

Technical Memo

Evaluation of Courtauld Food Waste Target – Phase 1

21.09.10

Background

The first phase of the Courtauld Commitment (CC) was a voluntary agreement between WRAP and over 40 major retailers, brand owners, manufacturers and suppliers aimed at developing solutions across the whole supply chain to reduce both household packaging and household food waste.

In 2008 WRAP was able to negotiate a quantified household food waste¹ target with retailers and brands as part of the CC. This target reads:

To help reduce the amount of food the nation's householders throw away by 155,000 tonnes by 2010, against a 2008 baseline.

The target covers the whole of the UK and is assessed on an annualised basis². The target was phrased as signatories helping WRAP to deliver the fraction of its business plan target that falls between the introduction of the target and the end of the CC. Therefore, a positive statement on the CC food-waste target also indicates that WRAP is on course to meet its business plan target.

It was intended to monitor the reduction in food waste via a self-reported metric – the Committed Food-Waste Reducer (CFWR) metric. However, this approach is no longer thought to be fit for purpose (see Appendix 1).

In order to determine whether the CC target has been achieved, a methodology based on direct measurement has been adopted (described below). Information from a recent, short project, which synthesised existing waste analyses studies and information from WasteDataFlow, has been used within this methodology. The results from this project have been compared with the CC 155,000 tonne target to assess whether the target has been met.

Direct Evidence

The direct evidence for a change in the quantity of household food waste comes from two studies:

- *Review of Municipal Waste Component Analyses*; carried out by Resource Futures for Defra (project code - WR0119)³.
- *Assessment of Household Food Waste*; carried out by Resource Futures for WRAP (project code RHF522-016)⁴.

¹ 'Food waste' – in this memo – also includes drink waste.

² In this context, '**annualised**' reduction refers to a comparison of the level of food waste arising in two 12 month periods. For example, an annualised reduction of 155,000 tonnes means that the level of food waste in the final year (2010) of the agreement is 155,000 tonnes lower than in the baseline year (2008). This contrasts with '**cumulative**' reductions, which refers to the total tonnes of food waste avoided over time. All reductions referred to in this memo are annualised.

³ <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=15133>

⁴ Currently unpublished

Both projects quantified the amount of food waste in household waste streams in England using a combination of information from WasteDataFlow and existing compositional analysis. The former makes the quantification for 2006/7, the latter for 2009. Both reports use the same methodology and are therefore comparable.

Estimates from these studies indicate that there has been a statistically significant drop in household food waste within these streams over the period in question (Table 1). For the study referring to 2009 data, two estimates of collected household waste were obtained – the higher estimate has been quoted in this memo, which leads to a conservative estimate of the reduction in food waste. The estimate of the reduction is 598,000 tonnes, or 13.1% of the 2006/7 total.

Table 1: Household food waste arisings in England; 95% confidence interval quoted for difference

Household food waste arisings (tonnes / year)	
2006/7	4,556,176
2009	3,957,736
Difference	598,440 ± 281,335

This information gives a very strong indication of the trend in food waste arisings between 2006/7 and 2009. However, there are a number of points that need to be addressed for completeness:

- **Geographical:** The estimate covers England only, not the whole of the UK, which is the extent of the Courtauld Commitment.
- **Waste streams:** The estimate does not include all household waste streams that are likely to contribute substantially to the total household waste.
- **Temporal:** The time period between the two measurements is longer than the Courtauld target period.

Geographical

If the trend in food waste arisings seen in England were extended to Scotland, Wales and Northern Ireland, the resulting drop would be approximately 758,000 tonnes⁵. It should be stressed that there is no trend data in Scotland, Wales or Northern Ireland to compare this estimate against and as such this extrapolation is based on an assumption of similar changes across the UK. As activity to reduce food waste has been occurring in England, Scotland and Wales over the period in question, it is reasonable to assume similar impacts in these countries over this period. However, the untested nature of this assumption in this calculation means that the extrapolated estimate should be treated with caution⁶.

However a comparison of the percentage of food waste in the residual bin for different nations (2009) reveals; Wales: 30.0%, Scotland: 31.5%, England: 31.4%.

The uncertainties in the Welsh and Scottish figures is around +/- 2 percentage points. Therefore there is no evidence here of a difference between the countries in terms of % food waste in residual - all can be explained in terms of sampling error. Further work is planned to explore food waste arisings in the different nations more fully.

⁵ In Household Food and Drink in the UK, WRAP estimate that there is 5.77 million tonnes of Local Authority collected food waste across the UK. Applying the 13.1% reduction to this total, leads to a drop of 758,000 tonnes.

⁶ It is unlikely that further information will come to light that allows this to be explored more fully – in particular, there are no **comparable** estimates of the proportion of food waste in household waste streams for Scotland and Wales for the years 2006, 2007 or 2008.

Waste streams

As identified in *Household Food and Drink Waste in the UK*, food and drink waste is also thrown away by pouring down the kitchen sink, used in home composting or fed to animals⁷. For these three routes, there is no information on the trend that can be used to estimate the change in arisings over the period of time in question.

Behaviours that lead to a reduction in the amount of food (and drink) waste generated are likely to reduce both waste collected by the Local Authority and waste disposed of via other routes. For example, waste **poured down the kitchen sink**. Once generated, the decision by a householder of how to dispose of food waste largely depends on how liquid or solid the waste is. For these reasons, it is likely that the component of food waste poured down the sink is closely linked to changes in food collected by Local Authorities and therefore there has been an additional reduction in food waste associated with sink disposal. If this reduction was in proportion to the reduction seen in Local Authority collections – an untested assumption – this would be a further 243,000 tonnes reduction in the UK⁸.

During the Courtauld target period, WRAP has had a **home composting** programme. This consisted of subsidised sales of home composting bins and support on their use. One outcome of this programme was the diversion of food waste from Local Authority collected waste streams into home composting.

Taking data from England – allowing comparison with Table 1 – approximately 780,000 compost bins were sold. WRAP have estimated that this has led to an increase in annual composting rates of 123,000 tonnes (taking into account people buying bins who later stop using them). The majority of this waste was garden waste, with food waste accounting for around one-fifth of the total. This leads to an estimate of diversion of c. 23,000 tonnes of food waste⁹.

As this estimate is much smaller than the reduction in food waste collected by Local Authorities (598,000 tonnes), the diversion of food waste to home composting could only explain a small percentage of the decrease in Local Authority collected food waste. Although other activities may have driven up home composting levels further, it is also unlikely that these were of a magnitude to explain the reductions seen.

Food waste **fed to animals** is a very small element of the total amount of food waste generated (<5%). It is unlikely that there has been a change in this component over the last two years that will substantially impact on the total food and drink waste arisings in the UK.

For the purposes of this analysis, waste streams contributing very minor amounts of household food waste (e.g. Household Waste Recycling Centres) have been omitted. Furthermore, waste streams relating to food not entering the household (e.g. offices, litter bins) have also been omitted.

Temporal

The evidence presented in this memo compares 2006/7 data with that collected for 2009; however, the CC target period is 2008 to 2010.

WRAP has previously claimed a reduction in the annualised level of food waste of 110,000 tonnes over the period March 2006 to March 2008. This reduction is included in the time-span of 2006/7 to 2009. Therefore, any statement made by WRAP now should take into account this previous claim (i.e. any claim should be 110,000 tonnes lower than otherwise).

The CC target period extends beyond 2009 to March 2010. It is highly unlikely that there will be a sudden increase in food-waste arisings early 2010 that will negate a substantial fraction of the measured reduction.

⁷ Current estimates show that 2.5 million tonnes of the total 8.3 million tonnes of household food & drink waste is disposed of via 'non-collected' routes.

⁸ 13.1% reduction applied to 1.848 million tonnes of food and drink waste disposed of via the sewer (from Household Food and Drink Waste in the UK).

⁹ Figures on number of home compost bins sold and diversion use information from 2007, 2008 and 2009 in England. It is assumed that 31 kg of food waste is diverted per bin sold, taken from table 14 of WRAP's home composting diversion report (http://www.wrap.org.uk/downloads/Home_Composting_Diversion_District_Level_Analysis.246256ea.7747.pdf). This diversion factor is taken from the fraction of home-compostable residual waste that is food waste (90 kg / 136 kg = 66%) multiplied by the total diversion seen to home composting 47 kg / hh / year. Of the 780,000 bins sold, it is estimated that 730,000 would still be in use at the end of 2009, leading to a change in diversion of 23,000 tonne between 2006 (baseline year) and 2009.

Contextual Evidence

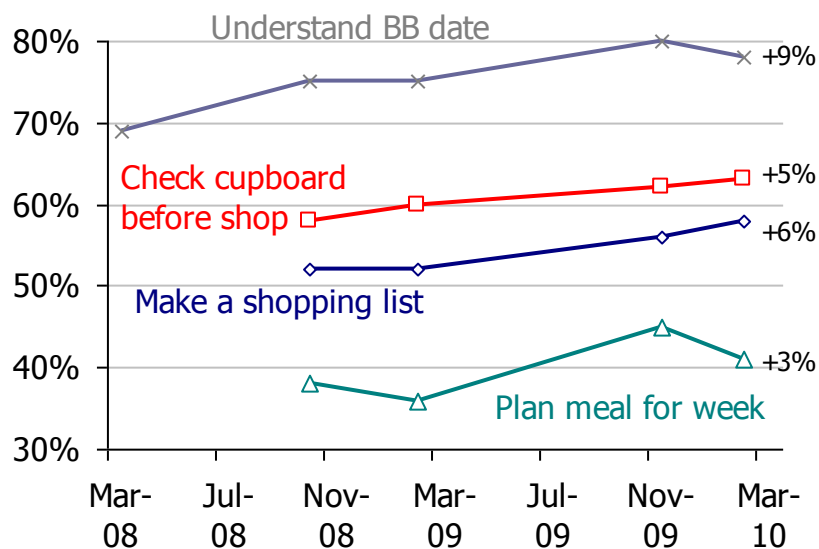
The analyses presented above indicate that the quantity of food waste has reduced over the first phase of the Courtauld Commitment. This section explores related evidence to see if this conflicts with or corroborates a reduction of household food waste.

Self-reported behaviours that reduce food waste

There are many actions that people can take to reduce food waste in the home. Due to the complexity of food waste generation, these behaviours encompass food planning, the way people shop, storage, and preparation and use of food.

Three behaviours have been tracked consistently over the course of the CC, all associated with planning. Figure 1 gives the proportion of the population claiming to perform these behaviours some or all of the time, as measured by the regular tracker survey commissioned by WRAP. In general, these have increased over time (by six, five and three percentage points - the first two of these increases are significant at the 95% level), supporting the quantitative estimate drawn above. In addition the understanding of the 'best before' date has increased by 9%, reflecting the emphasis on this by the programme.

Figure 1: Trends in food-waste reducing behaviours (% reporting all of the time or most of the time) and those understanding best-before dates (note that y-axis does not start at zero).



Question: Thinking about when you go food shopping, how often, if at all, do you do the following...? a) Make a list before you go, b) check what you have in the cupboards before you go, c) plan what you will eat for each meal of the forthcoming week. Options = i) All of the time; ii) Most of the time; iii) Some of the time; iv) Rarely; v) Never; vi) Don't know / Not Applicable.

I am going to read out a number of statements. Please tell me whether you think they are true or false: A best before date means that I can safely eat the product after this date but the quality may not be at its best. Options = true / false / don't know.

Asked to all respondents with some responsibility for food shopping, or food cooking and preparation. Minimum base size = 1663.

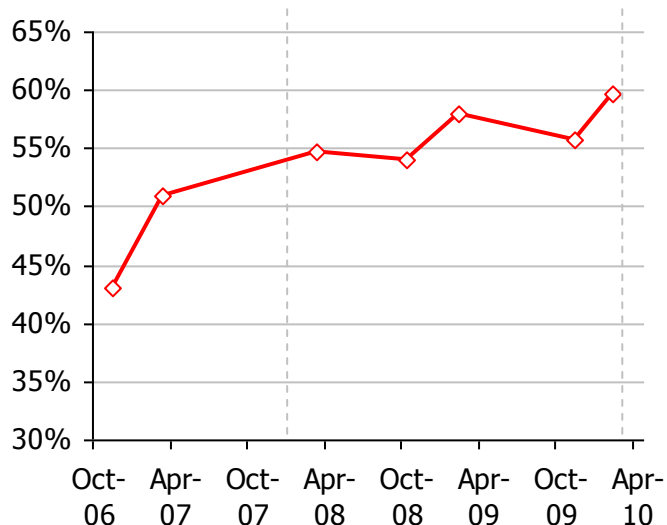
However, it should be noted that these behaviours constitute a minority of those that WRAP is targeting. Although questions have been asked about other food-waste-reduction behaviours, they have not been asked to all respondents (e.g. only those bothered about food waste) or the method of measurement has changed significantly over the time period of interest. It should also be noted that these are self-reported levels of behaviour.

Self-reported levels of food waste

There is a strong correlation between the quantities of food waste generated by a household, as measured via compositional analysis, and self-reported levels of food waste, as determined by questionnaire survey (*The Food We Waste*). Despite this strong correlation, there was a general trend of underestimation of the amount of food waste generated.

The results of this self-reported question are given **Figure 2**. It can be seen that there has been a 5% increase (significant at the 95% level) in the proportion of responses of 'none' or 'hardly any' over the period of the interest (dotted lines).

Figure 2: Trends in self-reported levels of food waste (% answering 'none' or 'hardly any'). Note that the y-axis does not start at zero.



Question: Thinking about the different types of food waste we have just discussed, how much uneaten food, overall, would you say you generally end up throwing away? Options = i) Quite a lot; ii) A reasonable amount; iii) Some; iv) A small amount; v) Hardly any; vi) none; vii) Don't know. Asked to all respondents with some responsibility for food shopping, or food cooking and preparation. Minimum base size = 1663.

However, the stated level of food waste could be affected by factors other than actual levels of food waste, such as how aware respondents are of their food waste. The relationship between stated and actual levels of food waste could change over time (e.g. as a response to WRAP's activity), thus influencing the results.

The results presented on behaviours and self-reported levels of food waste presented here are qualitatively consistent with the results of the calculations presented in this memo.

Factors that may have influenced food waste arisings

There are many factors that can influence the quantities of household food waste generated. WRAP and its partners have focused on behaviours in the home and shopping alongside changes to products, packaging and the way food is sold that could minimise food waste. The activities of the signatories are described in the first section below¹⁰. Over the period of the first CC WRAP managed an integrated consumer facing Love Food Hate Waste programme across the UK, helping those who wanted to reduce their food waste and save money. In addition more than 300 local authorities have also run Love Food Hate Waste initiatives that help local people, including road shows, cookery demonstrations and recipe competitions, working with community groups, housing associations, and businesses. Community groups and individuals have also taken action.

The second section describes some of the external factors that may also have influenced household food waste.

Activities of Signatories

Having the food industry working with WRAP to help consumers reduce food waste has been key, both to amplify messages in the environment most relevant (i.e. where consumers expect to receive information about what they buy, and make the purchase decisions) and to introduce changes that make it easier for consumers to take action if they wish.

There are many examples of signatory activity, from large scale campaigns such as Sainsbury's "Love Your Leftovers" and Morrisons "Great Taste Less Waste", through to the introductions of better labelling (e.g. Warburtons removing 'display until' dates from all of their products, leaving a more prominent 'best before' date),

¹⁰ Due to the nature and wording of the Courtauld household food-waste target, the activities of the signatories contribute to the meeting of the target, rather than them being the sole actors responsible for meeting the target.

pack sizes that are better suited to today's household sizes (e.g. Kingsmills "Little Big Loaf") and promotions that give consumers good value and more flexibility to use up the food they buy (e.g. Tesco's "Buy One Get One Free Later").

There have also been successful community level initiatives. These include the 47 Co-op \ Love Food Hate Waste "Watch your Waste" events around the UK in 2009 (demonstrating recipes using leftovers and avoiding food waste).

Collectively signatories have spent millions of pounds supporting the delivery of Household Food Waste prevention programme and its objectives.

External Factors

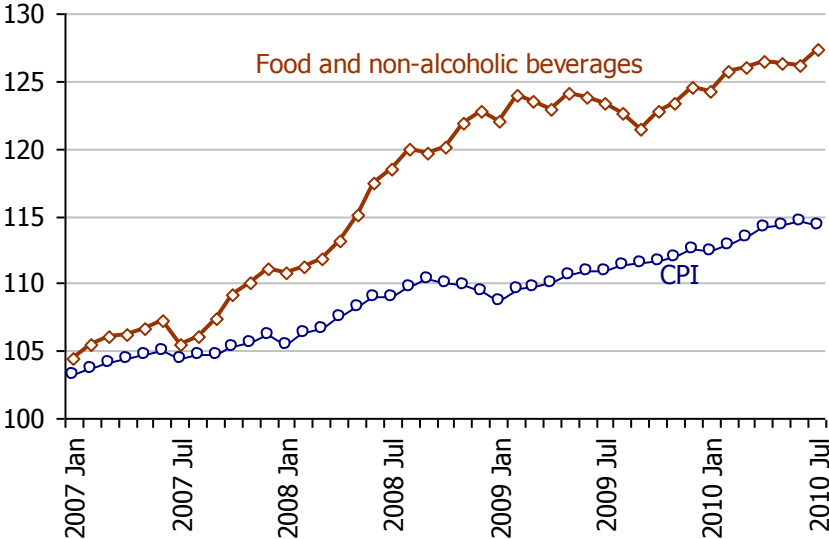
There are a number of factors – other than the work of WRAP and its partners on household food waste – that could have influenced household food waste. These include (but are not limited to) food prices, income levels and the separate collection of household food waste.

For example, consumer food prices have undergone high levels of inflation – most notably in the second half of 2007 and 2008 during which prices rose by 16% (Figure 3). This compares with a 4% rise in consumer prices (as measured by the Consumer Price Index) over the same period.

As a result of price rises and other economic changes (not evidenced here), food expenditure patterns have shifted, not only in terms of quantities and types of food, but also the proportion of food eaten in the home. It is possible that changes in behaviours related to food waste (Figure 1) have been triggered – at least in part – by these economic factors.

There is evidence that the method of collection of household waste has an impact on the quantities and composition collected. The evidence connecting food waste arisings and the household collection scheme is currently anecdotal. Nevertheless changes in food waste collection schemes should not be ruled out as one possible driver for the observed trend in food-waste arisings.

Figure 3: Consumer price index for food and non-alcoholic beverages compared to overall consumer price index (CPI); 100 = 2005 level; Source: Office of National Statistics.



At present, it is not possible to attribute impact on food-waste arisings between economic and waste collection drivers and the household food-waste activity of WRAP and its partners. Research is on-going to disambiguate these factors and this will benefit as more food-waste information becomes available. However it is highly likely that work by WRAP and CC signatories will have helped to realise such behaviour change, regardless of the trigger for change.

Conclusion

In conclusion, it is likely that the total quantity of household food and drink waste generated in the UK has reduced by more than the 598,000 tonnes observed in Local Authority collections in England. However, caution should be exercised in making claims from this information given the relatively large confidence interval ($\pm 281,000$ tonnes at the 95% level).

If extrapolated to all relevant waste streams in the UK, a total of approximately 1 million tonnes would be reached; this takes into account diversion of food waste to home composting. However, the assumptions underlying these extrapolations are untested.

For the Courtauld target to have been met an annualised reduction of 265,000 tonnes (155,000 tonne for the target plus 110,000 tonne already claimed against the 2006/8 WRAP Business Plan) would need to have occurred between 2006/7 and 2009. The evidence of the two studies by Resource Futures, supported by the trends in self-reported behaviours, strongly suggests that this level of reduction has occurred, even if the information is interpreted cautiously.

A conservative estimate could be obtained by using the lower end of the confidence interval and not extrapolating to all waste streams; this gives a figure of 317,000 tonnes for England. If this level of reduction was seen across all nations of the UK, a reduction of 381,000 tonnes would be seen.

These conservative figures have been used in reporting achievement against the CC target.

The measured reduction in food waste suggests that WRAP is also on track to meet its business plan target. The information presented in this memo will be reviewed again, alongside new research, at the end of WRAP's business plan (March 2011). At this stage, further research may have been undertaken to more fully understand the impact of external factors on food waste arisings.

External Statement

Given the evidence in this memo, the following external statement has been made:

"As part of the Courtauld Commitment signatories agreed to work with WRAP, and its Love Food Hate Waste programme, to reduce household food waste by 155,000 tonnes. Signatories have, together with WRAP, Local Authorities and other partners, helped raise awareness of the benefits of reducing the amount of food thrown away, and helped millions of consumers to achieve this through customer focused campaigns, on pack and on shelf labelling, through modified offers to the public and through their websites.

An analysis of household waste data* supported by consumer behavioural research indicates that this target has been exceeded. In 2009, a minimum of ~270,000 tonnes less food waste was generated than in 2007/8. This will have prevented around £610 million of food being wasted in 2009, and the emission of around 1.1 million tonnes of CO₂e (both compared to 2007/8).

WRAP plans to generate a further estimate of UK household food waste in early 2011 in order to determine achievement against its 2008/2011 Business Plan target.

* Based on an analysis of LA collected household waste in England, which shows that a minimum of ca 300,000 tonnes less food waste was collected in 2009 vs 2006/7, and an extrapolation to all of the UK (ca 380,000 tonnes). Achievement reported against WRAPs 2006/8 Business Plan (i.e. prior to the CC food waste target being agreed; 110,000 tonnes) has been subtracted to yield the estimated minimum reduction for 2008/10. Further work is needed to extrapolate to all waste streams (e.g. home composting, sink), but for the purposes of this assessment of food waste reduction the most conservative estimate has been taken. Over the same time period WRAP has measured significant changes in self-reported levels of consumer behaviours associated with reduced food waste."

Appendix 1: Measuring WRAP's Impact on Reducing Household Food Waste – Rationale for Revising the Method

1. The previous method for measuring impact of programmes with the purpose of reducing household food waste was via the CFWR. This was made up of three questions relating to:
 - A self-reported estimate of food waste generated;
 - How bothered by food waste the respondent is; and
 - How much effort to minimise food waste the respondent goes to
2. The level of food waste reduction was estimated from the increase in the proportion of the population that were CFWRs. Such estimates were based on factors obtained from a study comprising both a questionnaire of households (determining if they were CFWRs) and compositional analysis (which measured the amount of food waste generated by the household).
3. The proportion of the population who were CFWRs was measured at approximately six-month intervals via a national survey. In late 2009, this started to show anomalous results – the proportion of CFWRs was decreasing, but levels of behaviours that reduce the amount of food waste (e.g. planning meals) were increasing. These anomalies were most likely the result of people:
 - doing more to tackle food waste, but building it into their daily routine, so not feeling that they make a great effort towards reducing food waste;
 - becoming less bothered by food waste as they produce less of it; and
 - making more accurate assessments of the quantities of food that they do waste as they become more aware of what they thrown away.
4. Further analysis of existing datasets (which were not available when the metric was developed) showed only a weak link between the quantity of food waste generated by a household and either their stated level of effort or 'botheredness'. However, a strong link was found between stated levels of food waste generated and measured levels of food waste.

This new evidence indicated that an improved method for monitoring the impact of household food waste reduction programmes needed to be developed.

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