

SUSTAINABLE PRODUCTION & HEALTHY EATING FACT SHEET



SHEET NO. 3

This fact sheet is one of a series compiled by the Food Innovation Centre at the University of Nottingham, providing clear, concise and scientifically reliable information on key topics for SMEs

Food waste management and valorisation

When food is lost or wasted it impacts the environment and the economy and waste resources at a time when many people cannot access enough food to eat.

The causes of food waste or loss are numerous and occur throughout the food system, during production, processing, distribution, retail and consumption. Global food waste amounts to **one-third** of all food produced, resulting in millions of tonnes of food wasted annually.

Food waste represents a large proportion of the impact that agriculture has on driving **climate change**. The FAO estimated that food waste causes a global economic, environmental and social cost of \$2.6 trillion a year and is responsible for 8% of global greenhouse gas emissions. Moreover, reducing food waste in all parts of the food system is fundamental to curb the environmental impact of agriculture by reducing the total amount of water, land and other resources needed to feed the global community.

In the UK, WRAP estimated that annual food waste arisings within UK households, hospitality and food services, food manufacturers, retail and wholesale sectors at around 9.5 million tonnes. Food waste had a value of over £19 billion a year and is associated with more than 25 million tonnes of greenhouse gas emissions. By weight, household food waste makes up 70% of the UK post-farm-gate, **manufacturing 16%**, hospitality and foodservice 12%, and retail 3%.

Benefits of food waste reduction

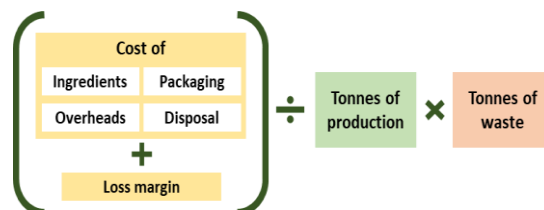
i. The commercial case

➤ Less waste = less cost

The overall value of food waste from the UK food and drink supply chain is estimated at £2 billion a year. This translates to between £360 and £4000 per tonne of waste. Hence, waste prevention can have substantial saving potential. WRAP has estimated that by adopting just the top few no/low-cost waste reduction strategies manufacturing sites and retailers could save up to £1 million on average.

In the UK, the typical cost of waste is between 4% and 5% of a company turnover but this is often underestimated and can be as high as 10% in some cases. To fully understand the cost of waste, companies must consider the cost of ingredients and packaging as well as the cost of overheads, disposal, and lost margins.

This can be calculated using the formula developed by WRAP:



➤ Less waste = less risk

The traditional supply of materials and ingredients is under threat due to finite resources, price volatility, climate change, increasing global population, and unsustainable western diets. Additionally, the ongoing Covid-19 pandemic, Brexit and the recent Suez canal disruption have highlighted the fragility of some supply chains. To remain competitive, businesses need to assess the risks associated with their supply chains and make the necessary changes to ensure they are resilient to these factors and that their business has a sustainable future. Importantly, by preventing waste from arising, companies are not just reducing waste within their business but avoiding the waste of resources across the whole product lifecycle — from farm-to-fork. Thus, reducing the associated risk of supply and improving the entire supply chain's resilience.

➤ Less waste = greater customer satisfaction

An increasing number of consumers want products that are 'good for them and good for the environment' and are expecting retailers and brands to take the lead on environmental issues and demonstrate their corporate social responsibility. Hence, to remain competitive, companies need to respond to these demands for sustainability and demonstrate which actions they are taking to prevent waste and use resources more efficiently.

ii. The environmental case

In the UK, the food and drink sector accounts for 20% of total CO₂ emissions. Every year 10 million tonnes of food waste is produced across the supply chain and people's homes. Wasted food and packaging has several direct and indirect impacts on the environment, such as loss of resources, greenhouse gas emissions, land and water pollution and consumption.

Particularly, impacts arise from:

- waste of resources embodied within the product such as energy, water, fertilisers and transport fuel;

Sustainable production & healthy eating: food waste management and valorisation

- the waste of resources involved in storing products and displaying them (e.g., energy used to refrigerate goods);
- loss of the material in the waste itself (i.e., packaging & product);
- traditional waste disposal routes such as landfill where food waste produce the potent greenhouse gas methane from the anaerobic digestion of organic matter.

iii. The legal and policy case

The waste hierarchy – a legal requirement

UK companies have a Duty of Care to operate according to the principles of waste minimisation. These are illustrated by the 'food and drink material hierarchy' which sets out steps for dealing with waste to minimise environmental impacts: the best option is to **prevent** raw materials, ingredients and products from becoming waste in the first place. Then, surplus food can be reduced by **redistributing** it for human consumption, **re-utilising** it to develop value-added products or using it for animal feed. Finally, when food waste is unavoidable, priority should be given to **recycling** and **recovery**. Disposal should always be the last resort.



How to tackle food waste?

We recommend using WRAP's 5-5-5 approach to reduce waste and maximise cost reduction. It consists of **five actions to take**, **five areas to target** and **five stages to follow**.

A. Five key actions to take

- 1) Measure the waste.** Companies often do not have an accurate understanding of how much waste they are producing. WRAP has produced a comprehensive [Food and Waste Reduction Roadmap & Toolkit](#) that aims to allow businesses to measure waste and report it consistently and confidently.
- 2) Cost it appropriately.** Cost calculations used by companies rarely provide the actual cost of the waste.
- 3) Set a target for waste reduction.** Challenge 'tolerance' levels and ensure KPIs encourage the correct behaviour.
- 4) Take action on the highest waste areas.** Follow the five stages to target waste in your business.

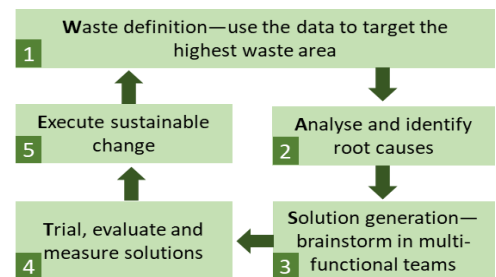
5) Embed a culture of waste prevention. Senior management needs to be convinced about the commercial case and lead the charge. [Educate](#) and engage employees on waste reduction.

B. Five key areas to target

- 1) Improve systems and processes.** Forecasting, ordering, product life, and promotions are areas where small tweaks can make vast gains.
- 2) Implement Lean/Continuous Improvement (CI) type processes.** Use WRAP's [Whole Chain Resource Efficiency Toolkit](#) to drive food waste out of all stages of the supply chain. This tool gives guidance on how to bring supply chain partners together to achieve food waste reduction.
- 3) Collaborate.** The most significant gains are made when companies collaborate with customers and their supply chain.
- 4) Optimise packaging to reduce waste.** While there has been lots of progress on [primary packaging](#), there are still significant opportunities to cut down on secondary and tertiary packaging.
- 5) Redistribute.** Surplus food should be [sold or sent to charity](#); if this is not possible, check if food can be used for [animal feed](#).

C. Five stages to follow

Use WRAP's **W.A.S.T.E.** problem-solving tool based on Lean/Continuous Improvements principles to reduce waste.



Finally, as 70% of waste happens within households, SMEs should consider strategies to help reduce this from arising, such as:

- the use of **food additives** and **smart packaging** to extend food shelf-life whilst preserving its nutritional quality;
- clear '**best before**' and '**use by**' labels to inform how long the food is safe for consumption;
- detailed **storage information** to guarantee shelf life;
- Correct nutritional information and portion size.

Resources

D'Agostino D (2021) 'Food waste management and valorisation'. In: D'Agostino D (2021) 'Sustainable production in the food and drink sector'.

WRAP (2020) [Action on food waste](#).

Contacts & further information

Written by Dr Daniele D'Agostino (June 2021).

[✉ SB-FoodInnovCentre@exmail.nottingham.ac.uk](mailto:SB-FoodInnovCentre@exmail.nottingham.ac.uk)

[🌐 To download](#) this document, the main reference guide and more

If you want to know more and have food-related issues you wish to discuss, contact the Food Innovation Team who may be able to help