
Summary Report

Food Waste in Schools



A summary report on the findings of a research project to better understand the nature and types of food waste in schools; the reasons why food is wasted in schools and the impact of interventions developed to help schools to reduce this waste.

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Written by: WRAP on the basis of work by Resource Futures

Front cover photography: [A child scraping food waste into a container]

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Why is food waste from schools an important issue?

In 2007/08, WRAP (Waste & Resources Action Programme) produced a report into the types and quantities of waste produced by schools in England. A key finding was that food waste was a major component of waste from schools, estimated to account for almost half of the waste, by weight, from primary schools in England and almost a third of waste, by weight, from secondary schools in England. A copy of the report can be found here: http://www.wrap.org.uk/downloads/Report_into_the_Nature_and_Scale_of_Waste_produced_by_schools_in_England.2f3077e3.5723.pdf

Food waste can be seen as a particularly significant issue because, when food is wasted in schools:

- the embedded energy from growing, transporting, storing and preparing food is also wasted;
- the money spent on buying and preparing the food is wasted and costs are incurred in treating and disposing of it; and
- perhaps most importantly in the context of schools, children are not gaining the nutritional benefit of the wasted food.

Therefore, in order to identify what could be done to reduce food waste in schools, WRAP commissioned a study to better understand the composition of the food waste and the behaviours and practices which lead to it being wasted. A copy of the full report can be found here: www.wrap.org.uk/foodwasteinschools

However, food waste is not the only issue to be considered in any study of food in schools – health and nutrition are arguably even more important, although they were not the focus of this study. This should be borne in mind when considering possible solutions to food waste; approaches will not be desirable if they impact negatively on health and nutrition, regardless of any benefit on reducing food waste.

What was the aim of this study?

The specific aims of this study were to:

- Better understand:
 - the nature of food waste produced by schools (i.e. cooked or uncooked, whole or part consumed);
 - the types of food being wasted; and
 - the point at which the waste arises (e.g. service waste from the kitchen, plate waste, food waste from packed lunches, food waste from break time snacks).
- Understand the range of reasons why food waste is produced in schools.
- Identify interventions that could be effective in reducing food waste in schools, and to assess the impact of implementing them.
- Produce a toolkit to help those responsible to implement initiatives to reduce food waste in schools.

Consistent with the previous study, the objective was to analyse the waste stream coming out of schools; not the amount of food going in. It was not, therefore, the intention of this report to quantify the percentage of food served in school canteens or food brought into school that was wasted.¹

What methodology was used?

There were 3 parts to the study:

- Compositional analysis to understand the nature of food waste from schools, the types of food being wasted and the point at which the waste arises, consisting of 39 schools (30 primary and 9 secondary) from 4 local authority areas in England. Schools were selected so as to ensure a geographical spread, with a mix of

¹ Information on plate waste from school lunches in primary schools is available in research from the School Food Trust at <http://www.schoolfoodtrust.org.uk/school-cooks-caterers/reports/primary-school-food-survey-2009>

urban/rural and socio-economic status, a mix of catering arrangements, and a range of school sizes. The study took place over a period of three weeks, to cover a full school menu cycle, and waste was collected and sorted daily during this period.

- Qualitative research with a range of stakeholders to understand the reasons why the food is wasted:
 - Research in schools, via a mix of interviews and focus groups, talking to a range of school staff and pupils in 16 of the schools that took part in the compositional analysis to explore their awareness of food waste and understanding of the reasons for it.
 - A workshop involving a wide range of stakeholders involved in setting policy, delivering services, or providing support relating to food and / or waste in schools.
 - Telephone interviews with local authority and commercial catering managers, food enforcement and monitoring officers and individual caterers in schools from across 9 local authority areas.

- Trialling a range of interventions identified as being likely to have a positive impact on reducing food waste in schools. Interventions were identified based on the findings from the first two stages, and trialled in twelve schools (most of which, but not all, were also involved in the earlier stages). Six of these also received communications support. There were also an additional four control schools. Attitudinal surveys were carried out with staff and pupils before and after the interventions, and schools weighed their own waste daily recording that produced in the kitchen and canteen areas throughout the trial period.

Summary of Compositional Findings: What food is being thrown away?

Quantity of food waste produced

This study suggests that over a school year (40 weeks) a total of 55,408 tonnes of food waste is generated by primary schools in England and 24,974 tonnes by secondary schools, giving a total food waste weight of 80,382 tonnes.

Food waste was found to be statistically significantly different by school type, with primary schools producing 72 grams per pupil per day and secondary schools 42 grams per pupil per day.

Composition of food waste produced

Fruit, vegetables² and “mixed (non sandwich)” were found to be the dominant fractions of the food waste streams for both primary and secondary schools. Fruit and vegetable categories accounted for almost half of food waste (by weight) from primary schools and more than a third of food waste (by weight) from secondary schools. The category “mixed (non sandwich)” refers to meals such as pizza, cottage pie and spaghetti bolognese which incorporate a number of food stuffs. This category was found to account for approximately 17% of food waste (by weight) from primary schools and 19% from secondary schools (where it was the highest category).

² Note, potatoes are included in the “vegetables” category, and represent 46% and 40% of the vegetable waste in primary and secondary schools respectively.

Figure 1: Primary school food waste composition (% by kg sorted)

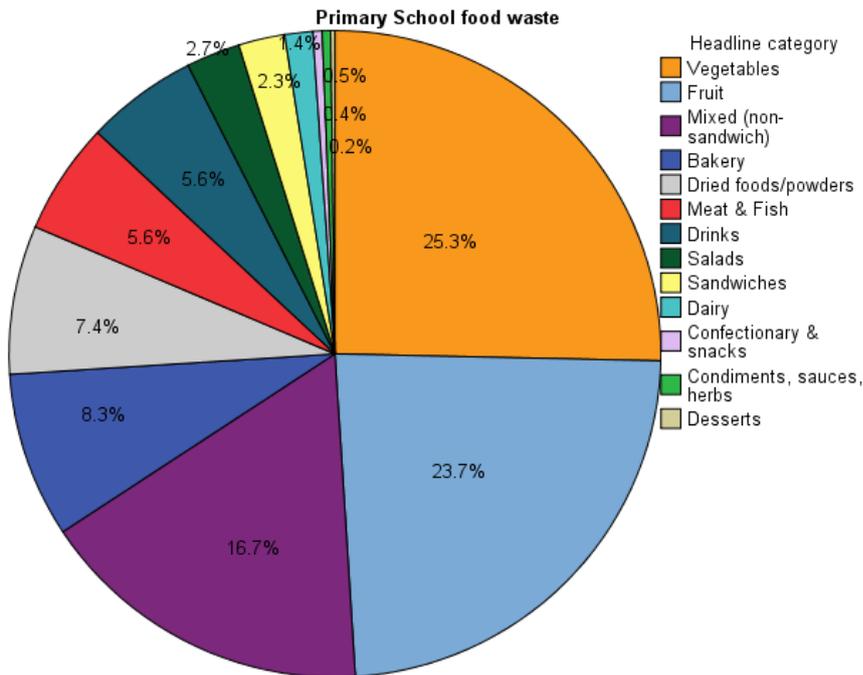
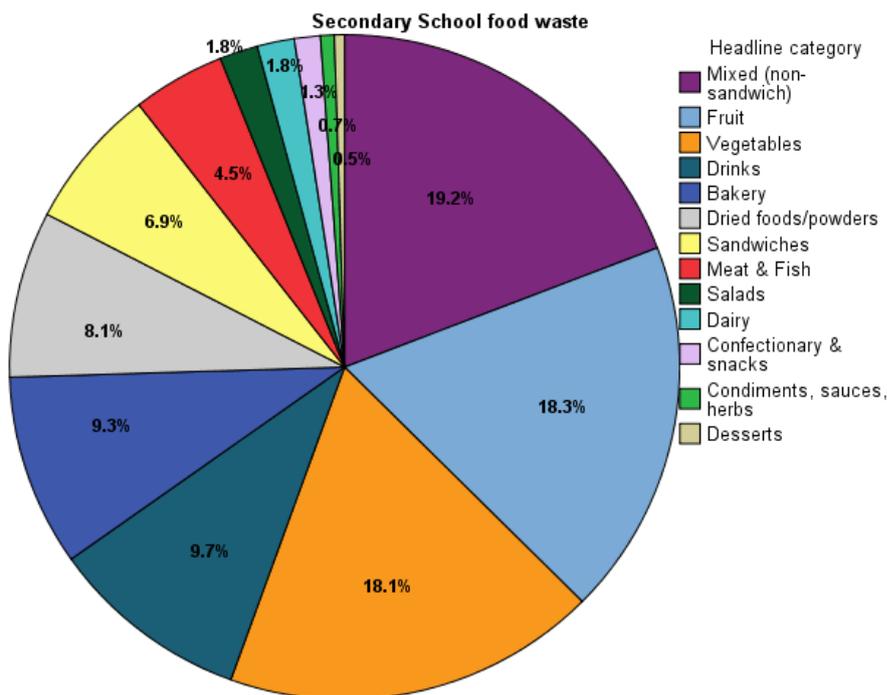


Figure 2: Secondary school food waste composition (% by kg sorted)



Proportion of avoidable food waste

The majority of food waste in both secondary (77%) and primary (78%) schools was found to be avoidable (see section 3.2 of the main report for definitions of “avoidable”, “possibly avoidable” and “unavoidable” food waste).

Avoidable food waste contained all the food categories, with the largest proportions being made up of vegetables, mixed (non sandwich) and fruit. There was more avoidable vegetable waste, by weight, than any other category, suggesting that more vegetables are being prepared than are currently being eaten in both school types. The

food category with the largest proportion of unavoidable waste was fruit, with approximately half of the fruit waste categorised as unavoidable.

Where is this food waste coming from?

For both primary and secondary schools, the kitchen and canteen areas were found to produce the majority of the total food waste and this is assumed to represent the waste generated by food that is prepared, but not served (kitchen) and served, but not eaten (canteen). In primary schools the total produced in these two areas was 72%, with an equal split between kitchen (36%) and canteen (36%). Classrooms produced 14% and the playground 8%, with the remainder from other areas, or unknown. In secondary schools the kitchen area generated 38% and the canteen area 21%, a total of 59%. Classrooms generated 18%, and the playground 9%, with the remainder from other areas or unknown.

Food waste from the kitchen and canteen areas contained a high proportion of vegetables and mixed meals (e.g. pizza, pasta bake, quiche etc.) suggesting that it was generated from school meals. All food waste generated in the kitchen area is assumed to come from school meals. Due to the state of the food waste produced in the canteen, it was difficult to differentiate between plate scrapings and packed lunch waste, however school policies would suggest that the majority of this waste comes from school meals: primary schools in the sample where packed lunches were eaten in the canteen usually required pupils to take their waste home and in most secondary schools in the sample, packed lunches were eaten outside the canteen, often in the classroom.

In both primary and secondary schools, fruit accounts for the majority of waste generated in the classrooms and playground areas. In these areas, the wastes generated are assumed to come from break time snacks and packed lunches.

Food waste produced in "all other areas" accounts for less than 10% of the food waste produced in both school types. The majority of this is assumed to come from the staff room.

Summary of Qualitative Findings: Why is food wasted?

Reasons identified by those interviewed within schools

Findings from this part of the research were grouped into three categories: operational (relating to catering provider policies on food and school meals and to systems at a school level), situational (relating to broader issues not directly connected to food, such as rushed lunch hours or the canteen environment) and behavioural (relating to individual choices and preferences).

■ Operational reasons resulting in food being prepared, but not served, include:

- Absence of ordering systems for school meals leading to kitchens catering for unknown total numbers of pupils (Secondary);
- Lack of flexibility to adapt centrally planned menus to meet the preferences of pupils in individual schools;
- Kitchens over-cater to ensure pupils have the meal option of their choice (specifically at Primary);
- Second helpings disallowed; and
- Limited opportunities for re-using unserved food.

■ Operational reasons resulting in food being served, but not eaten, include:

- Inflexible portion sizes leading pupils being "over-faced" with food;
- Fixed food combinations, e.g. pupils have to have a pudding whether they want one or not;
- Pupils at the end of the queue do not get the meal option of their choice and may be served with food they do not like; and
- Pupils do not know what meal options are available.

■ Situational reasons identified, largely related to food being served but not eaten, include:

- Unpleasant canteen environment, e.g. noisy, crowded;
- Rushed meal times with pupils spending long times queuing and/ or being hurried along to allow other pupils into the dining hall, or because it needs to be cleared for afternoon lessons; and
- Practical difficulties with eating the food served such as inability to cut up food with cutlery provided.

■ Behavioural reasons resulting in food being prepared, but not served, include:

- Pupils are not hungry by lunch time;
- Pupils buy a cheaper snack rather than a full meal (specific to secondary); and
- Some meal options are less popular.

■ Behavioural reasons resulting in food being served, but not eaten, include:

- Pupils reject food due to:
 - Food is unfamiliar;
 - Food looks unappealing;
 - Pupils don't want to eat healthy foods;
 - Strange combinations of foods; and
 - Fussy eaters.
- Children do not finish food due to a desire to finish meals quickly (to socialise with friends/ go out to play etc).

Communications (or the lack of them) between catering providers, school staff and pupils were also important, and cut across the categories above.

Reasons for food waste from sources other than school meals (i.e. packed lunches and break time snacks) and from food preparation were rarely mentioned by respondents.

When asked about any policies and procedures that had already been adopted as an attempt to reduce food waste, those interviewed reported a range of actions, including changing menus to suit pupils' preferences, encouraging pupils to "eat up", using leftover foods and making improvements to the canteen system. It should be stressed that although these actions were perceived to reduce the amount of food wasted, the schools involved had not monitored any effect on food waste. Interviewees also suggested ideas to reduce food waste which they had not tried and most of these suggestions related to educating both pupils and staff on food issues and providing pupils with more information and more choice about their meals.

Comparison of reasons identified by those interviewed within schools, participants at stakeholder workshop and catering providers

The stakeholder workshop largely supported the findings of the schools based research in recognising operational, situational and behavioural reasons for food waste. In addition, it highlighted a lack of awareness of food waste as an issue at the local level. Some of those attending the stakeholder workshop also expressed the view that the particular form of some of the national regulations and associated guidance relating to school food could lead to food being wasted, or limit the opportunities to reduce this waste.

Both the school level research and the stakeholder workshop highlighted concerns relating to both un-served and uneaten food. In contrast, research with catering providers showed that their awareness of food waste was largely limited to unserved food. Unserved food represents a cost to the catering provider, and thus there is a clear financial driver to minimise it. They have less reason to be concerned with food that is served, but not eaten, since that has already been budgeted and paid for and perceive that their ability to influence plate waste is limited by the specific form of the nutrient and food based standards. The absence of a financial driver and perceived inability to influence plate waste would be likely to act as a barrier to engaging caterers in reducing this food waste. In contrast to the other two groups, catering providers typically identified only "operational" reasons for food waste arising, but within this category they identified a range of national, local and school-level causes.

Interestingly, however, it was apparent across all groups interviewed that there were significant differences in how national standards – both on nutrition and food safety – were interpreted in local policies and subsequently how local policies were implemented in practice within individual school kitchens. This, combined with confusion identified at a school level about what practices were permitted (e.g. use of seconds, flexible portion sizes and leftovers) suggests that some avoidable food waste may arise from overzealous application, or simple misunderstanding of policies.

Summary of Interventions: How might food waste be reduced?

The following interventions were selected to trial in schools as they were identified as the most likely to positively address key causes of food waste in schools and therefore the most likely to help to reduce food waste. These are described below.

Meals cooked to order

This intervention aimed to reduce food waste by introducing a system to supply school meal service providers (i.e. kitchens either on the school premises or elsewhere) with information on exactly how many portions of each meal option to prepare that day, thereby:

- eliminating the need for over-catering practices adopted in some schools to allow the majority of pupils to have their preferred choice of meal (reducing unserved food); and
- preventing children who are last to come into the dining hall from missing out on the meal option of their choice and being served with a meal option they did not choose and may not like, in schools where the practice is to prepare just one portion of food per child (reducing uneaten food).

Pupils received information on menu options in advance. Menu choices were recorded during registration each day and this information was communicated to the kitchen staff by 9.30am every morning. Pupils were given a coloured wrist band identifying their meal choice so there was no confusion at lunch time. This intervention requires a pre-pay system for meals within the school, as well as an efficient way to record and communicate student meal choices in a timely manner.

Improving the dining experience

This intervention aimed to reduce uneaten food waste arising in the canteen by making it more enjoyable for students to spend time in the canteen and/ or less pressing for them to leave by addressing issues relating to:

- the canteen environment, e.g. noise levels, crowding, poor ambience; and
- time pressures, e.g. pupils may spend so long queuing that they do not have enough time to eat all of their meal, or may be hurried along at the end of a sitting to allow other pupils into the dining hall, or to enable the space to be cleared for afternoon lessons.

Schools trialling this intervention typically formed an action group to identify priorities, plan activities, implement and communicate the changes. Actual activities implemented varied depending on the key issues in individual schools, but were generally taken from the following options: measures to shorten queues, make better use of space, reduce noise and crowding, or extend eating time available.

Improving familiarity and appreciation of school meals

This intervention aimed to reduce food waste by offering small 'tasters' of new foods in order to encourage pupils to try, rather than reject, unfamiliar foods and make informed food choices (rather than prejudging whether they will like something). It also aimed to encourage greater appreciation of school meals amongst pupils (e.g. by seeing how the food is prepared) and also amongst parents who may be unfamiliar with the quality of school meals and whose influence could have a positive impact on their children's eating habits.

Again activities varied depending on the key issues in individual schools and availability of resources. They included greater scope for pupil feedback, taster sessions and kitchen visits as well as engagement with parents

(both to make them aware of the range and quality of contemporary school dinners and engage them in encouraging their children to appreciate them).

What were the results of the trials?

- In terms of impact on quantities of food waste, no clear trend was found across schools trialling the interventions during the trial period (a half term). Self weighed data from some schools participating in the trials did, however, show a reduction in quantities of food waste during the trial period.
- Across all interventions trialled, a positive impact on staff and pupil awareness of food waste was reported. Non waste specific benefits were also reported by some schools, including greater pupil engagement with food and improved behaviour due to shorter queues. Increased uptake in school meals was also expected in some schools.
- All interventions would have benefitted from more time for in-school planning and implementation. This was a particular issue for schools working on improving their dining experience, where it was often not possible to make the key changes identified by the school during the trial period, particularly where funding was required.
- Perceptions of positive impacts on quantities of food waste were greatest in schools trialling the meals cooked to order intervention. 83% of management respondents and 71% of all respondents rated the intervention as “highly successful” or “successful”. This may have been because the actions the school needed to take were clearly mapped out in this intervention, whereas the other two interventions required more input from the schools as they needed to identify the priorities for their particular circumstances which could take more time. This intervention also required the greatest level of joint working between catering provider and school, which might be expected to have a greater impact.
- All schools expressed an interest in continuing with the changes made, or planned, after the trial period. It is planned to work with these schools to understand any impact the changes may have over a longer period.

Conclusions

A large proportion of the food waste in schools was found to originate from school meals, and this is a source of food waste upon which a school might be expected to have most opportunity to intervene to bring about changes.

Those interviewed in the research identified a range of reasons why they perceived this food is wasted. Some of these can be changed at the level of the school, and others at a local level with schools and catering providers working in partnership to make changes. Equally, some of the reasons identified relate to national standards and legislation, and there may be little scope to address these at a local level. Additionally, food waste, and solutions to it, should not be looked at in isolation from other critical factors relating to school food, such as pupil health and nutritional intake.

The trial interventions suggest school-level changes can positively impact on food waste, without any negative implications for nutrition – indeed, many of these interventions might improve nutritional intake, if students are happier eating different and more varied foods, or less inclined to leave meals unfinished. Interventions also raise the profile of food waste as an issue. All the schools involved in the trial reported plans to continue with and progress the activities they had undertaken during the trial. However, given the practical constraints involved and the short time span of the trials, measurable impacts were difficult to achieve. Certain interventions clearly take longer to become established than others.

The actions that were identified through this study as being likely to reduce food waste often correspond with actions associated with other benefits. Nutritional benefits are mentioned above, and these might also be expected to improve concentration. Reduced time spent queuing and a more relaxed canteen environment might improve behaviour. However, neither of these factors was measured in the course of this study.

Action to address some of the causes of food waste identified through this research can be effective; but the aim of reducing food waste should not be viewed in isolation. Activities which might seem optimal from a waste management point of view, such as preparing less of the food types which are wasted most, would not be optimal when looking at food in schools holistically, since this could compromise compliance with nutritional

guidance, or the educational value of introducing new and different foods. We can encourage pupils to waste less of these, but it may not be desirable to seek to reduce the amount offered. This is consistent with the findings of the School Food Trust's Primary school food survey 2009 which suggested more needs to be done to encourage pupils to eat the fruit and vegetables served.

As a result, whilst there is a clear and important role for food waste prevention, waste management options, such as composting and food waste collections, should also be seen as important in minimising the negative impacts of food waste in a school environment.

Next steps - What can schools that are interested in reducing food waste do?

Materials for schools and catering providers to help to identify and address issues that may be causing food to be wasted in your school can be found here: www.recyclenow.com/schoolsfoodwaste

These cover:

- Background to food waste issues and why this is an important area for schools
- Details of activities that can be undertaken, and practical suggestions for their implementation
- Advice on communicating messages within the school to ensure success of the activities
- Links to other relevant materials

Further work to help schools to reduce food waste is planned by WRAP in partnership with the School Food Trust.

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