Measuring Household Food Waste – The UK Experience

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What I’ll cover

1. Brief introduction of WRAP
2. Brief UK context
3. What do we know now?
4. What did we know when we set out?
5. How did we get from then to now?
6. What did we learn?
7. What’s next
8. Questions and discussion
Our vision
A world in which resources are used sustainably

Our mission
To accelerate the move to a sustainable, resource-efficient economy through:

Re-inventing how we design, produce and sell products.
Re-thinking how we use and consume products.
Re-defining what is possible through re-use and recycling.
WRAP and food waste prevention

Design ➔ Production ➔ Retail ➔ Consumption

THE COURTAULD COMMITMENT

THE HOSPITALITY AND FOOD SERVICE AGREEMENT

LOVE FOOD HATE WASTE
The UK......

- 65 million people
- Almost 27 million households
- Significant demographic changes
- Four nations
- Different national policies on food waste
- Different local approaches
The UK......

- 50Mt food is produced
- 10Mt of food goes to waste
- 80% of HH food waste
- <20% of HH food waste is recycled
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What do we know now? – UK food waste

- The amount of food being wasted post-farm gate in the UK is around 10 Mt
- ca. 6 Mt is avoidable, worth >£17 billion a year
- 70% of UK food waste comes from households
What do we know now? – Breakdown of HHFW

Avoidable food waste:

- Costs £700 a year per average family
- Associated with 19 Mt of CO$_2$e and 4% of the total UK water footprint
- Requires land >90% the size of Wales to produce
- Includes 13 billion “5 a day” portions
What do we know now? – Food types and reasons for household food being wasted

- Fresh vegetables and salads
- Drink
- Bakery
- Meals (home-made and pre-prepared)
- Dairy and eggs
- Fresh fruit
- Meat and fish
- Processed vegetables and salad
- Cake and desserts
- Staple foods
- Condiments, sauces, herbs & spices

- Not used in time (70%)
- Cooked, prepared, served too much (19%)
- Personal preference (8%)
- Accidents (1%)
- Other (2%)
What do we know now? – Granular data for key products

% weight of packaged leafy salad waste by amount left in pack

Source: Waste composition dataset
What do we know now? – Much more about people....

Indirect influences*
- Time availability
- Cooking and food-management skills
- A desire to eat healthily
- Personal preferences (‘fussy eating’)

Direct influences
- Behaviours that influence food waste: planning, buying, storing, preparing, using leftovers and their interactions
- Amount and types of food and drink brought into the home

Amount of avoidable household food waste

Environmental and economic impact of food waste

*Sparse data were collected on socio-demographic and individual characteristics and environments. It is clear that many studies are needed to fully understand the pathways through which these characteristics influence the amount and types of food and drink brought home by people and the amount and types of avoidable food waste they generate.
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6. What did we learn?
7. Summary & what’s next
8. Questions and discussion
What did we know when we set out?
Dustbin composition 1930-2000

In 2004/5:
- Food made up ca. 17% of all household waste
- 25-30% of collected waste
What did we know when we set out?
Self-reported food waste - 2004

£424 food waste per person per year
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Being clear on what was needed
Being clear on what was needed

WRAP defined this as:
• Avoidable and potentially avoidable
• Unavoidable
Being clear on what was needed

Included food waste:
- Collected in the general / residual bin
- Collected separately
- Disposed of via the sewer
- Home composted
- [Fed to pets/animals]
Destinations for HHFW (2012)

- **Total**: 82% Food, 18% Drink
- **LA collected**: 90% Food, 10% Drink
- **Sewer**: 56% Food, 44% Drink
- **Home composting / fed to animals**: 87% Food, 13% Drink
Destinations for HHFW (2012)

- Total: 82% Food, 18% Drink
- LA collected: 90% Food, 10% Drink (ca. 65% overall)
- Sewer: 56% Food, 44% Drink
- Home composting / fed to animals: 87% Food, 13% Drink
Being clear on what was needed

NOT including:
- Out of home (workplace & school lunches, meals out)
- Food waste in litter
Approach to measuring HHFW in the UK


TBC  TBC
Approach to measuring HHFW in the UK

Large-scale bespoke primary research (compositional analysis; diaries, surveys)
Approach to measuring HHFW in the UK

Large-scale bespoke primary research (compositional analysis; diaries, surveys)

Synthesis of data from secondary sources / modelling
### Bespoke research – Compositional studies/household survey

<table>
<thead>
<tr>
<th>% of HHFW destinations covered</th>
<th>Ca. 65% (food placed in main / separate bins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>Medium to high</td>
</tr>
<tr>
<td>Number of households</td>
<td>1,800 to 2,000</td>
</tr>
<tr>
<td>Level of uncertainty</td>
<td>Relatively low (3-4%)</td>
</tr>
<tr>
<td>Time to complete</td>
<td>6-9 months</td>
</tr>
<tr>
<td>Costs</td>
<td>Relatively high (€350,000 – €500,000)</td>
</tr>
<tr>
<td>Outputs</td>
<td>Highly granular data (food types, state etc.), link to information on households (demographics, behaviours etc.)</td>
</tr>
<tr>
<td>Main advantages</td>
<td>Detailed data on what is actually disposed of; provides invaluable detail on which to design effective interventions</td>
</tr>
<tr>
<td>Main disadvantages</td>
<td>Investment required (financial, time); excludes some disposal routes</td>
</tr>
</tbody>
</table>
Bespoke research – Compositional studies

- Household ID
- Waste stream ID
- Weight of item
- Preparation state of item
- Food waste category menu
  - Bakery menu
  - Meat and fish menu
  - Each other food waste category menu
    - Bread menu
    - Biscuits menu
      - Biscuit types
    - Cakes menu
      - Cake types
    - Each other food waste sub-category menu
      - Loaf Slices Crusts Etc Other
      - Biscuit types
      - Cake types
      - Further drop downs for each bakery type

Does this fully describe the object and packaging?
- Yes
  - Other description
- No
  - Is the item packaged?
    - Yes
      - Series of packaging detail questions
    - No
      - Series of packaging detail questions

Submit data
Submit data
Submit data
## Bespoke research – Diaries

<table>
<thead>
<tr>
<th>% of HHFW destinations covered</th>
<th>Up to 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>Medium</td>
</tr>
<tr>
<td>Number of households</td>
<td>200 - 300</td>
</tr>
<tr>
<td>Level of uncertainty</td>
<td>Relatively high (ca. 12 - 20%)</td>
</tr>
<tr>
<td>Time to complete</td>
<td>6-9 months</td>
</tr>
<tr>
<td>Costs</td>
<td>Relatively high (€200,000 – €250,000)</td>
</tr>
<tr>
<td>Outputs</td>
<td>Granular data (food types, reasons for disposal etc.) link to information on households (demographics, behaviours etc.)</td>
</tr>
<tr>
<td>Main advantages</td>
<td>Can cover all food and drink thrown away, provides invaluable detail on which to design effective interventions</td>
</tr>
<tr>
<td>Main disadvantages</td>
<td>Relies on self-reporting which leads to significant under-reporting (up to 40%), investment required (financial, time)</td>
</tr>
</tbody>
</table>
How to record the amount of food and drink waste

It is really important that the amount of waste thrown away is recorded in this diary as accurately as possible. We have provided you with some measuring cups/spoons to help you measure waste items, but please feel free to use your own scales or other standard measuring containers but remember to write in the unit used (e.g. litre, gram, ounce, etc.).

Waste items can be whole items or loose. If the item is in a container (such as a bottle or carton) please only record the weight or amount of the food or drink and not the packaging; usually you will find the net weight of the item on the packaging (e.g. a litre of cola is the weight of the cola excluding the bottle). The following boxes describe how you might estimate the amount of waste for whole and loose waste.

Examples of ‘WHOLE GOODS’ are a fish finger, a slice of bread, a bar of chocolate, an apple, a meat joint, a leg of chicken, a cheese sandwich, a sausage, a banana, a used tea bag, a bottle of soda. For whole food items, you can weigh the item using kitchen scales or estimate how much is being thrown away using the scales:
- A whole
- Half
- A quarter
- Less than a quarter

But please remember to say how much the whole item was (e.g. half a 100g Cadbury Double Decker bar)

Examples of ‘LOOSE GOODS’ are foods that were originally in a container such as baked beans, pasta, rice, cereal, soup or yoghurt. It also includes waste such as fruit and vegetable peelings and bread crusts. For loose food items, please use the measuring jugs/spoons provided or your own scales to estimate the amount being thrown away.

### EXAMPLE OF COMPLETED ENTRIES: Morning meal

**BREAKFAST/MORNING: FOOD**

<table>
<thead>
<tr>
<th>WT/WT</th>
<th>Type of food or drink</th>
<th>Original weight</th>
<th>Pack/Goat</th>
<th>Weight/Volume</th>
<th>Type of food or drink</th>
<th>Original weight</th>
<th>Pack/Goat</th>
<th>Type of food or drink</th>
<th>Original weight</th>
<th>Pack/Goat</th>
<th>Waste or reason for disposal</th>
<th>Original weight</th>
<th>Pack/Goat</th>
<th>Waste or reason for disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A whole apple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Half an apple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>A quarter of an apple</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Less than a quarter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

### BREAKFAST/MORNING: DRINKS AND LIQUID FOODS

<table>
<thead>
<tr>
<th>WT/WT</th>
<th>Type of drink or beverage</th>
<th>Original weight</th>
<th>Pack/Goat</th>
<th>Waste or reason for disposal</th>
<th>Original weight</th>
<th>Pack/Goat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A cup of tea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>A tea bag</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>A slice of bread</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NEED HELP? CALL OUR DIARY SUPPORT TEAM 0800 0786627**
## Synthesis of data from secondary sources

**[Local authority waste studies]**

<table>
<thead>
<tr>
<th>% of HHFW destinations covered</th>
<th>Ca. 65% (food placed in main / separate bins)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complexity</td>
<td>Low to medium</td>
</tr>
<tr>
<td>Number of households</td>
<td>n/a [secondary studies ca. 150-300 households each]</td>
</tr>
<tr>
<td>Level of uncertainty</td>
<td>Relatively low (3-4%)</td>
</tr>
<tr>
<td>Time to complete</td>
<td>2-3 months</td>
</tr>
<tr>
<td>Costs</td>
<td>Relatively low (€25,000 – €35,000)</td>
</tr>
<tr>
<td>Outputs</td>
<td>Overall estimates of collected food waste; % main bin vs separate; potentially some detail on % food vs inedible parts</td>
</tr>
<tr>
<td>Main advantages</td>
<td>Low cost approach</td>
</tr>
<tr>
<td>Main disadvantages</td>
<td>Relies on availability of suitable secondary sources; lack of ability to control sample representativeness</td>
</tr>
</tbody>
</table>
## Synthesis of data from secondary sources

### Target period for estimates

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of local authorities from which data included (out of a total for the UK of ca. 420)</td>
<td>120</td>
<td>87</td>
<td>63</td>
<td>87</td>
<td>116</td>
</tr>
</tbody>
</table>

### Figure 10: Coverage of LAs performing compositional studies (levels of deprivation): UK – 2015 estimates

- % population Social Grade D or E (2011 Census)
- High deprivation
- Local authorities ordered by level of deprivation
- Low deprivation
Measuring household food waste - summary

WasteDataFlow

Total collected national household waste
[Residual; mixed organics; food only]
Measuring household food waste - summary

Total collected national household waste
[Residual; mixed organics; food only]

27 Mt; >80% of household food waste is in the residual fraction
Measuring household food waste - summary

Total collected national household waste [Residual; mixed organics; food only]

Percentage of food in collected household food waste

4.9 Mt
Measuring household food waste - summary

**WasteDataFlow**
Total collected national household waste
[Residual; mixed organics; *food only*]

**Synthesis/bespoke compositional study**
Percentage of food in collected household food waste

**Diaries**
Estimates of food waste for other disposal routes

4.9 Mt → 7.3 Mt → 2.4 Mt
Measuring household food waste - summary

WasteDataFlow

Synthesis/bespoke compositional study

Total collected national household waste
[Residual; mixed organics; food only]

Percentage of food in collected household food waste

Diaries

Estimates of food waste for other disposal routes

4.9 Mt

Bespoke compositional study

Food vs inedible parts; food types and state

2.4 Mt

Diaries

Food vs inedible parts; food types and reasons

7.3 Mt

Household surveys

Links to demographics, behaviours, knowledge etc.
Variations on a theme.....

- Bespoke studies can be designed to suit what is needed:
  - Level of granularity required
  - Number of households
- This will influence costs, complexity and levels of uncertainty

- Availability and quality of data for any synthesis can be influenced:
  - Funding can be provided to local authorities
  - A requirement to carry out local studies can be stipulated
  - Guidance can be provided on how local studies should be carried out
Important considerations

- Design / analysis needs to include an awareness of factors that influence levels of household food waste, and therefore need to be controlled/adjusted for:
  - e.g. household size, collection type / frequency, seasonality etc.
Below the UK level......
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Learnings

- Quantifying food waste (robustly) is challenging!
  - Particularly the non-collected fractions
- The benefits of having comparable time-series data, and a robust evidence base are critical to an effective strategy to reduce food waste
- The financial benefits vastly outweigh the costs
  - Amounts of household food waste thrown away in 2015 were €3.1 billion less than in 2007
- Essential to have clarity on definitions, scope and research specifications
  - e.g. food plus inedible, no packaging
Learnings

- Estimates for only a small percentage of food waste can be easily extracted from national statistics (<10%)
- Need to balance robustness and comparability over time, with cost and complexity – and agree what the ‘appropriate’ balance is
- Levels of uncertainty and likely changes in levels of household food waste mean that statistically significant differences may only be detected at say 3-5 year intervals
- Methods and understanding improves over time, therefore must re-calculate historical data to be comparable
- In-depth studies every 5 or so years, ‘light-touch’ approach for intervening periods
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What next....

Courtauld 2025 is an ambitious voluntary agreement that brings together a broad range of organisations involved in the food system to make food and drink production and consumption more sustainable.

Action will be delivered through collaboration, harnessing the power of partnerships, shared expertise and innovation.

Our collective ambition is to cut the amount of resource needed to provide our food & drink by one fifth in ten years.

Targets
- 20% reduction in food and drink waste
- 20% reduction in GHG
What next....

- New strategy / refreshed campaign
  - Drawing on the evidence base
- Alignment with WRI Global Food Loss and Waste Standard
- Continue to look at how to develop more cost-effective monitoring and reporting
  - New approaches
  - Indicators and proxy data
  - Learn from the experiences of others
Next steps – Continuing to explore improvements to measurement

Food & drink purchases (green line) and food & drink waste (blue diamonds) (per person per week; adjusted to compare trends)
Questions and Discussion