> and the objectives of the Climate Change Act to reduce greenhouse gas emissions by 34% by 2020 and 80% by 2050 from a 1990 baseline. WRAP is responsible for the Courtauld Commitment and works in partnership with leading retailers, brand owners, manufacturers and suppliers who have signed up and support the delivery of the targets.

As noted above, in addition to household food waste, the Courtauld Commitment also tackles waste from the food manufacturing and retail sector. In 2012, WRAP undertook work to provide robust estimates of the amount of waste in the UK supply chain of food and drink<sup>30</sup>. The research shows that grocery waste in manufacturers and retailers amounts to 6.5 Mt. Some 4.9 Mt arises in manufacturing and some 1.6 Mt arises in retailing. The waste comprises 4.3 Mt of food, 1.6 Mt of packaging and 0.5 Mt 'other' material.

Food and packaging waste is also being tackled in the hospitality and food service sector through WRAP's new agreement, on behalf of UK Government<sup>31</sup>. Research by WRAP<sup>32</sup> indicates that if hospitality and food service sector avoidable food waste was prevented and unavoidable food waste diverted to anaerobic digestion (AD), the potential savings to industry would be more than £720 million a year.

This new research provides an updated detailed evidence base, which will allow Governments, WRAP and its partners to make strategic decisions regarding the prevention of household food and drink waste, and refresh and target the approaches and materials aimed at delivering this – bringing benefits to individuals, communities, businesses and the UK as a whole. Overall, the aim is to reduce costs for consumers and local authorities (LAs), improve the resilience of the UK food system by making better use of the food we buy and reducing the impact on the environment. In addition, information on how food waste is disposed, and in particular the amounts and types of food in the 'residual' bin and separately collected will be of interest to local authorities and waste management companies.

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<sup>29</sup> <http://www.wrap.org.uk/content/how-wrap-supports-circular-economy>

<sup>30</sup> <http://www.wrap.org.uk/node/16088>

<sup>31</sup> <http://www.wrap.org.uk/category/sector/hospitality-and-food-service>

<sup>32</sup> <http://www.wrap.org.uk/content/composition-waste-disposed-uk-hospitality-industry-1>

### 1.3 Definition of household food and drink waste

This section defines which material types and disposal routes<sup>33</sup> are included in the report. In so doing, it provides a working definition<sup>34</sup> for household food and drink waste.

#### 1.3.1 Definition of material types

The categorisation of food and drink waste used in this report is consistent with previous WRAP studies, as defined in §1.3 of the previous *Household Food and Drink Waste in the UK* report. Food and drink waste includes the three fractions described below:

**Avoidable** – food and drink thrown away because it is no longer wanted or has been allowed to go past its best. The vast majority of avoidable food is composed of material that was, at some point prior to disposal, edible, even though a proportion is not edible at the time of disposal due to deterioration (e.g. gone mouldy)<sup>35</sup>. In contrast to 'possibly avoidable' (see below), the category of 'avoidable' includes foods or parts of food that are considered edible by the vast majority of people.

**Possibly avoidable** – food and drink that some people eat and others do not (e.g. bread crusts and potato skins). As with 'avoidable' waste, 'possibly avoidable' waste is composed of material that was, at some point prior to disposal, edible.

**Unavoidable** – waste arising from food and drink preparation that is not, and has not been, edible under normal circumstances<sup>36</sup>. This includes egg shells, pineapple skin, apple cores, meat bones, tea bags, and coffee grounds.

These three fractions can be combined to obtain data for different needs (Table 1). For instance, the term 'kitchen waste' – which includes all three levels of avoidability described above – is frequently used by local authorities and corresponds to what many food waste collection schemes accept. However, not all kitchen waste comes from the edible fraction of food – for this reason, many people focus on the avoidable (sometimes in combination with the possibly avoidable) fraction(s) to determine what proportion of food is not being eaten in the home.

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<sup>33</sup> The word 'disposal' is used here in its everyday sense (i.e. removal of food and drink from the kitchen / home), rather than the legal definition in Article 3 of the EU Waste Framework Directive (2008/98/EC).

<sup>34</sup> This is a definition for the purposes of this report; wider discussions are taking place within WRAP, the EU and globally on the definition of food waste.

<sup>35</sup> There are two exceptions to this rule: a) inedible items that are thrown away unused (e.g. unused tea bags), and b) the unavoidable fraction of whole items thrown away (e.g. the banana skin of a whole banana) - this material was all classified as avoidable, rather than split into the avoidable (banana flesh) and unavoidable fractions (banana peel). One can argue that in both cases that the waste was avoidable, but it is not material that was edible. It is recommended that future research investigates the effect of these assumptions on the results.

<sup>36</sup> This definition takes a pragmatic view as strictly speaking, most material classified as unavoidable could be ingested – drinks can be made from egg shells, stock from animal bones, marmalade from citrus peel, and pickle from melon rind. Therefore, inedible is defined as unpalatable to the vast majority of the population without substantial preparation.



**Table 1:** Definitions relating to food and drink waste

Waste Fraction	Description	Corresponding fractions in this report
Kitchen waste	Food or drink disposed of, including associated inedible material, such as bones from meat, egg shells, and inedible parts of fruit and vegetables, but excluding man-made packaging associated with food or drink, e.g. glass bottles, polymer film, aluminium cans.	All (avoidable, possibly avoidable and unavoidable)
Edible waste	Food and drink disposed of, excluding inedible material and packaging. It should be noted that this food and drink may not actually be edible at the point of disposal (e.g. it may have gone mouldy). However, it is composed of the fraction of food and drink that was, at some point, edible.	Avoidable and possibly avoidable
Avoidable waste	Food and drink, excluding inedible material and packaging. Further excluded are foods that some people eat and others do not (e.g. bread crusts), or that can be eaten when a food is prepared in one way but not in another (e.g. potato skins).	Avoidable

As with previous WRAP reports, this report defines food and drink as waste if it is not consumed by a human. This definition is broadly in line with the definition of waste in European directive 2008/98/EC: 'any substance or object which the holder discards or intends or is required to discard'. As discussed in the previous *Household Food and Drink Waste in the UK* report, it could be argued that there is a slight discrepancy between the European Commission definition and that used in this report with regard to food and drink that has been either home composted or fed to animals. Usually, this material is not reported by European Union Member States as waste: although this material has not been consumed by a human, it has still been used to provide some value to the holder (e.g. by displacing purchases of compost or pet food).

However, for the edible fraction of food at least, the value reduces greatly if not consumed by a human; for instance, the value of the compost generated from food waste is generally a small fraction of the price of the food used to create it. Nevertheless, the amount of food and drink home composted and fed to animals is reported separately, allowing the reader to use the most appropriate estimate for their needs and make the most appropriate comparisons with other countries.

### 1.3.2 Definition of 'household'

This report takes a similar approach to defining waste from households as previous WRAP reports on household food waste. For the purposes of this report, the following are classified as household disposal routes, as illustrated in Figure 1:

- Waste streams collected by (or on behalf of) local authorities from households:
  - Residual waste collected at the kerbside (i.e. the general bin).
  - Collections by local authorities that target food waste (either separate food waste collections or mixed garden and food waste collections).
  - Contamination of 'dry' kerbside recycling collections (e.g. glass, paper).
  - Residual waste collected at household waste recycling centres.

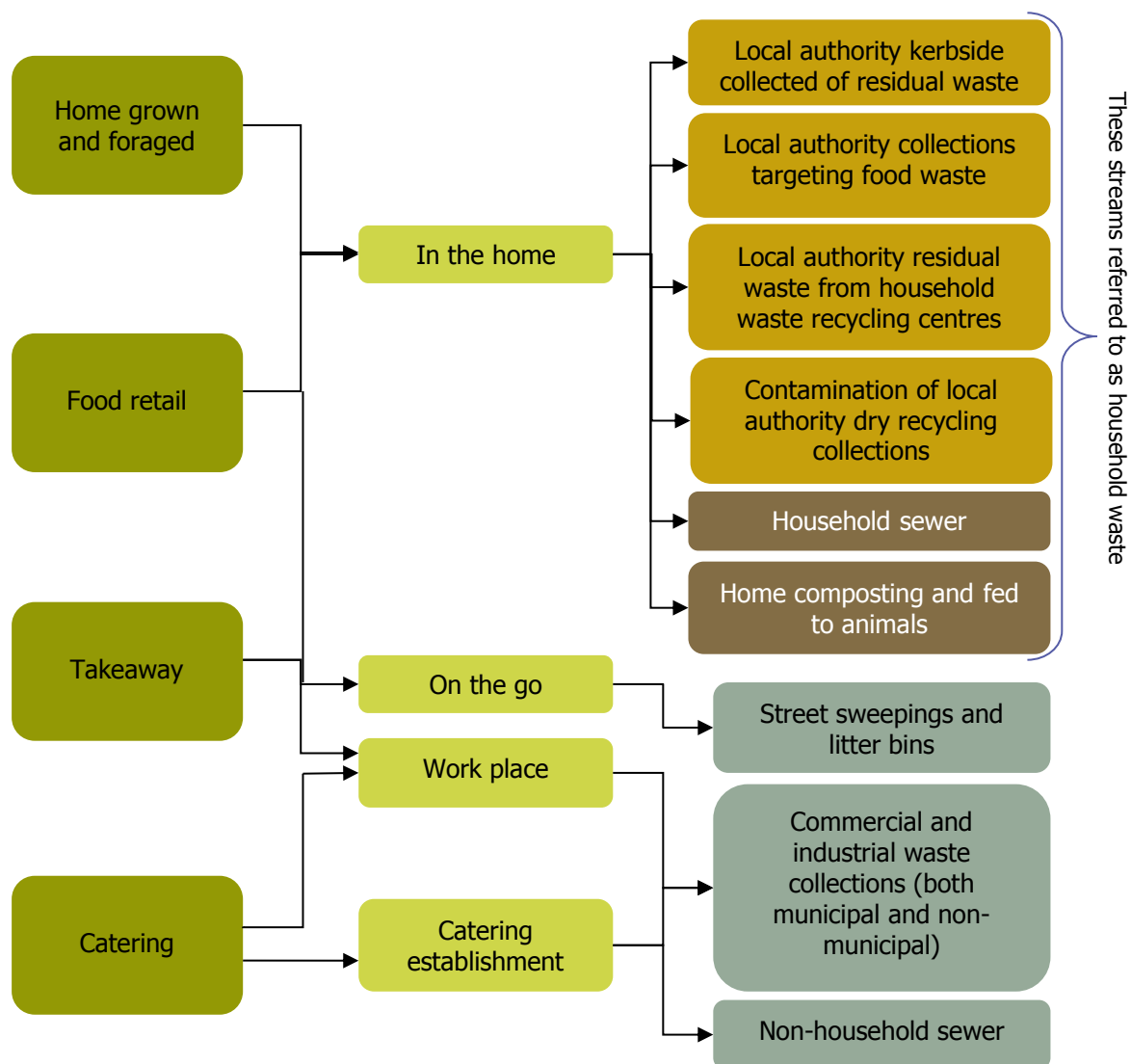


- The sewer (mostly down the kitchen sink);
- Home composting; and
- Fed to animals.

This definition means that food and drink is included in the estimates provided it enters the home: retail, takeaways, gifts and home-grown or foraged foods. It also implies that food and drink waste disposed of outside the home – via street sweepings and litter bins, commercial waste streams and commercial sewers – is excluded from the estimates of household waste. In effect, this excludes the vast majority of food and drink that is eaten outside of the home, i.e. foodstuffs eaten on the go, in the workplace, or in a catering establishment. The definition also excludes food and drink waste generated in the grocery and hospitality supply chains (e.g. on farms, during food processing and manufacture, and from retail stores).

There may be some waste that comes into the home associated with consumption outside of the home (and vice versa), for example doggy bags from restaurants. However, it is likely that these latter flows are negligible in comparison to those in Figure 1, and, for this reason, they have been omitted from this report.

**Figure 1:** Schematic of major flows of food and drink and associated waste routes



Adapted from: the previous *Household Food and Drink Waste in the UK* report

## 1.4 Data sources used in this research

This section provides a summary of the research and calculations that were used to produce the estimates in this report. Full details can be found in the *Methods Annex Report*. The estimates for household food and drink waste are derived from three main pieces of research:

- **Synthesis of Food Waste Compositional Data 2012:** collates information from recent waste audits commissioned by local authorities and waste data submitted to WasteDataFlow to obtain an estimate of household food and drink waste collected by local authorities.
- **Detailed waste compositional analysis:** research quantifying the weight and types of food and drink waste from approximately 1,800 consenting households (conducted in 2013).
- **Kitchen Diary 2012 research:** use of diary keeping to record waste from all disposal routes from the home (including poured down the kitchen sink, home composted or fed to animals). Diary keepers also recorded why each item was thrown away.

How these pieces of research are combined is detailed in Table 2. For each element of the results, the most appropriate source for that information has been used. For example, for food and drink waste collected by local authorities (top row of Table 2), the most reliable estimate of the total amount of waste comes from the *Synthesis of Food Waste Compositional Data 2012*: it provides an estimate that is subject to less uncertainty and fewer biases than those from the detailed waste compositional analysis or the kitchen diaries. This is because the synthesis uses actual waste tonnages from local authorities in the UK and compositional information from a large number of studies that were reasonably representative of the UK in terms of deprivation levels and population density. However, the synthesis report is not able to give details on what types of food and drink are wasted or why food and drink are wasted; this information comes from the waste compositional analysis and kitchen diaries respectively.

**Table 2:** Summary of information used to obtain estimates of food and drink waste in the current report

Disposal route	Amount of food wasted	Type of food wasted	Reason for waste
Local authority collected waste	<i>Synthesis of Food Waste Compositional Data 2012</i>	Waste compositional analysis	<i>Kitchen Diary 2012</i>
Household sewer e.g. kitchen sink	Derived from <i>Down the Drain</i>	Derived from <i>Down the Drain</i>	<i>Kitchen Diary 2012</i>
Home composted	<i>Kitchen Diary 2012</i>	<i>Kitchen Diary 2012</i>	<i>Kitchen Diary 2012</i>
Fed to animals			

For the estimates of food and drink disposed of down the kitchen sink, it was originally intended to use estimates from the kitchen diaries. As discussed in §2.3 of the *Methods Annex Report*, this particular estimate from the *Kitchen Diary 2012* was found not to be comparable with previous research, most likely due to methodological differences. In particular, previous diary research (*Down the Drain*) focused just on sewer waste, whereas

the *Kitchen Diary 2012* research gathered information for all disposal routes from the home. This, therefore, precluded the possibility of a robust comparison over time<sup>37</sup>. For this reason, estimates for this disposal route have been modelled using the previous study relating to the kitchen sink (*Down the Drain*) alongside information about changes in waste from other disposal routes. Further details of the calculations and the rationale behind them can be found in the *Methods Annex Report* (§2.3).

This issue relating to the kitchen sink does not extend to material home composted or fed to animals. For these disposal routes, previous estimates were derived from a similar kitchen-diary study and are therefore comparable.

## 1.5 Classification and calculations of food and drink waste estimates

Material is grouped according to the same classification as previous research: 15 food groups, which are subdivided into 150 separate food types (Appendix 1 of the *Methods Annex Report* has a full list). This classification attempts to accommodate various perspectives on food and drink. It should be noted that milk is categorised under 'dairy and eggs', and as such a food, in line with definitions used within the grocery supply chain.

As with the previous research, an estimate of water added to food in the home is made for items thrown away via the sewer such as squash, tea and coffee. This quantity of water is excluded from the main estimates presented, although the quantity is stated in §2.1.

Food and drink is classified by its appearance as it leaves the home. Therefore, some food categories (e.g. cheese, eggs, milk, fruit, vegetable and salad) are likely to be underestimated in the chapters relating to the separate food groups because they can be combined in the preparation of, for example, meals in the home. Instead, the waste associated with these combined foods (e.g. meals, cakes) is reported in the chapter associated with the combined food. Therefore chopped carrot within a cottage pie would be reported under the meals category (as part of that meal, not separately) rather than being reported under fresh vegetables.

Two important changes have been made to the methodology since the previous *Household Food and Drink Waste in the UK* report. Firstly, adjustment has been made for seasonality in food waste arisings. Because the research took place over relatively short periods of the year, it was necessary to adjust for seasonal effects so that results are more representative of the whole year. For instance, the *Kitchen Diary 2012* was performed in May 2012, a time of year when more salad and less soup are purchased. The method for seasonal adjustment is described in the *Methods Annex Report* (Chapter 11). Seasonal adjustment has also been applied retrospectively to 2007 figures to aid comparisons over time for different foods, as presented in Chapter 4.0.

Another change from the previous *Household Food and Drink Waste in the UK* report is the information source and classifications around why food is thrown away. The 'reasons for disposal' presented in the previous report were based on information from the waste compositional analysis. However, it is hard to determine why food was thrown away just from how it looks. For the current report, we have more detailed information from the diary research: given the higher number of participants, more accurate information was obtainable from the diary research. The reasons for disposal from the previous report (2007 figures) have not been re-stated as the information to perform these calculations was not collected

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<sup>37</sup> The estimate for food and drink waste disposed of down the kitchen sink in 2012 was much lower than the estimate for previous research (*Down the Drain*) and appeared to overstate reductions between 2007 and 2012.

during the 2007 fieldwork. Given this change in methodology, comparisons drawn between the reasons for disposal in the current research and those in the previous *Household Food and Drink Waste in the UK* report should be made tentatively.

The reasons for disposal included in the report are listed below, alongside what they cover:

- **Not used in time:** food that has been thrown away because it has gone off (mouldy, mushy or rotten) or because it has passed a date label<sup>38</sup> (e.g. 'use by' or 'best before').
- **Cooked, prepared or served too much:** food and drink that has been cooked, prepared or served in the home and subsequently disposed of. This category could also be referred to as 'leftovers'.
- **Personal preference:** food and drink not eaten due to allergies, other health reasons, or simply not wanting to eat this particular food<sup>39</sup>.
- **Accidents:** food that has been contaminated, burnt or otherwise spoilt.
- **All other reasons:** e.g. cupboard clear out, dregs at the bottom of a cup.

These estimates of the weight of waste are compared to the amount of food and drink brought into the home, obtained from the Family Food datasets<sup>40</sup>. Details of the methodology can be found in *Methods Annex Report* Chapter 10 and the results are given in §2.1.

The price of purchasing the food that becomes avoidable food waste is estimated (§2.2). The prices quoted are for 2012 and methods used for estimating them are described in Chapter 8 of the *Methods Annex Report*.

This report only estimates the price associated with avoidable food and drink waste, as this is the primary focus of the food waste reduction activities. It is also problematic to apportion the value of foods comprising, for instance, avoidable and unavoidable fractions. Although the unavoidable fraction is not eaten, it can function as natural packaging (fruit peel), or containment (egg shell) that can also be turned into compost. The value of these functions is hard to assess, and this is a reason why unavoidable costs are not reported.

The methodology for calculating the greenhouse gas emissions associated with food and drink waste is presented in Chapter 9 of the *Methods Annex Report* and the estimate for the environmental burden associated with avoidable food waste is presented in §2.3. The emissions cover the relevant elements of the life-cycle of food and drink including: agriculture, manufacture, packaging, distribution, retail, transport to the home, storage and preparation in the home, and waste treatment and disposal. An assessment has also been made of the amount of land required to produce the avoidable food and drink wasted by UK households.

In addition to the greenhouse gas emissions, there are other environmental impacts and resource issues relating to food and drink waste including water use, eutrophication of water bodies, and depletion of soils. Although important, these have not been calculated as part of this report. However, the information on the different types of food and drink wasted in the

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<sup>38</sup> As cited by the diary participant. In the case of a best-before date, the food may be palatable and safe to eat, but is thrown away due to a misinterpretation of what the best-before date means.

<sup>39</sup> As cited by the diary participant - it would not always be possible to know whether the reason behind not wanting to eat a particular food was down to it 'going off' or just a decision not to eat a particular food.

<sup>40</sup> <https://www.gov.uk/government/statistical-data-sets/family-food-datasets>

UK could be used as the basis for such a calculation. In a similar manner, a calculation on the nutrients, including energy, within the food and drink waste could also be made.

## 1.6 Notes on reporting information

Information for an individual food group is presented in Chapters 5.0 to 12.0. These chapters are ordered by the group's contribution to the total amount of food and drink waste, starting with the highest, namely vegetables and salad. Chapter 12.0 includes the food groups with minor contributions to the total. The chapters on vegetables & salad (Chapter 5.0), and fruit respectively (Chapter 7.0) contain a combined analysis of both fresh and 'processed' items. Results are presented in Appendix 3 for fresh fruit, vegetables and salad combined as one 'fresh produce' food group.

Not all food and drink types are reported separately. Where the estimate for a food type is of relatively poor precision<sup>41</sup>, the amount of waste is added to a category named, for example, 'all other bakery'. The food types that are not reported separately are highlighted in the first table of Chapters 5.0 to 12.0. As they are included in an 'all other ...' category, this process has no effect on the total waste reported for each food group, or the headline results.

Given the uncertainty around estimates of the waste of individual food groups and food types, information in the following chapters is reported to two significant figures<sup>42</sup>. For estimates where the relative error is close to the threshold for inclusions, these estimates are more uncertain than the two significant figures imply. For brevity, most results are reported without an associated confidence interval; however the *Methods Annex Report* presents confidence intervals for the key results. In tables and figures reporting food and drink waste, the sum of certain columns can be inconsistent with the total quoted in the final row; this is due to the rounding convention adopted.

All amounts of less than 1,000 tonnes have been denoted as '<1,000' in the tables. This includes categories for which no waste was found in the research; given that the surveys covered a sample of households – rather than all households in the UK – absence from the survey does not necessarily imply that the arisings in the UK are zero, only that they are likely to be low.

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<sup>41</sup> Food types are included if the confidence intervals in both this report and the previous report (*Household Food and Drink Waste in the UK*) were less than 40% of the respective estimate (i.e. for a food type with an estimate of 100,000 tonnes, it was reported separately if the confidence interval was less than  $\pm 40,000$  tonnes). This criterion for inclusion of a food type is discussed further in the *Methods Annex Report* (§13.3).

<sup>42</sup> With the exception of chapter 4, where unrounded figures are given to allow the calculations of changes between 2007 and 2012 to be transparent.

## 2.0 Headline results

This chapter presents the headline results for the amount of household food and drink waste generated in the UK in 2012<sup>43</sup>. The chapter starts with information on the weight of the waste, with information on the disposal route, how avoidable the food waste is and why it was wasted in §2.1. The cost and environmental impact of this waste are outlined in §2.2 and §2.3 respectively. Information on food and drink waste generated by the size of household and for households with and without children is presented in §2.4.

### 2.1 Weight of food and drink waste in the UK

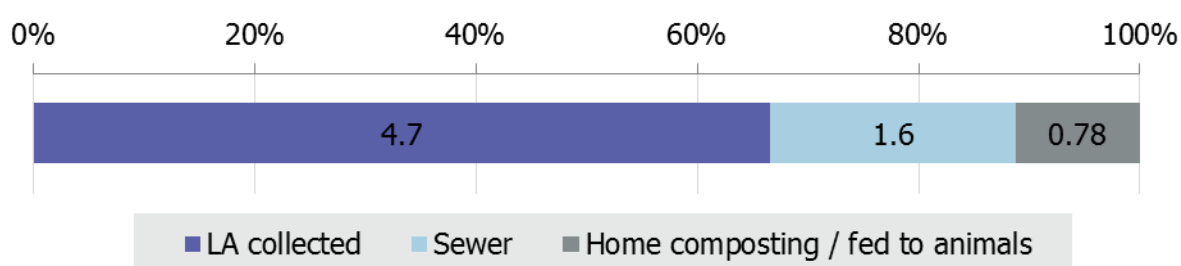
The total amount of food and drink waste generated by households in the UK during 2012 was 7.0 million tonnes. The 95% confidence interval due to sampling is approximately  $\pm 4\%$  or  $\pm 0.3$  million tonnes per year; this gives an indication of the reliability of the headline result<sup>44</sup>. Comparisons with previous estimates of household food and drink waste are made in Chapter 4.0, which also presents confidence intervals for key changes since 2007.

This 7.0 million tonnes in 2012 is equivalent to 260 kg per household per year, or 5.0 kg per household per week. This 7.0 million tonnes represents 19% of food and drink brought into the home.

The majority of this 7.0 million tonnes of waste was collected by local authorities: 4.7 million tonnes or 67% (Figure 2). Most of this was through kerbside collections of residual waste ('general' waste; 4.0 million tonnes) or kerbside collections targeting food waste (0.54 million tonnes)<sup>45</sup>.

A further 1.6 million tonnes of food and drink waste was disposed of via the sewer; this excludes water added to products in the home<sup>46</sup>. A further 0.78 million tonnes was either composted at home (0.51 million tonnes) or fed to animals (0.28 million tonnes).

**Figure 2:** Weight of household food and drink waste in 2012 split, by disposal route



*Figures within bars state waste in millions of tonnes*

Of the 7.0 million tonnes of waste in 2012, 5.8 million tonnes (82%) was food with the remaining 1.3 million tonnes being drink (Figure 3).

<sup>43</sup> Information comes from a variety of sources that span a period 2011 to 2013; however, the estimates most closely correspond to 2012.

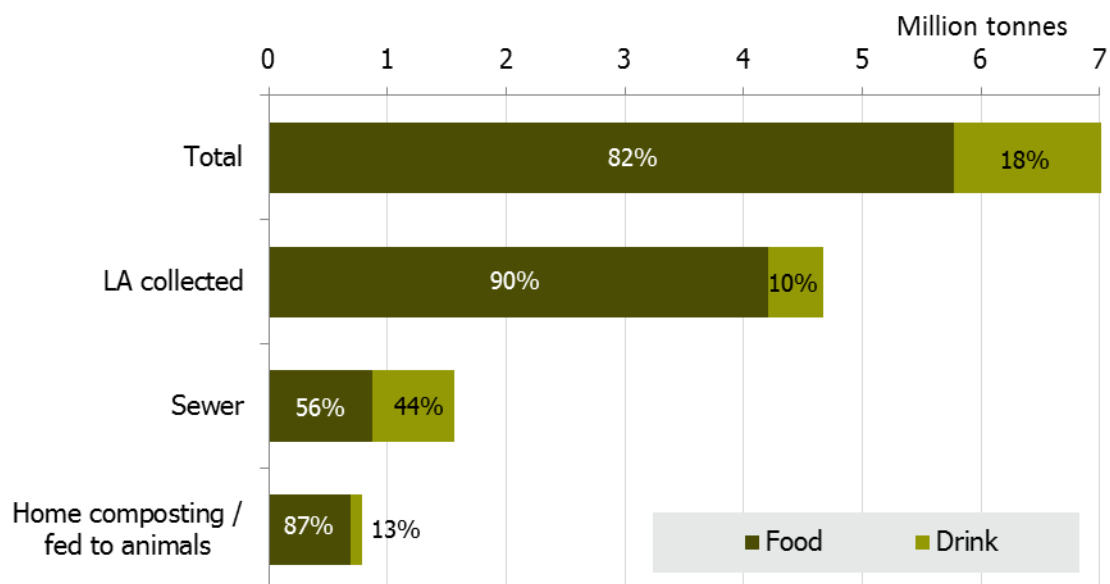
<sup>44</sup> The confidence intervals take into account sampling errors, but should be considered as approximate as they do not include systematic uncertainties, which are more difficult to quantify. For a full discussion of uncertainties associated with these estimates, please refer to chapter 13 of the Methods Annex Report.

<sup>45</sup> For more details, please see *Synthesis of Food Waste Compositional Data 2012* (§4.1).

<sup>46</sup> The water added to food and drink is estimated to total approximately a further 1.5 million tonnes. See *Methods Annex Report* for more details.

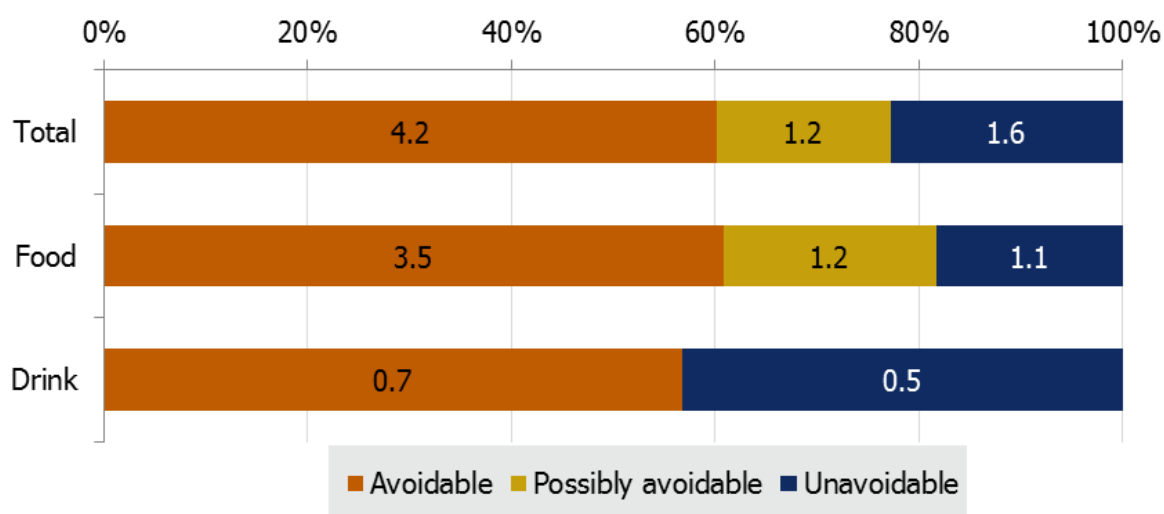
Waste collected by local authorities had a higher proportion of food (90%; 4.2 million tonnes). In comparison, waste disposed of down the sewer had a lower proportion of food (56%). Of the material classified as food disposed of via the sewer, a large proportion of this was liquid or semi-liquid, including milk, cooking sauces and oil. 87% of waste fed to animals or home composted was food; the small amount of material classified as drink was mainly tea bags and coffee grounds composted at home.

**Figure 3:** Weight of household waste in 2012 by disposal route, split by food and drink



60% of the total food and drink waste generated was avoidable in 2012: 4.2 million tonnes (Figure 4). Although much of this food and drink may not have been edible at the point of disposal, the vast majority of this waste could have been avoided through better planning, purchasing, storage or preparation (see §1.3.1 for the full definition of avoidability). This 4.2 million tonnes is the equivalent of 12% of the weight of edible food and drink brought into the home.

**Figure 4:** Weight of household waste in 2012 by food and drink, split by avoidability

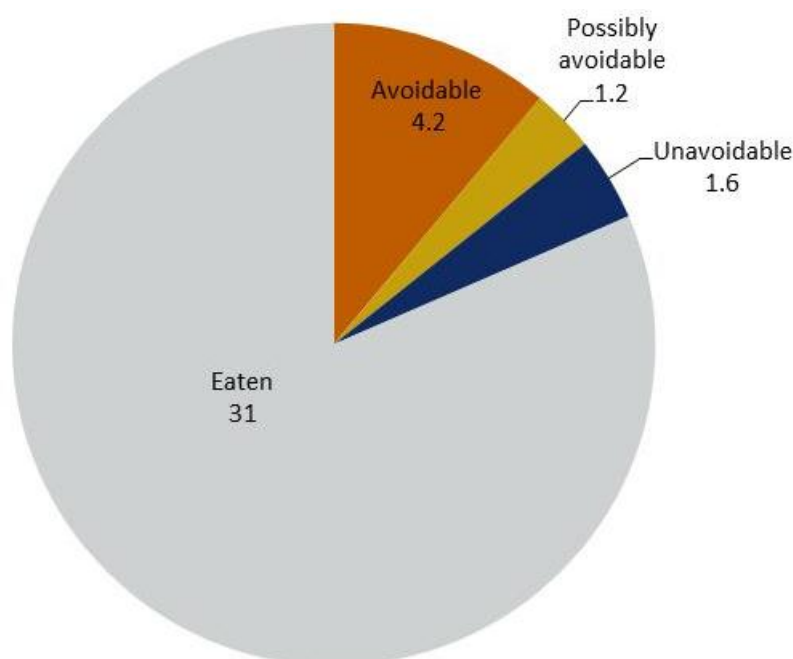


*Figures within bars state waste in millions of tonnes*



Figure 5 shows the total food and drinks purchased, obtained from the 2011 Family Food survey, split by the amount eaten and the amount wasted.

**Figure 5:** Weight of food and drink waste per household – by avoidability – in comparison to an annual shop

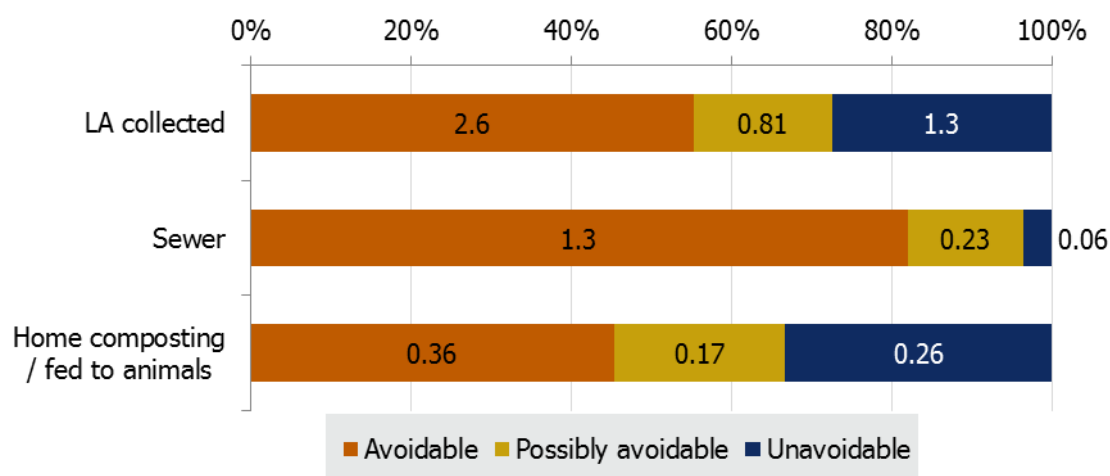


*Figures give amount of food purchased and wasted in millions of tonnes*

The proportion of avoidable waste was similar for food compared to drink (Figure 4). No drink waste is classified as 'possibly avoidable'. Details of the food and drinks classified as possibly avoidable and unavoidable can be found in Chapters 5.0 to 12.0.

The avoidability of food and drink waste varied considerably with disposal route (Figure 6). Over 80% of food and drink waste disposed of via the sewer was avoidable, contrasting with 55% for local authorities and around 45% for home composting and fed to animals.

**Figure 6:** Weight of household waste in 2012 by disposal route, split by avoidability



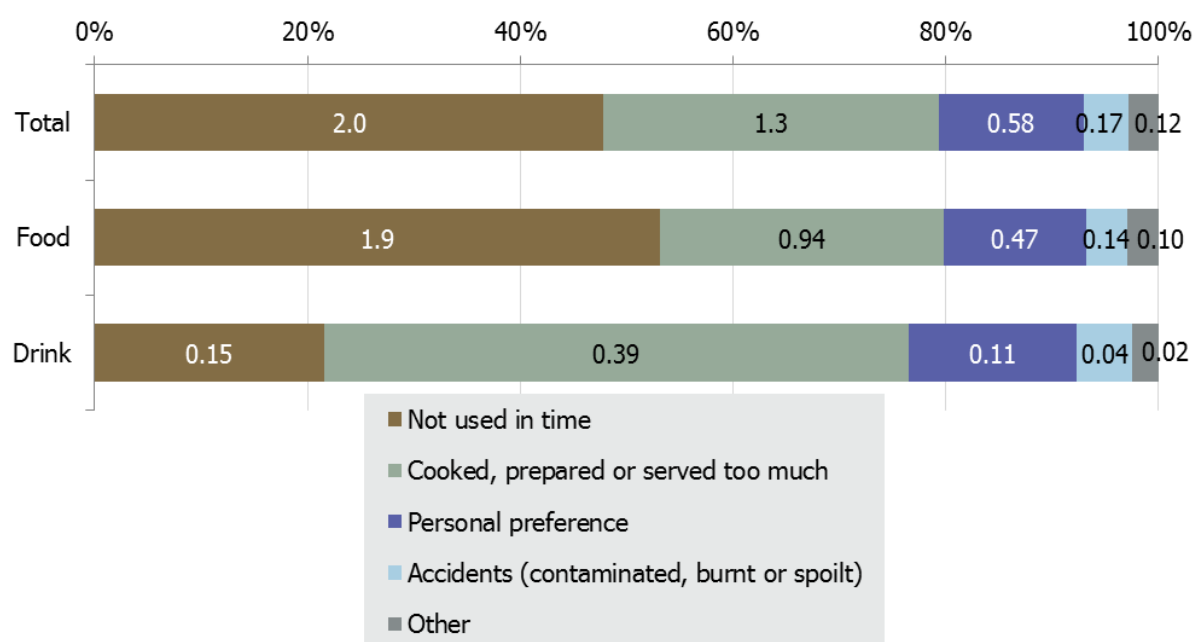
*Figures within bars state waste in millions of tonnes*



Avoidable waste was further subdivided by the reason for disposal as stated in the *Kitchen Diary 2012* research (Figure 7). Just under half of avoidable food and drink in 2012 was classified as 'not used in time': thrown away because it had either gone off or passed the date on the packaging. A further 31% was classified as 'cooked, prepared or served too much': this included food and drink that had been left over after preparation or serving. Around 14% was linked to personal preferences including health reasons and not liking certain foods. Accidents – including food dropped on the floor and failure of a freezer – accounted for 4%.

This split was similar for food, although, as seen in subsequent chapters, these fractions varied greatly between different types of food. However, for drink, 55% of avoidable waste was classified as 'cooked prepared or served too much' with only 22% 'not used in time'.

**Figure 7:** Weight of avoidable household waste by food and drink in 2012, split by reason for disposal



*Figures within bars state waste in millions of tonnes*

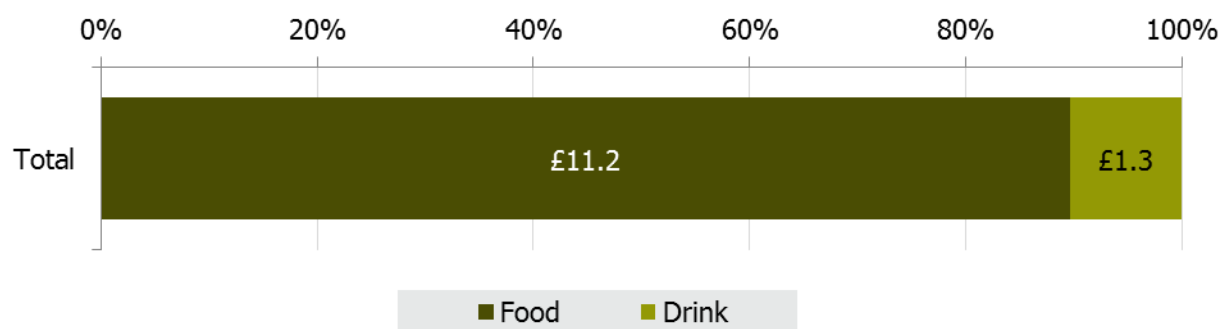
## 2.2 Cost of household food and drink waste in 2012

The cost to households of avoidable waste has been estimated from food prices for 2012, i.e. the cost to purchase food that was subsequently thrown away. It does not include the cost associated with preparing food and drink in the home (e.g. gas or electricity for cooking), travelling to and from the supermarket, or disposal costs incurred by local authorities. As described in §1.5, the cost was only calculated for avoidable food and drink waste as it is problematic to ascribe a cost to possibly avoidable and unavoidable waste.

The total cost of avoidable food and drink waste to householders was £12.5 billion (to three significant figures<sup>47</sup>), or £470 per household per year. This avoidable waste represents 14% of expenditure on food and drink brought into the home.

<sup>47</sup> This cost is presented to 3 significant figures, different from the convention of 2 significant figures used for the other figures in this report (to ensure comparability with the Executive Summary and other related materials where this headline estimate is used).

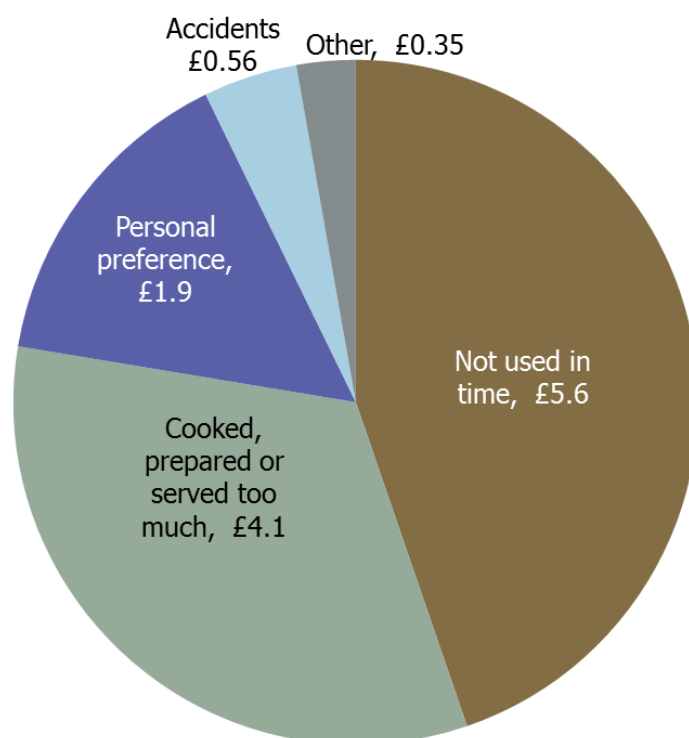
**Figure 8:** Cost of avoidable household waste, split by food and drink



*Figures within bars state waste in £ billions*

Around 90% of the cost of avoidable waste was associated with food as opposed to drink (Figure 8). Of the avoidable food and drink waste, £5.6 billion was associated with material not used in time, £4.1 billion with leftover food (cooked, prepared or served too much) (Figure 9).

**Figure 9:** Cost of avoidable household waste by food and drink, split by reason for disposal



*Figures in chart state waste in £ billions*

### 2.3 Environmental impact of household food and drink waste in 2012

The greenhouse gas emissions associated with avoidable food and drink waste in the UK accounted for approximately 17 million tonnes of CO<sub>2</sub> equivalent in 2012. This figure includes contributions from the relevant elements of the food and drink system: agriculture, manufacture, packaging, distribution, retail, transport to the home, storage and preparation in the home, and waste treatment and disposal<sup>48</sup>.

<sup>48</sup> Details on how the greenhouse gas emissions are calculated are in chapter 9 of the Methods Annex Report).

To put this figure in context, the total greenhouse gas emissions relating to consumption in the UK (as opposed to emissions produced within the geographical bounds of the UK) amounted to around 981 million tonnes in 2010<sup>49</sup>. Thus, avoidable household food and drink waste accounted for approximately 1.7% of this total.

The greenhouse gas emissions associated with avoidable food and drink waste were equivalent to the emissions from one quarter of private car journeys made in the UK<sup>50</sup>. Therefore, any reductions to avoidable food and drink waste could make an important contribution to decrease the UK's greenhouse gas emissions.

Land is required both in the UK and abroad to produce food and drink that is subsequently thrown away by UK households. For the first time, an estimate has been made of these land requirements: 19,000 square kilometres or an area about 91% the size of Wales.

The use of this land to generate food that is wasted increases demand for agricultural land worldwide, which can indirectly cause deforestation and other land-use change. If the impact of this indirect land-use change on greenhouse gas emissions is taken into account, the estimates for greenhouse gas emissions associated with household food and drink waste increases from 17 million tonnes to 22 million tonnes of CO<sub>2</sub> equivalent.

## 2.4 Variation of waste with household characteristics

This section contains information on the amount of food and drink waste generated by different types of household. The weight and cost of this waste are given for households with different numbers of occupants ('household size'). Information is also given by whether a household contains children. Further information at a household level is contained in Chapter 13.0.

**Table 3:** Food and drink waste by household size, weight and avoidable cost

Household size	Weight (kg / household / year)				Cost (avoidable; £ / hh / year)
	Total	Unavoidable	Possibly avoidable	Avoidable	
1	170	43	28	97	£290
2	250	64	42	140	£420
3	330	57	56	220	£640
4+	400	78	69	250	£740
<b>Average UK household</b>	<b>260</b>	<b>60</b>	<b>45</b>	<b>160</b>	<b>£470</b>

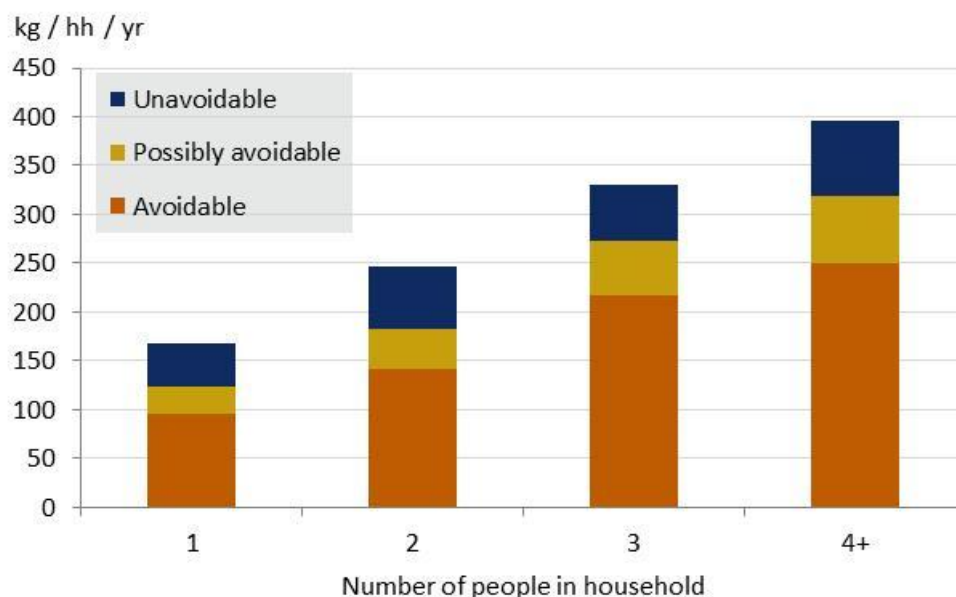
For households with one occupant, the average amount of food and drink waste generated was 170 kg per household in 2012, with the avoidable fraction costing £290 in 2012. These

<sup>49</sup> UK's Carbon Footprint 1993 to 2010 (Defra, 2012): <https://www.gov.uk/government/publications/uks-carbon-footprint>. Information used is for 2010, most recent year published.

<sup>50</sup> See chapter 9 of the Methods Annex Report for calculations.

figures increase with the size of the household; for households containing four or more people, 400 kg of food and drink waste was generated, with the avoidable waste costing £740. Since 2007, the amount of avoidable food and drink waste has reduced by a similar percentage for each household size.

**Figure 10:** Weight of food and drink waste by household size, split by avoidability



The higher the number of occupants in a household, the greater the amount of food waste generated, although it should be noted that the increase is not proportional, i.e. an average four-person household wastes less than four times the average single-occupancy household. This can also be seen from the comparison between one-person households and the UK average per person (Table 4). This shows that one-person households threw away, on average, over 40% more avoidable food and drink waste than the overall amount per person in the UK<sup>51</sup>.

**Table 4:** Food and drink waste: comparison of one-person households and UK average per person

	Weight (kg / person / year)				Cost (avoidable; £ / person / year)
	Total	Unavoidable	Possibly avoidable	Avoidable	
One-person household	170	43	28	97	£290
UK average per person	110	25	19	67	£200

Households containing children generated on average 360 kg of food and drink waste in 2012, with the avoidable fraction costing £700 (Table 5). This is somewhat higher than households without children, which generated an average of 240 kg of food and drink waste per year at a cost of £410 for the avoidable part.

<sup>51</sup> Preliminary analysis suggests that it is unlikely that there are significant differences between households with more than one occupant on a per capita basis, but this will be subject to further analysis.

The difference between households with and without children can be attributed to the fact that households with children have, on average, more occupants than households without children. Table 6 illustrates the average amount of food and drink waste collected by local authorities for households containing three or four people, with or without children. For both household sizes, there is no evidence to suggest a significant difference between these two groups in the amount of food and drink waste generated (Too little information was available for other household sizes to make a similar comparison).

**Table 5:** Food and drink waste by presence of children, weight and avoidable cost

	Weight (kg / household / year)				Cost (avoidable; £ / hh / year)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Children	360	63	63	240	£700
No children	240	58	39	140	£410

**Table 6:** Weight of food and drink waste **collected by local authorities** split by presence of children and number of occupants

Household type	Weight (kg / household / year)	
	Three occupants	Four occupants
Multiple occupancy <b>with</b> children	230	260
Multiple occupancy <b>without</b> children	210	260

More analysis on how food and drink waste correlates with other socio-demographic factors will be included in follow-up research reports on this subject from WRAP.

### 3.0 Food group results

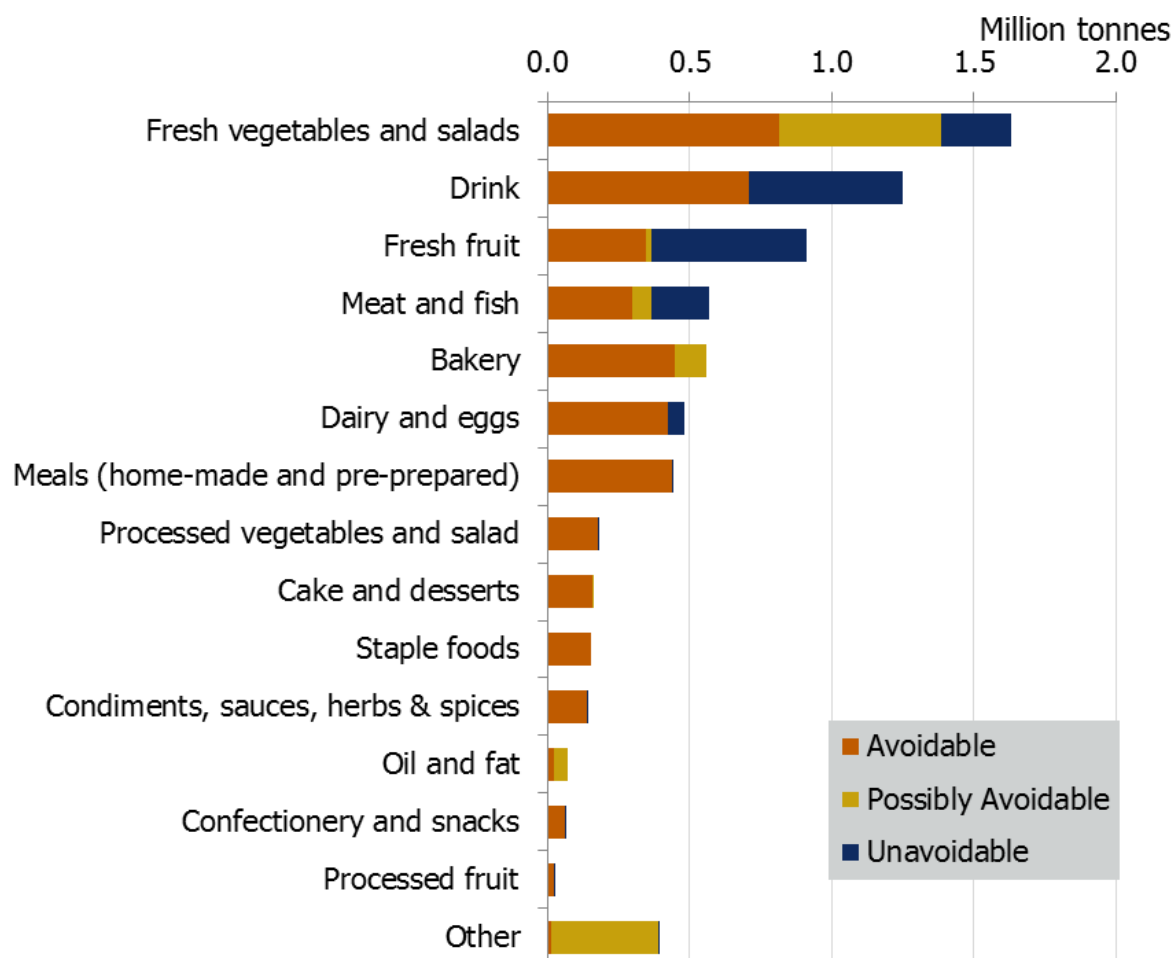
This section presents information about the quantity of household food and drink waste by food group. These food groups are the highest level of categorisation found in WRAP's food waste research; definitions for each category can be found at the beginnings of Chapters 5.0 to 12.0, which also contain more detailed analysis and discussion of the waste within each group.

A few points to note:

- The drinks category includes items used to make beverages that are not edible in themselves – tea bags and coffee grounds – that are nonetheless 'kitchen waste' and classified as unavoidable waste.
- Milk has been grouped with other dairy products (i.e. as a food).
- For food and drink waste going down the sewer, an estimate of water that has been added in the home to make products like tea and gravy has been subtracted from the results (*Methods Annex Report* §3.5).
- Some food items change weight on cooking: for example, dried rice and pasta absorb water and many meats lose fat or juices. In this report, the weights quoted for these items are 'as thrown away', rather than as purchased. In determining the cost and greenhouse gas emissions associated with food and drink waste, the equivalent amount of raw (i.e. purchased) product is estimated. See *Methods Annex Report* Chapters 8 and 9).
- Food and drink is classified by its appearance as it leaves the home. Therefore, some food categories (e.g. cheese, eggs, milk, fruit, vegetable and salad) are likely to be underestimated in the chapters relating to the separate food groups because they can be combined in the preparation of, for example, meals in the home. Instead, the waste associated with these combined foods (e.g. meals, cakes) is reported in the chapter associated with the combined food. Therefore, chopped carrot within a cottage pie would be reported under the meals category (as part of that meal, not separately) rather than being reported under fresh vegetables.

Fresh produce – fruit, vegetables and salad – contributed over a third of the food and drink waste generated in 2012 (2.5 million tonnes; Figure 11). A relatively low proportion of fresh produce waste was avoidable (ca. 45%); however, it still constituted over a quarter of all avoidable food waste. Figures for fruit and vegetables as a combined category can be found in Appendix 3.

**Figure 11:** Weight of food and drink waste by food group, split by avoidability



Waste related to drink accounted for 18% or 1.3 million tonnes in 2012. Of this total, 540,000 tonnes (or 43%) was unavoidable, comprising tea bags and coffee grounds; the rest was avoidable.

Meat and fish contributed 570,000 tonnes of waste, 8% of the total. Around one-third of this total (or 200,000 tonnes) was unavoidable: inedible material such as bones. Around 300,000 tonnes was avoidable. Bakery waste accounted for 560,000 tonnes of waste. Of this, 450,000 tonnes was avoidable, and the remaining 110,000 tonnes largely composed of possibly avoidable bread crusts.

480,000 tonnes of dairy and egg waste was generated in 2012; around 59,000 tonnes (12% of the total) was unavoidable egg shells, and the remainder of the waste classified as avoidable. Home-made and pre-prepared meals (the latter including takeaways and those purchased in grocery stores) – including soups, sandwiches, and stews – comprised 440,000 tonnes of waste, of which the vast majority was avoidable. However, due to the relatively high cost of meals per unit weight, meals contributed a large proportion (17%) of the total cost of avoidable food and drink waste - £2,100 million per year (Table 7).

**Table 7:** The amount of food and drink waste in 2012 by food group, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Fresh vegetables and salads	1,600,000	250,000	570,000	810,000	£1,700
Drink	1,300,000	540,000	<1,000	710,000	£1,300
Fresh fruit	910,000	540,000	20,000	350,000	£900
Meat and fish	570,000	200,000	66,000	300,000	£2,100
Bakery	560,000	<1,000	110,000	450,000	£860
Dairy and eggs	480,000	59,000	<1,000	420,000	£780
Meals (home-made and pre-prepared)	440,000	<1,000	1,000	440,000	£2,100
Processed vegetables and salad	180,000	<1,000	<1,000	180,000	£510
Cake and desserts	160,000	<1,000	<1,000	160,000	£570
Staple foods	150,000	<1,000	<1,000	150,000	£350
Condiments, sauces, herbs & spices	140,000	<1,000	2,000	140,000	£650
Oil and fat	72,000	<1,000	52,000	20,000	£55
Confectionery and snacks	62,000	1,000	<1,000	61,000	£410
Processed fruit	21,000	<1,000	<1,000	21,000	£190
Other	390,000	<1,000	380,000	11,000	£29
<b>Total</b>	<b>7,000,000</b>	<b>1,600,000</b>	<b>1,200,000</b>	<b>4,200,000</b>	<b>£12,500<sup>52</sup></b>

Figure 12 (a) illustrates the split between the food groups of the total food and drink waste (i.e. the sum of avoidable, possibly avoidable and unavoidable). The split for avoidable waste – in part (b) of the figure – was similar to that for all food and drink waste, due to a high proportion of most food groups' waste being avoidable.

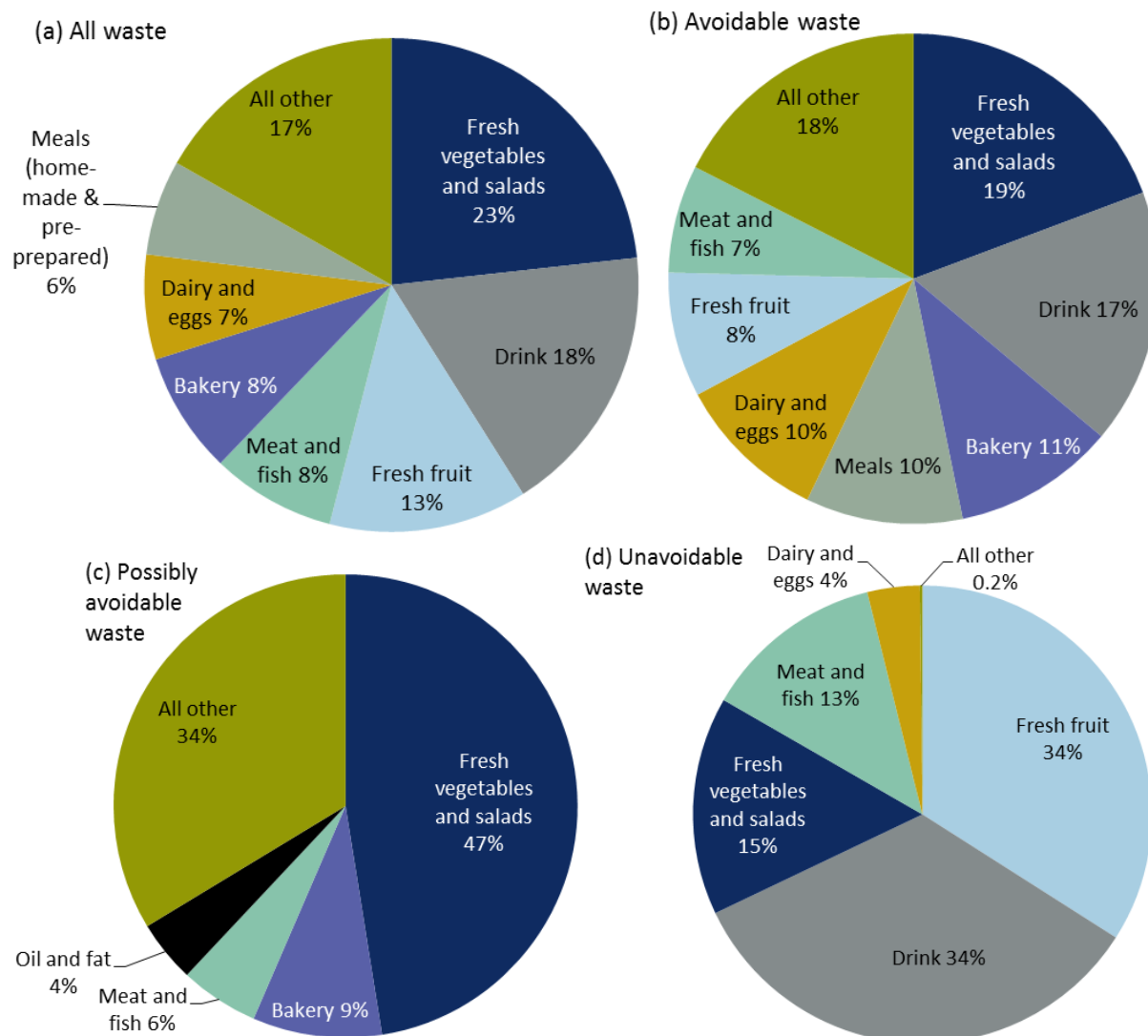
In contrast, the groups of food and drink that made up the possibly avoidable (c) and unavoidable (d) waste were very different from the total. Possibly avoidable food waste was dominated by fresh vegetables and salad, in particular peelings of root vegetables. Other contributions were bakery (bread crusts), and meat and fish (skin and fat). 96% of unavoidable food and drink waste came from four food groups. Fruit (e.g. citrus peel, melon rind, apple cores, banana skins) and drinks (mainly tea bags) both contributed a third of the

<sup>52</sup> This cost is presented to 3 significant figures, different from the convention of 2 significant figures used for the other figures in this report. (To ensure comparability with the Executive Summary and other related materials where this headline estimate is used)



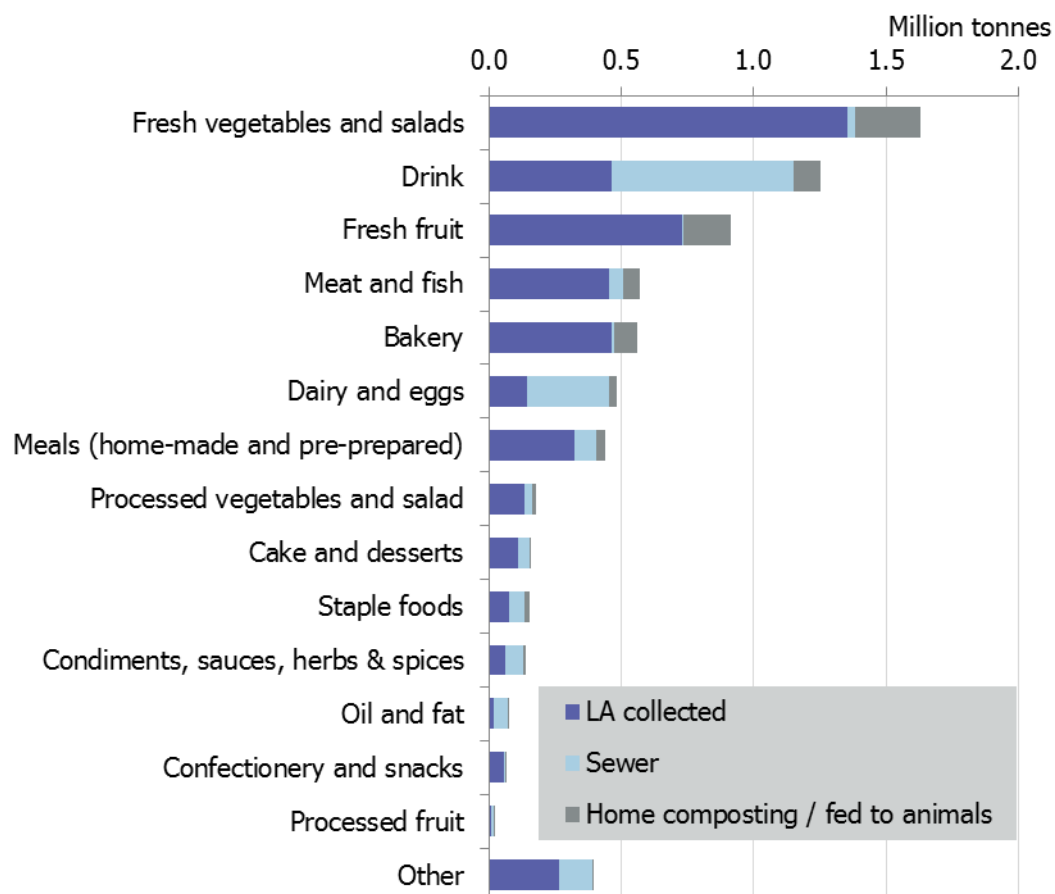
total. Vegetables and salads made up 15%, and meat and fish – mainly bones – contributed 13%.

**Figure 12:** Proportions of **weight** of food and drink waste, split by food group



There was a strong variation in disposal route between the food groups (Figure 13; Table 8). A high proportion of groups containing liquids were disposed of via the sewer: drink, dairy and eggs (mainly milk), and oil and fat. Home composting was made up largely of fruit, vegetables and salads, although the vast majority of waste from these groups was collected by local authorities.

**Figure 13:** Weight of food and drink waste in 2012 by food group, split by disposal route



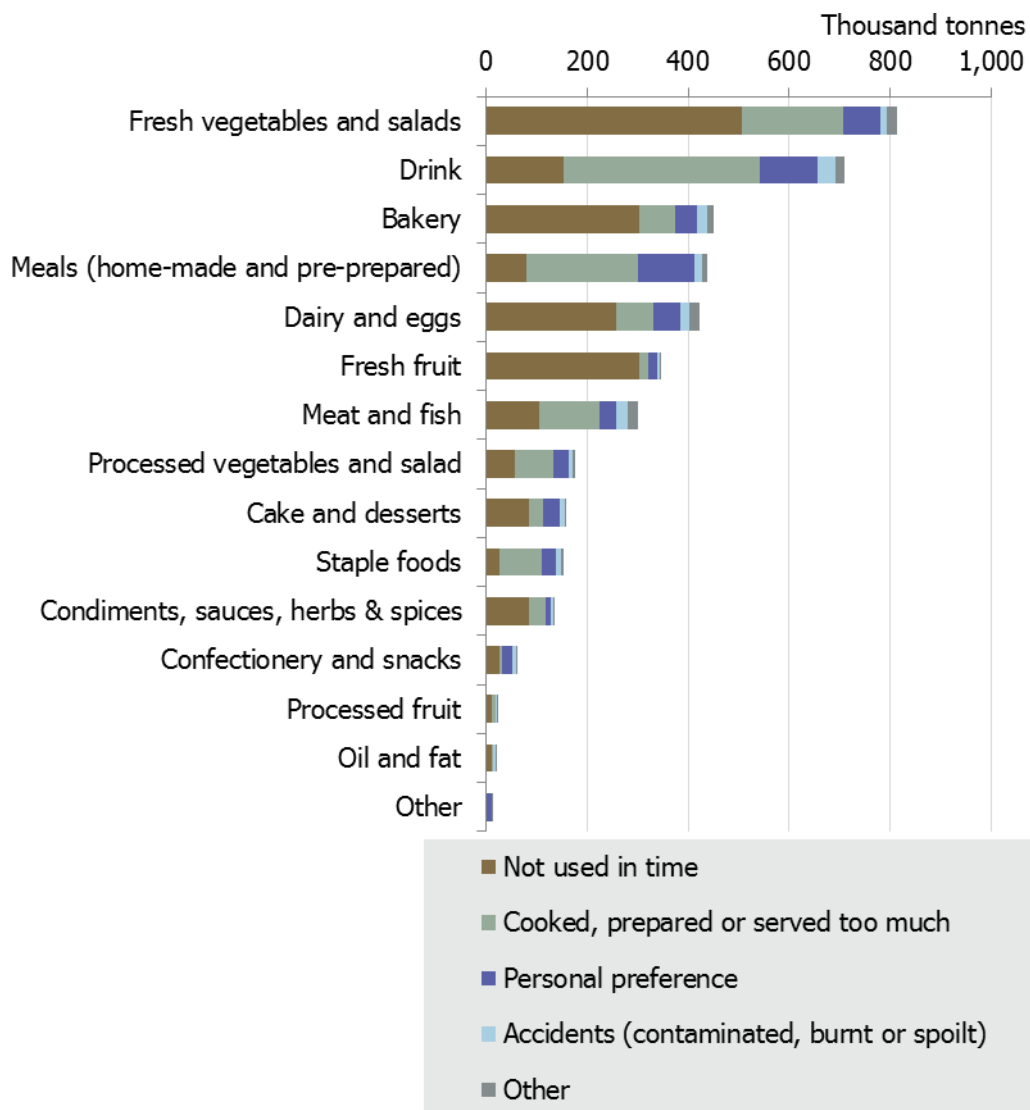
**Table 8:** Amount of food and drink waste in 2012 by food group, split by disposal route

Food Type	Weight generated (tonnes)			
	Total	LA collected	Sewer	Home composting / fed to animals
Fresh vegetables and salads	1,600,000	1,400,000	26,000	250,000
Drink	1,300,000	460,000	690,000	100,000
Fresh fruit	910,000	730,000	6,000	180,000
Meat and fish	570,000	460,000	52,000	63,000
Bakery	560,000	460,000	9,000	86,000
Dairy and eggs	480,000	140,000	310,000	26,000
Meals (home-made and pre-prepared)	440,000	320,000	86,000	31,000
Processed vegetables and salad	180,000	140,000	27,000	15,000
Cake and desserts	160,000	110,000	43,000	5,000
Staple foods	150,000	79,000	57,000	17,000
Condiments, sauces, herbs & spices	140,000	61,000	71,000	7,000
Oil and fat	72,000	17,000	55,000	<1,000
Confectionery and snacks	62,000	60,000	<1,000	2,000
Processed fruit	21,000	9,000	11,000	<1,000
Other	390,000	270,000	120,000	3,000
<b>Total</b>	<b>7,000,000</b>	<b>4,700,000</b>	<b>1,600,000</b>	<b>780,000</b>

Figure 14 presents information on why food was thrown away, using information supplied in the *Kitchen Diary 2012* research for individual instances of waste. This information is only presented for avoidable food and drink waste.

Between major food groups, there was large variation in the proportions relating to each of the reasons for disposal. For food groups that have relatively short shelf-lives (notably, vegetables and salad, fruit, bakery and dairy and eggs), the majority of waste arose because the food was 'not used in time'. In contrast, meals and drink had a large proportion of food that was wasted because too much has been cooked, prepared or served. Avoidable drink waste was made up largely of carbonated drinks and fruit juices; for the majority of these products, the shelf-life is very long prior to opening, and this may explain the relatively low levels of waste arising from 'not used in time'.

**Figure 14:** Weight of avoidable food and drink waste by food group, split by reason for disposal



**Table 9:** Weight of avoidable food and drink waste in 2012 by type, split by reason for disposal (tonnes)

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Fresh vegetables and salads	510,000	200,000	73,000	13,000	20,000
Drink	150,000	390,000	110,000	37,000	17,000
Bakery	300,000	73,000	42,000	21,000	12,000
Meals (home-made and pre-prepared)	80,000	220,000	110,000	14,000	10,000
Dairy and eggs	260,000	73,000	54,000	18,000	20,000
Fresh fruit	300,000	18,000	18,000	4,000	4,000
Meat and fish	110,000	120,000	35,000	21,000	20,000
Processed vegetables and salad	57,000	77,000	31,000	8,000	4,000
Cake and desserts	84,000	28,000	34,000	9,000	2,000
Staple foods	28,000	83,000	28,000	10,000	5,000
Condiments, sauces, herbs & spices	86,000	33,000	9,000	5,000	3,000
Confectionery and snacks	28,000	5,000	19,000	8,000	2,000
Processed fruit	13,000	5,000	2,000	<1,000	<1,000
Oil and fat	12,000	2,000	<1,000	5,000	<1,000
Other	<1,000	1,000	8,000	<1,000	<1,000
<b>Total</b>	<b>2,000,000</b>	<b>1,300,000</b>	<b>580,000</b>	<b>170,000</b>	<b>120,000</b>

Figure 15 gives the cost to householders of purchasing the avoidable food and drink that was wasted. The food groups that contributed most were meat and fish and meals (both home-made and pre-prepared), reflecting the higher prices (per unit weight) for these groups.

**Figure 15:** Proportions of **cost** of avoidable food and drink waste, split by food group

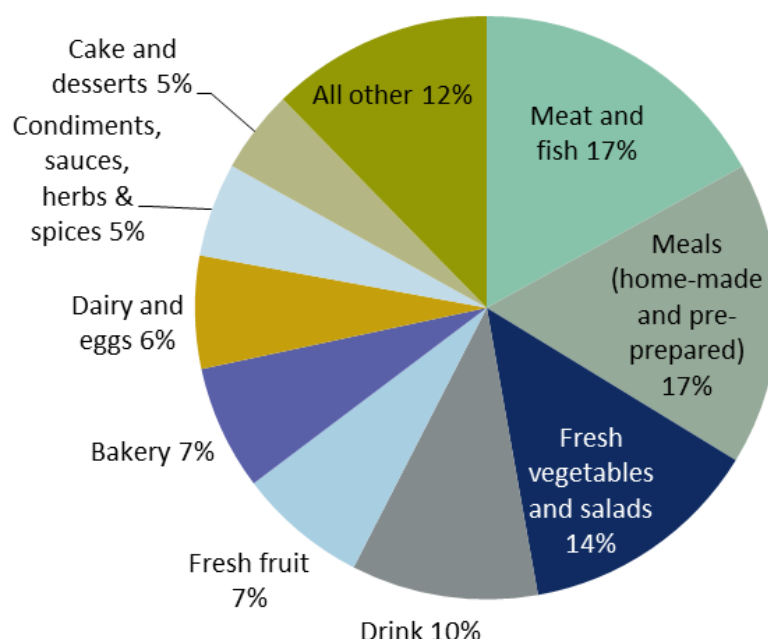


Table 10 shows the costs associated with each reason for disposal, ordered by the total cost of avoidable food and drink waste. Substantial costs were associated with foods not used in time, especially for fresh vegetables and salads (£1.1 billion), meat and fish (£730 million), fresh fruit (£720 million), bakery (£540 million) and dairy and eggs (£530 million). Cooked, prepared or served too much had large costs associated with waste of meals (£1.1 billion), meat and fish (£850 million), and drinks (£670 million).

Cost of waste associated with personal preference (relating to health reasons, allergies and rejection of food) was highest for meals (£560 million) and meat and fish (£260 million). The category relating to the highest costs associated with accidents was meat and fish (£150 million).

**Table 10:** Cost of avoidable food and drink waste in 2012 by type, split by reason for disposal (£ million)

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Meat and fish	£730	£850	£260	£150	£130
Meals (home-made and pre-prepared)	£350	£1,100	£560	£75	£41
Fresh vegetables and salads	£1,100	£380	£130	£24	£36
Drink	£370	£670	£190	£65	£24
Fresh fruit	£720	£110	£43	£9	£11
Bakery	£540	£170	£91	£48	£20
Dairy and eggs	£530	£97	£83	£34	£32
Condiments, sauces, herbs & spices	£370	£210	£44	£12	£16
Cake and desserts	£320	£94	£130	£28	£8
Processed vegetables and salad	£130	£240	£110	£23	£11
Confectionery and snacks	£190	£33	£130	£46	£9
Staple foods	£63	£170	£80	£22	£9
Processed fruit	£140	£12	£30	£2	£0
Oil and fat	£31	£5	£2	£16	£1
Other	£3	£4	£21	£1	£0
<b>Total</b>	<b>£5,600</b>	<b>£4,100</b>	<b>£1,900</b>	<b>£560</b>	<b>£350</b>



## 4.0 Changes in household food and drink waste over time

This chapter compares estimates of household food and drink waste from 2007 and 2012. §4.1 contains an overview of previous research by WRAP quantifying food and drink waste. §4.2 contains comparison of 2007 and 2012 data at the headline level and split by disposal route. Results by avoidability categories are in §4.3 and by food group in §4.4. Care has been taken to make comparisons using consistent methodologies and therefore some of the results from 2007 have been re-stated, although the magnitude of these changes is generally very small.

### 4.1 An overview of past WRAP research

The table below lists various pieces of research by WRAP that quantify household food and drink waste in the UK, alongside an assessment of the comparability with current estimates.

Research	Description
<i>The Food We Waste</i>	This report was published in May 2008 with estimates based on 2007 fieldwork. It covered all disposal routes, but the estimates for sewer waste, home composting and fed to animals were not comparable with current estimates, being based on different methodologies.
Previous <i>Household Food and Drink Waste in the UK</i> report	Published in November 2009, this report restated the information in <i>The Food We Waste</i> (i.e. it presented revised 2007 estimates). It included additional diary-based estimates for waste going down the sewer, home composted and fed to animals <sup>53</sup> . The figures in this report are largely comparable with the current research. For full comparability, minor adjustments have been made to account for seasonality and food waste in fines <sup>54</sup> .
<i>New estimates of household food and drink waste in the UK</i>	This report, published in November 2011, contained estimates for 2010. It was largely based on new data relating to waste collected by local authorities; estimates for all other disposal routes were based on assumptions that linked waste levels to the change in number of households in the UK <sup>55</sup> . As there was no detailed compositional analysis, there were no estimates of the split of different types of food and drink, and the calculation on the avoidable fraction of waste was based on indirect (purchasing) data.
Current research	The current report contains estimates for 2012 for all disposal routes and includes details of types of food and drink. It also contains information relating to 2007, restating estimates originally found in the previous <i>Household Food and Drink Waste in the UK</i> report.

<sup>53</sup> This includes the Down the Drain report: <http://www.wrap.org.uk/content/down-drain>

<sup>54</sup> Fines are small particles of waste, some of which are composed of food or drink. However, fines tend not to be categorised during compositional analysis, so it is difficult to ascertain the proportion of fines that are food waste.

<sup>55</sup> This assumption was used as no information on these disposal routes was available at the time. This produced a conservative estimate of the decrease in food and drink waste between 2007 and 2010.

This means that, with suitable adjustments, comparisons between 2007 and 2012 estimates can be made<sup>56</sup>. In addition, comparison of the local authority collected waste over interim years is also possible; these are presented in *Synthesis of Food Waste Compositional Data 2012*.

For the tables in this section, unrounded figures have been used. This allows the changes in waste, which are smaller than the totals, to be described more precisely and the calculations of percentage change to be clearer. However, given the uncertainties in the results, it is recommended that these changes are quoted to two significant figures, as they are in the text.

In this chapter, statistical significance is assessed at the 5% significance level, i.e. where significant, there is a low probability (below 1 in 20) that the observed change could have arisen due to chance if there was truly no change between 2007 and 2012. The calculations relating to uncertainties take into account sampling errors, but do not include systematic uncertainties, which are more difficult to quantify. For a full discussion of uncertainties associated with these estimates, please refer to Chapter 13 in the *Methods Annex Report*.

## 4.2 Change in food and drink waste by disposal route, 2007 to 2012

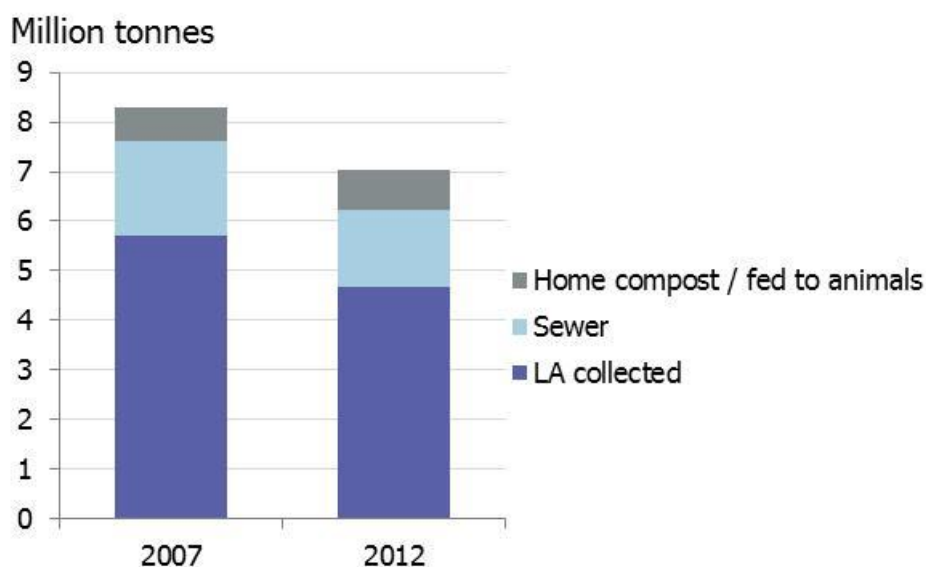
The total amount of household food and drink waste in the UK was around 1.3 million tonnes lower in 2012 (7.0 million tonnes) compared to 2007 (8.3 million tonnes); this reduction of 15% is statistically significant. Most of this reduction is associated with waste collected by local authorities, which saw a significant reduction of 18% from 5.7 million tonnes in 2007 to 4.7 million tonnes in 2012 (Table 11 and Figure 16).

**Table 11:** Estimate of household food and drink waste by disposal route, unrounded figures in tonnes

Disposal route	2007 (restated)	2012	Change		Statistically significant?
			Weight	%	
LA collected	5,698,614	4,672,835	-1,025,780	-18.0%	Yes
Sewer	1,904,332	1,561,543	-342,790	-18.0%	No
Home composting and fed to animals	692,726	784,295	91,570	13.2%	No
<b>Total</b>	<b>8,295,672</b>	<b>7,018,673</b>	<b>-1,277,000</b>	<b>-15.4%</b>	<b>Yes</b>

<sup>56</sup> The results from 2010 are not directly comparable with 2007 and 2012 due to a lack of primary data relating to home composting, fed to animals and sewer waste. Furthermore, only tentative estimates are possible for the avoidable fraction of total waste. The estimate for 2010 published in 'New estimates of household food and drink waste in the UK' was 7.2 million tonnes of waste. Using a methodology as close to that in the current research as possible and making the assumption that changes to home composting and fed to animals have been linear between 2007 and 2012 gives a restated figure of 7.1 million tonnes for 2010.

**Figure 16:** Comparison of weight of household food and drink waste arisings in the UK between 2007 and 2012, split by disposal route



The data for sewer waste in 2012 has been modelled, rather than based on data from primary research. The calculation assumes that the percentage change in sewer waste was the same as for local authority collected waste (i.e. -18.0%). This assumes that behaviours relating to waste generation have changed at a similar rate between 2007 and 2012 for food and drinks commonly thrown away down the sink compared to those collected by local authorities. Further discussion and rationale for this assumption is presented in §2.3 of the *Methods Annex Report*. Given this, there is considerable uncertainty in the 2012 result for sewer waste. For the 2007 estimate, the 95% confidence interval is  $\pm 220,000$  tonnes (or around  $\pm 12\%$  of the estimate). Given the uncertainty around both estimates, although the best estimate provided in Table 11 is a decrease in sewer waste, other trajectories for this disposal route cannot be ruled out.

For food and drink waste that is home composted or fed to animals, the 95% confidence interval around the 2007 estimate is around  $\pm 140,000$  tonnes (or  $\pm 20\%$  of the estimate). For 2012, the confidence interval is around  $\pm 88,000$  tonnes (or  $\pm 12\%$  of the estimate)<sup>57</sup>. This means that the increase of 92,000 tonnes is not statistically significant: i.e. the increase indicated for this disposal route in Table 11 could be due to random sampling error, rather than a real effect. The 95% confidence interval around the change in unavoidable food waste is bounded by a 70,000 tonne reduction and a 250,000 tonne increase.

Another way of stating the changes above is the average amount of waste per household. Table 12 shows that during 2012 an average of 260 kg of food and drink waste were generated per household, of which 170 kg were collected by local authorities, 58 kg were disposed of down the sewer, and 29 kg were either home composted or fed to animals.

<sup>57</sup> The confidence interval in 2012 is much smaller due to a larger sample size in the kitchen diary research (948 households) compared to 2007 (286 households).

**Table 12:** Estimate of household food and drink waste by disposal route, kilograms per household

Disposal route	2007 (restated)	2012	Change	
			Weight	%
LA collected	221.7	174.7	-47.0	-21.2%
Sewer	74.1	58.4	-15.7	-21.2%
Home composting and fed to animals	26.9	29.3	2.4	8.8%
<b>Total</b>	<b>322.7</b>	<b>262.3</b>	<b>-60.3</b>	<b>-18.7%</b>

The number of households in the UK increased by approximately 4% between 2007 and 2012, which means that the percentage decrease in all household food and drink waste is more pronounced when stated per household (-19%) compared to the total amount in the country (-15%).

#### 4.3 Changes in food and drink waste by avoidability, 2007 to 2012

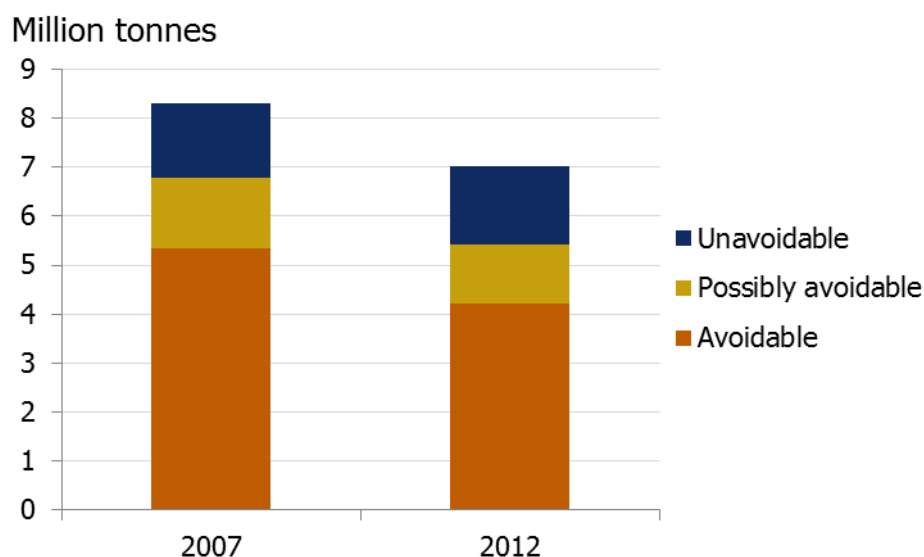
A large contribution to the reduction in food and drink waste between 2007 and 2012 was from avoidable waste (Table 13). Of the total reduction of 1.3 million tonnes, 1.1 million was associated with avoidable food and drink waste. This represents a 21% reduction from 5.3 million tonnes to 4.2 million tonnes, which is statistically significant.

**Table 13:** Estimate of household food and drink waste by avoidability, unrounded figures in tonnes

Fraction	2007 (restated)	2012	Change		Statistically significant
			Weight	%	
Avoidable	5,341,610	4,219,155	-1,122,455	-21.0%	Yes
Possibly avoidable	1,433,284	1,202,720	-230,564	-16.1%	Yes
Unavoidable	1,520,778	1,596,797	76,019	5.0%	No
<b>Total</b>	<b>8,295,672</b>	<b>7,018,673</b>	<b>-1,277,000</b>	<b>-15.4%</b>	<b>Yes</b>

Possibly avoidable waste reduced by 230,000 tonnes (or 16%), also a statistically significant change. The majority of this change is associated with fresh vegetables and salad. In contrast, unavoidable food waste increased by 76,000 tonnes or 5% (although this increase is not statistically significant); therefore, the changes seen for unavoidable waste may simply be the result of random sampling error.

**Figure 17:** Comparison of weight of household food and drink waste arisings in the UK between 2007 and 2012, split by avoidability



These results confirm that the amount of avoidable and possibly avoidable waste generated can change over time. Between 2007 and 2012, there has been considerable activity by WRAP and partners aimed at reducing household food waste, a prolonged recession and large rises in the price of food. The data presented above shows the combined effect of these influences on food waste; however, disaggregation of the impacts of these influences is beyond the scope of this research<sup>58</sup>.

It is interesting to contrast the decreases in avoidable and possibly avoidable waste with absence of any evidence of a reduction in unavoidable food and drink waste. This suggests that, given the nature of food and drink brought into the home, the generation of unavoidable waste is a natural consequence of provisioning a household. For instance, if eggs are purchased, then there will be some egg shells to be disposed of. With a 4% increase of the number of households over this time period, all other things being equal, we would expect a similar increase in unavoidable food and drink waste, which is consistent with the results.

Again, these figures can be stated as the average amount of waste per household in a year. The average amount of avoidable food and drink waste generated in 2012 was 160 kg per household. A further 45 kg was possibly avoidable waste and 60 kg was unavoidable. As in §4.2, the percentage reductions are higher when stated in this way (e.g. –24% for avoidable) compared to the total amount waste in the UK (–21% for avoidable).

<sup>58</sup> New research by WRAP investigating the factors that have influenced household food waste will be published winter '13 (CFP101-008).

**Table 14:** Estimate of household food and drink waste by avoidability, kilograms per household

Fraction	2007 (restated)	2012	Change	
			Weight	%
Avoidable	207.8	157.7	-50.1	-24.1%
Possibly avoidable	55.8	45.0	-10.8	-19.4%
Unavoidable	59.2	59.7	0.5	0.9%
<b>Total</b>	<b>322.7</b>	<b>262.3</b>	<b>-60.3</b>	<b>-18.7%</b>

#### 4.4 Changes in food and drink waste by category, 2007 to 2012

This section explores which types of food and drink have contributed to changes between 2007 and 2012. The results for the total amount of household food and drink waste are presented first, followed by the change in avoidable food and drink waste.

**Figure 18:** Comparison of total household food and drink waste between 2007 and 2012 split by food group

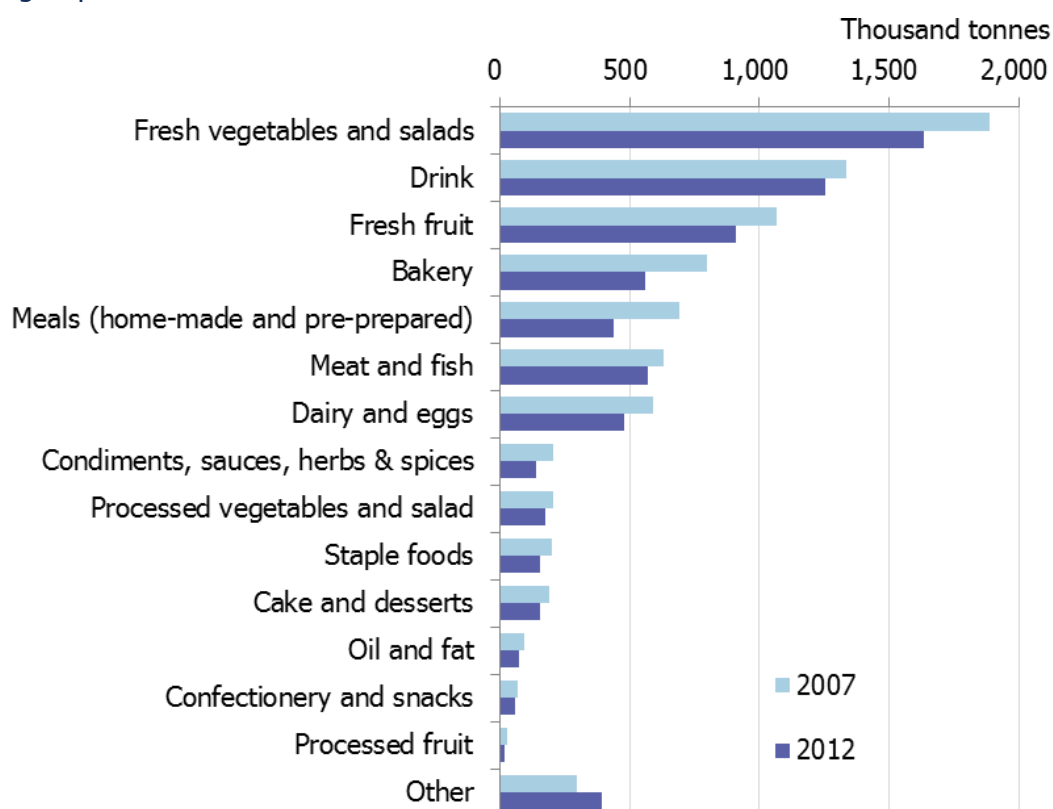
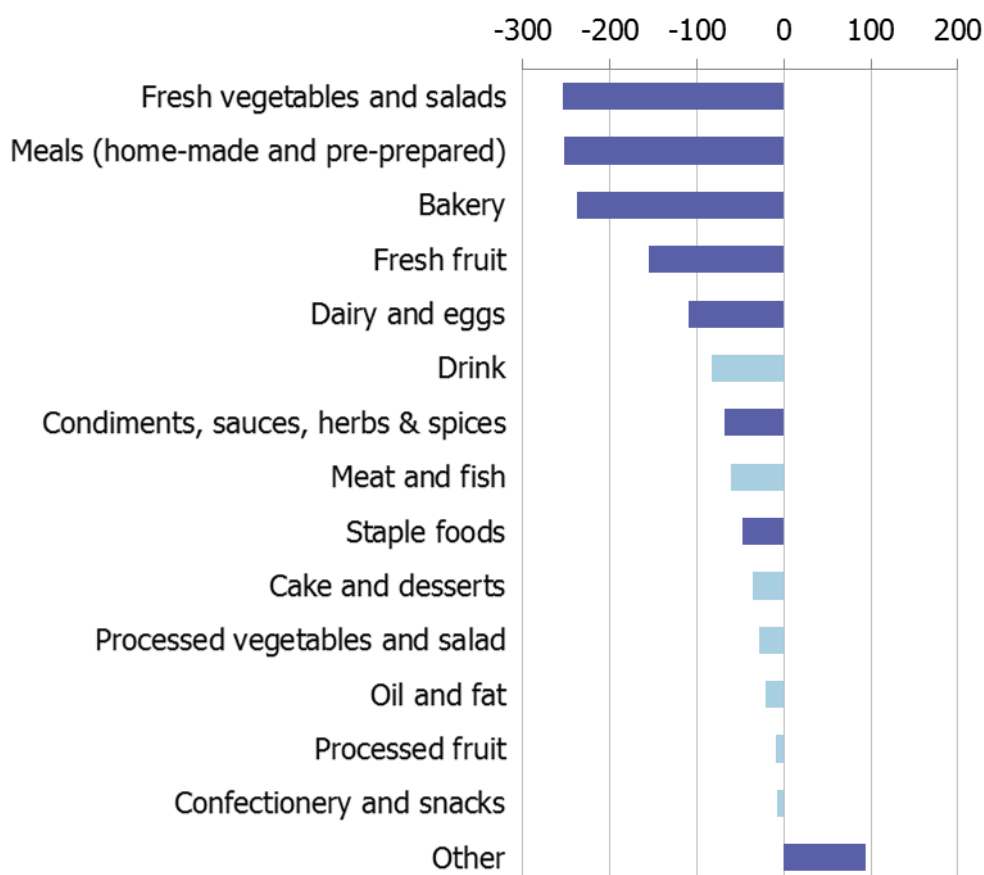


Figure 18, Figure 19 and Table 15 illustrate the absolute reduction in waste for different food groups: around 900,000 tonnes (or 70% of the 1.3 million tonne reduction) can be attributed to four categories: fresh vegetables and salads, meals (both home-made and pre-prepared), bakery and fresh fruit.

**Figure 19:** Changes in weight of household food and drink waste arisings in the UK between 2007 and 2012, split by food group (thousand tonnes)



*Note: Dark blue bars indicate statistically significant changes; light blue bars are not significant.*

For bakery, the reduction was largely associated with bread, and for meals it was associated with 'composite meals', which includes home-made and pre-prepared meals. It is difficult to say much about other food types that have been contributing to the reduction in waste as confidence intervals are generally broader for food types associated with less waste.

One category experiencing an increase in the amount of waste was 'other'. This consisted of food and drink that does not fit in other categories or that was difficult to classify or separate. This latter category includes a reasonable amount of semi-solid mixed food that was categorised as possibly avoidable as it was not possible to further identify this food waste<sup>59</sup>.

There may have been some changes in classification of food and drink between the waste compositional analyses in 2007 and 2012. In particular, more material from meals that is semi-solid may have been classified under 'other' in 2012 compared to 2007. This provides a plausible explanation for the increase in the latter category; similarly, it could explain a small proportion of the decrease in meals. If a change in classification had occurred and it was possible to adjust the figures to be consistent with 2007, the reduction in waste associated with meals would still be large and significant.

<sup>59</sup> This material was 'unpickable' during the compositional analysis and includes decomposing food and semi-solid waste from meals; see section 12.6.

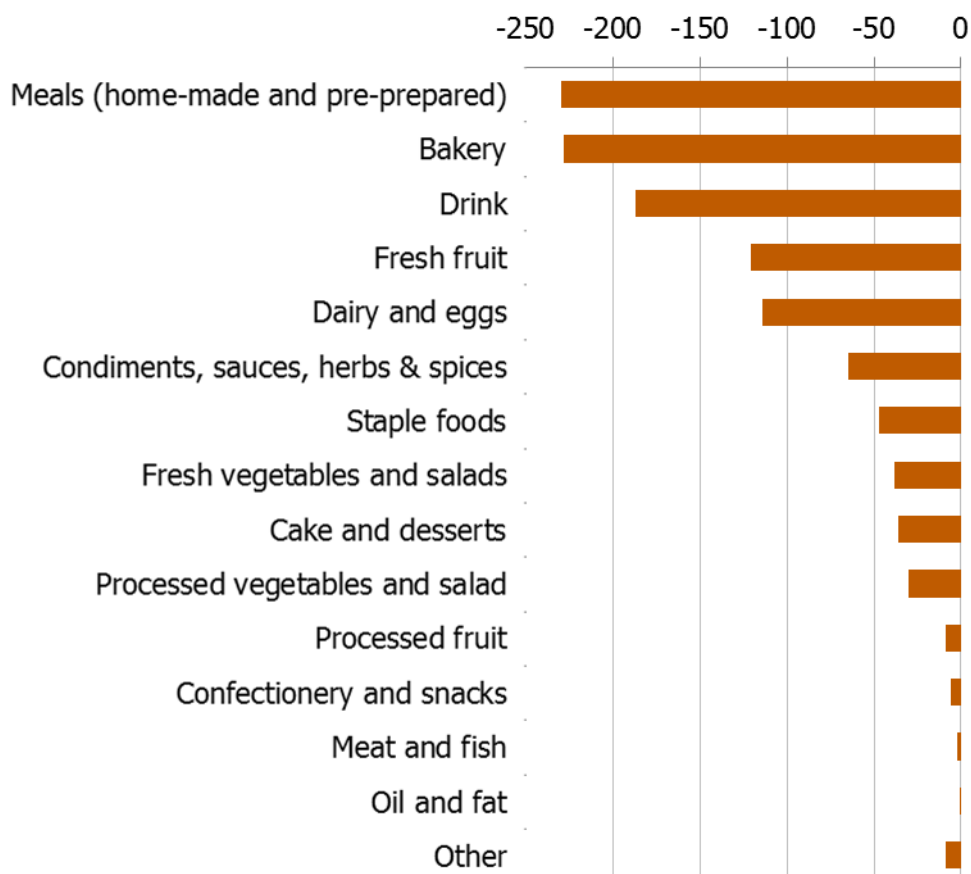
**Table 15:** Estimate of household food and drink waste by food group, unrounded figures in tonnes

Food group	2007 (restated)	2012	Change		Statistically significant
			Weight	%	
Fresh vegetables and salads	1,884,300	1,630,866	-253,434	-13%	Yes
Drink	1,333,878	1,250,578	-83,301	-6%	No
Fresh fruit	1,066,007	910,921	-155,086	-15%	Yes
Bakery	796,225	558,722	-237,503	-30%	Yes
Meals (home-made and pre-prepared)	691,184	438,207	-252,977	-37%	Yes
Meat and fish	632,503	571,083	-61,420	-10%	No
Dairy and eggs	590,879	481,739	-109,140	-18%	Yes
Condiments, sauces, herbs & spices	207,551	138,843	-68,709	-33%	Yes
Processed vegetables and salad	206,928	178,155	-28,773	-14%	No
Staple foods	200,884	153,805	-47,080	-23%	Yes
Cake and desserts	193,628	157,746	-35,882	-19%	No
Oil and fat	92,721	72,376	-20,345	-22%	No
Confectionery and snacks	70,368	62,185	-8,183	-12%	No
Processed fruit	29,799	21,034	-8,765	-29%	No
Other	298,818	392,414	93,596	31%	Yes
<b>Total</b>	<b>8,295,672</b>	<b>7,018,673</b>	<b>-1,277,000</b>	<b>-15%</b>	<b>Yes</b>

The changes in **avoidable** food and drink waste were concentrated in five categories, each with reductions of more than 100,000 tonnes between 2007 and 2012: meals, bakery, drink fresh fruit and dairy and eggs (Table 16 and Figure 20).



**Figure 20:** Changes in weight of **avoidable** food and drink waste arisings in the UK between 2007 and 2012, split by food group (thousand tonnes)



**Table 16:** Estimate of **avoidable** food and drink waste by food group, unrounded figures in tonnes

Food group	2007 (restated)	2012	Change	
			Weight	%
Drink	896,730	709,667	-187,063	-21%
Fresh vegetables and salads	851,660	813,603	-38,057	-4%
Bakery	679,052	450,355	-228,697	-34%
Meals (home-made and pre-prepared)	667,061	437,119	-229,942	-34%
Dairy and eggs	536,811	422,972	-113,839	-21%
Fresh fruit	468,553	347,810	-120,743	-26%
Meat and fish	302,361	300,490	-1,871	-1%
Processed vegetables and salad	206,918	176,574	-30,344	-15%
Condiments, sauces, herbs & spices	201,231	136,212	-65,019	-32%
Staple foods	200,884	153,805	-47,080	-23%
Cake and desserts	193,628	157,719	-35,909	-19%
Confectionery and snacks	66,748	60,923	-5,825	-9%
Processed fruit	29,799	20,838	-8,961	-30%
Oil and fat	20,589	20,312	-277	-1%
Other	19,587	10,757	-8,830	-45%
<b>Total</b>	<b>5,341,610</b>	<b>4,219,155</b>	<b>-1,122,455</b>	<b>-21%</b>

Significance of changes was not assessed for avoidable food waste by food and drink group.

#### 4.5 Summary

This section has presented data showing that the amount of household food and drink waste in the UK reduced by an estimated 1.3 million tonnes (15%) between 2007 and 2012. Most of the reduction is associated with avoidable waste, which reduced by 1.1 million tonnes (21%). A large part of the avoidable waste reduction is associated with drinks, meals, bakery, dairy and fresh fruit.

If assessed on the average amount of waste per household, the reduction in food and drink waste was 19%. This is a greater decrease than the 15% presented above due to an increase in the number of households in the UK during this time period. For avoidable food and drink waste, the reduction in food and drink waste per household was 24%.

## 5.0 Results for vegetables and salad

### 5.1 Categorisation of vegetables and salad

Vegetables and salad is split into 'fresh' and 'processed' to differentiate between those purchased in a fresh / uncut state, and those purchased preserved or pre-prepared. These foods are often prepared in the home to form part of a meal (for instance as a vegetable portion in a typical 'meat-and-two-veg' meal, or a vegetable curry). When disposed of as a separate item – including the peelings and other discarded parts from the preparation of the meal – the waste is classified as 'fresh' vegetables and salad, whereas where it is combined with other ingredients it is classified as a meal (Chapter 11.0).

The vegetables and salads in the fresh group includes those which have been prepared at home, for example potatoes that have been baked, boiled or mashed, as it is assumed that the potatoes had been purchased raw (or home grown).

Processed vegetables and salad includes items that were purchased tinned, frozen, pickled or otherwise processed. Notably, the group contains some food types not found in fresh form, which are baked beans, coleslaw, hummus, mixed non-leafy salad, vegetable-based sandwich spread, and meat substitute products such as Quorn and soya mince.

In general, vegetables and salad are assumed to be 'fresh' unless they can be identified as 'processed', for example peas are only recorded as 'processed' when the tin or other packaging is identified with the food waste. Cucumber portions, washed salad and trimmed green beans are considered 'fresh'. All leafy salads are classified as fresh, and include all mixed salads with a significant proportion of salad leaves that may have been pre-washed and chopped.

Exceptions to this rule include chips: if they could be positively identified as home-made, they are classified as 'fresh', otherwise they are assumed to be pre-prepared and therefore classified as 'processed'. Similarly, non-leafy salads (e.g. potato salad, bean salad) are categorised as processed vegetables and salads, as it was not always possible to make the distinction between those bought pre-prepared and those made in the home.

The vegetables and salad group contains foods which are technically fruits, such as tomatoes and peppers. They are found in this section as they are most frequently eaten as, or alongside, savoury foods, and rarely eaten as fruit. If a food can be eaten both as a fruit and a vegetable, for example avocado, then it can be found in the chapter on fruit (Chapter 7.0).

For some types of vegetables, there are strong seasonal patterns in purchasing and waste. The results have been adjusted for this effect to provide data representative of the whole year. (Chapter 11 in the *Methods Annex Report* has more details.)

Table 17 shows the types of vegetables and salad and the assumption regarding what is fresh or processed, these are consistent with the assumptions used in the previous *Household Food and Drink Waste in the UK* report other than for coleslaw and hummus that were previously reported in the same category, but are reported separately in this report.

**Table 17:** Types of vegetables and salads waste

Food Type	Fresh: what it includes	Processed: what it includes	What it doesn't include
Aubergine	Aubergine, peel, stem	Not found	
Baked beans	n/a	Baked beans	
Bean (all varieties)	Bean sprouts, dwarf, fine, French, green, runner	Butter beans, chickpea, green, haricot, kidney beans, runner; canned, frozen	Drainings from the tin
Broccoli	Broccoli, stem	Frozen	
Cabbage	Cabbage, outer leaves, stem	Pickled	
Carrot	Carrot, peel, tops	Frozen, pre-prepared, tinned	Drainings from the tin
Cauliflower	Cauliflower, outer leaves, stem,	Pickled	
Celery	Celery base, heart, leaves, stalks	Pre-prepared	
Coleslaw*	n/a	Coleslaw	
Courgette	Courgette, ends, peel	Not found	
Cucumber	Cucumber, ends, peel	Not found	
Hummus*	n/a	hummus	
Leafy salad	Mixed leafy salads, rocket, watercress/ cress	Not found	Lettuce as a single item
Leek	Leek, base, outer leaves, trimmings	Not found	
Lettuce	Lettuce, base, outer leaves	Not found	
Mixed vegetables	Mixed vegetables and peels, stir fry	Frozen, pre-prepared, mixed stir fry vegetables	
Mushroom	Mushrooms, skins, stalks	Not found	
Non-leafy salad	Beetroot salad, mixed non leaf salad,	Mixed prepared salads, potato salad; takeaway,	
Onion	Onions, shallots, ends, skins	Pickled, rings, dried	
Pea (all varieties)	Garden, mange tout, sugar snap	Frozen, mushy, tinned	

Food Type	Fresh: what it includes	Processed: what it includes	What it doesn't include
Pepper	Peppers, core, seeds, tops	In jar, takeaway	Chilli peppers
Potato	Potatoes, peel; baked, boiled, chips (if specified home-made), mashed, roast, uncooked	Chips, hash browns, potato waffles; packaged, pre-prepared	
Spinach	Spinach (including pre-washed/ bagged), stems	Frozen, tinned	
Vegetable based sandwich spread	n/a	Any vegetable based sandwich spread or pate	
Spring onion	Spring onion, outer leaves, stem	Not found	
Sprout	Sprout, outer leaves, stem	Frozen	
Sweetcorn / corn on the cob	Baby corn, corn on the cob, core, leaves,	Sweetcorn; canned, frozen	Drainings from the tin
Tomato	Tomatoes, skins, stalks	Passata, puree, sundried, tinned	Drainings from the tin
Other vegetables and salad	Greens, rhubarb, seeds, squash	Frozen greens, gherkins, lentils, Quorn, textured vegetable protein, soya, water chestnuts	Drainings from the tin
Other root vegetables	Beetroot, celeriac, parsnip, radish, swede, sweet potato, turnip	Pickled beetroot	

*\*Coleslaw and hummus were reported in the same category in the previous report but are reported separately in this report.*

*Shaded cells indicate categories with poor precision around the estimate (see §1.6). These categories have been reported as part of either 'all other fresh vegetables and salad' or 'all other processed vegetables and salad'.*

## 5.2 Fresh vegetables and salad

### 5.2.1 Breakdown of fresh vegetables and salad by avoidability

Each item of food waste is considered in terms of avoidability as described in §1.3.1. For fresh vegetables and salad the avoidable waste is that which the vast majority of people would consider edible. Possibly avoidable food includes vegetable skins that some people may choose to eat but others do not, for example potato and cucumber skin. Unavoidable waste is that which the vast majority of people would consider inedible, for example onion skin, hard vegetable peel (e.g. swede) and sweetcorn cobs.

**Figure 21:** Weight of fresh vegetable and salad waste by type, split by avoidability

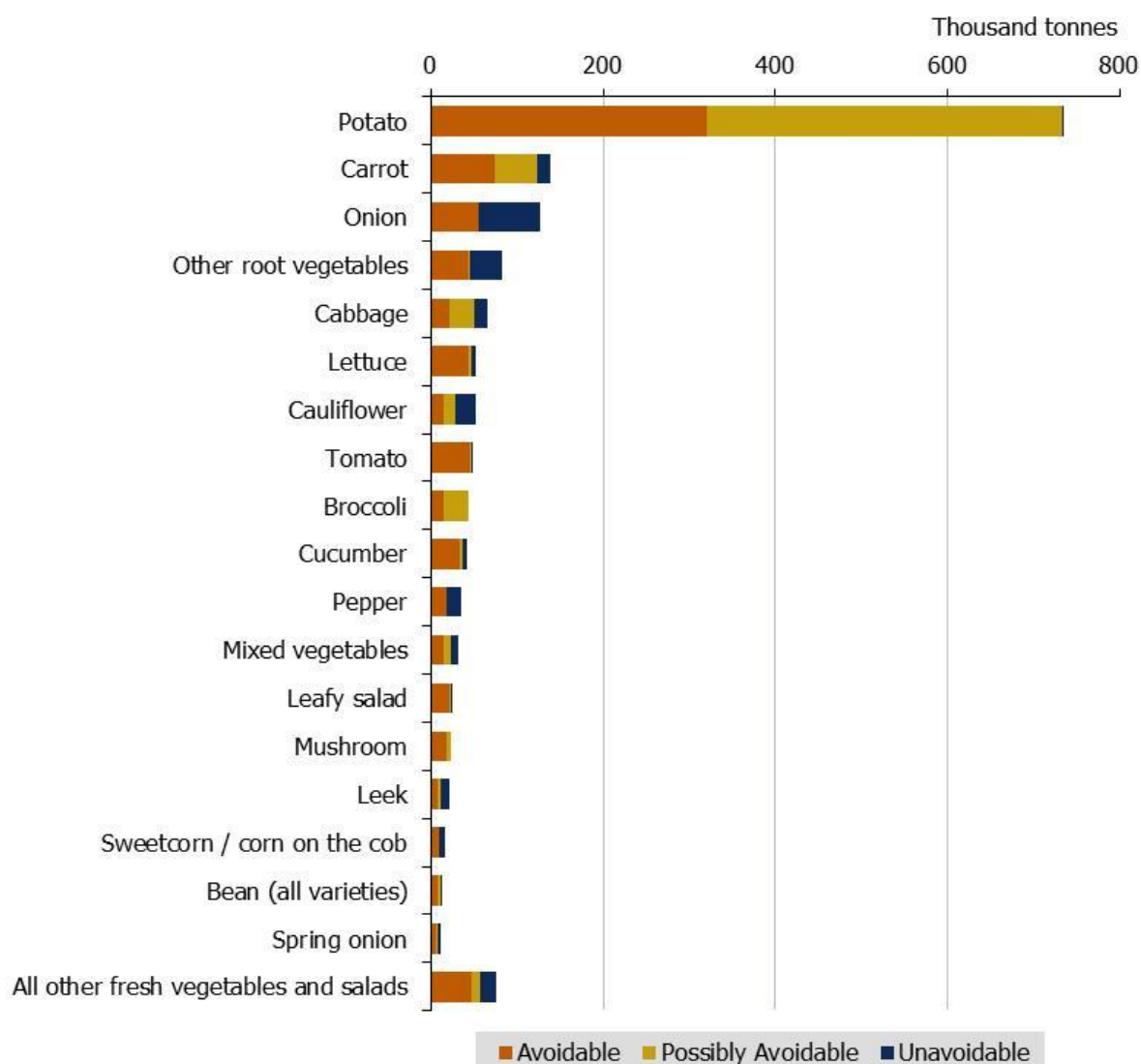


Figure 19 and Table 18 show the weight of fresh vegetable and salad waste by food type and avoidability. The total amount of fresh vegetable and salad waste in 2012 was in the region of 1.6 million tonnes, of this approximately half (810,000 tonnes) was avoidable, waste that would be considered edible. A further 570,000 tonnes was possibly avoidable waste, which was largely made up of potato peelings. The purchase cost for the avoidable waste in 2012 was approximately £1.7 billion.

By far the greatest proportion of fresh vegetable waste was from potatoes, with 730,000 tonnes waste, of which 320,000 tonnes was avoidable. Carrots and onions had the next greatest weight of waste at 140,000 tonnes and 130,000 tonnes respectively. These two food types included a large proportion of possibly avoidable and unavoidable waste.

However, when considering cost, the value of avoidable lettuce was the greatest at approximately £270 million; also avoidable leafy salad wasted had a cost of £150 million. While the tonnages of avoidable lettuce and leafy salad were not as large as other food types (44,000 tonnes and 21,000 tonnes respectively) the purchase cost per kilogramme were high.

**Table 18:** The amount of fresh vegetables and salad waste in 2012 by type, split by avoidability

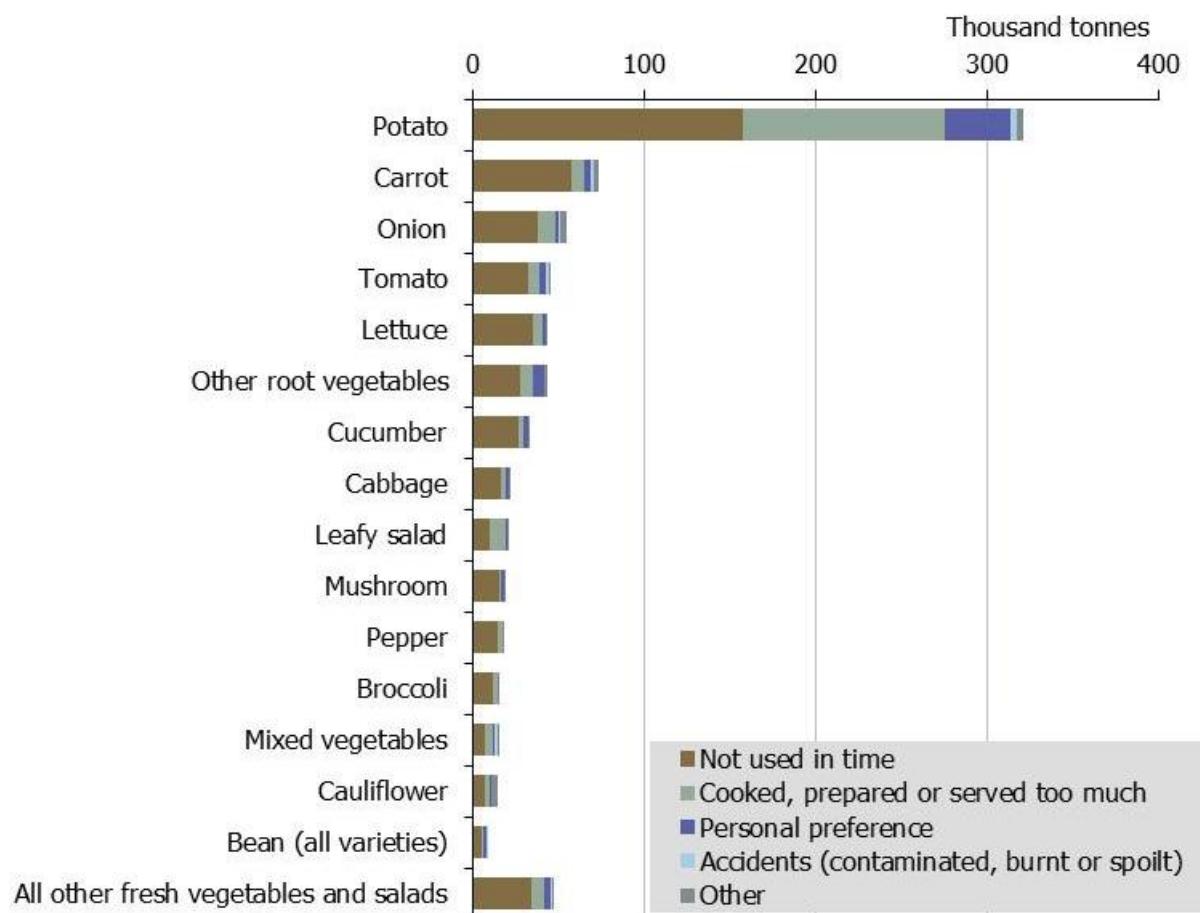
Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Potato	730,000	<1,000	410,000	320,000	£230
Carrot	140,000	15,000	50,000	73,000	£68
Onion	130,000	71,000	<1,000	55,000	£78
Other root vegetables	82,000	37,000	1,000	43,000	£65
Cabbage	65,000	15,000	29,000	22,000	£30
Lettuce	52,000	5,000	3,000	44,000	£270
Cauliflower	51,000	23,000	14,000	14,000	£26
Tomato	49,000	3,000	<1,000	45,000	£130
Broccoli	42,000	<1,000	28,000	15,000	£80
Cucumber	42,000	5,000	4,000	33,000	£56
Pepper	36,000	18,000	<1,000	18,000	£62
Mixed vegetables	32,000	10,000	8,000	15,000	£45
Leafy salad	23,000	1,000	2,000	21,000	£150
Mushroom	23,000	<1,000	4,000	18,000	£61
Leek	21,000	11,000	3,000	8,000	£28
Sweetcorn / corn on the cob	16,000	7,000	<1,000	9,000	£77
Bean (all varieties)	13,000	2,000	3,000	8,000	£24
Spring onion	11,000	4,000	2,000	6,000	£26
All other fresh vegetables and salads	75,000	18,000	10,000	47,000	£170
<b>Total fresh vegetables and salads</b>	<b>1,600,000</b>	<b>250,000</b>	<b>570,000</b>	<b>810,000</b>	<b>£1,700</b>

### 5.2.2 Breakdown of avoidable fresh vegetables and salad waste by the reason for disposal

Figure 22 and Table 19 show the weight of avoidable fresh vegetable and salad waste by the reason given for its disposal (as reported in the kitchen-diary). Table 20 shows the cost of the avoidable waste by these reasons for disposal.

The reason given for the greatest amount of avoidable food waste was 'not used in time' which accounts for 510,000 tonnes, approximately two-thirds of the total. This includes fresh produce that has gone rotten, mouldy or otherwise inedible, or has been discarded because it has passed a 'best-before' or 'use-by' date. For perishable salad items such as tomato, lettuce and cucumber, a greater proportion of the waste was linked to not being used in time compared to less perishable vegetables.

**Figure 22:** Weight of avoidable fresh vegetable and salad waste by type, split by reason for disposal



*Results for leek, spring onion and sweetcorn / corn on the cob omitted as too few instances of avoidable waste in the diary research to be able to quantify reasons for disposal accurately.*

For potatoes, approximately half the waste was associated with not being used in time and over a third due to cooking, preparing or serving too much. This is in contrast to other staples such as rice and pasta (§12.2) where approximately one-fifth was wasted because it was not used in time and approximately half because of cooking, preparing or serving too much. It is also worth noting that a relatively higher proportion (as well as sheer volume) of potato waste was thrown away due to cooking / serving too much compared to almost all the other fresh vegetables.



**Table 19:** Weight of avoidable fresh vegetable and salad waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Potato	160,000	120,000	38,000	4,000	3,000
Carrot	58,000	7,000	4,000	1,000	3,000
Onion	38,000	11,000	2,000	1,000	4,000
Tomato	32,000	6,000	4,000	2,000	1,000
Lettuce	35,000	6,000	2,000	<1,000	<1,000
Other root vegetables	27,000	8,000	6,000	<1,000	2,000
Cucumber	27,000	3,000	2,000	<1,000	<1,000
Cabbage	17,000	2,000	2,000	<1,000	<1,000
Leafy salad	10,000	9,000	1,000	<1,000	<1,000
Mushroom	15,000	1,000	2,000	<1,000	<1,000
Pepper	15,000	3,000	<1,000	<1,000	<1,000
Broccoli	11,000	3,000	<1,000	<1,000	<1,000
Mixed vegetables	7,000	5,000	<1,000	2,000	<1,000
Cauliflower	7,000	3,000	<1,000	<1,000	3,000
Sweetcorn / corn on the cob	Results omitted as too little information to quantify				
Bean (all varieties)	Results omitted as too little information to quantify				
Leek	3,000	4,000	<1,000	<1,000	<1,000
Spring onion	Results omitted as too little information to quantify				
All other fresh vegetables and salads	34,000	7,000	4,000	<1,000	1,000
<b>Total fresh vegetables and salads</b>	<b>510,000</b>	<b>200,000</b>	<b>73,000</b>	<b>13,000</b>	<b>20,000</b>

Table 20 shows the cost of waste by reason for disposal. The order of food types remains the same as the other tables and figures; it is not ranked according to the total cost of avoidable waste. Avoidable fresh vegetable and salad wasted because it was not used in time cost £1,110 million, approximately two-thirds of the total cost for fresh vegetables and salads. For perishable salad items such as tomato, lettuce and cucumber, this reason accounted for a higher proportion of the cost (approximately 80%).

**Table 20:** Cost of avoidable fresh vegetable and salad waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Potato	£120	£86	£28	£3	£3
Carrot	£54	£7	£4	£1	£3
Onion	£53	£15	£3	£1	£5
Tomato	£91	£17	£11	£5	£3
Lettuce	£220	£36	£15	£<£1	£5
Other root vegetables	£41	£11	£9	£1	£3
Cucumber	£46	£5	£4	£1	£1
Cabbage	£23	£3	£3	£1	£1
Leafy salad	£72	£66	£8	£1	£1
Mushroom	£51	£4	£5	<£1	<£1
Pepper	£51	£9	£1	<£1	<£1
Broccoli	£61	£16	£2	£1	<£1
Mixed vegetables	£21	£16	£1	£6	£1
Cauliflower	£13	£5	£1	<£1	£6
Sweetcorn / corn on the cob	Results omitted as too little information to quantify				
Bean (all varieties)	£15	£3	£5	<£1	<£1
Leek	Results omitted as too little information to quantify				
Spring onion	Results omitted as too little information to quantify				
All other fresh vegetables and salads	£120	£28	£13	£3	£3
<b>Total fresh vegetables and salads</b>	<b>£1,100</b>	<b>£380</b>	<b>£130</b>	<b>£24</b>	<b>£36</b>

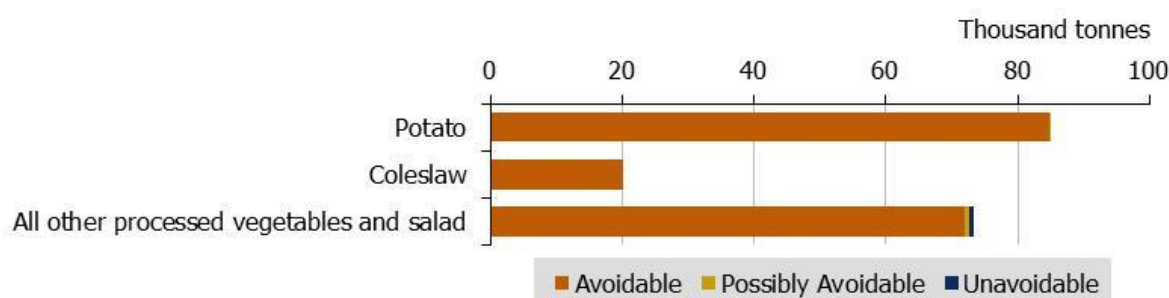
### 5.3 Processed vegetables and salad

#### 5.3.1 Breakdown of processed vegetables and salad by avoidability

A total of 180,000 tonnes of processed vegetables and salad was wasted in 2012, the vast majority of which was avoidable waste. The cost of this avoidable waste was £510 million.

Almost half of the processed vegetables were potato products (85,000 tonnes at a cost of £280 million), including chips, hash browns, waffles etc. The second largest type was coleslaw with 20,000 tonnes of waste.

**Figure 23:** Weight of processed vegetable and salad waste by type, split by avoidability



While the vast majority of the processed vegetable and salad waste reported here was avoidable, some unavoidable and possibly avoidable waste would have been generated by the manufacturer (and therefore is not included in this report). For example, the potato skins associated with the manufacture of some oven chips would be removed and dealt with by the food manufacturer, rather than the household consuming the product.

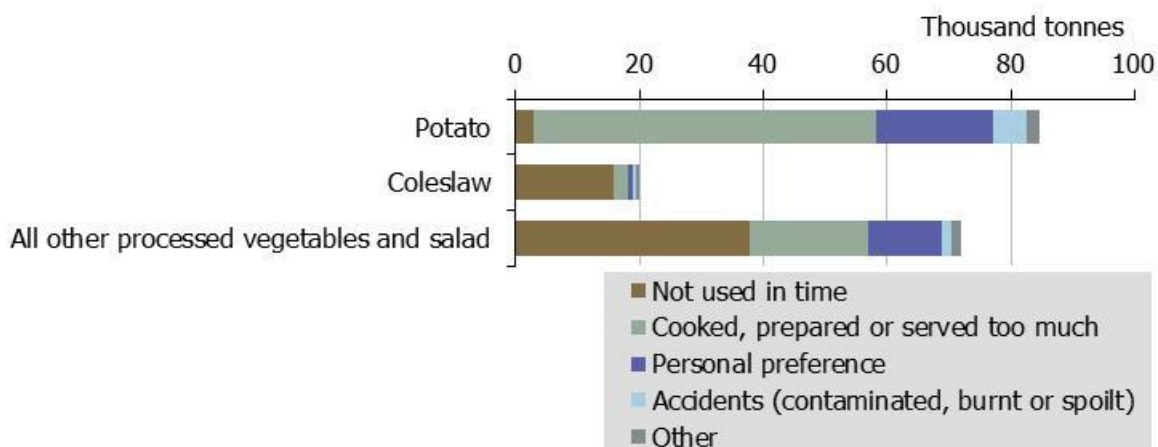
**Table 21:** The amount of processed vegetables and salad waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Potato	85,000	<1,000	<1,000	85,000	£280
Coleslaw	20,000	<1,000	<1,000	20,000	£39
All other processed vegetables and salad	73,000	<1,000	<1,000	72,000	£190
<b>Total processed vegetables and salad</b>	<b>180,000</b>	<b>&lt;1,000</b>	<b>&lt;1,000</b>	<b>180,000</b>	<b>£510</b>

### 5.3.2 Breakdown of avoidable processed vegetables and salad waste by the reason for disposal

A large proportion of processed vegetables were preserved in some way, such as frozen, dried or pickled and therefore less likely to perish. Of the total processed vegetables and salad, one-third was disposed of because it was not used in time (c.f. ca. 60% for fresh vegetables and salads). Processed potatoes had a low instance of not being used in time (4%), while 'cooked, prepared or served too much' accounted for approximately two-thirds of the processed potatoes wasted. This is likely a reflection of their longer shelf-life. For coleslaw, the vast majority was disposed of as it was not used in time and this is likely to be a reflection of its short shelf-life.

**Figure 24:** Weight of avoidable processed vegetable and salad waste by type, split by reason for disposal



**Table 22:** Weight of avoidable processed vegetable and salad waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Potato	3,000	55,000	19,000	6,000	2,000
Coleslaw	16,000	2,000	<1,000	<1,000	<1,000
All other processed vegetables and salad	38,000	19,000	12,000	2,000	2,000
<b>Total processed vegetables and salad</b>	<b>57,000</b>	<b>77,000</b>	<b>31,000</b>	<b>8,000</b>	<b>4,000</b>

**Table 23:** Cost of avoidable processed vegetable and salad waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Potato	£10	£190	£63	£18	£7
Coleslaw	£31	£5	£1	£1	£1
All other processed vegetables and salad	£86	£54	£41	£3	£3
<b>Total processed vegetables and salad</b>	<b>£130</b>	<b>£240</b>	<b>£110</b>	<b>£23</b>	<b>£11</b>

## 6.0 Results for drink

### 6.1 Categorisation of drink

This category includes soft drinks, bottled water, milkshakes, juices, hot beverages and alcoholic drinks. Tap water added to items poured down the sink has been omitted from the results. Therefore, water used to make tea and coffee or to dilute squash has been subtracted from the data, as discussed in Chapter 8 of the *Methods Annex Report*. Soups and milk are not included here because they are generally considered to be foodstuffs rather than drink, and are classified under meals (Chapter 11.0) and dairy and eggs (Chapter 10.0) respectively. Table 24 shows the types into which drink has been categorised.

**Table 24:** Types of drink waste

Food Type	What it includes	What it doesn't include
Bottled water	Bottled water, flavoured water; carbonated or still	Tap water
Carbonated soft drink	Cola, cream soda, dandelion and burdock, energy drinks, fruit-based soda, ginger beer, lemonade, limeade	Carbonated water
Coffee	Coffee grounds, instant coffee granules	Water used to make coffee
Fruit juice and smoothies	Fruit juices, tomato juice, smoothies	Lemon juice*
Hot chocolate	Both powder and liquid form	
Lager, beer and cider	Ale, cider, lager, stout	
Milkshake and milk drink	Flavoured milk, milkshake, milkshake powder (and milk if used to constitute), soya milk	Milk (except where used to constitute)
Squash	Squash	Water added to squash
Tea waste	Black, green, herbal teas; milk and sugar added to tea that is disposed of <sup>60</sup>	Water used to make tea
Wine	All wines	
Other alcohol	Alcopops, spirits, spirits with mixers	
Other drinks	Protein drinks, sports drinks, 'coffeemate'	

\*Lemon juice is reported in the 'Other condiments' category.

Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other drinks'.

<sup>60</sup> See §3.5 of the *Methods Annex report* for full description of analysis relating to tea waste.

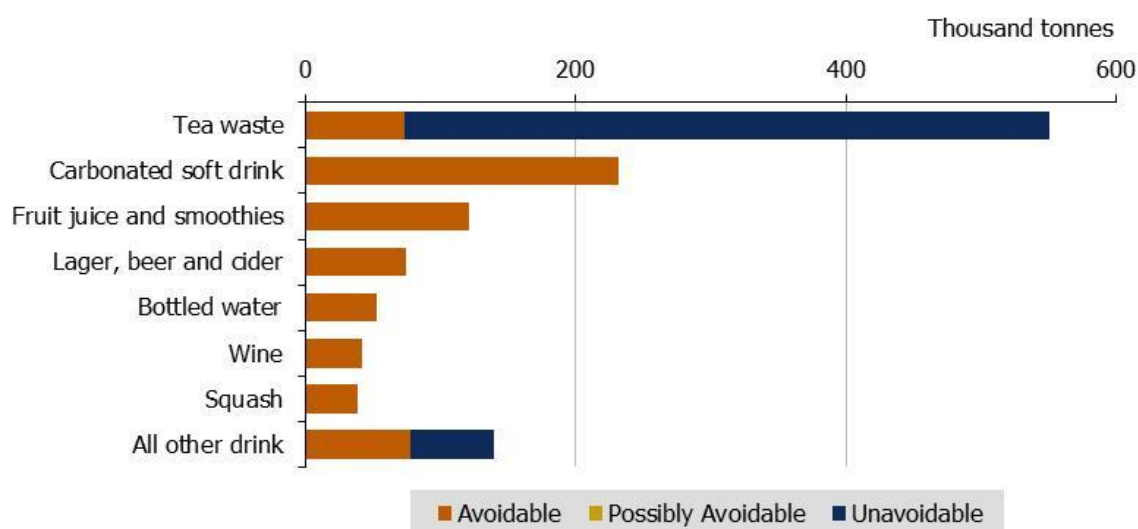
## 6.2 Breakdown of drink by avoidability

Drinks accounted for 1.3 million tonnes of waste. Approximately 40% of this (540,000 tonnes) was unavoidable (used tea bags and coffee grounds), the remaining 60% (710,000 tonnes) was avoidable. This avoidable waste cost £1.3 billion.

Of the avoidable waste, carbonated soft drinks accounted for about a third (230,000 tonnes) of the total at a cost of £200 million. While the amount of wine waste was lower at 42,000 tonnes, the high cost per tonne of wine means that the value of this waste was £270 million.

Avoidable tea waste is made up of unused tea bags and materials associated with 'liquid' tea that has not been drunk; (for example milk and sugar); the water used to make the tea has been excluded. Unavoidable tea waste consists of used tea bags or leaves.

**Figure 25:** Weight of drink waste in 2012 by type, split by avoidability



**Table 25:** The amount of drink waste in 2012 by type, split by avoidability

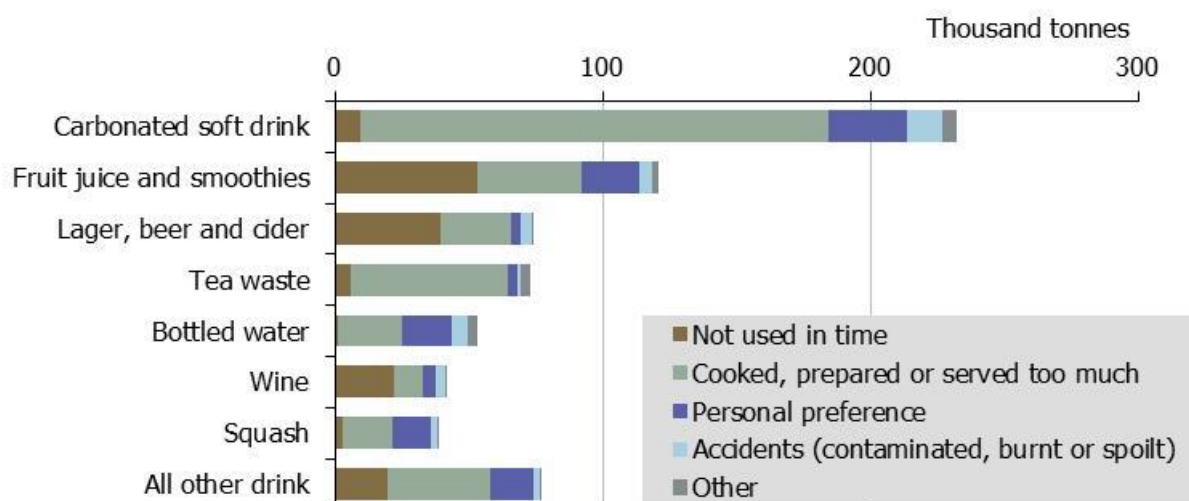
Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Tea waste	550,000	480,000	<1,000	73,000	£110
Carbonated soft drink	230,000	<1,000	<1,000	230,000	£200
Fruit juice and smoothies	120,000	<1,000	<1,000	120,000	£150
Lager, beer and cider	74,000	<1,000	<1,000	74,000	£150
Bottled water	53,000	<1,000	<1,000	53,000	£22
Wine	42,000	<1,000	<1,000	42,000	£270
Squash	38,000	<1,000	<1,000	38,000	£41
All other drink	140,000	63,000	<1,000	77,000	£390
<b>Total drink</b>	<b>1,300,000</b>	<b>540,000</b>	<b>&lt;1,000</b>	<b>710,000</b>	<b>£1,300</b>

### 6.3 Breakdown of avoidable drink waste by the reason for disposal

Over half of the drinks were disposed of because too much was cooked<sup>61</sup>, prepared or served at a cost of £670 million. For carbonated soft drinks, this disposal route accounted for almost three-quarters of the waste. However, for drinks with short shelf-lives such as smoothies or that are consumed shortly after opening (lager, beer, cider and wine), a greater proportion was disposed of because it was not used in time.

<sup>61</sup> For drinks 'prepared or served too much' is obviously more relevant than 'cooked too much'.

**Figure 26:** Weight of avoidable drink waste in 2012 by type, split by reason for disposal



**Table 26:** Weight of avoidable drink (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Carbonated soft drink	9,000	180,000	29,000	13,000	5,000
Fruit juice and smoothies	53,000	39,000	21,000	5,000	2,000
Lager, beer and cider	39,000	26,000	4,000	4,000	<1,000
Tea waste	6,000	59,000	4,000	<1,000	4,000
Bottled water	1,000	24,000	19,000	6,000	4,000
Wine	22,000	11,000	5,000	3,000	<1,000
Squash	3,000	19,000	14,000	2,000	<1,000
All other drink	20,000	38,000	17,000	2,000	<1,000
<b>Total drink</b>	<b>150,000</b>	<b>390,000</b>	<b>110,000</b>	<b>37,000</b>	<b>17,000</b>



**Table 27:** Cost of avoidable drink (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Carbonated soft drink	£8	£150	£25	£12	£4
Fruit juice and smoothies	£67	£49	£27	£6	£3
Lager, beer and cider	£78	£53	£8	£8	£1
Tea waste	£9	£86	£5	£1	£5
Bottled water	£1	£10	£8	£3	£2
Wine	£140	£69	£33	£21	£5
Squash	£3	£20	£15	£2	£1
All other drink	£67	£240	£72	£11	£3
<b>Total drink</b>	<b>£370</b>	<b>£670</b>	<b>£190</b>	<b>£65</b>	<b>£24</b>

## 7.0 Results for fruit

### 7.1 Categorisation of fruit

In this report, fruit is categorised according to the culinary definition, rather than the botanical definition. Hence, many food stuffs that are botanically fruit but are eaten as salad or vegetables – such as tomatoes or squash – are classified under vegetables and salad (Chapter 5.0). This categorisation is open to interpretation, as many fruits in this group are also eaten in savoury dishes, for example, papaya and avocado can be salad ingredients. The default is that if a food can be eaten as a fruit, then it is categorised as such. For this reason avocado and papaya are included in the current section. This approach is consistent with that used in the previous *Household Food and Drink Waste in the UK* report.

**Table 28:** Types of fruit waste

Food Type	Fresh: what it includes	Processed: what it includes	What it doesn't include
Apple	Apple, core, peel	Cooked apple and 'snack' packs	Apple juice*
Banana	Banana, banana skin	Battered and dried banana	Plantain
Kiwi	Kiwi, kiwi skin	Not found	
Melon	Melon, rind, seeds, watermelon	Shop prepared	
Mixed fruit	Fresh fruit salad, mixed peelings	Dried mixed peel, packaged fruit salads	
Orange	Clementines, mandarins, oranges, satsumas and peel	Not found	Orange juice*
Pear	Pear, cores, peel	Tinned pears	
Pineapple	Pineapple, skin, top	Tinned and prepared pineapple	
Soft / berry fruit	Blackberries, blueberries, grapes, raspberries, redcurrants, strawberries, stems of these berries	Frozen strawberries, raisins, sultanas, mixed berry fruit	
Stone fruit	Apricot, avocado, cherry, damson, mango, nectarine, peach, peel, plum, stones	Dates, dried apricots, glace cherries, prunes, tinned peaches	
Other citrus	Grapefruit, lemon, lime and peel	Tinned grapefruit	**Lemon juice
Other fruit	Coconut, fig, guava, lychee, papaya, passion fruit, pomegranate, unknown fruit	Desiccated coconut, dried figs, tropical fruit mix	

\*Fruit juices are reported as drinks under the 'fruit juice and smoothies' category.

\*\*Lemon juice is reported in the 'Other condiments' category.

Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of either 'all other fresh fruit' or 'all other processed fruit'.

In order to be considered 'fresh', the fruit has to be in its raw or minimally prepared state. Fruit salads are classified as fresh, unless known to be pre-prepared when purchased e.g. the fruit salad is within packaging that identifies it as pre-prepared.

Processed fruit includes any items that are purchased dried, tinned, frozen or otherwise processed. This group of foods could in theory contain any of the fruit listed in Table 28. In practice however, only those fruit with examples given were found during the waste analysis. The lists are populated using real examples from the database and are not exhaustive.

For some types of fruit, there are strong seasonal patterns in purchasing and waste. The results have been adjusted for this effect to provide data representative of the complete year (Chapter 11 in the *Methods Annex Report* has more details).

## 7.2 Breakdown of fruit by avoidability

As with the fresh vegetable and salad category, fruit is considered avoidable waste if the vast majority of people would consider it edible. Possibly avoidable food includes fruit skins that some people may choose to eat but others do not, for example apple and pear skin. Unavoidable waste is that which the vast majority of people would consider inedible, for example apple cores, banana skin, peel from citrus fruit, melons and pineapple.

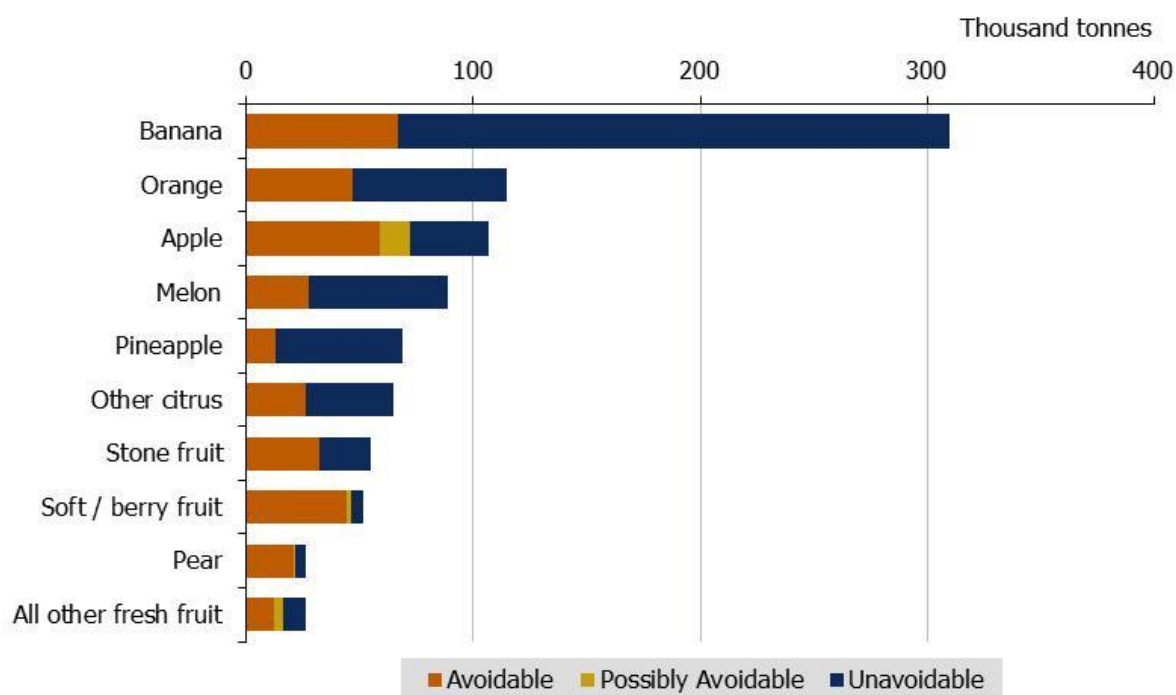
Approximately 930,000 tonnes of fresh and processed fruit waste was produced by UK households in 2012. Of this, 370,000 tonnes (ca. 40%) was avoidable, and cost £1.1 billion. The vast majority of this was fresh fruit (910,000 tonnes) costing £900 million.

Almost two-thirds (540,000 tonnes) was unavoidable: the inedible parts of the fruit such as banana skin, orange and melon rind and apple cores. A much smaller amount, 20,000 tonnes, was possibly avoidable.

All of the processed fruit was avoidable – i.e. no 'unavoidable' or 'possibly avoidable' processed fruit waste was identified during the waste analysis. This is likely to be linked to all fruit in this category being pre-prepared.

Of the fresh fruit waste, a third was associated with bananas, the majority of which was inedible peel. The total weight of discarded apple (total of 110,000 tonnes) was much less than banana (total of 310,000 tonnes), but both had similar tonnages of avoidable waste. Avoidable apple waste had the highest value of any other category (£89 million). Soft / berry fruit was 90% avoidable and due to the value of items in this category the cost was £200 million.

**Figure 27:** Weight of fresh fruit waste in 2012 by type, split by avoidability



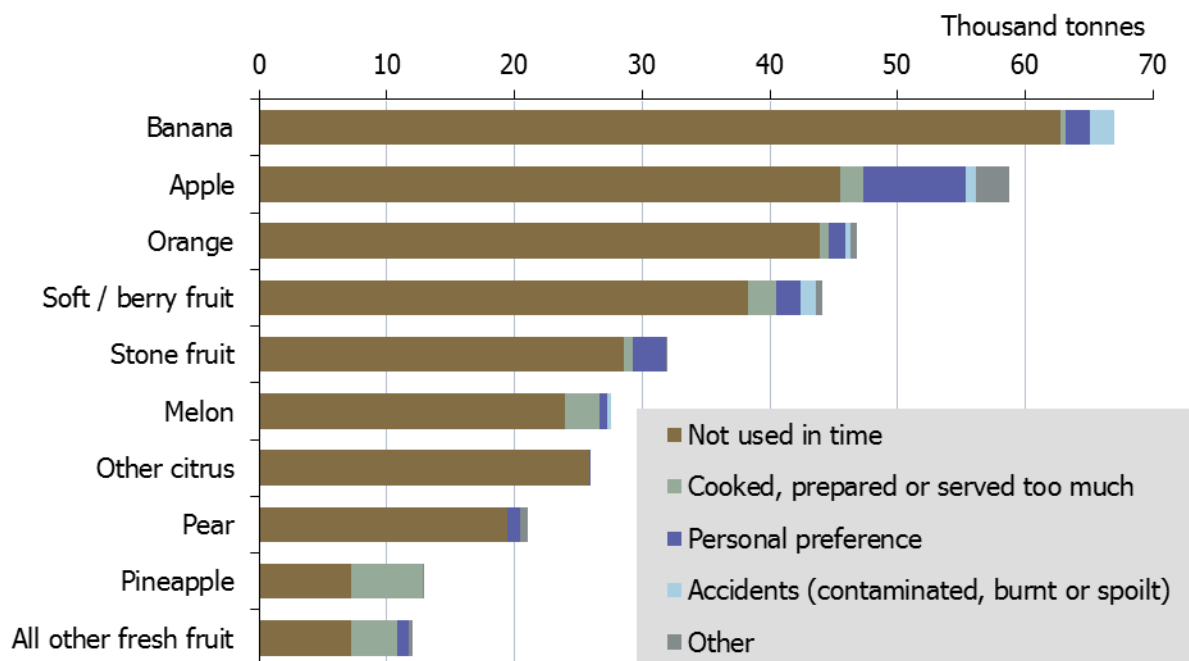
**Table 29:** The amount of fruit waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Banana	310,000	240,000	<1,000	67,000	£63
Orange	110,000	68,000	<1,000	47,000	£66
Apple	110,000	35,000	13,000	59,000	£89
Melon	89,000	61,000	<1,000	28,000	£40
Pineapple	69,000	56,000	<1,000	13,000	£87
Other citrus	64,000	38,000	<1,000	26,000	£51
Stone fruit	54,000	23,000	<1,000	32,000	£94
Soft / berry fruit	51,000	5,000	2,000	44,000	£200
Pear	26,000	5,000	<1,000	21,000	£32
All other fresh fruit	26,000	10,000	4,000	12,000	£170
<b>Total fresh fruit</b>	<b>910,000</b>	<b>540,000</b>	<b>20,000</b>	<b>350,000</b>	<b>£900</b>
<b>Total processed fruit</b>	<b>21,000</b>	<b>&lt;1,000</b>	<b>&lt;1,000</b>	<b>21,000</b>	<b>£190</b>
<b>Total fruit</b>	<b>930,000</b>	<b>540,000</b>	<b>20,000</b>	<b>370,000</b>	<b>£1,100</b>

### 7.3 Breakdown of avoidable fruit waste by the reason for disposal

The vast majority of fresh and processed fruit was disposed of because it was not being used in time e.g. it had gone rotten, mouldy or otherwise inedible. This is likely to be linked to the perishability of fruit and the large quantities that are often purchased. This could be further exacerbated by fruit being stored in sub-optimal conditions – in general, fruit will store for longer in the fridge<sup>62</sup>.

**Figure 28:** Weight of avoidable fresh fruit waste in 2012 by type, split by reason for disposal



*Results for melon and pineapple omitted as too few instances of avoidable waste in the diary research to be able to quantify reasons for disposal accurately.*

<sup>62</sup> <http://www.wrap.org.uk/content/helping-consumers-reduce-fruit-and-vegetable-waste>

**Table 30:** Weight of avoidable fruit waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Banana	63,000	<1,000	2,000	2,000	<1,000
Apple	46,000	2,000	8,000	<1,000	3,000
Orange	44,000	<1,000	1,000	<1,000	<1,000
Soft / berry fruit	38,000	2,000	2,000	1,000	<1,000
Stone fruit	29,000	<1,000	3,000	<1,000	<1,000
Melon	Results omitted as too little information to quantify				
Other citrus	26,000	<1,000	<1,000	<1,000	<1,000
Pear	19,000	<1,000	1,000	<1,000	<1,000
Pineapple	Results omitted as too little information to quantify				
All other fresh fruit	7,000	4,000	<1,000	<1,000	<1,000
<b>Total fresh fruit</b>	<b>300,000</b>	<b>18,000</b>	<b>18,000</b>	<b>4,000</b>	<b>4,000</b>
<b>Total processed fruit</b>	<b>13,000</b>	<b>5,000</b>	<b>2,000</b>	<b>&lt;1,000</b>	<b>&lt;1,000</b>
<b>Total fruit</b>	<b>320,000</b>	<b>23,000</b>	<b>21,000</b>	<b>5,000</b>	<b>5,000</b>

**Table 31:** Cost of avoidable fruit waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Banana	£59	<£1	£2	£2	<£1
Apple	£69	£3	£12	£1	£4
Orange	£62	£1	£2	£1	£1
Soft / berry fruit	£180	£10	£9	£6	£2
Stone fruit	£84	£2	£8	<£1	<£1
Melon	Results omitted as too little information to quantify				
Other citrus	£51	<£1	<£1	<£1	<£1
Pear	£30	<£1	£2	<£1	£1
Pineapple	Results omitted as too little information to quantify				
All other fresh fruit	£110	£57	£8	<£1	£2
<b>Total fresh fruit</b>	<b>£720</b>	<b>£110</b>	<b>£43</b>	<b>£9</b>	<b>£11</b>
<b>Total processed fruit</b>	<b>£140</b>	<b>£12</b>	<b>£30</b>	<b>£2</b>	<b>&lt;£1</b>
<b>Total Fruit</b>	<b>£860</b>	<b>£122</b>	<b>£73</b>	<b>£11</b>	<b>£11</b>

## 8.0 Results for meat and fish

### 8.1 Categorisation of meat and fish

This group includes carcass meats and processed meats, and all fish and shellfish, except those disposed of as part of a composite meal. Table 32 shows the types of foods included in the meat and fish group. Shellfish and fish have been grouped together because they are all animal products from the sea or fresh water.

**Table 32:** Types of meat and fish waste

Food Type	What it includes	What it doesn't include
Pork / ham / bacon	Bacon, bones, fat, gammon, ham, jelly, pork chops, rinds, sausages, spare ribs	Sausages identified as meat other than pork
Beef	Beef, bones, burgers, corned beef, fat, mince, roast beef, steak	Burgers or mince identified as meat other than beef, veggie burgers
Fish and shellfish	All fish, all shellfish (molluscs and crustaceans), bones, breaded or battered fish, caviar, crab paste, crab sticks, fish heads, guts, shellfish shells, fish skin	
Lamb	Bone, fat, lamb, lamb kebab	
Poultry (chicken / turkey / duck)	Bones, breaded chicken products, carcass, chicken, chicken wings, duck, fat, goose, giblets, skin, turkey	
Meat and fish based sandwich spread	Sandwich fillers containing meat or fish, pâté	
Bone (unidentifiable / mixed)	Mixed bones, unidentified bone	
Game	Venison	
Other meat (unidentifiable / mixed meat / offal)	Black pudding, unidentified fat, hot dogs, jelly, kebab meat, kidney, liver, meatballs, mixed meat, speciality sausages, unidentified meat	

*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other meat and fish'.*

For some types of meat, there are strong seasonal patterns in purchasing and waste. The results have been adjusted for this effect to provide data representative of the complete year. (Chapter 11 in the *Methods Annex Report* has more details.)



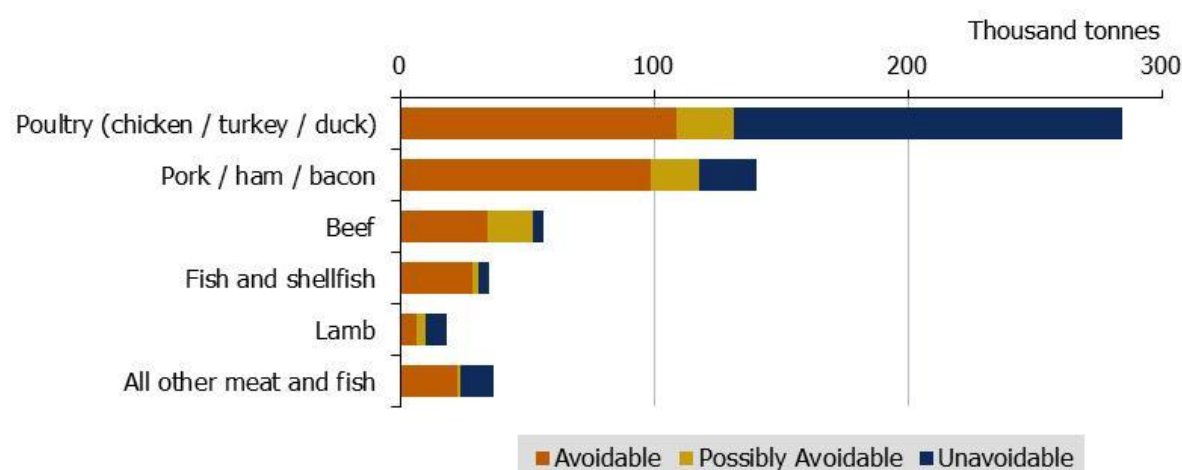
## 8.2 Breakdown of meat and fish by avoidability

Fat, skin, rind and crackling are considered possibly avoidable. Bones, fish heads, guts, mussel shells and similar material considered unavoidable. Meat and fish waste comprised 570,000 tonnes in the UK in 2012, of which over half (300,000 tonnes) was avoidable costing £2.1 billion<sup>63</sup>. Possibly avoidable waste made up a small part of meat and fish waste, approximately one-tenth of the total.

Approximately half of the total meat and fish waste was poultry (280,000 tonnes). Of this, around half was unavoidable and 110,000 tonnes was avoidable. Therefore, the amount of avoidable waste was similar to that of pork / ham / bacon (99,000 tonnes). The costs of the avoidable poultry and pork / ham / bacon were also of a similar magnitude (£660 and £640 million respectively).

In general, the amount of unavoidable waste is a reflection of the amount of carcass meat sold. For example, much of the pork sold is in the form of prepared pork products such as sausages, ham and bacon, rather than being carcass meat; consequently only around 15% of pork was unavoidable. However, for poultry and lamb, a large fraction of the meat entering the home is carcass meat, which contains a substantial amount of inedible material and the unavoidable portion for these categories was approximately 50%.

**Figure 29:** Weight of meat and fish waste in 2012 by type, split by avoidability



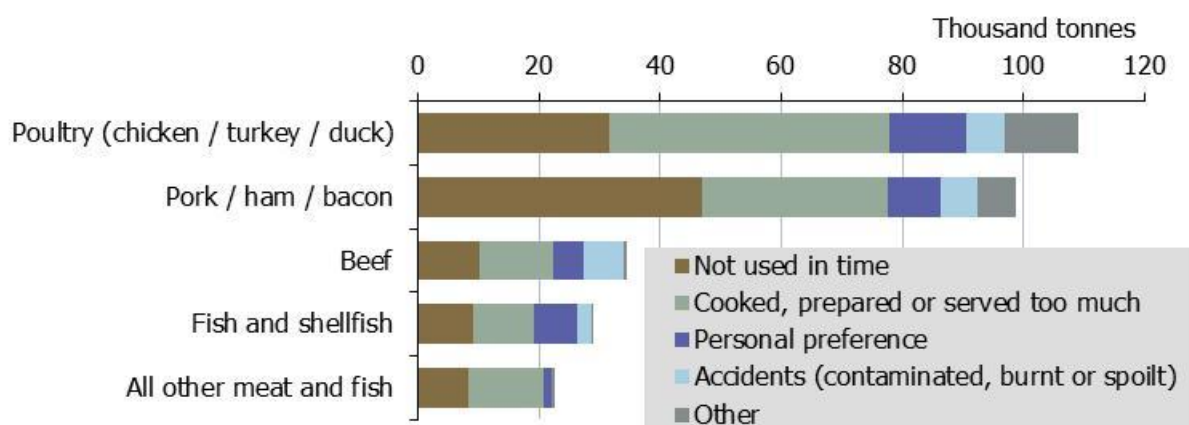
<sup>63</sup> For carcass- and bone-related material, the proportion of the total weight that was meat was estimated in the detailed waste compositional analysis. If the proportion of meat was greater than 40% the food waste was recorded as avoidable; all other carcasses and bones were recorded as unavoidable. This approach differs from that used in the previous Household Food and Drink Waste in the UK report, where all carcass waste was assumed to be unavoidable. If all bone / carcass meat had been recorded as unavoidable to total avoidable meat and fish waste would reduce by around 30,000 tonnes to 270,000 tonnes, a reduction of around 10%. This would reduce the avoidable waste cost to £1.9 billion. The new method has the advantage that some of the avoidable material in this category is classified as such, rather than it all being classified as unavoidable. Further work will be undertaken to explore the effect of these assumptions.

**Table 33:** The amount of meat and fish waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Poultry (chicken / turkey / duck)	280,000	150,000	23,000	110,000	£660
Pork / ham / bacon	140,000	23,000	19,000	99,000	£640
Beef	56,000	4,000	18,000	34,000	£260
Fish and shellfish	35,000	5,000	2,000	29,000	£320
Lamb	18,000	8,000	3,000	7,000	£78
All other meat and fish	37,000	13,000	1,000	23,000	£160
<b>Total meat and fish</b>	<b>570,000</b>	<b>200,000</b>	<b>66,000</b>	<b>300,000</b>	<b>£2,100</b>

### 8.3 Breakdown of avoidable meat and fish waste by the reason for disposal

Of the avoidable meat and fish waste a similar quantity was disposed of as a result of not being used in time and too much cooked, prepared or served. These two reasons for disposal accounted for almost four-fifths of the total.

**Figure 30:** Weight of avoidable meat and fish waste in 2012 by type, split by reason for disposal

*Results for lamb omitted as too few instances of avoidable waste in the diary research to be able to quantify reasons for disposal accurately.*

**Table 34:** Weight of avoidable meat and fish waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Poultry (chicken / turkey / duck)	31,000	46,000	13,000	6,000	12,000
Pork / ham / bacon	47,000	31,000	9,000	6,000	6,000
Beef	10,000	12,000	5,000	6,000	<1,000
Fish and shellfish	9,000	10,000	7,000	2,000	<1,000
Lamb	Results omitted as too little information to quantify				
All other meat and fish	8,000	12,000	1,000	<1,000	<1,000
<b>Total meat and fish</b>	<b>110,000</b>	<b>120,000</b>	<b>35,000</b>	<b>21,000</b>	<b>20,000</b>

**Table 35:** Cost of avoidable meat and fish waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Poultry (chicken / turkey / duck)	£190	£280	£76	£38	£74
Pork / ham / bacon	£300	£200	£55	£40	£41
Beef	£76	£92	£38	£49	£5
Fish and shellfish	£100	£110	£80	£25	£3
Lamb	Results omitted as too little information to quantify				
All other meat and fish	£57	£92	£11	<£1	£4
<b>Total meat and fish</b>	<b>£730</b>	<b>£850</b>	<b>£260</b>	<b>£150</b>	<b>£130</b>

#### 8.4 Further breakdown of poultry and pork by food subtype

Due to the high number of instances of poultry and pork waste in the research, it is possible to investigate these food types at a higher level of detail whilst still maintaining an acceptable degree of confidence around the estimates. Poultry and pork have been divided into the subtypes shown in Table 36.

**Table 36:** Classification of poultry and pork into subtypes

Food Subtype	What it includes
<b>Poultry</b>	
Carcass meat / bones	Whole birds, portions (breast, thigh, drumsticks), bones and carcasses, fat. Includes marinated products where no evidence of any reforming process or breading.
Poultry product	Breaded products (nuggets, kiev), reformed drumsticks. Includes takeaway chicken as assumed to be breaded or coated in some way (and bones from takeaway chicken).
Sliced Poultry	Sliced sandwich meats e.g. turkey ham, honey roast chicken breast slices
<b>Pork</b>	
Bacon	Bacon (including rind and rashers)
Carcass meat / bones	Portions (chop, joint), bones, fat. Includes marinated products where no evidence of any reforming process. Includes smoked cuts such as gammon.
Sausages	Uncured sausages. All sausages were assumed to be pork unless packaging stated otherwise.
Sliced Ham	Sliced sandwich meats: ham, luncheon meat, sliced polony (smoked sausage).
Other pork product	Includes kebabs, cured sausages such as spicy sausage, salami, and chorizo, pork scratchings.

The vast majority of poultry waste was carcass meat / bone of which approximately one-third (78,000 tonnes) was avoidable at a cost of £390 million.

**Table 37:** The amount of poultry waste in 2012 by sub-type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Poultry - carcass meat / bones	240,000	150,000	21,000	78,000	£390
Poultry - poultry product	34,000	7,000	1,000	27,000	£230
Sliced poultry	5,000	<1,000	<1,000	5,000	£34
<b>All poultry</b>	<b>280,000</b>	<b>150,000</b>	<b>23,000</b>	<b>110,000</b>	<b>£660</b>

Approximately two-thirds of pork waste was associated with processed pork products, the remaining third (46,000 tonnes) was from carcass meat / bones. Compared to poultry, there was a higher proportion of pork carcass meat that was avoidable: 21,000 tonnes of avoidable pork waste associated with carcass meat / bones was generated in 2012, costing £120 million. The majority of the processed pork waste was avoidable, the largest amount being sausages at 32,000 tonnes costing £150 million.

**Table 38:** The amount of pork waste in 2012 by sub-type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Pork - Carcass meat / bones	46,000	19,000	6,000	21,000	£120
Pork - Sausages	34,000	<1,000	2,000	32,000	£150
Pork - Sliced ham	22,000	<1,000	5,000	17,000	£170
Pork - bacon	21,000	<1,000	3,000	18,000	£120
Pork - other	17,000	3,000	2,000	12,000	£74
<b>All pork</b>	<b>140,000</b>	<b>23,000</b>	<b>19,000</b>	<b>99,000</b>	<b>£640</b>

## 9.0 Results for bakery

### 9.1 Categorisation of bakery

Table 39 shows the foods included in the bakery group. Notably, sweet bakery items are not included here, but can be found in the cakes and desserts group (§12.1). Bread found in sandwiches is included under meals (Chapter 11.0). This is consistent with the assumptions used in the previous *Household Food and Drink Waste in the UK* report.

**Table 39:** Types of bakery products waste

Food Type	What it includes	What it doesn't include
Cracker / crisp bread	Savoury biscuits, crackers, sesame toast, rye bread and crackers, rice cakes	Sweet biscuits
Breadsticks	Breadsticks	
Dough	Bread dough (cooked or uncooked), dough balls	Pizza crusts
Dumplings	Dumplings, dumpling mix	
Morning goods	Croissants, crumpets, oven bottom muffins, potato cakes, scotch pancakes, waffles	Danish pastries, hot cross buns, iced buns, potato waffles, scones
Pastry	Choux, Filo, puff, shortcrust, vol-au-vents	Pies
Speciality bread	Bagels, brioche, chapatti, ciabatta, focaccia, garlic bread, naan, paratha, pitta, poppadom, stottie, tortilla	
Standard bread	Granary, white, wholemeal; baguettes, loaves, rolls; crumbs, crusts, whole slices and pieces; toasted or untoasted	
Yorkshire pudding and other batters	Batter mix, fish batter, pancakes, Yorkshire pudding	
Other bakery	Breadcrumbs (bought), bread mix, croutons, gluten free bread, pizza base, taco shells.	

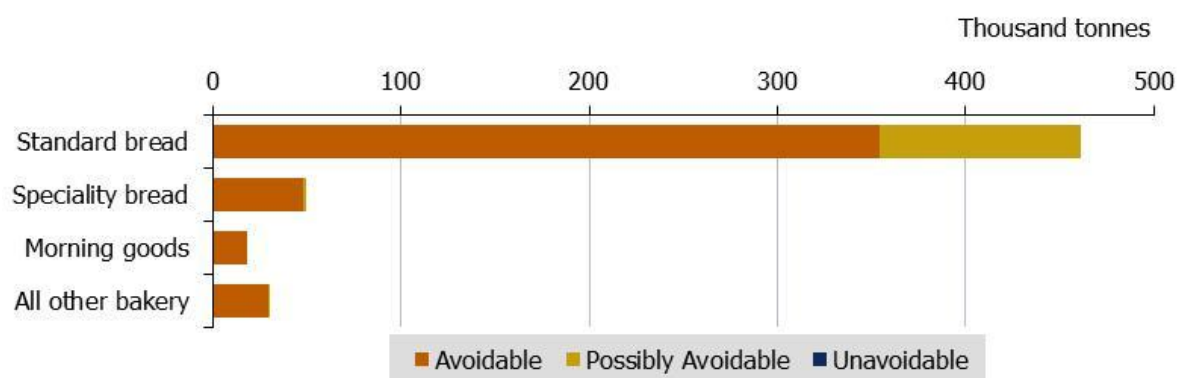
*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other bakery'.*

### 9.2 Breakdown of bakery by avoidability

Bread crusts and ends are considered to be possibly avoidable as some people choose not to eat them; all other waste in this category is considered avoidable.

Approximately 560,000 tonnes of bakery waste were disposed of in the UK in 2012. Of this, the four-fifths was avoidable waste (450,000 tonnes per year) which cost £860 million. There was a further 110,000 tonnes of possibly avoidable food waste, including items such as bread crusts that some people choose not to eat or find unpalatable but which other people eat. There was no 'unavoidable' bakery waste, as all these bakery products are supplied in a form either ready for consumption, or ready to be mixed (batter mixes etc.). The vast majority of the bakery waste was standard bread which accounted for over 80% of the total at a cost of £550 million.

**Figure 31:** Weight of bakery waste in 2012 by type, split by avoidability



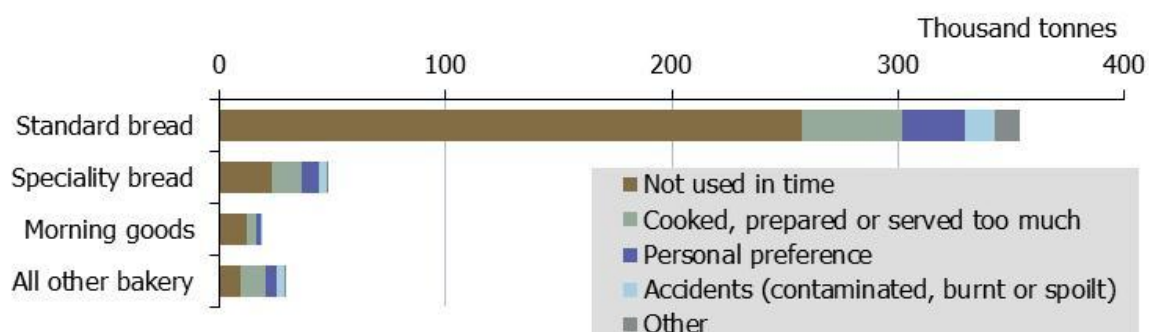
**Table 40:** The amount of bakery waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Standard bread	460,000	<1,000	110,000	350,000	£550
Speciality bread	49,000	<1,000	1,000	48,000	£130
Morning goods	19,000	<1,000	<1,000	19,000	£51
All other bakery	29,000	<1,000	<1,000	29,000	£140
<b>Total bakery</b>	<b>560,000</b>	<b>&lt;1,000</b>	<b>110,000</b>	<b>450,000</b>	<b>£860</b>

### 9.3 Breakdown of avoidable bakery waste by the reason for disposal

The majority of bakery products were disposed of as a result of not being used in time, reflecting the short shelf-life of these products. This is consistent with fresh potatoes but not with other staple foods such as rice and pasta where the main reason for disposal is cooking, preparing or serving too much.

**Figure 32:** Weight of avoidable bakery waste in 2012 by type, split by reason for disposal



**Table 41:** Weight of avoidable bakery waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Standard bread	260,000	44,000	28,000	13,000	11,000
Speciality bread	23,000	13,000	8,000	4,000	<1,000
Morning goods	12,000	4,000	2,000	<1,000	<1,000
All other bakery	9,000	11,000	5,000	4,000	<1,000
<b>Total bakery</b>	<b>300,000</b>	<b>73,000</b>	<b>42,000</b>	<b>21,000</b>	<b>12,000</b>

**Table 42:** Cost of avoidable bakery waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Standard bread	£400	£69	£43	£20	£17
Speciality bread	£62	£36	£21	£10	£1
Morning goods	£33	£11	£5	£1	<£1
All other bakery	£46	£50	£23	£16	£2
<b>Total bakery</b>	<b>£540</b>	<b>£170</b>	<b>£91</b>	<b>£48</b>	<b>£20</b>



## 10.0 Results for dairy and eggs

### 10.1 Categorisation of dairy and eggs

This food group includes milk, milk products and eggs. This category thus includes the majority of non-meat animal products. Milkshakes and milk substitutes such as soya and rice milk are not included here; they can be found in the drinks group. Foods in this group are frequently used in the construction of meals, and it is only when the foods themselves could be identified as separate items that they are reported here. Table 43 shows the six types of foods included in the dairy and eggs group.

**Table 43:** Types of dairy and eggs waste

Food Type	What it includes	What it doesn't include
Milk	Fresh, UHT and goats' milk	Soya milk, baby milk formula
Cheese	All cheese including goats' and sheeps' cheese	
Cream and crème fraîche	Clotted cream, cream, crème fraîche, sour cream	
Egg	Eggs (chicken, duck etc.), egg shells	Fish eggs
Yoghurt / yoghurt drink	Fromage frais, yoghurt, yoghurt drinks	
Other dairy	Evaporated milk, milk powder, whey	

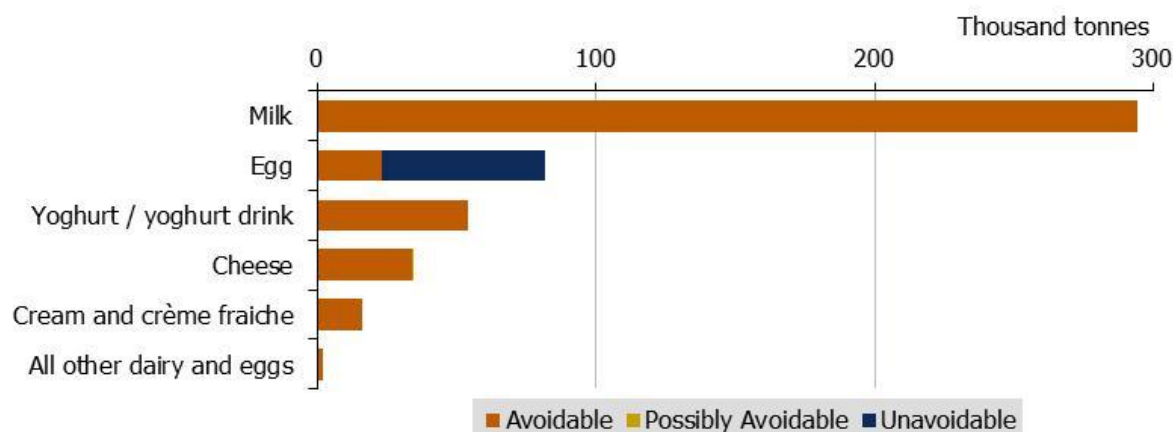
*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other dairy and eggs'.*

### 10.2 Breakdown of dairy and eggs by avoidability

Egg shells are the only item within the category to be considered unavoidable, all other food waste is considered avoidable other than small quantities of cheese rind that is considered as possibly avoidable.

A total of 480,000 tonnes of dairy and egg waste was disposed of in the UK in 2012, almost all of which was avoidable (420,000 tonnes), costing £780 million. The majority of the waste by weight was milk (290,000 tonnes or 60% of the total) all of which was avoidable and cost £290 million. The avoidable fractions of cheese waste weighed 34,000 tonnes (8% of the total), but cost £230 million (29% of the total cost) due to the higher price of cheese. Egg shells, which are classified as unavoidable waste, accounted for around three quarters of the total egg waste.

**Figure 33:** Weight of dairy and egg waste in 2012 by type, split by avoidability



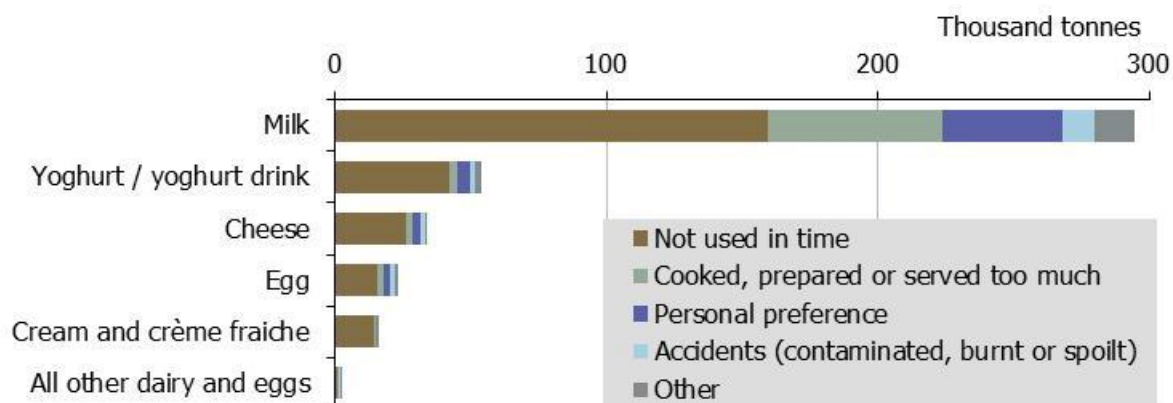
**Table 44:** The amount of dairy and egg waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Milk	290,000	<1,000	<1,000	290,000	£290
Egg	82,000	59,000	<1,000	23,000	£63
Yoghurt / yoghurt drink	54,000	<1,000	<1,000	54,000	£130
Cheese	34,000	<1,000	<1,000	34,000	£230
Cream and crème fraîche	16,000	<1,000	<1,000	16,000	£56
All other dairy and eggs	2,000	<1,000	<1,000	2,000	£4
<b>Total dairy and eggs</b>	<b>480,000</b>	<b>59,000</b>	<b>&lt;1,000</b>	<b>420,000</b>	<b>£780</b>

### 10.3 Breakdown of avoidable dairy and egg waste by the reason for disposal

Two-thirds of the total dairy and eggs were disposed as they were not used in time; this reflects the relatively short shelf-life of these food types. Milk has a different profile from the other foods in this category, with a lower proportion not used in time (ca. 55%) and around 20% leftover after either preparation or serving. A further 15% is related to personal preference.

**Figure 34:** Weight of avoidable dairy and egg waste in 2012 by type, split by reason for disposal



**Table 45:** Weight of avoidable dairy and egg waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Milk	160,000	64,000	44,000	12,000	14,000
Yoghurt / yoghurt drink	42,000	3,000	5,000	2,000	2,000
Cheese	26,000	2,000	3,000	1,000	<1,000
Egg	15,000	2,000	2,000	2,000	<1,000
Cream and crème fraîche	14,000	<1,000	<1,000	<1,000	1,000
All other dairy and eggs	<1,000	<1,000	<1,000	<1,000	<1,000
<b>Total dairy and eggs</b>	<b>260,000</b>	<b>73,000</b>	<b>54,000</b>	<b>18,000</b>	<b>20,000</b>

**Table 46:** Cost of avoidable dairy and egg waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Milk	£160	£64	£44	£12	£14
Yoghurt / yoghurt drink	£110	£8	£11	£5	£5
Cheese	£180	£16	£23	£10	£6
Egg	£42	£7	£6	£6	£2
Cream and crème fraîche	£50	£3	<£1	<£1	£4
All other dairy and eggs	£2	£1	<£1	£1	<£1
<b>Total dairy and eggs</b>	<b>£530</b>	<b>£97</b>	<b>£83</b>	<b>£34</b>	<b>£32</b>

## 11.0 Results for home-made and pre-prepared meals

### 11.1 Categorisation of home-made and pre-prepared meals

We eat a large proportion of our food in the form of meals, and the associated waste reported here only includes that which is disposed of in the household waste stream. For foods which are often consumed outside the home such as sandwiches and takeaways, there is likely to be additional arisings in non-household waste streams, e.g. litter bins and commercial, office waste.

This food group includes soups, composite meals (spaghetti bolognaise, curry and rice, fish and chips etc.), sandwiches, and composite savoury products e.g. pasties, that can be eaten as a snack on their own or as part of a meal. Composite meals includes foods that are clearly part of a meal e.g. curry, cottage pie; component parts of meals were recorded to specific food categories where possible e.g. 'meat and two vegetables' were recorded to the chicken, potatoes and carrots categories etc. Further details on the types of meals in these categories are shown in Table 47 including how each food type has been sub-divided into those purchased pre-prepared and home-made, these are detailed further in §11.4.

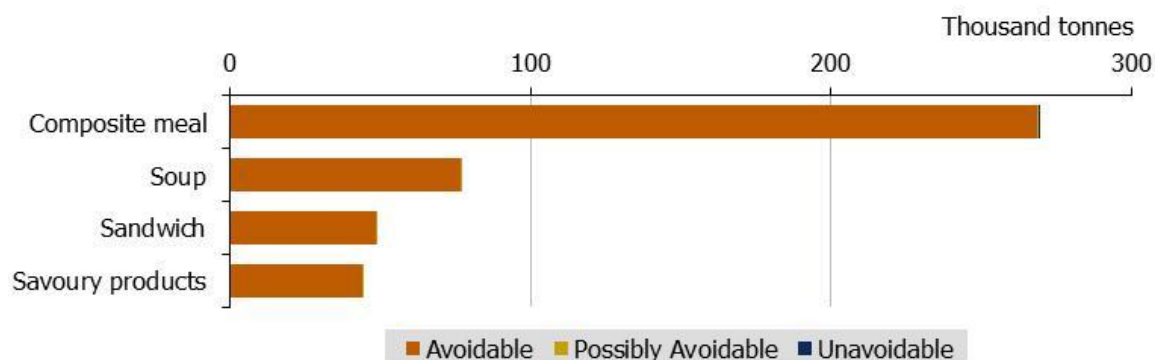
**Table 47:** Types of meals waste

Food Type	What it includes		What it doesn't include
	Pre-prepared	Home-made	
Soup	Packet or tinned soup	Home-made soup (where specified)	Stock
Composite meal	For example, curry and rice dishes, noodle dishes, pizza, pasta meals and ravioli, ready meals, spaghetti hoops, takeaway meals. Where identified by the tin or packaging.	Meals assumed to be home-made unless they can be identified as pre-prepared. Also includes pre-prepared savoury products where combined with other ingredients in the home.	
Sandwich	Where known to be pre-prepared due to packaging type / brand name	All other sandwiches are assumed to be home-made.	
Savoury products	A wide range of products including: bhaji, pakora, pies and pasties, pork pie, quiche, samosa, sausage roll, Scotch egg, unless stated home-made	Savoury products are assumed to be home-made unless they can be identified as pre-prepared. A similar range of foods are including to those shown in pre-prepared category.	

### 11.2 Breakdown of meals by avoidability

A total of approximately 440,000 tonnes of meals were disposed of in 2012, with the vast majority being avoidable, costing £2.1 billion. A small tonnage was possibly avoidable and included pizza, pie and sandwich crusts. Almost two-thirds of the waste was associated with composite meals, costing £1.5 billion.

**Figure 35:** Weight of meal waste in 2012 by type, split by avoidability



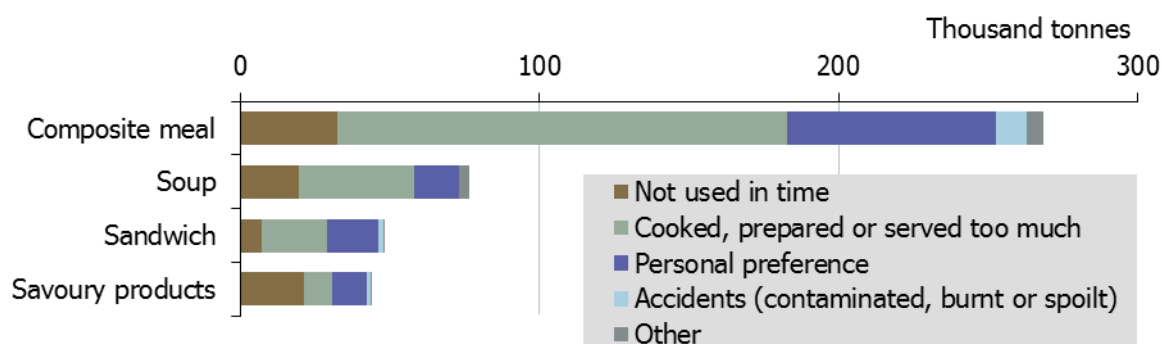
**Table 48:** The amount of meal waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Composite meal	270,000	<1,000	<1,000	270,000	£1,500
Soup	77,000	<1,000	<1,000	76,000	£120
Sandwich	49,000	<1,000	<1,000	48,000	£240
Savoury products	44,000	<1,000	<1,000	44,000	£190
<b>Total meals (home-made and pre-prepared)</b>	<b>440,000</b>	<b>&lt;1,000</b>	<b>1,000</b>	<b>440,000</b>	<b>£2,100</b>

### 11.3 Breakdown of avoidable meal waste by the reason for disposal

Approximately half of the waste arose from cooking, preparing or serving too much (220,000 tonnes). Although this was largely due to the influence of the composite meals, the other food types exhibited a similar distribution of reasons for disposal.

**Figure 36:** Weight of avoidable meal waste in 2012 by type, split by reason for disposal



**Table 49:** Weight of avoidable meal waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Composite meal	32,000	150,000	70,000	10,000	6,000
Soup	19,000	39,000	15,000	<1,000	3,000
Sandwich	7,000	22,000	17,000	2,000	<1,000
Savoury products	21,000	10,000	11,000	1,000	<1,000
<b>Total meals (home-made and pre-prepared)</b>	<b>80,000</b>	<b>220,000</b>	<b>110,000</b>	<b>14,000</b>	<b>10,000</b>

**Table 50:** Cost of avoidable meal waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Composite meal	£200	£840	£410	£57	£31
Soup	£30	£60	£25	<£1	£6
Sandwich	£30	£130	£73	£11	£1
Savoury products	£92	£42	£49	£6	£2
<b>Total meals (home-made and pre-prepared)</b>	<b>£350</b>	<b>£1,100</b>	<b>£560</b>	<b>£75</b>	<b>£41</b>

#### 11.4 Breakdown of avoidable meal waste by pre-prepared and home-made

The meals are sub-divided into those purchased pre-prepared and home-made, with the pre-prepared category including ready meals and takeaways. It was not always possible to identify whether food was pre-prepared or home-made; the food waste is assumed to be home-made unless it can be identified as pre-prepared. Further details of the assumptions used to sub-divide this food type are listed in Table 47. These assumptions are consistent with those used in the previous *Household Food and Drink Waste in the UK* report.

In total almost two-thirds of the food waste (270,000 tonnes) was from home-made meals at a cost of £1.2 billion. Limitations in the available data mean it is not possible to report the split of the individual food types.

**Figure 37:** Weight and cost of all meal waste in 2012 by type by home-made / pre-prepared split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Home-made	270,000	<1,000	<1,000	270,000	£1,200
Pre-prepared	160,000	<1,000	<1,000	160,000	£890

**Table 51:** Weight of avoidable meal waste in 2012 by home-made / pre-prepared, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Home-made	45,000	150,000	61,000	10,000	5,000
Pre-prepared	34,000	68,000	52,000	4,000	5,000

**Table 52:** Cost of avoidable meal waste in 2012 by home-made / pre-prepared, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Home-made	£170	£680	£280	£49	£25
Pre-prepared	£180	£390	£280	£25	£16



## 12.0 Results for food groups with minor contributions

This chapter contains the food groups which each contribute less than 5% to the total amount of household food and drink waste, alongside the 'other' category. The inclusion of food types within these categories is based on the cut-off rule described in the *Methods Annex Report*. In light of this, and the fewer instances of food and drink waste recorded for these food groups, the breakdown of information to the level of food type is limited, and hence many of the potential tables in this chapter are omitted or, if included, contain less information than preceding chapters. Although the food groups in this chapter form a smaller proportion of the total food and drink waste, there is still information useful to the development of solutions and messages to reduce food waste.

### 12.1 Cakes and desserts

#### 12.1.1 Categorisation cakes and desserts

This group includes all sweet items that could be consumed at the end of a meal, but many of the items are also consumed as snacks. Further categories relating to confectionery and snacks are shown in §12.5. Table 53 shows the 10 types of foods included in the bakery group. Notably, savoury bakery items are not included here, but can be found in the bakery group (Chapter 9.0).

**Table 53:** Types of cake and desserts waste

Food Type	What it includes
Cheesecake	Cheesecake
Chocolate pudding / dessert	Chocolate desserts, chocolate pudding
Cakes / gâteaux / doughnuts / pastries	Cake mix, cake, Christmas pudding, Danish pastries, doughnuts, éclairs, egg custard tarts, flapjack, fruit cake, gâteaux, iced buns, Indian cakes, malt loaf, profiteroles, scones, Swiss roll
Fruit pie / strudel / crumble	Crumble, fruit pie, mince pies, strudel
Ice Cream	Ice cream, ice lollies, sorbet
Jelly	Jelly, both concentrated and constituted
Milk pudding (custard etc.)	Custard, custard powder (and milk used to constitute), rice pudding
Mousse	Mousse (including chocolate mousse)
Trifle	Trifle
Other desserts	Banoffee pie, bread and butter pudding, cake decorations, marzipan and icing, ice cream cones, fruit fools, meringue

*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other cakes and desserts'.*

### 12.1.2 Breakdown of cakes and desserts by avoidability

A total of 160,000 tonnes of cakes and desserts were wasted in 2012 at a cost of £570 million. All food waste in this category is edible and was therefore considered avoidable. Half of the waste (84,000 tonnes) was disposed of because it is not used in time at a cost of £320 million.

**Table 54:** The amount of cake and dessert waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Cakes / gateau / doughnuts / pastries	86,000	<1,000	<1,000	86,000	£380
All other cake and desserts	72,000	<1,000	<1,000	72,000	£190
<b>Total cake and desserts</b>	<b>160,000</b>	<b>&lt;1,000</b>	<b>&lt;1,000</b>	<b>160,000</b>	<b>£570</b>

### 12.1.3 Breakdown of avoidable cake and dessert waste by the reason for disposal

**Table 55:** Weight of avoidable cake and dessert waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Cakes / gateau / doughnuts / pastries	49,000	9,000	22,000	4,000	1,000
All other cake and desserts	35,000	20,000	12,000	5,000	<1,000
<b>Total cake and desserts</b>	<b>84,000</b>	<b>28,000</b>	<b>34,000</b>	<b>9,000</b>	<b>2,000</b>

**Table 56:** Cost of avoidable cake and dessert waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Cakes / gateau / doughnuts / pastries	£220	£39	£99	£19	£6
All other cake and desserts	£97	£54	£30	£9	£2
<b>Total cake and desserts</b>	<b>£320</b>	<b>£94</b>	<b>£130</b>	<b>£28</b>	<b>£8</b>

## 12.2 Staple foods

### 12.2.1 Categorisation of staple foods

Staple foods are starchy foods made from wheat, rice, other grains and vegetables that we eat as a source of carbohydrate. This food group does not contain bread or potatoes as these are classified as bakery and vegetables respectively. Table 57 shows the five types of foods included in the staple foods group. The waste in this group includes a mixture of cooked and uncooked food and the waste may include a significant amount of absorbed water or milk.

**Table 57:** Types of staple foods waste

Food Type	What it includes	What it doesn't include
Breakfast cereal	Commercial cereals, muesli, porridge oats; dry or with absorbed milk	Cereal/ breakfast bars (see table 27)
Flour	Corn flour, flour	
Pasta	Gnocchi, noodles, pasta, takeaway noodles; cooked or dried	Pasta as part of a meal
Rice	Rice, including boil in the bag / express rice, takeaway rice; cooked or dried	Rice as part of a meal
Other staple foods	Couscous, semolina, tapioca; cooked or dried	Other staples as part of a meal

*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other staple foods'.*

### 12.2.2 Breakdown of staple foods by avoidability

All food waste in this category is edible and is therefore considered as avoidable. A total of 150,000 tonnes of staple food was wasted in 2012 at a cost of £350 million. Approximately half of this was breakfast cereal with rice accounting for 27% of the total and pasta 23%.

**Table 58:** The amount of staple food waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Breakfast cereal	70,000	<1,000	<1,000	70,000	£230
Rice	40,000	<1,000	<1,000	40,000	£68
Pasta	34,000	<1,000	<1,000	34,000	£43
All other staple foods	10,000	<1,000	<1,000	10,000	£11
<b>Total staple foods</b>	<b>150,000</b>	<b>&lt;1,000</b>	<b>&lt;1,000</b>	<b>150,000</b>	<b>£350</b>

### 12.2.3 Breakdown of avoidable staple food waste by the reason for disposal

More than half of these staple foods were disposed of because too much was prepared or served, rather than not used in time (as for most other food types). This is likely to be due to the fact they are relatively inexpensive and have long shelf-lives.

**Table 59:** Weight of avoidable staple food waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Breakfast cereal	14,000	27,000	23,000	4,000	2,000
Rice	3,000	30,000	<1,000	4,000	1,000
Pasta	4,000	25,000	4,000	<1,000	1,000
All other staple foods	7,000	1,000	<1,000	1,000	<1,000
<b>Total staple foods</b>	<b>28,000</b>	<b>83,000</b>	<b>28,000</b>	<b>10,000</b>	<b>5,000</b>

**Table 60:** Cost of avoidable staple food waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Breakfast cereal	£46	£88	£74	£13	£5
Rice	£6	£51	£1	£7	£2
Pasta	£5	£31	£5	£1	£1
All other staple foods	£6	£3	<£1	£1	£1
<b>Total staple foods</b>	<b>£63</b>	<b>£170</b>	<b>£80</b>	<b>£22</b>	<b>£9</b>

## 12.3 Condiments, sauces, herbs & spices

### 12.3.1 Categorisation of condiments, sauces, herbs and spices

Items in this group are usually added to other foods in small amounts in order to impart flavours. The table shows the 14 types of foods included in the condiments group.

**Table 61:** Types of condiments, sauces, herbs & spices waste

Food Type	What it includes	What it doesn't include
Cook in sauce	Sauces ready to make meals, either home-made or pre-prepared	Sauces as part of a meal
Dip	Dip, guacamole, salsa, taramasalata	Hummus
Gravy	Either as liquid or powder / granules	Tap water used to constitute gravy
Herb / Spice	Powdered spices, fresh and dried herbs, ginger, garlic, chillies,	
Honey	Honey	
Jam	Jam, marmalade	
Ketchup	Tomato ketchup only	Brown, barbeque and other sauces
Mayonnaise / salad cream	Mayonnaise, salad cream	
Olives	Olives	Olive oil
Pickle	Lime pickle, piccalilli, pickle	Pickled beetroot, pickled onions
Salt	Salt	
Sugar	Granulated, icing, caster	Syrup
Sweet spread	Chocolate spread, golden syrup, lemon curd, peanut butter	
Other condiments etc.	All other sweet and savoury sauces, lemon juice, vinegar, stock, syrup.	

*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other condiments, sauces, herbs & spices'.*

### 12.3.2 Breakdown of condiments, sauces, herbs and spices by avoidability

The majority of the food waste in this category is considered to be avoidable, although stalks from fresh herbs are considered possibly avoidable. Garlic and ginger skin and herbs such as bay leaves, lemongrass and cardamom pods that have been used in cooking are considered unavoidable.

Of the 140,000 tonnes of waste classified in this category, the vast majority was avoidable, costing £650 million. Most of the food types could not be reported individually due to the

high level of uncertainty around the estimates; however, 42,000 tonnes of cook-in sauces and 12,000 tonnes of gravy were wasted, all of which was avoidable

**Table 62:** The amount of condiments etc. waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Cook in sauce	42,000	<1,000	<1,000	42,000	£130
Gravy	12,000	<1,000	<1,000	12,000	£130
All other condiments, sauces, herbs & spices	85,000	<1,000	2,000	82,000	£390
<b>Total condiments, sauces, herbs &amp; spices</b>	<b>140,000</b>	<b>&lt;1,000</b>	<b>2,000</b>	<b>140,000</b>	<b>£650</b>

### 12.3.3 Breakdown of avoidable waste of condiments etc. by the reason for disposal

Of the 140,000 tonnes of avoidable waste, over 60% was disposed of because it was not used in time, at a cost of £370 million. A quarter was disposed of because too much was cooked, prepared or served.

**Table 63:** Weight of avoidable condiments etc. waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Cook in sauce	30,000	8,000	3,000	<1,000	<1,000
Gravy	1,000	10,000	<1,000	<1,000	<1,000
All other condiments, sauces, herbs & spices	55,000	15,000	5,000	5,000	2,000
<b>Total condiments, sauces, herbs &amp; spices</b>	<b>86,000</b>	<b>33,000</b>	<b>9,000</b>	<b>5,000</b>	<b>3,000</b>

**Table 64:** Cost of avoidable condiments etc. waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Cook in sauce	£93	£25	£10	£1	£2
Gravy	£10	£100	£9	<£1	£2
All other condiments, sauces, herbs & spices	£270	£76	£24	£11	£11
<b>Total condiments, sauces, herbs &amp; spices</b>	<b>£370</b>	<b>£210</b>	<b>£44</b>	<b>£12</b>	<b>£16</b>

## 12.4 Oil and fat

### 12.4.1 Categorisation of oils and fats

This group excludes fats (and juices) generated by the cooking of meats in the home; also excluded is oil drained from tins of fish, olives, etc.

**Table 65:** Types of oil and fat waste

Food Type	What it includes	What it doesn't include
Oil	Olive oil, flavoured oils, vegetable oils	
Fat	Butter, dripping, margarine, lard, suet	Fat from cuts of meat

*Shaded cells indicate categories with poor precision around the estimate. This category has been reported as part of 'all other (oil)'.*

### 12.4.2 Breakdown of oil and fat by avoidability

Oils and fats are assumed to be avoidable unless they were recorded as having been 'used', in which case they are recorded as possibly avoidable (due to the ambiguity of whether they could be used further). This is different from the assumption in the previous *Household Food and Drink Waste in the UK* report where a small proportion of 'used' oil and fat was recorded as unavoidable. A total of 72,000 tonnes of oils and fat were wasted, approximately three-quarters of which was possibly avoidable.



**Table 66:** The amount of oil and fat waste in 2012, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Fat	12,000	<1,000	<1,000	11,000	£34
All other (oil)	61,000	<1,000	51,000	9,000	£21
<b>Total oil and fat</b>	<b>72,000</b>	<b>&lt;1,000</b>	<b>52,000</b>	<b>20,000</b>	<b>£55</b>

### 12.4.3 Breakdown of avoidable oil and fat waste by the reason for disposal

Of the avoidable oil and fat waste, 60% is disposed of because it is not used in time. A quarter of the waste is disposed of as a result of accidents (e.g. contaminated or burnt). Results are omitted for the detailed food types, as too little data was available to report robust results.

**Table 67:** Weight of avoidable oil and fat waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
<b>Total oil and fat</b>	<b>12,000</b>	<b>2,000</b>	<b>&lt;1,000</b>	<b>5,000</b>	<b>&lt;1,000</b>

*Results for the food types are omitted as too little information to quantify*

**Table 68:** Cost of avoidable oil and fat waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
<b>Total oil and fat</b>	<b>£31</b>	<b>£5</b>	<b>£2</b>	<b>£16</b>	<b>£1</b>

*Results for the food types are omitted as too little information to quantify*

## 12.5 Confectionery and snacks

### 12.5.1 Categorisation of confectionery and snacks

**Table 69:** Types of confectionery and snacks waste

Food Type	What it includes	What it doesn't include
Chocolate and sweets	Chocolate bars, chocolate sweets, fudge, Indian sweets, mints, sweets	Chewing gum
Cereal bar	Cereal, brunch and breakfast bars	Flapjacks
Savoury snacks	Bombay mix, crisps, nuts, popcorn, prawn crackers, pretzels, savoury snacks, tortilla chips	Savoury products such as scotch eggs (see Table 47)
Other confectionery and snacks	Chewing gum, fortune cookies, fruit and nut mix, yoghurt coated fruit	
Sweet biscuits	Home-made and shop-bought sweet biscuits, including fig rolls, jaffa cakes, kitkats, shortbread etc.	Cheese biscuits, crackers, savoury biscuits

*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'all other confectionery and snacks'.*

### 12.5.2 Breakdown of confectionery and snacks and by avoidability

All food waste in this category is recorded as avoidable other than the shells from pistachios and other nuts, which are classified as unavoidable. A total of 62,000 tonnes of confectionery and snacks was thrown away by households. Nearly all of this was avoidable (61,000 tonnes) and cost £410 million. Of this, 23,000 tonnes was savoury snacks such as peanuts and crisps, 19,000 tonnes was biscuits, and 18,000 tonnes was chocolate and sweets.

**Table 70:** The amount of confectionery and snacks waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes per year)				Avoidable waste (£ million per year)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Savoury snacks	23,000	1,000	<1,000	22,000	£160
Sweet biscuits	19,000	<1,000	<1,000	19,000	£84
Chocolate and sweets	18,000	<1,000	<1,000	18,000	£150
All other confectionery and snacks	2,000	<1,000	<1,000	2,000	£14
<b>Total confectionery and snacks</b>	<b>62,000</b>	<b>1,000</b>	<b>&lt;1,000</b>	<b>61,000</b>	<b>£410</b>

### 12.5.3 Breakdown of avoidable confectionery and snack waste by the reason for disposal

Almost half of the avoidable confectionery and snacks waste was due to it not being used in time and a third due to personal preference.

**Table 71:** Weight of avoidable confectionery and snacks waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Savoury snacks	6,000	3,000	10,000	2,000	<1,000
Sweet biscuits	8,000	1,000	5,000	4,000	1,000
Chocolate and sweets	13,000	<1,000	3,000	2,000	<1,000
All other confectionery and snacks	<1,000	<1,000	<1,000	<1,000	<1,000
<b>Total confectionery and snacks</b>	<b>28,000</b>	<b>5,000</b>	<b>19,000</b>	<b>8,000</b>	<b>2,000</b>

**Table 72:** Cost of avoidable confectionery and snacks waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Savoury snacks	£46	£22	£72	£14	£3
Sweet biscuits	£34	£6	£22	£16	£6
Chocolate and sweets	£110	£1	£29	£13	<£1
All other confectionery and snacks	£2	£4	£4	£4	<£1
<b>Total confectionery and snacks</b>	<b>£190</b>	<b>£33</b>	<b>£130</b>	<b>£46</b>	<b>£9</b>

## 12.6 Other

### 12.6.1 Categorisation of 'other'

This group includes unidentifiable food and drink waste and foods that do not fit into another category, e.g. baby food, liquids drained from cans and jars (Table 73). Note that non-food items (medicines and pet food) have been removed from the dataset as they are not considered as human food. Possibly avoidable waste includes unidentifiable items (including 'mixed semi-solid food'), and drainings from cans and jars.

**Table 73:** Types of other foods waste

Food Type		What it doesn't include
Baby food	Baby food	
Baby milk	Baby milk (formula)	Milk
Mixed semi-solid food	Food that was 'unpickable' during the compositional analysis and includes food that has decomposed and is no longer identifiable. It also contains semi-liquid material from meals. These materials were often found mixed together. This category was previously known as 'gunge'.	
Mixed food	Foods from more than one food group mixed together, but that aren't a meal	
Other food	Food colouring, gelatine, glucose powder, cake decorations	
Drainings from canned and bottled food	Brine, olive oil, vinegar, water; from fish, fruit, gherkins, hot dogs, olives, vegetables	

*Shaded cells indicate categories with poor precision around the estimate. These categories have been reported as part of 'Remaining other'.*

### 12.6.2 Breakdown of 'other' by avoidability

This category largely contains mixed semi-solid food, unidentifiable food waste, other mixed foods and drainings from canned and bottled food, these food types are all considered as possibly avoidable. The avoidable food waste includes baby food and other food such as food colouring.

There was a total of 250,000 tonnes of mixed semi-solid food<sup>64</sup> that is all categorised as possibly avoidable as it was not possible to further identify this food waste. This material was 'unpickable' during the compositional analysis and includes decomposing food and semi-solid waste from meals.

<sup>64</sup> This category was previously known as 'gunge'.

**Table 74:** The amount of other food waste in 2012, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Mixed semi-solid food	250,000	<1,000	250,000	<1,000	<£1
Drainings from canned food	120,000	<1,000	120,000	<1,000	<£1
Remaining 'other'	23,000	<1,000	12,000	11,000	£29
<b>Total 'other'</b>	<b>390,000</b>	<b>&lt;1,000</b>	<b>380,000</b>	<b>11,000</b>	<b>£29</b>

### 12.6.3 Breakdown of avoidable 'other' waste by the reason for disposal

There is insufficient avoidable waste to analyse the reasons for disposal for other waste.

## 13.0 Results per household

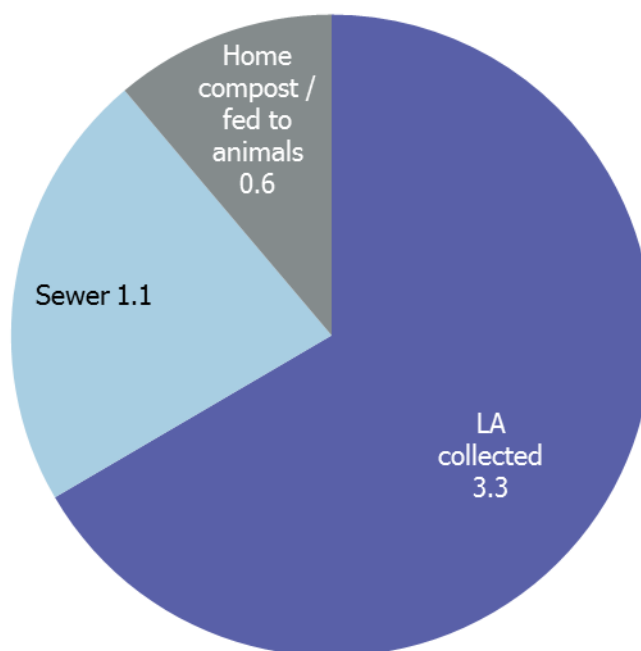
The total amount of household food and drink waste generated in the UK in 2012 was 7.0 million tonnes, of which 4.2 million tonnes was avoidable. This section reports the UK figures for 2012 for an 'average' UK household. No household in the UK exactly conforms to this average: for example, it would not be possible for a household to contain the average number of occupants (2.4 people). Furthermore, no household generates precisely the amounts of waste described below. However, it is a useful way of reporting a typical UK household.

The results are presented for a week, rather than for a whole year, as this should allow the reader to relate to the information more easily.

### 13.1 Weight of food and drink waste generated by an average household

During 2012, 5.0 kg of food and drink waste was generated in the average household in a week. Of this, approximately 3.3 kg went into the bin or food waste collections, 1.1 kg was poured down the sewer, and 0.6 kg was fed to animals or home composted<sup>65</sup> (Figure 38).

**Figure 38:** Weight of food and drink waste per household per week, by disposal route

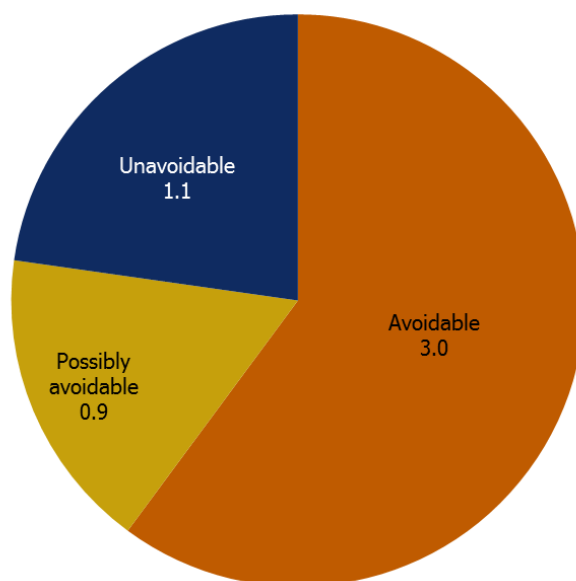


*Figures given are waste in kg per household per week*

Of the 5.0 kg of food and drink waste generated per household per week, 1.1 kg were unavoidable items (such as egg shells, tea bags, chicken bones, orange peel etc.) and a further 0.9 kg corresponded to possibly avoidable waste. A third of this possibly avoidable waste was made up of potato peelings, with other contributions from other edible peelings, bread crusts and the skin of meat and fish.

<sup>65</sup> As this is an average, households that do not home compost will dispose of no waste via this method. In contrast, households with compost bins will, on average, dispose of a higher percentage of food and drink waste via this route.

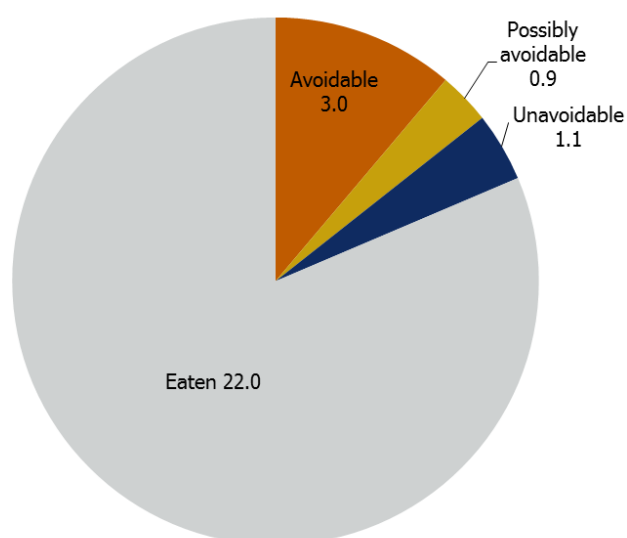
**Figure 39:** Weight of food and drink waste per household, by avoidability



*Figures give waste in kg per household per week*

This leaves approximately 3.0 kg of avoidable food and drink waste – the overwhelming majority of which could have been eaten had it been better managed in the home. This includes leftovers – food and drink that was prepared or served but not consumed – and food and drink that were disposed of because it was not used in time, either passing a 'use-by' date, or going mouldy.

**Figure 40:** Weight of food and drink waste per household – by avoidability – in comparison to a weekly shop



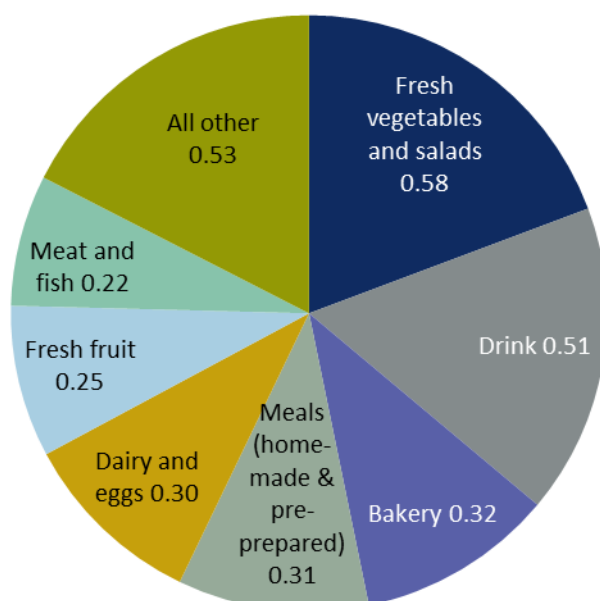
*Figures give amount of food purchases and waste in kg per household per week*

The average household of 2.4 people purchased 27 kg of food and drink per week in 2011<sup>66</sup>. 19% of this was not consumed; this was made up of approximately 4.2% disposed as inedible waste, a further 3.2% possibly avoidable; avoidable food and drink waste represented 11.2% of home purchases (Figure 40).

<sup>66</sup> The 2012 Family Food Survey was not published at the time of writing this report.

The avoidable food and drink waste was not dominated by any one particular type of food. Rather, a diverse range of foodstuffs contributed to household waste (Figure 25). There was a large contribution from fresh produce – fresh fruit, vegetables and salad made up around one-quarter (0.8 kg per week) of the 3.0 kg of avoidable waste. Drinks contributed a further 0.5 kg per week – this figure excludes the tap water used to constitute drinks in the home (e.g. for diluting squash or brewing tea). Bakery – mainly bread – made up a further 0.3 kg. Meals – both home-made and pre-prepared (ready meals and takeaways) – also contributed 0.3 kg. Dairy and eggs contributed another 0.3 kg per week, two-thirds of which was milk.

**Figure 41:** Weight of avoidable food and drink waste per household, by food group



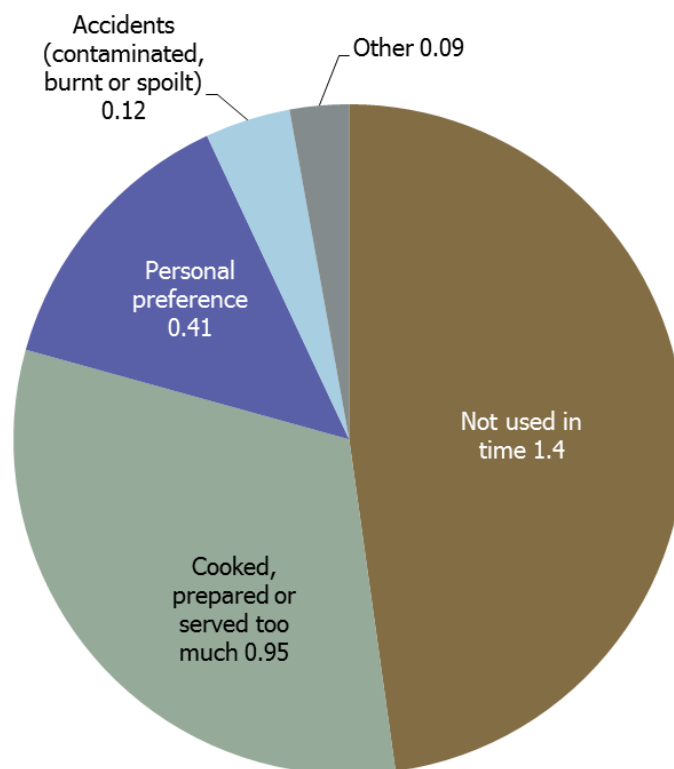
*Figures give waste in kg per household per week*

The reasons why this avoidable food and drink was wasted are varied – from leaving lettuce in the bottom of the fridge until it was no longer appetising, to serving too much pasta and throwing away what wasn't eaten. These reasons have been grouped into four headline categories (Figure 42).

The research indicates that 1.4 kg per week was thrown away due to food not being used in time: either it went off or was thrown away because it passed the date on the label. A further 0.95 kg per week was thrown away because food was left over: either after preparation or after serving. Personal preference – health reasons or rejection of food for other reasons – accounted for 0.41 kg per week, and accidents (burnt toast, split milk, etc.) a further 0.12 kg per week.



**Figure 42:** Weight of avoidable food and drink waste per household, by reason for disposal



*Figures given waste in kg per household per week*

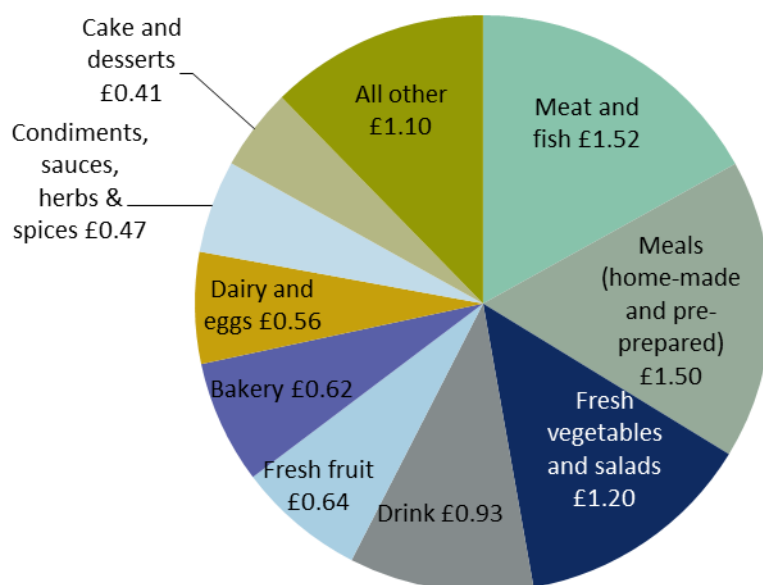
### 13.2 Cost of avoidable waste generated by an average household

For the average household, the retail price of the avoidable food and drink waste was around £9 per week, or more than £1 per day. This compares to an average weekly food and drink expenditure of £66 per household per week<sup>67</sup> in 2011. Therefore, avoidable food and drink waste accounted for approximately 14% of the shopping budget.

This cost was split between the different food and drink groups, although not in the same proportions as the weight, as the cost per kilogramme varied between food groups. Around £1.50 was spent per week on meat and fish that was thrown away and a similar amount on meals (both home-made and pre-prepared) that were not eaten (Figure 43). £1.20 was spent fresh vegetables and salad and a further £0.93 on drinks.

<sup>67</sup> WRAP calculations based on Family Food statistics for UK in 2011; spend on in home food purchases only, i.e. excludes eating out.

**Figure 43:** Cost of avoidable food and drink waste per household per week, by food group



*Figures give waste in £ per household per week*

### 13.3 Environmental impact of food and drink waste generated

To produce, package, distribute, store, and (where applicable) cook food and drink that is subsequently not eaten requires the use of resources – energy and fuel, water and land. Each of these stages emits greenhouse gases, contributing to climate change.

How much does food and drink waste contribute? The average household generated 160 kg of avoidable food and drink waste in 2012 and this is associated with the equivalent of 0.62 tonnes of CO<sub>2</sub>. This compares to total greenhouse gas emissions associated with consumption in the UK of approximately 37 tonnes CO<sub>2</sub> equivalent per household. So, food and drink waste accounted for 1.7% of the total greenhouse gas emissions in 2012.

To illustrate the scale of these emissions, they are similar in magnitude to:

- One quarter of the annual mileage driven by the members of that household; or
- All members of a household taking a return flight from London to Prague each year.

In other words, if avoidable food and drink waste were no longer generated, there would be an important cut in greenhouse gas emissions.

## 14.0 Discussion and future work

This report has demonstrated that there was a substantial reduction in the amount of household food and drink waste generated in the UK between 2007 and 2012, and highlighted the scale of the opportunity remaining – providing detailed data on the types of food and drink wasted in 2012, and the reasons for this.

There was 1.3 million tonnes less household food and drink waste in 2012 compared to 2007, a 15% reduction, despite an increase of 4% in the number of households in the UK. Almost all, 85% (1.1 million tonnes; or enough to completely fill Wembley Stadium) of this reduction was in food that could have been eaten (avoidable). The contributions to the large reduction in avoidable food and drink waste are primarily concentrated in five categories, each with reductions of more than 100,000 tonnes: home-made and pre-prepared meals, bakery, drink, fresh fruit and dairy and eggs. A range of behaviours (buying appropriate amounts, storing food under the optimal conditions, portion control, using the freezer more effectively etc.) and technical innovations (range of pack sizes available, improved storage and freezing guidance, clearer date labelling, increased shelf-life, packaging innovations etc.) will have contributed to these reductions, supported by LFHW and its partners through a wide range of national and local initiatives.

For other categories, there were smaller reductions (such as in fresh vegetables and salad) or very little change (such as for meat and fish). Further analysis is in progress to understand why this is the case, and what more can be done to help people reduce the waste of these types of food. For fresh vegetables and salad waste this is important as it makes up almost 20% (by weight) of the avoidable household food and drink waste. Buying the right amounts, storing produce correctly (in particular making better use of packaging, as highlighted by LFHW and Fresher for Longer<sup>68</sup>), understanding 'best before' dates and what can be done with 'tired' vegetables can all make a big difference. Similarly retailers and brands are looking at how changing pack sizes, promotions, date labelling and shelf-life can make it easier for people to waste less.

For fresh meat and fish this is also important, due to its high value (financial, environmental and ethical). Buying the right amounts, understanding 'use by' dates and making more use of the freezer (whole packs or part contents) can all make a big difference. Similarly retailers and brands have a role to play, looking at pack sizes, date labelling, freezing guidance and shelf-life (e.g. through innovative packaging).

The results presented here are consistent with those found in a recent evaluation of the LFHW campaign<sup>69</sup>, where the majority of the reduction in avoidable household food and drink waste occurred in 'cooked food', with no significant change found for meat and fish, or fresh fruit and vegetables.

Importantly there is more to do in all the categories of waste and no one area has improved so much that further action would not deliver significant benefits.

The research behind this report was extensive, and additional analysis will be undertaken and reported in spring 2014. This includes developing a better understanding of the amount and types of food and drink waste for different types of household, and the relationship between food and drink waste and the responses to household interviews (e.g. relating to specific attitudes and behaviours) that were conducted as part of this research. Such

<sup>68</sup> <http://www.wrap.org.uk/fresherforlonger>; <http://england.lovefoodhatewaste.com/content/fresher-longer-0>

<sup>69</sup> <http://www.wrap.org.uk/content/west-london-food-waste-campaign>

information will help understand why the scale of reductions differs between categories (which are likely to reflect different challenges faced in terms of changing behaviours and products), and develop and target more tailored messages, guidance and solutions for different groups of people.

Detailed data on specific types of food waste will also be obtained: for instance, at the product level, how much is thrown away in the original packaging, what the dates were on this packaging, and what proportion of the pack was wasted. From the kitchen-diary, it will also be possible to determine the weight of each instance of waste: this helps see if a lot of material is being thrown away in small amounts, or as relatively few (but large) amounts. This information will help the food industry optimise products and labelling to reduce the likelihood of a product being wasted.

There is also a need to understand how this information fits with purchasing data (e.g. Defra's Family Food survey) and consumption data (for example, the National Diet and Nutrition Survey). Preliminary analysis suggests that the amount of food and drink brought into the home per person has declined, qualitatively consistent with the decrease in waste levels<sup>70</sup>. However, further analysis would be beneficial to understand how changes in population, levels of eating outside the home, and changes in diet are influencing purchases, consumption and waste.

Alongside other research, such as the recent evaluation of the positive impact of a six month LFHW campaign in West London (which indicated up to a 14% reduction in avoidable food waste), this work demonstrates that change is possible: households can reduce the amount of food and drink waste they generate considerably. This may be as a direct result of engagement campaigns, in response to how food is sold and is packaged, or linked to food price inflation and other economic factors, and new research by WRAP investigating the influences on food waste and food purchases will be published winter 2013.

This, together with other analysis, will help forecast levels of household food and drink waste in the future, and determine how far we can go in reducing this. Understanding this, and what types of food and drink are found in different waste streams, and how this might change over time, will be of interest to those involved in the treatment of food waste (as different types of food waste could effect processability and yield).

This information will further develop our understanding of food waste specifically, as well as how it fits with other food- and waste-related issues. This deeper understanding will aid prioritisation of action to reduce food and drink waste, helping to tackle the issue in a targeted and appropriate way. WRAP and LFHW will be updating their guidance and tools for consumers, and resources for partners in the light of this research and the planned further analysis. Links to all of WRAP's previous research on food and drink waste and resources for partners can be found at <http://www.wrap.org.uk/waste-resource-listing>.

These new insights will also form the basis of discussions with Governments, local authorities, retailers, brands and manufacturers to maximise the impact of our collective actions in the future.

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<sup>70</sup> 2012 food purchase data was not available at the time of writing this report.

# Appendix 1: Proportion of purchases that are wasted

Note (24<sup>th</sup> June 2014): The information in this appendix has been superseded by that in [Household food and drink waste: a product focus](#) (sections 2.1 and 5.1). The new information includes purchasing data for 2012 and more refined assumptions in the calculations.

This appendix presents results for the proportion of purchases<sup>71</sup> that are wasted for selected types of food. The methods used to obtain these estimates are described in Chapter 10 of the *Methods Annex Report*. Comparison is made between 2012 waste data and 2011 purchasing data from the Family Food survey; purchase data for 2012 was not published at the time of writing. For this reason alone, the results in this appendix should be treated as preliminary. Further work is planned to refine the methods used in comparison of purchases and waste.

Consistent with the previous report – *Household Food and Drink Waste in the UK* – two proportions have been calculated:

- The proportion of purchases that become waste; and
- The proportion of purchases that become avoidable waste.

This allows comparison with previously published figures. Further analysis is planned to look at the proportion of edible purchases that become avoidable waste (i.e. subtracting the quantity of materials such as egg shells and banana skins from the purchase data).

The results are only presented for a small group of food types as there are difficulties in producing accurate estimates. In particular, foods are combined in the home (e.g. in the preparation of a meal) or change weight (e.g. absorb water during cooking). For these reasons, results are only produced for foods for which these issues are less important and which are associated with large amounts of waste. These issues are discussed in more detail in Appendix E of the previous *Household Food and Drink Waste in the UK* report.

The proportion of fresh potato purchased that subsequently became avoidable waste was 20%, higher than for processed potato products (10%; Table 75). Avoidable waste associated with standard bread accounts for 22% of purchases, a reduction from 31% in 2007. This will be a slight underestimate due to the waste category not including bread made into sandwiches that are subsequently wasted. 9% of banana purchases became avoidable waste, whilst a further 33% became unavoidable waste.

Similar to 2007, lettuce and leafy salads purchases had a very high proportion not eaten (37% of purchases become avoidable waste). This high level is likely to be a combination of two factors – lettuce has a relatively short shelf-life and it is often served as a garnish that is not always consumed.

In contrast, drinks were generally associated with lower proportions of waste: 7% of carbonated soft drinks purchases were wasted, 11% of fruit juice and smoothie purchases and 5% of alcoholic drink purchases.

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<sup>71</sup> In this appendix, 'purchases' are used as a shorthand for food and drink brought into the home. This includes home-grown and foraged food, gifts as well as retail and takeaway purchases.

The proportion of purchases wasted for apples (12% become avoidable waste) was much lower than in the previous *Household Food and Drink Waste in the UK* report (31%). This is partly due to seasonality being better accounted for in the current analysis and also a reduction in the amount of apple waste.

**Table 75:** Estimates of proportion of purchases wasted for selected food types in 2012

Food type	Amount purchased (2011; tonnes)	All waste (2012)		Avoidable waste (2012)	
		Amount (tonnes)	Proportion wasted	Amount (tonnes)	Proportion wasted
Fresh potato	1,600,000	730,000	45%	320,000	20%
Standard bread	1,600,000	460,000	28%	350,000	22%
Fresh banana	730,000	310,000	42%	67,000	9%
Milk	5,100,000	290,000	6%	290,000	6%
Poultry	820,000	280,000	35%	110,000	13%
Carbonated soft drink	3,100,000	230,000	7%	230,000	7%
Fruit juice & smoothies	1,100,000	120,000	11%	120,000	11%
Alcoholic drinks	2,400,000	116,000	5%	116,000	5%
Fresh apple	490,000	110,000	22%	59,000	12%
Processed potato	640,000	85,000	13%	85,000	13%
Lettuce and lettuce/leafy salads	170,000	75,000	43%	64,000	37%

For comparison, the figures for 2007 have been included in Table 76. For most products, levels of waste are lower in 2012 than 2007.

**Table 76:** Estimates of proportion of purchases wasted of selected food types in 2007

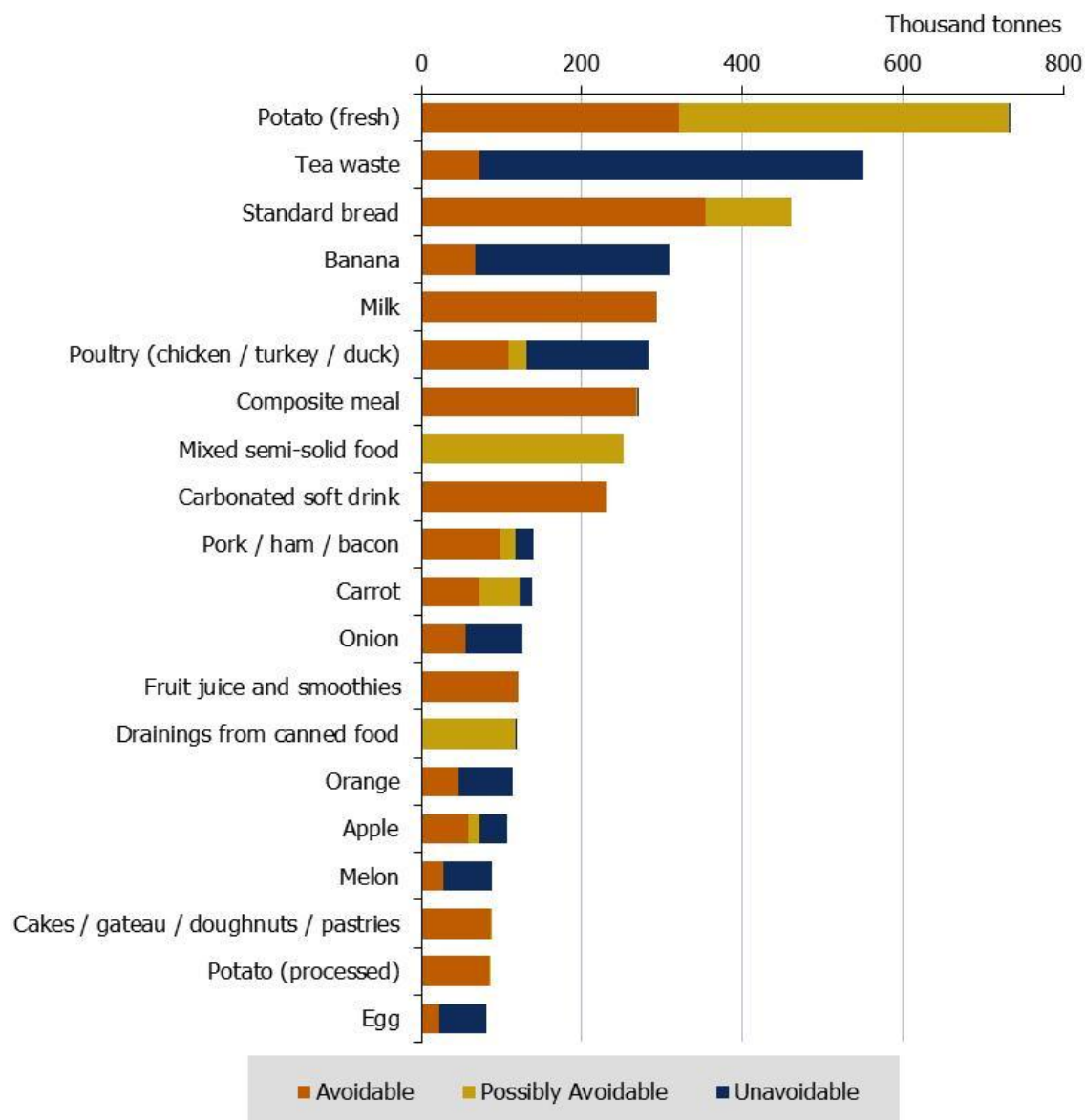
Food type	Purchased (2007; Tonnes)	All waste (2007 restated)		Avoidable waste (2007 restated)	
		Amount (tonnes)	Proportion wasted	Amount (tonnes)	Proportion wasted
Fresh potato	1,700,000	740,000	44%	280,000	16%
Standard bread	1,800,000	650,000	37%	540,000	31%
Fresh banana	730,000	310,000	42%	81,000	11%
Milk	5,200,000	370,000	7%	370,000	7%
Poultry	800,000	310,000	39%	84,000	10%
Carbonated soft drink	3,200,000	300,000	10%	300,000	10%
Fruit juice & smoothies	1,100,000	150,000	13%	150,000	13%
Alcoholic drinks	2,600,000	160,000	6%	160,000	6%
Fresh apple	570,000	220,000	39%	150,000	26%
Processed potato	600,000	74,000	12%	74,000	12%
Lettuce and lettuce/leafy salads	190,000	110,000	61%	110,000	57%

The estimates in this table have been calculated to be consistent with the results for 2012 and consequently differ from those published in the previous *Household Food and Drink Waste in the UK* report. The changes are mainly due to adjustment for seasonality. For more details see Chapter 11 of the *Methods Annex Report*.

## Appendix 2: Most wasted types of food

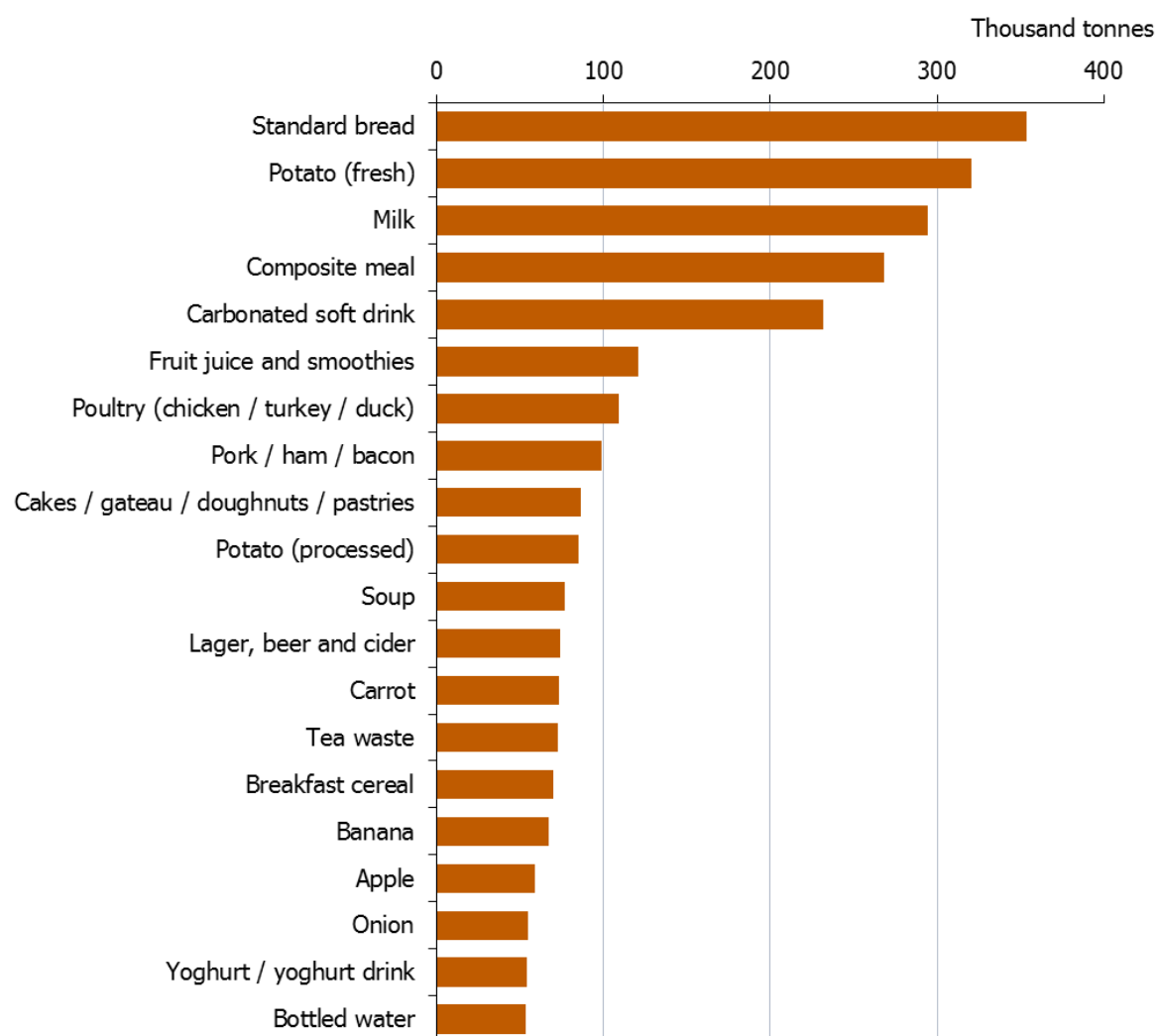
This appendix provides lists of the most wasted food types. These are provided for the total amount of waste, the different types of avoidability, and reasons for disposal.

**Figure 44:** Top 20 wasted food and drink items in 2012 – all food and drink waste

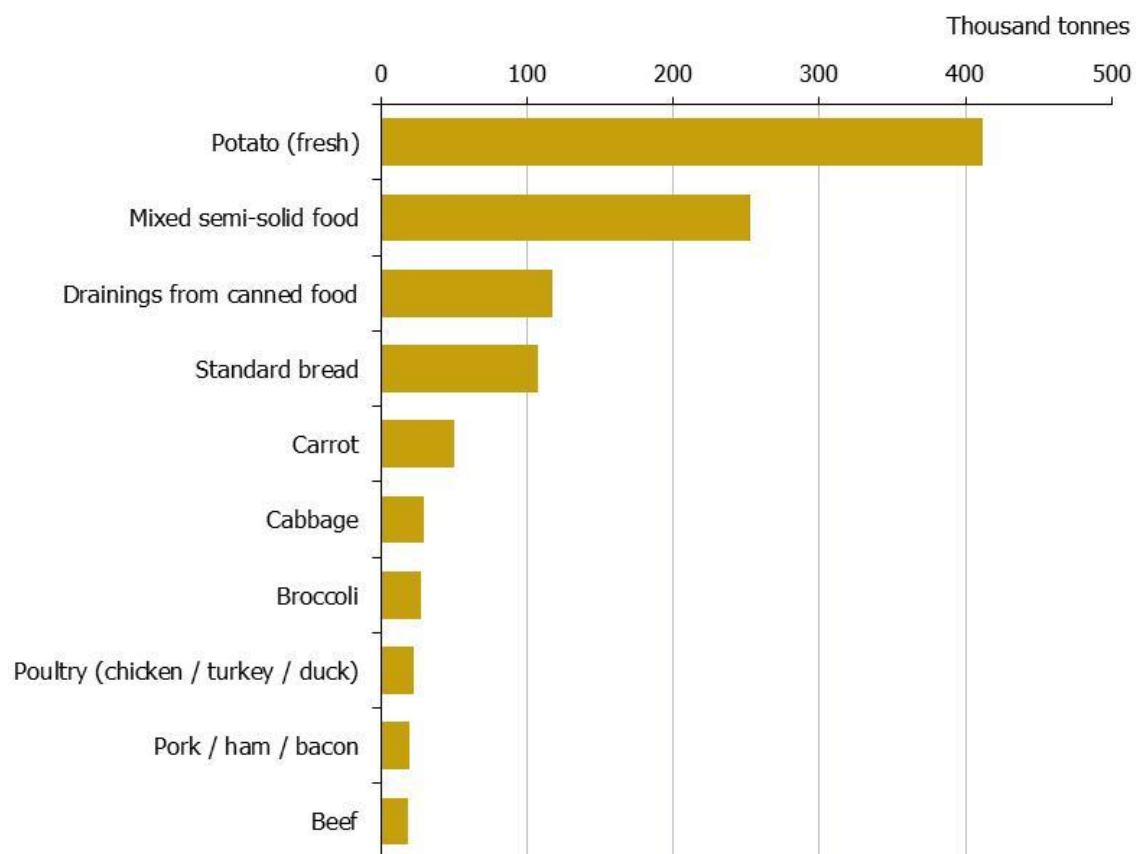




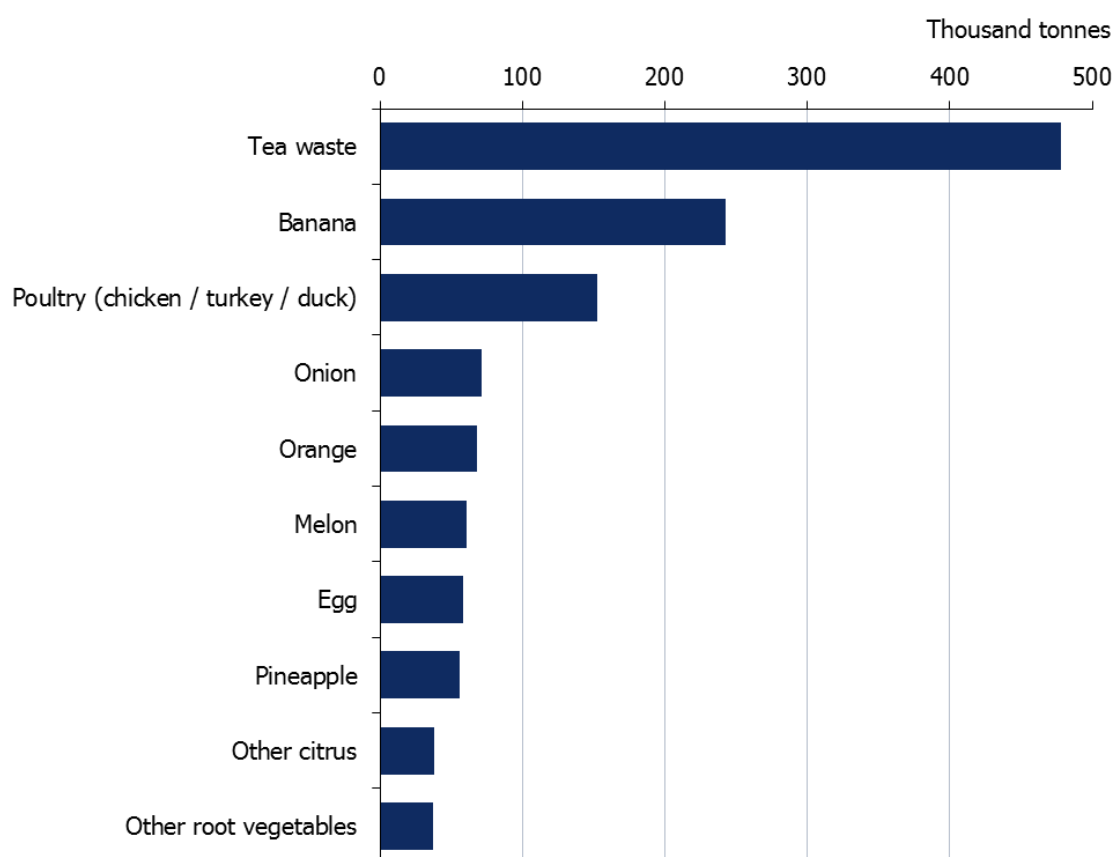
**Figure 45:** Top 20 wasted food and drink items in 2012 – avoidable food and drink waste



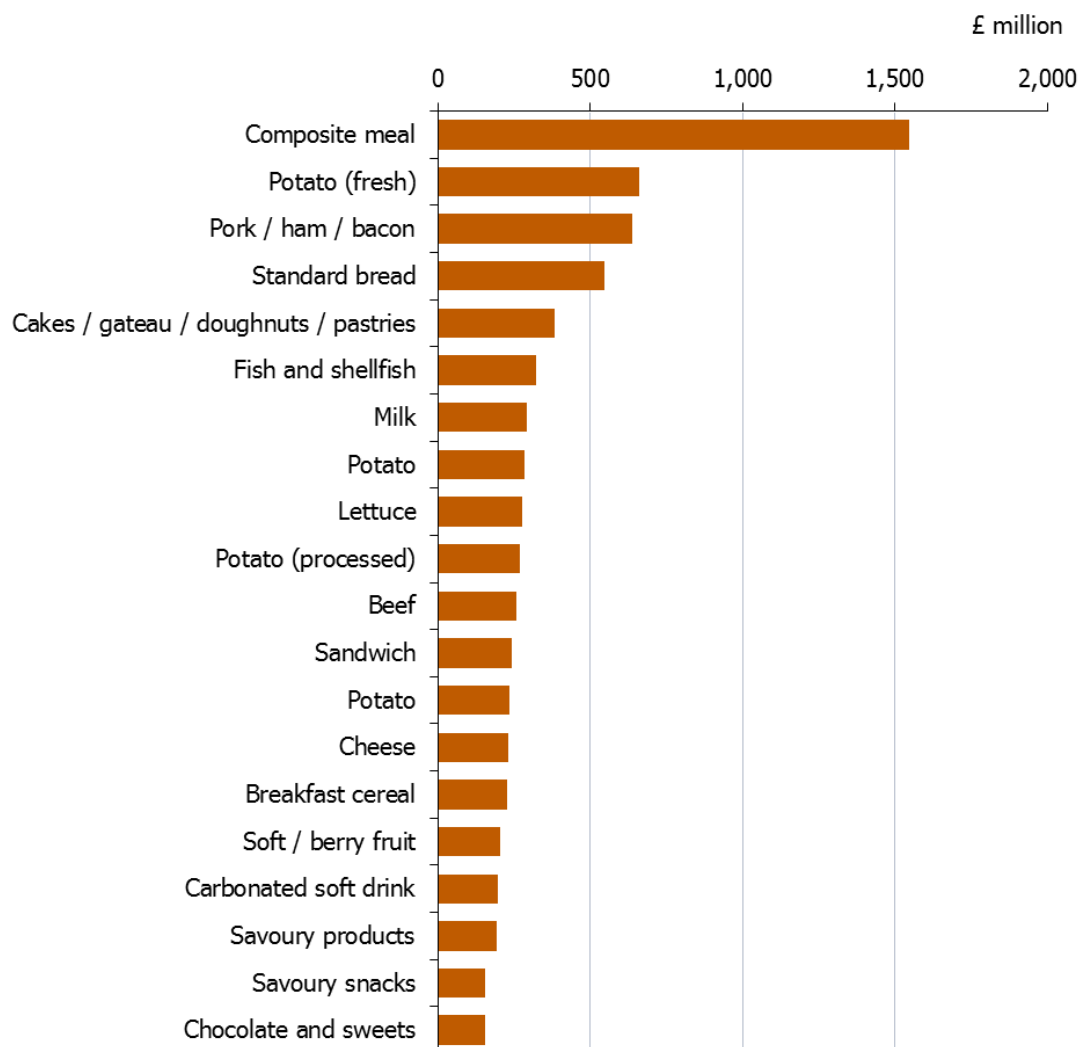
**Figure 46:** Top 10 wasted food and drink items in 2012 – possibly avoidable food and drink waste



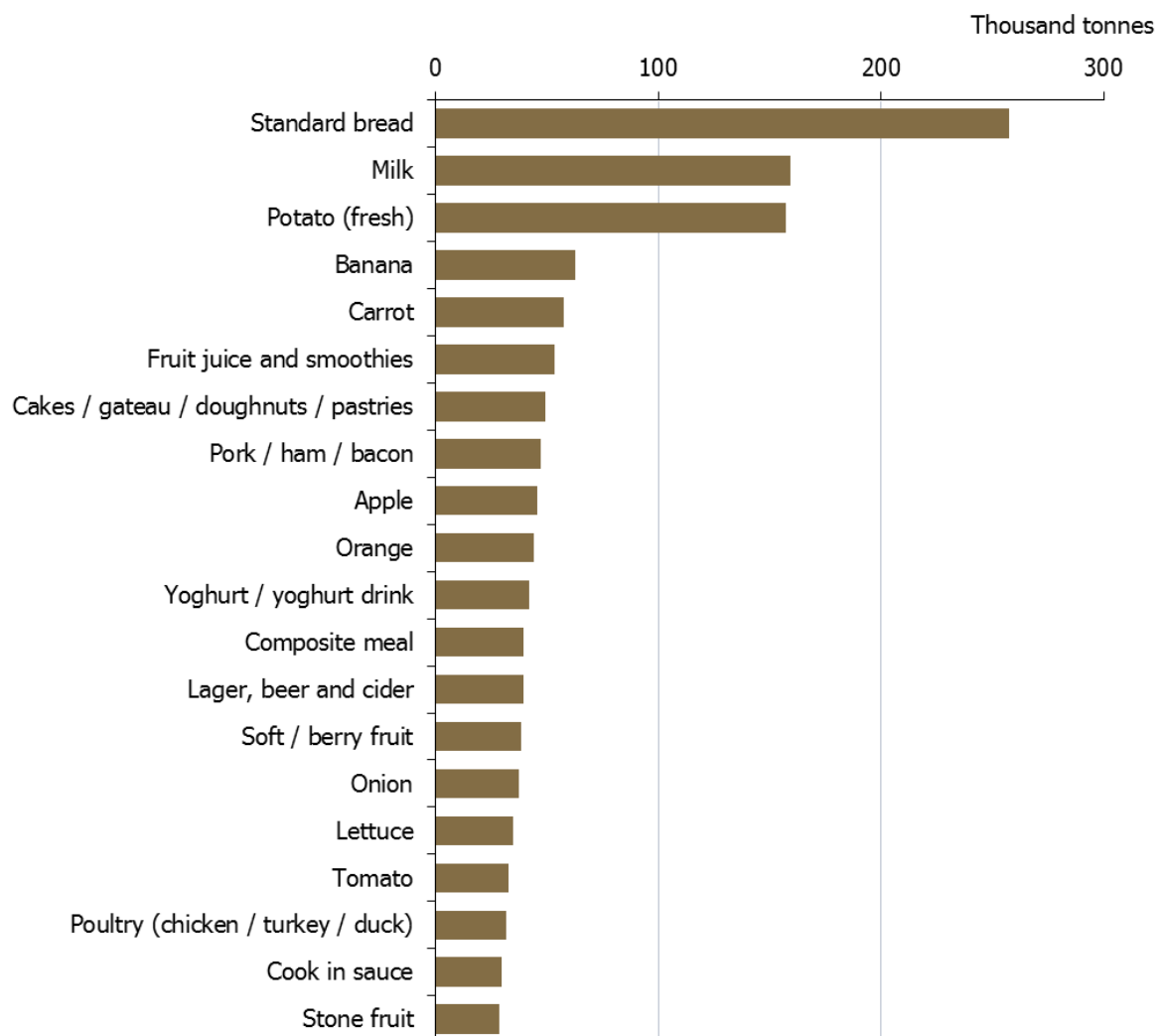
**Figure 47:** Top 10 wasted food and drink items in 2012 – unavoidable food and drink waste



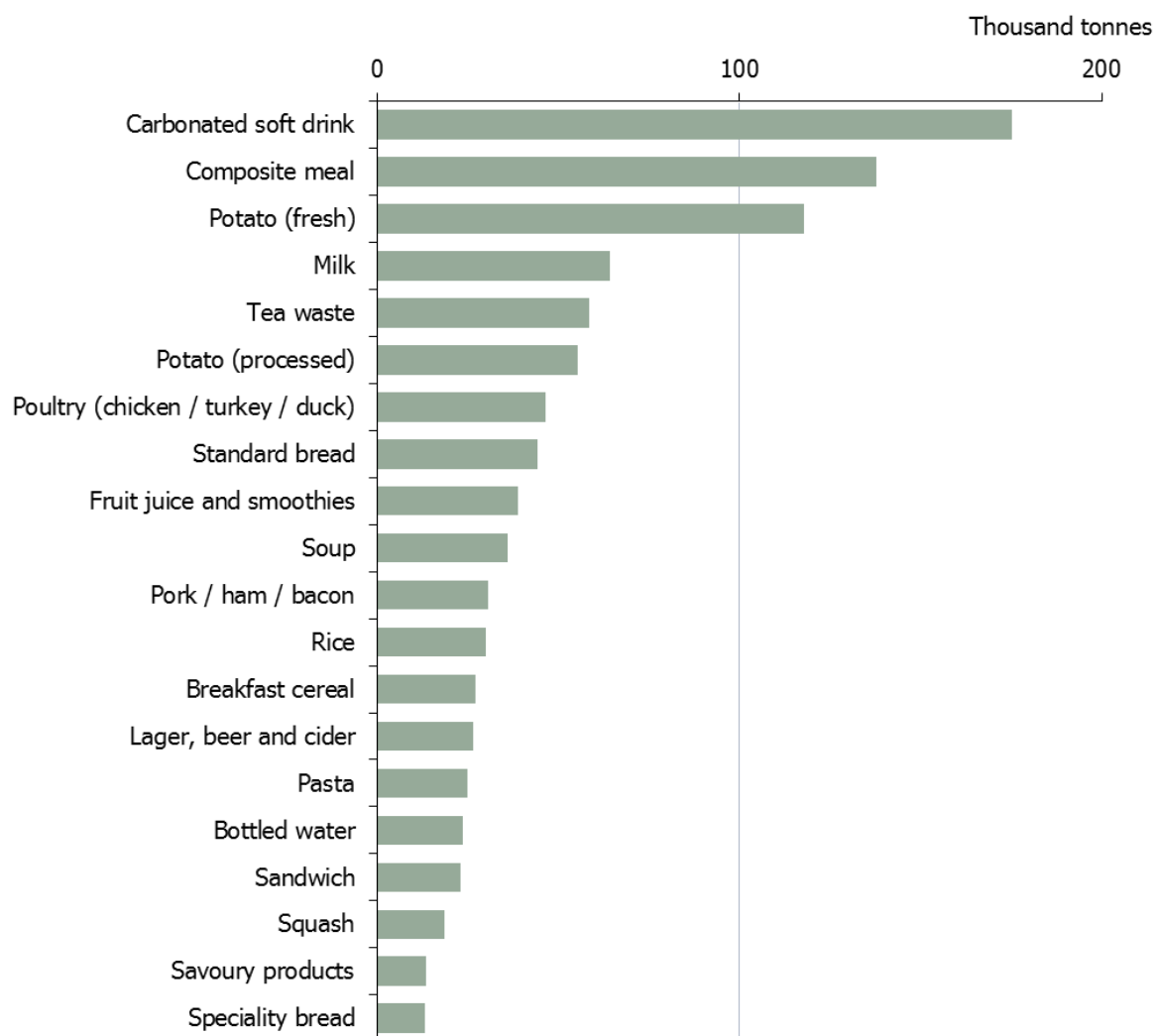
**Figure 48:** Top 20 wasted food and drink items in 2012 – avoidable food and drink waste by cost



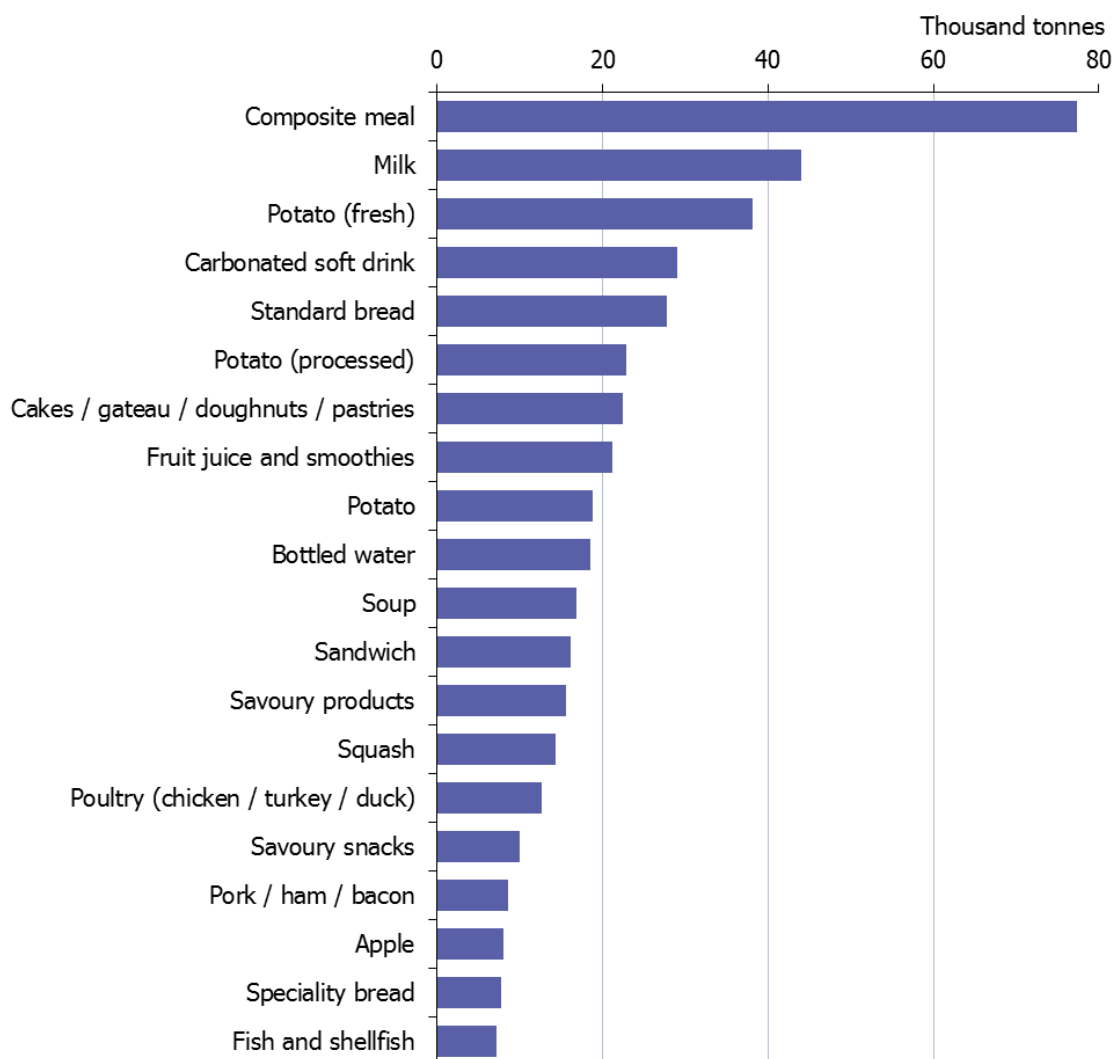
**Figure 49:** Top 20 wasted food and drink items in 2012 – avoidable food and drink waste that was not used in time



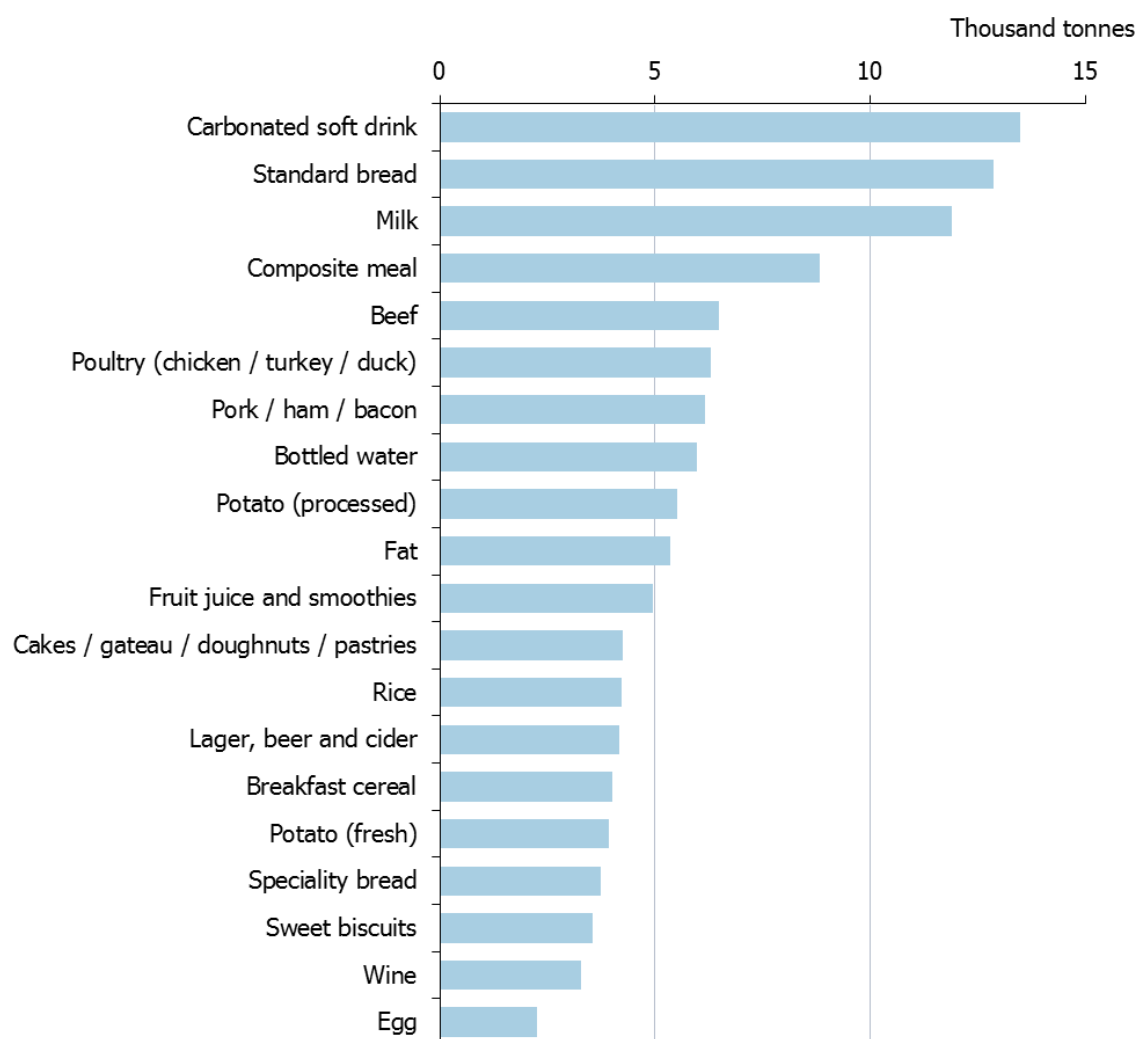
**Figure 50:** Top 20 wasted food and drink items in 2012 – avoidable food and drink waste where too much was cooked, prepared or served (leftovers)



**Figure 51:** Top 20 wasted food and drink items in 2012 – avoidable food and drink waste not eaten due to personal preferences



**Figure 52:** Top 20 wasted food and drink items in 2012 – avoidable food and drink waste not eaten due to accidents

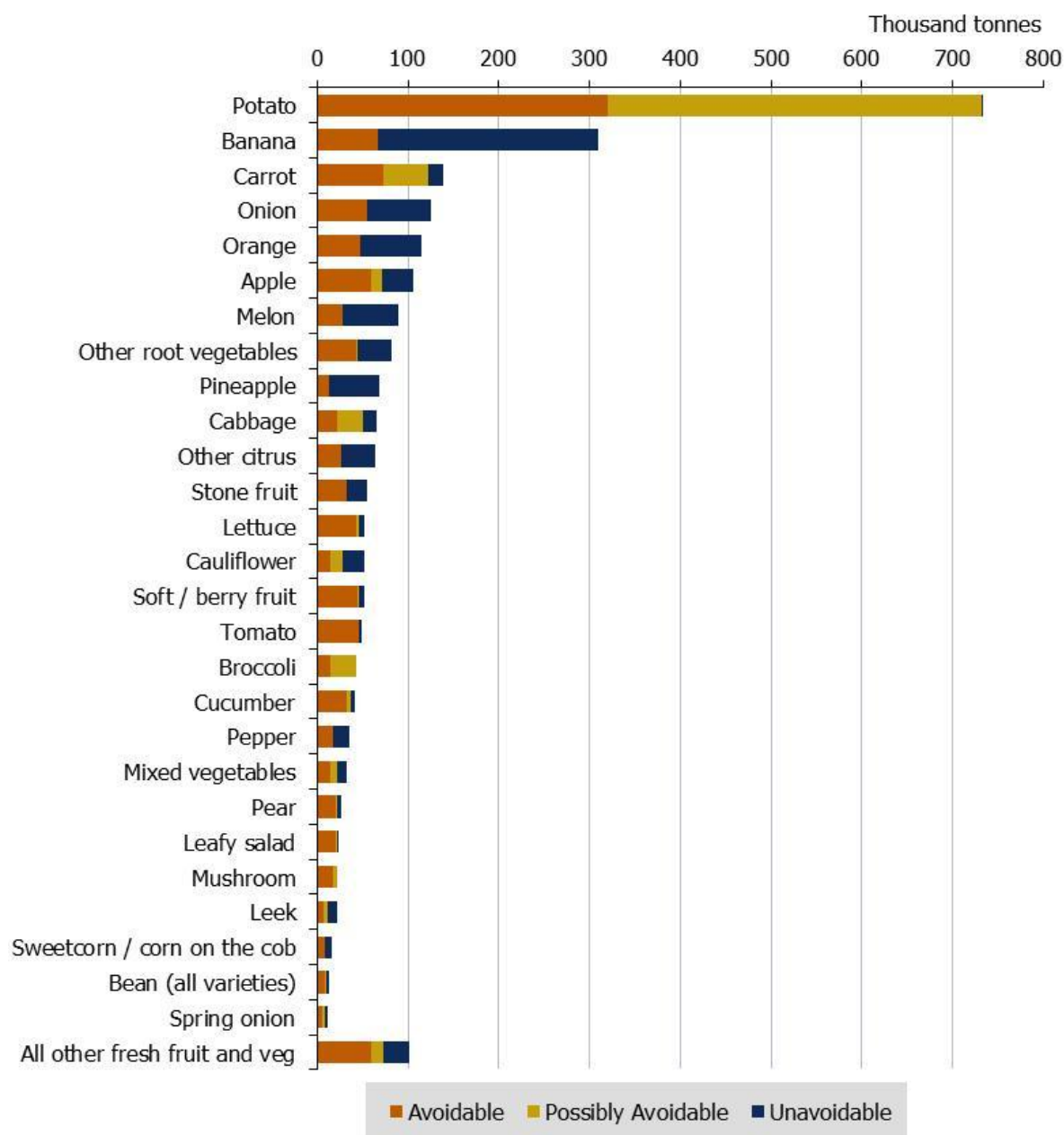




## Appendix 3: Results for fresh fruit, vegetables and salad

This appendix shows the combined results for the fresh fruit and vegetable categories.

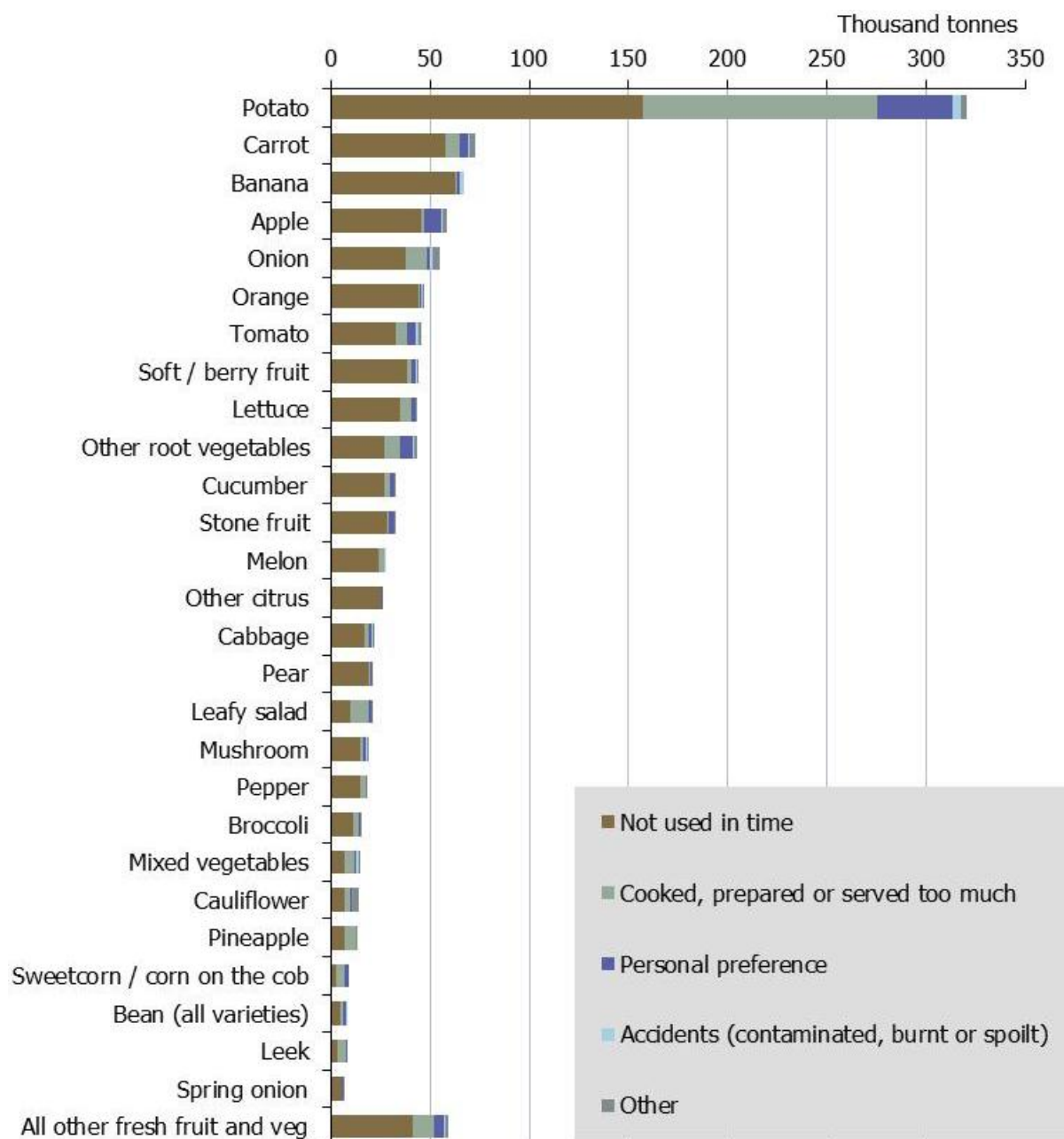
**Figure 53:** Weight of fresh fruit, vegetable and salad waste by type, split by avoidability



**Table 77:** The amount of fresh fruit, vegetable and salad waste in 2012 by type, split by avoidability

Food Type	Weight generated (tonnes)				Avoidable waste (£ million)
	Total	Unavoidable	Possibly avoidable	Avoidable	
Potato	730,000	<1,000	410,000	320,000	£230
Banana	310,000	240,000	<1,000	67,000	£63
Carrot	140,000	15,000	50,000	73,000	£68
Onion	130,000	71,000	<1,000	55,000	£78
Orange	110,000	68,000	<1,000	47,000	£66
Apple	110,000	35,000	13,000	59,000	£89
Melon	89,000	61,000	<1,000	28,000	£40
Other root vegetables	82,000	37,000	1,000	43,000	£65
Pineapple	69,000	56,000	<1,000	13,000	£87
Cabbage	65,000	15,000	29,000	22,000	£30
Other citrus	64,000	38,000	<1,000	26,000	£51
Stone fruit	54,000	23,000	<1,000	32,000	£94
Lettuce	52,000	5,000	3,000	44,000	£270
Cauliflower	51,000	23,000	14,000	14,000	£26
Soft / berry fruit	51,000	5,000	2,000	44,000	£200
Tomato	49,000	3,000	<1,000	45,000	£130
Broccoli	42,000	<1,000	28,000	15,000	£80
Cucumber	42,000	5,000	4,000	33,000	£56
Pepper	36,000	18,000	<1,000	18,000	£62
Mixed vegetables	32,000	10,000	8,000	15,000	£45
Pear	26,000	5,000	<1,000	21,000	£32
Leafy salad	23,000	1,000	2,000	21,000	£150
Mushroom	23,000	<1,000	4,000	18,000	£61
Leek	21,000	11,000	3,000	8,000	£28
Sweetcorn / corn on the cob	16,000	7,000	<1,000	9,000	£77
Bean (all varieties)	13,000	2,000	3,000	8,000	£24
Spring onion	11,000	4,000	2,000	6,000	£26
All other fresh fruit and veg	100,000	28,000	14,000	59,000	£340
<b>Total fresh fruit, vegetables and salads</b>	<b>2,500,000</b>	<b>790,000</b>	<b>590,000</b>	<b>1,200,000</b>	<b>£2,600</b>

**Figure 54:** Weight of avoidable fresh fruit, vegetable and salad waste by type, split by reason for disposal



**Table 78:** Weight of avoidable fresh fruit, vegetable and salad waste (tonnes) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Potato	160,000	120,000	38,000	4,000	3,000
Carrot	58,000	7,000	4,000	1,000	3,000
Banana	63,000	<1,000	2,000	2,000	<1,000
Apple	46,000	2,000	8,000	<1,000	3,000
Onion	38,000	11,000	2,000	1,000	4,000
Orange	44,000	<1,000	1,000	<1,000	<1,000
Tomato	32,000	6,000	4,000	2,000	1,000
Soft / berry fruit	38,000	2,000	2,000	1,000	<1,000
Lettuce	35,000	6,000	2,000	<1,000	<1,000
Other root vegetables	27,000	8,000	6,000	<1,000	2,000
Cucumber	27,000	3,000	2,000	<1,000	<1,000
Stone fruit	29,000	<1,000	3,000	<1,000	<1,000
Melon	Results omitted as too little information to quantify				
Other citrus	26,000	<1,000	<1,000	<1,000	<1,000
Cabbage	17,000	2,000	2,000	<1,000	<1,000
Pear	19,000	<1,000	1,000	<1,000	<1,000
Leafy salad	10,000	9,000	1,000	<1,000	<1,000
Mushroom	15,000	1,000	2,000	<1,000	<1,000
Pepper	15,000	3,000	<1,000	<1,000	<1,000
Broccoli	11,000	3,000	<1,000	<1,000	<1,000
Mixed vegetables	7,000	5,000	<1,000	2,000	<1,000
Cauliflower	7,000	3,000	<1,000	<1,000	3,000
Pineapple	Results omitted as too little information to quantify				
Sweetcorn / corn on the cob	Results omitted as too little information to quantify				
Bean (all varieties)	5,000	1,000	2,000	<1,000	<1,000
Leek	Results omitted as too little information to quantify				
Spring onion	Results omitted as too little information to quantify				
All other fresh fruit	41,000	11,000	5,000	<1,000	1,000
<b>Total fresh fruit, vegetables and salads</b>	<b>810,000</b>	<b>220,000</b>	<b>91,000</b>	<b>17,000</b>	<b>25,000</b>

**Table 79:** Cost of avoidable fresh fruit, vegetable and salad waste (£ million) in 2012 by type, split by reason for disposal

Food Type	Not used in time	Cooked, prepared or served too much	Personal preference	Accidents (contaminated, burnt or spoilt)	Other
Potato	£120	£86	£28	£3	£3
Carrot	£54	£7	£4	£1	£3
Banana	£59	£0	£2	£2	£0
Apple	£69	£3	£12	£1	£4
Onion	£53	£15	£3	£1	£5
Orange	£62	£1	£2	£1	£1
Tomato	£91	£17	£11	£5	£3
Soft / berry fruit	£180	£10	£9	£6	£2
Lettuce	£220	£36	£15	£0	£5
Other root vegetables	£41	£11	£9	£1	£3
Cucumber	£46	£5	£4	£1	£1
Stone fruit	£84	£2	£8	£0	£0
Melon	Results omitted as too little information to quantify				
Other citrus	£51	£0	£0	£0	£0
Cabbage	£23	£3	£3	£1	£1
Pear	£30	£0	£2	£0	£1
Leafy salad	£72	£66	£8	£1	£1
Mushroom	£51	£4	£5	£0	£0
Pepper	£51	£9	£1	£0	£0
Broccoli	£61	£16	£2	£1	£0
Mixed vegetables	£21	£16	£1	£6	£1
Cauliflower	£13	£5	£1	£0	£6
Pineapple	Results omitted as too little information to quantify				
Sweetcorn / corn on the cob	Results omitted as too little information to quantify				
Bean (all varieties)	£15	£3	£5	£0	£0
Leek	Results omitted as too little information to quantify				
Spring onion	Results omitted as too little information to quantify				
All other fresh fruit	£230	£84	£21	£3	£5
<b>Total fresh fruit, vegetables and salads</b>	<b>£1,800</b>	<b>£500</b>	<b>£170</b>	<b>£34</b>	<b>£47</b>

## Appendix 4: Methodology for calculating the food waste facts and equivalents

To allow the reader to more easily relate to the scale of the results, the executive summary contains a number of comparisons that relate the amount of food waste to recognisable equivalents e.g. the number of wheelie bins that the food waste would fill. This appendix details the assumptions used in calculating these equivalents.

Equivalent used	Calculation
7.0 million tonnes of food and drink was thrown away from our homes in 2012 – <i>enough to fill Wembley Stadium 9 times over.</i>	7.0 million tonnes of food waste would fill 35 million m <sup>3</sup> (conversion factor of 0.2 tonnes per m <sup>3</sup> ). The total volume of Wembley <sup>72</sup> is 4,000,000 m <sup>3</sup> . Therefore the food waste would fill it over 9 times. These assumptions are consistent with those used previously.
The total amount of food and drink waste has reduced ... from 320 to 260 kg per household per year – <i>this reduction of 60 kg is more than sufficient to fill a wheelie bin.</i>	The same tonnage to volume conversion factor as above is used and a standard wheelie bin is assumed to have a volume of 240 litres (0.24 m <sup>3</sup> ). Therefore 260 kg is equivalent to 1.3 m <sup>3</sup> or 5.4 wheelie bins and the difference of 60 kg is equivalent to 0.3 m <sup>3</sup> or 1.3 wheelie bins.
Fresh fruit, vegetable and salads combined amount to 1.2 million tonnes, worth £2.6 billion – <i>meaning that more than 13 billion '5 a day' portions of fruit and vegetables were thrown away.</i>	The definition of a '5 a day' portion from Defra's Family Food pocketbook is used, this assumes an adult portion size of 80 grammes for fresh and processed fruit and vegetables (excluding potatoes) and includes fruit juice and smoothies.

<sup>72</sup> <http://en.structurae.de/structures/data/index.cfm?id=s0006505>

Equivalent used	Calculation
<p>This reduction is reflected in the equivalent number of items thrown away per day in the UK for 2007 and 2012:</p> <ul style="list-style-type: none"> <li>■ Bananas have reduced: from 1.7 million to 1.4 million wasted per day</li> <li>■ Tomatoes: from 2.0 million to 1.5 million</li> <li>■ Yoghurts: from 1.7 million to 1.2 million</li> <li>■ Home-made meals: from 1.8 million to 1.5 million</li> <li>■ Bread: from 37 million slices to 24 million slices</li> </ul>	<p>The following weights per item are assumed and applied to the tonnage of avoidable waste:</p> <ul style="list-style-type: none"> <li>■ Whole bananas = 0.134 kg</li> <li>■ Whole tomatoes = 0.084 kg</li> <li>■ Yoghurts = 0.125 kg</li> <li>■ Home-made meal = 0.5kg</li> <li>■ Whole slices of bread = 0.04 kg</li> </ul> <p>It should be noted that the weight per item is applied to the total avoidable waste for that food type, not just the whole items that are wasted (hence the word 'equivalent' in the fact). The weight of each item is consistent with that using in the 2007 research.</p>
<p>There was 1.3 million tonnes less household food and drink waste in 2012 compared to 2007. ... <i>This amount of food waste would have filled 2,600 Olympic swimming pools.</i></p>	<p>The same tonnage to volume conversion factor as above is used and an Olympic swimming pool is assumed to have a volume of 2,500 m<sup>3</sup>. Therefore 1.3 million tonnes is equivalent to 6.5 million m<sup>3</sup>; this would fill 2,600 Olympic swimming pools.</p>
<p>4.2 million ..... is equivalent to the average household throwing away six meals per week, down from 8 meals per week in 2007.</p>	<p>This assumes a meal with a weight of 0.5kg.</p>

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**Waste & Resources  
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