

Institution: 10007822
Unit of Assessment: 19
Title of case study: Waste not, want not: reducing waste in the UK food supply chain
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>By identifying opportunities for waste reduction and recommending changes in forecasting, inventory management and packing, Cranfield research has shaped policy and practice in the reduction of food waste.</p> <p>Working with the UK's major food retailers and UK government, Cranfield has investigated the causes of food waste to help organisations and influence the development of the Courtauld Commitment, a voluntary agreement to reduce product and packaging waste in the food supply chain. Reductions in product and packaging waste exceeded 8% between 2010 and 2012, building on earlier reductions, exceeding 500,000 tonnes in the period 2005-2009. Annual savings on product waste for UK food companies are estimated at £400 to 500 million for fresh fruit and vegetables and £110 million for fresh meat.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>The global food system is dynamic and complex, making it difficult to estimate how much food is wasted. However, estimates indicate that between 30-50% of food produced globally is lost or wasted. This waste has negative implications for the economy, society and the environment.</p> <p>In collaboration with various trade organisations, including the Institute of Groceries Distribution (IGD), the Meat and Livestock Commission (MLC) and the Fresh Produce Consortium (FPC), and other universities in the UK (Warwick and Cardiff) and Spain (University of Oviedo), a multi-disciplinary team of Cranfield researchers skilled in supply chain management, food technology and environmental science has conducted research for more than a decade aimed at eliminating waste from the food supply chain [R3].</p> <p>Cranfield has undertaken five research projects in food waste, with a total funding exceeding £1 million supported by EPSRC, Defra, and the UK's Waste Reduction Action Programme (WRAP). These projects addressed different sectors and aspects of food supply chains:</p> <ul style="list-style-type: none"> • Resource Maps for Fresh Meat across Retail and Wholesale Supply Chains. This project received around £140,000 in funding from the Waste Reduction Action Programme (WRAP). The research evaluated the extent to which fresh meat is wasted or lost in the UK's food supply chain. • Fruit and Vegetable Resource Maps. Research funded by WRAP (£125,000) analysed the extent to which fresh fruit and vegetables are wasted or lost in the UK's food supply chain. • Evidence on the role of supplier-retailer trading relationships and practices in waste generation in the food chain [R2, R4]. With £80,000 in funding from Defra, this project set out to: assess the magnitude of food and packaging waste in the supplier/retailer interface; identify the causes of waste; identify good practices; and provide recommendations for policy and practice to help businesses address the causes of waste. • Improving the Cereals Supply Chain. Funded by Defra and the HGCA (£350,000) as a collaboration between Cranfield, Cardiff University and the Food Chain Centre, this project aimed to improve the competitiveness of UK cereals supply chains through the implementation of lean practices to reduce waste. Seven case studies lead to recommendations for the cereals industry in areas such as inventory management, quality control, planning, and relationships management [R1, R5].

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- Supply Chain Cost Effectiveness and Swift Service: An EPSRC (GR/R31546) funded project (£700,000) involving Cranfield and Warwick universities, aimed at developing a toolkit to provide visibility of costs and waste across food supply chains. The toolkit was developed and tested with major food producers including Mars, McCormick and Bernard Mathews as well as SMEs [R6]. The researchers collaboratively produced a practitioner handbook documenting the toolkit.

Through this programme Cranfield has investigated and identified the causes of food waste in the UK. This was followed by a more detailed evaluation and quantification of these causes and the development and testing of tools and techniques which could help analyse and reduce waste. Through this process we have moved from theory to practice, where we can deliver tangible results.

Key Researchers:

Dr Carlos Mena (Lecturer / SL / Reader in Procurement) since 2001

Mr Mike Bernon (Senior Lecturer)

Prof Alan Harrison (retired 2011)

Prof Richard Wilding

Dr Denyse Julien (Senior Lecturer) since 2011

Dr Marko Bastl (Senior Research Fellow) 2011 – August 2013

3. References to the research (indicative maximum of six references)

[R1] Mena, C., Humphries, A. and Choi, T. (2013) Towards a Theory of Multi-tier Supply Chain Management, *Journal of Supply Chain Management*, 49(2) 58-77.

[R2] Ettouzani Y., Yates N., Mena C. (2012) Examining Retail on Shelf Availability: Promotional Impact and a Call for Research. *International Journal of Physical Distribution and Logistics Management*, 42 (3) 213-243.

[R3] Maruchek A., Greis N., Mena C., Cai L. (2011) Product safety and security in the global supply chain: Issues, challenges and research opportunities. *Journal of Operations Management*, 29 (7-8) 707-720.

[R4] Mena C., Adenso-Diaz B., Yurt O. (2011) The causes of food waste in the supplier-retailer interface: Evidences from the UK and Spain. *Resources Conservation and Recycling*, 55 (6) 648-658.

[R5] Mena C., Humphries A., Wilding R. (2009) A comparison of Inter- and Intra-organizational Relationships: Two case studies from UK food and drink industry. *International Journal of Physical Distribution and Logistics Management*, 39 (9) 762-784.

[R6] Whicker L., Bernon M., Templar S., Mena C. (2009) Understanding the relationships between time and cost to improve supply chain performance. *International Journal of Production Economics*, 121 (2) 641-650.

4. Details of the impact (indicative maximum 750 words)

Through our '**Pathway to Impact – No.1 (Bespoke research projects)**', this impact case demonstrates **impact on the environment**, and **economic, commercial and organisational impacts** by influencing codes of practice that effect resource management practices which contribute to environmental sustainability.

In more recent projects, working with UK Government (Defra) [S5] and the Waste & Resources Action Programme (WRAP), Cranfield has influenced the development of Phase 2 of the Courtauld Commitment, a sector wide voluntary agreement funded by Westminster, Scottish, Welsh and Northern Ireland Governments and delivered by WRAP [S7]. The commitment, launched in 2005,

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is “aimed at improving resource efficiency and reducing the carbon and wider environmental impact of the UK grocery retail sector” **[S1]**, by providing more sophisticated measures and targets for the sustainable use of resources over the lifecycle of products. The agreement has more than 50 signatories including major retailers (e.g. Tesco, Asda, Sainsbury, WM Morrison and Waitrose) and Brands and Suppliers (e.g. Unilever, Mars, HJ Heinz, Nestle and Coca-Cola).

In Phase 1 of the commitment from 2005 to 2009, the food industry avoided 670,000 tonnes of food waste and 520,000 tonnes of packaging waste was avoided **[S2]**. The second phase completed at the end of 2012, claimed further reductions of 8.8% product waste and 8.2% packaging waste against a 2009 baseline. A third phase of the commitment was launched in May 2013, and aims to deliver savings of £1.6 billion to consumers, food and drink sector and local authorities.

The two projects funded by WRAP **[S3, S4]** based on more than 45 interviews with retailers and suppliers in each product sector and secondary data allowed Cranfield to estimate the losses from specific products and extrapolate this to the whole sector. Recommendations by Cranfield in these studies contributed to the Courtauld Commitment. When implemented these recommendations would save companies in the fresh fruit and vegetable chain an estimated £400 to £500 million annually, and a further £110 million in the meat supply chain.

These built on the earlier Cereals Supply Chain project which had provided a series of best practice case studies of how organisations like Coors Brewers **[S6]**, Bernard Matthews and Warburton’s had identified and managed sources of waste in their business processes. The prior EPSRC study had secured quantifiable benefits of over £2 million for the industrial collaborators during the life of that project.

5. Sources to corroborate the impact (indicative maximum of 10 references)

[S1] Courtauld Commitment: Details on WRAP website <http://www.wrap.org.uk/content/what-is-courtauld> (includes list of signatories and details of savings)

[S2] Courtauld Commitment phase 2 progress: <http://www.wrap.org.uk/content/courtauld-commitment-2-1> (full results will be reported in autumn 2013).

[S3] Whitehead, P., Palmer, M., Mena, C., Williams, A. Walsh, C. (2011) Resource Maps for Fresh Meat across Retails and Wholesale Supply Chains (http://www.wrap.org.uk/sites/files/wrap/RSC009-002_-_Meat_Resource_Map.pdf). Includes details of the research and the estimations of potential savings from waste reduction in the meat supply chain. Mena is a Cranfield researcher.

[S4] Terry, L., Mena, C., Williams, A., Jenny, N. and Whitehead, P. (2011) Fruit and Vegetable Resource Maps. Available from WRAP. (http://www.wrap.org.uk/sites/files/wrap/Resource_Map_Fruit_and_Veg_final_6_june_2011.fc479c40.10854.pdf). Includes details of the research and the estimations of potential savings from waste reduction in fruit and vegetable supply chains. Mena is a Cranfield researcher.

[S5] Mena, C., Hobday, D., Terry, L., Whitehead, P. and Williams, A. (2008) Evidence on the Role of Supplier-retailer Trading Relationships and Practices in Waste Generation in the Food Chain, Department for Food and Rural Affairs (DEFRA), Project Code FO0210. Report available at: <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=15806>

[S6] Brewer Improves Efficiency Through Strategic Partnership (example of one of the best-practice case study reports from the project on cereals supply chains). Available from: <http://www.foodchaincentre.com/cir.asp?type=1&subtype=7&cir=258>

Impact case study (REF3b)

[S7] Programme Area Manager for Food & Drink, WRAP. A statement corroborating the significance of Cranfield's research findings and their influence on the signatories to the Courtauld Commitment.