Government
Office for Science

Food waste: A response to the policy challenge

Government Office for Science

Contents

Introduction

The Government Chief Scientific Adviser and the Defra Chief Scientist brought together a group of experts from across academia, industry, government and non-government organisations to explore the issue of food waste. Two questions were explored. Firstly, why should the UK care about food waste and what are the benefits and costs of food waste reduction? Secondly, how, in simple policy terms, can food waste reduction be achieved?

The response to the two questions is set out below. This was developed as a result of seminars and the advice of experts. The Government Chief Scientific Adviser and Defra Chief Scientific Adviser are responsible for the findings. This report has been submitted to Defra for consideration. The views expressed do not represent Defra policy.

Why should we care about food waste?

The costs and benefits of food waste reduction

The UK throws away at least 10 million tonnes of food every year, of which 6 million tonnes is avoidable and has a retail value of £17 billion[1].

In developing the business case for the voluntary Courtauld 2025 agreement[2], the Waste and Resources Action Plan (WRAP) estimated that every £1 spent on influencing consumer behaviour to focus more on household food waste reduction could result in benefits to consumers of between £4.70 and £6.50[3]. These benefits would be between £5.20 and £6.70 if the manufacturing, retail, hospitality and food services sectors were also considered.

Food waste and Greenhouse Gas emissions

Globally, food production is responsible for 30% of total greenhouse gas (GHG) emissions, half of this coming from land conversion to agriculture and the rest from production itself. Though there is uncertainty about the precise figures, around one third of all food is wasted. The UN Food and Agriculture Organization[4] reports that if global food waste was a country it would be the third largest GHG emitting country in the world.

According to WRAP, the UK's avoidable food waste in 2011 gave rise to at least 20 million tonnes of carbon dioxide equivalents per year (an amount of GHGs with a similar warming potential to carbon dioxide, commonly written as CO_2e)[5], out of a UK total of around 500 million tonnes. Approximately three quarters of these emissions arise in the UK and the remainder from overseas. Unavoidable food waste is responsible for at least a further 0.25 million tonnes of CO2e. These figures do not take into account the food that is wasted on the farm where we do not currently have reliable data.

WRAP has calculated that on average 4 tonnes of carbon dioxide equivalents are avoided for every tonne of food waste prevented[6]. However, different foods produce very different quantities of GHG emissions. Meat results in more than twice the GHG emissions of nutritionally equivalent vegetarian food. It is therefore important to consider the sorts of food waste that would be reduced by individual policies. In another study, Environment Resources Management

on behalf of Defra found that the marginal abatement cost of food waste prevention is a net benefit of approximately £1000 per tonne of CO2e avoided in the UK through food waste prevention[7].

Co-benefits of food waste reduction

In addition to GHG emissions, there are a number of co-benefits that could result from minimising food waste. These include:

- Wide environmental positive impacts, including reducing land and water use and deforestation, improving the health of the seas, and protecting endangered species.
- Money saved: households and businesses can save money through less spent on landfill tax, and through the need to purchase less food by reducing waste. This has knock-on benefits in reducing costs to Local Authorities in the disposal of household food waste.
- Social benefits in terms of increased opportunities for redistribution of surplus food to those in need.

How can food waste reduction be achieved?

Food waste was estimated to be 11.6 million tonnes in 2007. This reduced to 10 million tonnes in 2015. Modelling by WRAP in 2014 suggested that, without further intervention, by 2025 food waste may increase by between 0.2 million and 2.0 million tonnes per year[8]. A substantial reduction in food waste is unlikely to be achieved through a single policy or intervention. There are, however, four broad areas where policy intervention could drive down food waste:

Dealing with food waste on the farm

We currently do not know exactly how much food is wasted on the farm. Work is underway to develop more accurate figures but the EU-funded FUSIONS project recently estimated that around 1-2 Mt of food waste occurred on the farm in countries producing similar levels of food to the UK[9].

One means of reducing this would be through the use of whole crop purchase (WCP) contracts between farmers and food retailers. For some crops, up to 25% is wasted because it does not meet standards set by retailers for appearance[10]. WCP could result in produce that does not reach the required standards for retail being used in other parts of retailers' supply chains, for example in the manufacture of soup or diced goods. This would reduce the incentive to farmers to over-produce. WCP has allowed the supermarket chain Morrisons to sell 100% British produce in season, make use of 20% more of a potato crop, and control its supply chain more effectively[11].

Encouragement of the reduction of food waste on the farm could also be achieved by including an obligation to work out a food surplus and waste minimisation plan formally in contracts between farmers and their customers. This would encourage both sides to consider the issue carefully and encourage innovative approaches to dealing with food waste. Compliance with this provision could be monitored by the Grocery Code Adjudicator. The GCA would require a change to their remit and additional support if they are to take on any new tasks.

Another option would be to encourage DFID to set up a fund targeting food waste reduction on the farm and in the supply chain in developing countries (particularly those supplying the UK). This would also reduce GHG emissions associated with production of the UK's food and reduce emissions in the country concerned. This fund could also target low carbon technology to help produce food and preserve it through the supply chain (e.g. solar powered refrigeration systems).

The National Farmers' Union, the Agriculture and Horticulture Development Board and WRAP are currently working to obtain better data on the amount of food wasted pre-farm gate. The availability of this data will assist in identifying where further improvements can be made.

Dealing with food waste in the household

Significant progress has been made in reducing household food waste. Between 2007 and 2012, the amount of edible food that was wasted by households reduced by 21% (or 1.1 million tonnes), with a likely driver being WRAP's Love Food Hate Waste campaign[12].

Despite this, households remain the largest producer of food waste. They are responsible for approximately 7 million tonnes per year costing the average family £700 in food not consumed each year.

Estimates by WRAP suggest that significant reductions in GHG emissions could be gained by following the guidelines recommended by Love Food Hate Waste[13], such as making better use of domestic freezers, and planning portion sizes more effectively. Cumulatively, from 2015 to 2025 between 3.5 million to 12 million tonnes of CO2e could be saved in the UK and abroad[14]. Including the hospitality, manufacturing, and retail sectors increases the emissions savings to between 5.8 million and 18 million tonnes of CO2 equivalents.

There are no single interventions that will result in further significant reductions in household food waste. However, the following interventions could continue the downward trend of household food waste:

- **Providing households and consumers with options that make it easier or more economically rational to be less wasteful**. Love Food Hate Waste is the obvious way to deliver this to consumers given its strong track record[15].
- **Improved education on food waste**. Universities and schools could be encouraged to include materials on helping their students understand food waste and ways to reduce it. Details of where food comes from should be provided to children at an early stage so that children understand the value of food.
- **Clear guidance on portion size**. Collaboration between the Department of Health, Public Health England and Defra should be encouraged so that up-to-date portion guidance could be provided to consumers. Improving education on portion size and increasing the range of competitively-priced pack sizes to meet the needs of single households may have co-benefits, such as reducing rates of obesity. The current trend towards the removal of multi-buy discounts is a step in the right direction. Further improvements could be made through encouraging WRAP to work with businesses to deliver more portion guidance on packaging.

Dealing with food waste in the supply chain

The manufacturing, hospitality and food service sectors waste 2.6 million tonnes of food each year worth an estimated £3.7billion. Possible interventions to reduce this waste include:

- **Public Ministerial support to the "Love Food, Hate Waste" and Courtauld 2025 campaign**. Vocal support to both campaigns would be a simple and cost-effective intervention that could drive further reduction in these sectors as well as the household. In addition, Government could encourage retailers to actively help their customers reduce food waste through encouragement of privately-led programmes similar to the "Waste Less, Save More" initiative run by Sainsbury's[16].
- **Government leadership through procurement policy**. Government could insist that their contractors ensure that a food surplus and minimisation management plan is included in contracts with suppliers. Public sector contracts could also encourage waste prevention in catering establishments with regular reports on progress. A small-scale trial in one part of the public sector, say schools or hospitals, would allow the potential benefits to be examined. The UK public sector spent £1.2 billion on food and drink in 2014[17]. The contribution of the food sector to the UK economy in 2015/16 was £21.9bn[18], and so this would represent significant pressure on food retailers to change their behaviour.
- **Development of annual food surplus and waste minimisation plans**. Requiring businesses to develop such a plan would highlight the amount of waste that is produced. Businesses would be required to identify ways to reduce food waste across the supply chain in line with the waste hierarchy (and therefore UK law). This would encourage waste prevention and redistribution to humans and animals for example above recycling to Anaerobic Digestion (AD). Compliance with development of these plans could be checked by Environmental Health Officers in hospitality and food service sectors and Environment Agency in the wider supply chain.
- **Better data on the type of waste that is produced**. All producers and handlers of waste (including food waste) have a legal 'Duty of Care' for the safe management of waste to protect human health and the environment. Evidence that the Duty of Care has been discharged is provided through the use of Waste Transfer Notes, which are currently kept in paper form and must be stored for up to 6 years for tax purposes. An electronic Duty of Care system has been developed by the EA, WRAP and other organisations. Mandatory use of this system by the manufacturing, hospitality and food service sectors would provide more accurate data on the type and amount of waste that is produced in the UK and what happens to it, at less cost to government and business.
- **New research programmes**. InnovateUK and the UK Research Councils could ensure that funding is made available for excellent research and innovation in this area. The aim would be to develop new technologies to reduce food waste and identify innovative uses of unavoidable waste and by-products (e.g. feedstocks for chemical production or biologically derived plastics).

Dealing with food once it becomes waste

The most desirable outcome is prevention, ensuring that food does not become waste in the first place. Once it does become waste we need to deal with it the right way to minimise the negative consequences. This means diverting food waste away from landfill, where it contributes to GHG emissions.

There are a number of ways in which the UK could deal better with its food waste. Firstly, sending food waste to anaerobic digestion (AD) would result in the production of biogas, a methane-rich gas that can be used as fuel; and digestate, which can be used as a fertiliser. To achieve this, Local Authorities would need to be incentivised to implement a separate food waste collection service.

For Local Authorities that have weekly residual waste collections there is a business case for introducing weekly food waste collections. The costs of additional food collections and treatment are outweighed by savings made by sending food waste to AD rather than landfill (thus saving on landfill tax). The business case is strengthened if food waste collections are combined with a fortnightly residual waste collection.

However, since many Councils have already made a switch from weekly to fortnightly residual waste collections without incorporating weekly food recycling there is now likely to be an overall net cost for the implementation of an England wide service. The operational costs of additional food waste collections could be reduced through co-collection service options (i.e. collecting food waste alongside dry recyclables). There would, however, need to be additional drivers to incentivise further collections and reduce costs for local authorities.

The biggest opportunities for dealing better with food waste are in the hospitality and food service sectors. Collectively, these sectors generate close to 1 million tonnes of food waste per year with 88% being sent to landfill or residual waste treatment (e.g. energy from waste facilities). The recent experience of Scotland shows that placing a clear legal requirement on businesses to separate food waste can increase the amount of food waste captured from this sector. According to the Renewable Energy Association, large and medium food producers could save up to 10% of their yearly waste collection costs20. Paying by weight would serve to increase the savings further, and non-food businesses would incur only a small increase to their yearly costs.

Summary

Changing consumer and producer behaviour often require multiple interventions. They can also bring economic, social and environmental benefits in the short, medium and long term. Government action could make a significant difference. Better collection of data would enable future action to focus on areas where the biggest benefits can be achieved.

[1] http://www.wrap.org.uk/sites/files/wrap/UK%20Estimates%20May%2016%20%28FINAL%20V2%29.pdf

[2] Courtauld 2025 is an ambitious voluntary agreement that aims for a 20% reduction in food and drink waste arising in the UK

[3] WRAP, 2016. Courtauld 2025 cost:benefit analysis

[4] http://www.fao.org/food-loss-and-food-waste/en/

[5] http://www.wrap.org.uk/content/uk-handy-waste-facts-and-figures-retail-sector

[6] http://www.wrap.org.uk/sites/files/wrap/Methods%20Annex%20Report%20v2.pdf

[7] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=18118

[8] http://www.wrap.org.uk/sites/files/wrap/UK%20food%20waste%20-%20Historical%20and%20future%20changes%20%28FINAL%29_0.pdf

[9] http://www.eu-fusions.org/phocadownload/Publications/Estimates%20of%20European%20food%20waste%20levels.pdf

[10] http://www.wrap.org.uk/sites/files/wrap/WCP%20Action%20Plan%20-%20finalv1.pdf

[11] http://your.morrisons.com/Documents/Morrisons_Corporate_Responsibility_Review_2011.pdf

[12] http://www.lovefoodhatewaste.com/content/facts-about-food-waste-1

[13] http://www.lovefoodhatewaste.com/node/2472

[14] WRAP, 2016, Courtauld 2025 Cost:benefit analysis

[15] Love food hate waste reduced food waste in West London by 14% in six months after it was introduced. For every £1 invested in Love Food, Hate Waste, £8 was saved. (http://www.wrap.org.uk/sites/files/wrap/West%20London%20LFHW%20Impact%20case%20study_0.pdf)

[16] https://wastelesssavemore.sainsburys.co.uk/

[17] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332756/food-plan-july-2014.pdf

[18] https://www.fdf.org.uk/statsataglance.aspx

© Crown copyright 2017

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3 or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication available from www.gov.uk/go-science

Contact us if you have any enquiries about this publication, including requests for alternative formats, at:

Government Office for Science
1 Victoria Street
London SW1H 0ET
Tel: 020 7215 5000
Email: contact@go-science.gsi.gov.uk