

BUSINESS OPPORTUNITIES IN FOOD WASTE

Teaching resource

**Material prepared by the Institute for Sustainable Futures, UTS
and the UTS Business School**

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This material can be modified and drawn upon by teachers at any institutions

This project is supported by the Environmental Trust as part of the NSW EPA's Waste Less, Recycle More initiative, funded from the waste levy.

This resource contains:

- Learning objectives
- Suggested lesson format
- Assessment questions & other possible assessment tasks
- Suggested reading list for students

INTRODUCTION FOR EDUCATORS

Learning Objectives

1. To understand the business case for addressing food waste
2. To identify market trends for food waste avoidance
3. To identify and understand key factors influencing unsustainable global food consumption patterns
4. To identify and analyse food waste avoidance business opportunities in relation to sustainable consumption trends.

Suggested lesson formats:

- **60 minutes lecture + workshop:**
15 minutes lecture overview, 10 mins video, 5 mins questions, 30 min workshop activity
- **180 minutes: lecture + workshop + guest speaker:**
15 minutes lecture overview, 10 mins video, 5 mins questions, 30 min workshop activity, 30 mins guest lecture, 25 mins open question discussion forum, 15 mins debrief, recap

A quick snapshot:

- Around one third of the food produced globally is lost or wasted.¹
- Eliminating food waste could save the global economy US\$120 and 300 billion per year by 2030. To achieve this would require a 20-50% reduction in consumer food waste².
- Food waste is currently valued at more than US\$400 billion per year, as the global middle class expands the cost could rise to US\$600 billion within 15 years³.
- There are business opportunities in food waste avoidance both in the generation of innovative solutions to reduce or prevent waste throughout the supply chain and/or to lower costs associated with waste disposal, overpurchasing and labour.
- For existing food businesses avoidance of food waste can be attained through avoiding over purchasing and incorporating 'root-to-stalk' techniques.
- Diverting food waste from landfill can be attained through at least three mechanisms: (1) donation to charity; (2) onsite composting or worm farming; and, (3) commercial composting or processing⁴
- Business approaches to address sustainable consumption can be broadly considered in three categories: (1) innovation – new and improved products and services; (2) choice influencing – use of marketing and awareness raising campaigns to encourage consumers to reduce or prevent food waste; (3) choice editing – the removal of products or services that encourage food wastage.
- Business solutions to food waste avoidance can be discovered across the supply chain through thinking about food products from 'plate to paddock'.
- A focus on local and seasonal food production systems sees the emergence of farmers markets and household solutions such as aquaponics and urban agriculture.

¹ <http://www.eea.europa.eu/signals/signals-2012/close-ups/food-waste>

² http://static.newclimateeconomy.report/wp-content/uploads/2015/02/WRAP-NCE_Economic-environmental-gains-food-waste.pdf

³ http://static.newclimateeconomy.report/wp-content/uploads/2015/02/WRAP-NCE_Economic-environmental-gains-food-waste.pdf

⁴ <http://www.lovefoodhatewaste.nsw.gov.au/business/hospitality/disposal-of-food-waste.aspx>

RESOURCES

REPORTS/ FACTSHEETS

'Global food losses and food waste' *Food and Agriculture Organization (FAO)*

This reports looks at the extent, causes and prevention of food waste as a global issue. The study highlights the losses occurring along the entire food chain, and makes assessments of their magnitude, based on research conducted between 2010 and 2011. It includes 'snapshot cases' – examples from food retailers and producers about initiatives leading to or reducing food waste.

http://www.fao.org/fileadmin/user_upload/sustainability/pdf/Global_Food_Losses_and_Food_Waste.pdf

Strategies to achieve economic and environmental gains by reducing food waste

WRAP (The Waste & Resources Action Programme) and the Global Commission on the Economy and Climate.

This 2015 report highlights the need for action on food waste and provides concrete examples of how this can be achieved. Investments of time and money will be required, but the potential economic and environmental benefits are huge, and the consequences of not taking sufficient action are serious – for billions of individuals, countries, and the food system as a whole.

The report highlights the economic costs and benefits of taking action on prevention of food waste and demonstrates case study examples in relation to households, hospitality and food service food waste and manufacturing and retail supply chain waste. The report also signifies how reduction in food waste through efficiency solutions can both reduce the climate impacts and reduce the food gap.

http://static.newclimateeconomy.report/wp-content/uploads/2015/02/WRAP-NCE_Economic-environmental-gains-food-waste.pdf

'The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States' - *Jean C. Buzby, Hodan Farah Wells, and Jeffrey Hyman, Economic Information Bulletin No. (EIB-121) 39 pp, February 2014.*

Examines 'food loss' in the US in relation to the retail level and consumer level losses. The study also revealed "There is a practical limit to how much food loss the United States or any other country could realistically prevent, reduce, or recover for human consumption given: (1) technical factors (e.g., the perishable nature of most foods, food safety, storage, and temperature considerations); (2) temporal and spatial factors (e.g., the time needed to deliver food to a new destination, and the dispersion of food loss among millions of households, food processing plants, and foodservice locations); (3) individual consumers' tastes, preferences, and food habits (e.g., throwing out milk left over in a bowl of cereal); and (4) economic factors (e.g., costs to recover and redirect uneaten food to another use)" (Summary report, pg. 2).

<http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib121.aspx>

'The Role of Packaging in Minimising Food Waste in the Supply Chain of the Future'

A study conducted by the Centre for Design at RMIT for CHEP Australia.

This report focuses on packaging opportunities that may help to reduce or recover food waste.

Packaging has a vital role to play in containing and protecting food as it moves through the supply chain to the consumer. It already reduces food waste in transport and storage, and innovations in packaging materials, design and labelling provide new opportunities to improve efficiencies. Product protection needs to be the primary goal for packaging sustainability, and sometimes this requires trade-offs between packaging and food waste.

http://www2.kau.se/kom/filer/RMIT-study-The-role-of-packaging-in-minimising-food-waste-in-the-supply-chain_June%202013_FINAL.pdf

Food Wastage Footprint Impacts on Natural Resources *Food and Agriculture Organization*

This FAO study provides a global account of the environmental footprint of food wastage focusing on the impact of that wastage on climate, water, land and biodiversity. For this study, "wastage"

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incorporates both food loss and food waste along the food supply chain and a model has been developed to answer two key questions: What is the magnitude of food wastage impact on the environment? What are the main sources of these impacts, in terms of regions, commodities and phases of the food supply chain involved – with a view to identify “environmental hotspots” related to food wastage?

<http://www.fao.org/docrep/018/ar429e/ar429e.pdf>

Reducing food waste: Advice from chefs and catering professionals

This 11 page accessible document contains ‘wise words and inspiration’ from GreenCook Food Waste Ambassadors in the UK and Netherlands. These are networks of skilled and passionate food professionals, who have a wealth of knowledge about the industry. In this document, they share their advice on how to create more sustainable dishes whilst curbing food waste.

www.sustainweb.org/resources/files/reports/ReducingFoodWaste.pdf

Paddock to Plate: policy propositions for sustaining food & farming systems. The Future Food and Farm Project Propositions Paper

Predominantly a policy paper this report contains several propositions specifically addressing business in the food supply chain. According to the author: “This paper culminates a project for the Australian Conservation Foundation that explores the future of the Victorian food and farming system in a rapidly changing and more demanding world, focusing on the period to 2020. It tries to anticipate and imagine the sorts of activities and investments that will be needed if Victoria is to equip its food and farming system to produce more healthy foods, more sustainably, in a much more difficult climate, while consuming less water, nutrients, energy, soil and biodiversity”.

http://www.triplehelix.com.au/documents/PaddocktoPlatePropositions_002.pdf

The Impacts of a Localised Food Supply: What is the Evidence?

A La Trobe University report outlining a project that “had its origins in the desire to test the often-stated claims and benefits of local food systems”. The report examines the evidence base and key drivers in various regions of Victoria. Various findings relate to the economic advantages of local food systems.

www.vichealth.vic.gov.au/.../impacts_localisedfoodsupply.ashx

NSW EPA website providing case studies, information and resources for business food waste avoidance:

<http://www.lovefoodhatewaste.nsw.gov.au/business/home.aspx>

The USA EPA guide to food recovery, reduction and prevention:

<http://www.epa.gov/foodrecovery/>

<http://www.epa.gov/foodrecovery/fd-reduce.htm>

MEDIA AND JOURNAL ARTICLES

Bowling, D. (2013) ‘Waste not, want not: how packaging can help tackle food waste’, *Food Magazine*.

<http://www.foodmag.com.au/features/waste-not-want-not-how-packaging-can-help-tackle-f>

Dee, J. (2013). ‘Australia needs a food waste strategy’, *ABC Environment*.

<http://www.abc.net.au/environment/articles/2013/06/05/3774785.htm>

‘Do Australians waste \$8 billion worth of edible food each year?’, ABC News Fact Check ‘

<http://www.abc.net.au/news/2013-10-08/food-waste-value-australia/4993930>

Henningsson, S., Hyde, K., Smith, A., & Campbell, M. (2004). The value of resource efficiency in the food industry: a waste minimisation project in East Anglia, UK. *Journal of Cleaner Production*, 12(5): 505-512.

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Parfitt, J., Barthel, M. & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050, *Phil. Trans. R. Soc.*, vol. 365: 3065-3081
<http://rstb.royalsocietypublishing.org/content/365/1554/3065.short>

Stuart, T. (2012). 'Food redistribution is a win-win solution for food waste', *The Guardian*. Makes a case for the benefits to be gained from the redistribution of food waste by business and charities.
<http://www.theguardian.com/sustainable-business/food-waste-redistribution-sustainable-solution>

Severson, K (2015) 'Starve a Landfill', *New York Times*. Examines many different ways kitchen efficiency can reduce food waste
http://www.nytimes.com/2015/03/04/dining/efficiency-in-the-kitchen-to-reduce-food-waste.html?_r=0

Hirsch, J. & Harmanci, R. (2013) Food Waste: The Next Food Revolution. *Modern Farmer*. "The next food revolution is about what you're not eating." This article from the US explores the extent of the global food waste problem and what some businesses are doing about it.
<http://modernfarmer.com/2013/09/next-food-revolution-youre-eating/>

Pearson, D., Minehan, M. & Wakefield-Rann, R. (2013). Food waste in Australian households: Why does it occur? **Locale: The Australia-Pacific Journal of Regional Food Studies**.
<http://localejournal.org/issues/n3/Locale%20n3%20-%2009%20-%20Pearson,%20Minehan,%20and%20Wakefield-Rann.pdf>

VIDEOS

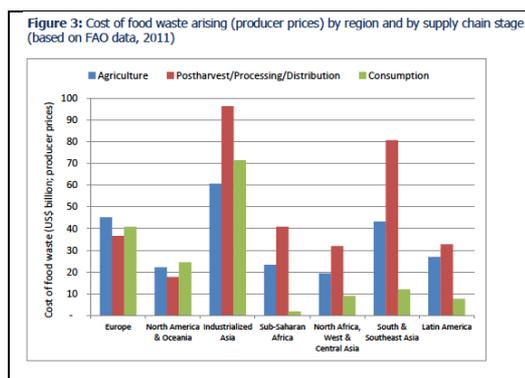
'Whole system' approach to food waste: Tara Garnett from the Food Climate Research Network at Oxford University discusses systemic approaches to food waste across supply chains
<http://www.theguardian.com/sustainable-business/video/reducing-food-waste-whole-systems-approach-video>

Impact and solutions to commercial food waste: Fresh facts for restaurant, catering and hospitality industries
<https://www.youtube.com/watch?v=ntxnb3HyHV8>

TED Talk: Peter Lehner TEDxManhattan talk exploring 'low-tech' solutions to food waste for business and consumers.
<https://youtu.be/UwOHpWTRsbE>

VISUALS

Some infographics about food waste are listed below.

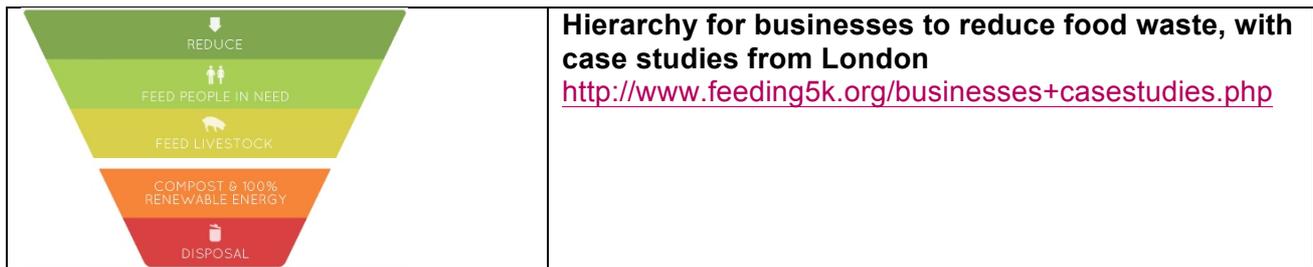


Lost value of food waste by global region and supply chain stage

http://static.newclimateeconomy.report/wp-content/uploads/2015/02/WRAP-NCE_Economic-environmental-gains-food-waste.pdf

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Food waste reduction tips from chefs

www.hospitalitymagazine.com.au/management/cutting-down-on-food-waste-top-chefs-share-their-t

CASE STUDIES/ SOLUTIONS

Tesco tackles food waste: an example of how a large retailer is addressing food waste avoidance

<http://www.reuters.com/video/2013/10/21/tesco-wants-uk-to-tackle-food-waste?videoid=274244335>

Sainsbury's store powered by food waste: an example of a supermarket generating biogas from foodwaste to power its store

<http://www.bbc.com/news/business-28395303>

Reclaiming outdated food: Specialised US supermarkets selling edible food that has passed its best before date.

<http://www.forbes.com/sites/nadiaarumugam/2012/01/06/what-happens-to-old-and-expired-supermarket-foods/>

Cafeteria Culture: 'Working creatively to achieve zero-waste public school cafeterias and climate-smart communities' Case study of a program to reduce waste in cafeterias.

www.cafeteriaculture.org

Food waste driving GreenTech: High levels of waste and inefficiency is actually one of the driving forces of the entire greentech industry.

<http://www.forbes.com/sites/michaelkanellos/2013/01/10/another-reason-food-will-be-hot-in-green-in-2013-waste/>

Food waste service of Business waste: collects food waste and disposes of it ethically

<http://www.businesswaste.com.au/food-waste/>

Oz Harvest: the first perishable food rescue organisation in Australia collecting quality excess food from commercial outlets and delivering it, direct and free of charge, to 600 charities

<http://www.ozharvest.org/what-we-do/>

Foodbank: the largest food relief organisation in Australia, acting as a 'pantry' to charities and community groups who feed the hungry

<http://www.foodbank.org.au>

Food Rescue US: Food rescue US rescues over a million meals annually from food establishments to feed the hungry

www.foodrescue.net

FoodWise, an Australian campaign providing practical advice on food waste avoidance:

<http://www.foodwise.com.au>

From the Paddock to the Plate: a set of case studies of professionals in the food industry at various points on the supply chain from paddock to plate illustrated with short videos

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<http://www.education.vic.gov.au/training/learners/vet/Pages/plate.aspx>

Food waste reduction tips and resources for the Hospitality Industry by NSW Government

<http://www.lovefoodhatewaste.nsw.gov.au/business/hospitality/food-waste-in-hospitality.aspx>

Food waste reduction tips from chefs

www.hospitalitymagazine.com.au/management/cutting-down-on-food-waste-top-chefs-share-their-t

Australian chef Kylie Kwong on food waste and how we can curb it

<http://www.foodwise.com.au/food-waste-we-can-curb-it/>

Minimising kitchen and food waste

<http://yourenergysavings.gov.au/waste/reducing-recycling/kitchen-food-waste/minimise-food-waste>

IDEAS FOR TEACHING

CLASS DISCUSSION QUESTIONS

- Should business be responsible for food waste?
- Is zero food waste an obtainable goal?
- What are the most important strategies that could be effectively implemented by restaurants/retailers/manufacturers/farmers to reduce food waste to zero?
- How can business provide solutions to support a food waste avoidance strategy?
- What role might retailers play in food waste reduction?
- What are some examples of consumer pressure shaping business responses to food waste?
- What are the barriers and drivers for business engaging in strategies to enhance food waste avoidance?
- Where have NGO's and small businesses used food waste as an opportunity?

INTERACTIVE ACTIVITIES (30-50 mins)

1. Brainstorm and business development:

- From students into small teams and allocate each team a sheet of butchers paper. Each team member should have a pen.
- Ask each individual to write down as many different sources of food wastage that come to mind (5 mins)
- Ask the team members to sort the sources of food wastage and choose the 5 sources that seem to have the most significance (10 mins)
- Ask the team to rank the top 5 sources in order of significance (3 mins)
- Ask each team to state aloud to the rest of the class what their top three sources of significant food waster were. Note any similarities or differences (5 mins).
- Ask the team to consider a business solution to avoid the waste they identified as most significant. In doing so they should explain the purpose of the business and develop a value proposition that demonstrates how value is created out of avoiding food wastage (15 mins).
- Ask teams to develop a short 3 minute pitch that aims to convince their peers that their business idea is significant and viable (5 mins)
- Invite teams to share their pitch with their peers and vote on the best idea (15 mins).

2. Rapid debate:

TOPIC: '*Government must regulate market incentives to drive business innovation in relation to food waste avoidance*'.

1. Form the class into two teams and allocate them as the Affirmative and Negative teams.
2. Ask each team to select three speakers and divide again into 3 smaller groups.
3. Tell the teams that each speaker will have 2 minutes to **present** their argument through a speech.
4. The three speakers should first spend 5 minutes together agreeing on the **key points** they will cover and the team case. The team case is a one-sentence statement that presents the main argument of the Negative or Affirmative team in relation to the topic.
5. The speaker then returns to their small team and they have only ten minutes to prepare their speech.
6. Teams then present their speech and rebuttal of the opposing teams arguments in consecutive order starting with the 1st speaker of the Affirmative.

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ASSESSMENT QUESTIONS (ESSAY FORMAT)

- What are the key drivers to reduce food waste within [your sector]? How can businesses act on these drivers for their own benefit (provide examples)? What are the barriers to acting?
- Analyse the key business opportunities within [your sector] presented by the issue of food waste. Identify any supporting mechanisms (e.g. policy changes) required to support the implementation of these opportunities.
- Avoiding food waste is the responsibility of consumers, not the business sector. Outline the evidence to support and refute this statement.

OTHER POSSIBLE ASSESSMENT TASKS

- Short film outlining the issue for a general audience
- Create an infographic outlining the current scale of food waste in the commercial and industrial sector.
- Develop a case study of:
 - a local business taking steps to avoid food waste, and outline which part of the overall food production system they are targeting.
 - a local not for profit organization helping business reduces food waste, and the benefits to businesses of the partnership.
 - a business that has developed a product or service to help reduce waste in the residential, commercial or industrial sector.
- Design and carry out a survey of food waste behaviours in restaurants /caterers / takeaway shops in a particular demographic/ geographical location, mirroring the questions from the EPA's NSW wide surveys – compare results
- Audit food waste produced at a commercial kitchen / catering service / grocery store – working on consent processes, data collection methods, and thinking about safe, unobtrusive and rigorous sampling design (considering issues such as time of day, seasonality, benchmarking etc)

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SUGGESTED READING LIST FOR STUDENTS (See also Media and Journals list above)

Buzby, J.C., Wells, H.F., & Hyman, J. (2014). The estimated amount, value, and calories of postharvest food losses at the retail and consumer levels in the United States, *Economic Information Bulletin*, No. (EIB-121). Available at:

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Campbell, Andrew (2009) Paddock to plate: policy propositions for sustaining food & farming systems. *The Future Food and Farm Project Propositions Paper*. Australian Conservation Foundation, Melbourne.

Griffin, M, Sobal, S. & Lyson, T.A. (2009). An analysis of a community food waste stream. *Agric Hum Values*, vol. 26, pp. 67-81.

Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R. and Meybeck, A. (2011). Global food losses and food waste. *Food and Agriculture Organization (FAO)*. Available at:

http://www.fao.org/fileadmin/user_upload/sustainability/pdf/Global_Food_Losses_and_Food_Waste.pdf

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Available at: <http://modernfarmer.com/2013/09/next-food-revolution-youre-eating/>

Lundqvist, J., Fraiture, C. de & Molden, D. (2008). Saving water: From field to fork – Curbing losses and wastage in the food chain. *SIWI Policy Brief*.

NRDC (2012). Wasted: How America is losing up to 40 percent of its food from farm to fork to landfill, *NRDC Issue Paper*. iP:12-06-B. Available at: <http://www.nrdc.org/food/files/wasted-food-IP.pdf>

Parry, A., James, K. & LeRoux, S. (2015) Banbury, Strategies to achieve economic and environmental gains by reducing food waste, WRAP. Available at:

http://static.newclimateeconomy.report/wp-content/uploads/2015/02/WRAP-NCE_Economic-environmental-gains-food-waste.pdf

Parfitt, J., Barthel, M. & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050, *Phil. Trans. R. Soc.*, vol. 365: 3065-3081 <http://rstb.royalsocietypublishing.org/content/365/1554/3065.short>

Pearson, D., Minehan, M. & Wakefield-Rann, R. (2013). Food waste in Australian households: Why does it occur? *Locale: The Australia-Pacific Journal of Regional Food Studies*.

Available at: <http://localejournal.org/issues/n3/Locale%20n3%20-%2009%20-%20Pearson,%20Minehan,%20and%20Wakefield-Rann.pdf>

UNEP. (2009). The environmental food crisis. ISBN: 978-82-7701-054-0.

Ventour, L. (2008). The food we waste. *Banbury: WRAP*, ISBN: 1-84405-383-0 (version 2).

Available at: <http://wrap.s3.amazonaws.com/the-food-we-waste.pdf>

Verghese, K., Lewis, H., Lockrey, S. & Williams, S. (2013). The role of packaging in minimising food waste in the supply chain of the future, *Centre for Design at RMIT for CHEP Australia*.

Available at: http://www2.kau.se/kom/filer/RMIT-study-The-role-of-packaging-in-minimising-food-waste-in-the-supply-chain_June%202013_FINAL.pdf

Waldron, K., Faulds, C. & Smith, A. (Ed.) (2004). Total food – Exploiting co products – minimizing waste. *Institute of Food Research*. Norwich. ISBN 0-7084-0644-5.