

# FOOD WASTE IN AUSTRALIAN HOUSEHOLDS:

## Why does it occur?

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### *Abstract*

Food waste has become a major issue, adding to environmental degradation, economic impoverishment and social tensions around the world. This article examines what is currently known in the literature about why food waste occurs at the household level. After reviewing what is known about the relevant demographic characteristics and broad behavioural drivers, these findings are applied to examine the potential causes of, and solutions to, household food waste in Australia. This research suggests that high levels of food waste may emerge from the interaction of activities associated with planning, shopping, storage, preparation and consumption of food. The literature also indicates the significance of behavioural drivers such as: lack of awareness; lack of negative economic impact; high quality standards; insufficient purchase planning; over-purchasing and cooking; lack of kitchen skills; high sensitivity to food safety; and changing meal plans. Although many of the findings presented have emerged from studies across numerous cultural and economic contexts, and are therefore necessarily general, they provide a valuable indication of some common drivers of household food waste. As such, this article provides a basis for the development of other more context specific investigations and interventions into the prevention of household food waste.

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## **Introduction**

Reducing unsustainable food consumption practices will be essential if future global food requirements are to be met. One consequence of presently unsustainable food consumption practices is avoidable food waste. Food waste is organic waste produced during the post-harvest and consumption of food (Mason et al., 2011). It is generated at all stages of the food production chain from pre-farm gate through to final consumption. Of particular concern is avoidable food waste, or food that could have been eaten but is discarded.

Avoidable food waste has consequences for the health and wellbeing of millions of people around the world. Globally, it has been estimated that 30–50% of food produced for human consumption is wasted each year (Gustavsson et al., 2012; Smil, 2004). In the context of global population growth and increasing resource scarcity, the reduction of avoidable food waste is likely to have significant implications for future food availability. The United Nations estimates that food production will need to increase by about 70% from 2005–07 levels to feed the projected world population of 9.3 billion by 2050 (DAFF, 2013). Failing to meet this target is likely to lead to increased rates of malnutrition and other health conditions (Booth and Smith, 2001).

In addition to its implications for food availability and human wellbeing, avoidable food waste has a number of adverse ecological impacts. Wasting food invariably means that many of the resources used in food production are lost, and that the greenhouse gas emissions arising from food production and its decomposition in landfill are generated unnecessarily. Thus food waste represents a waste of land, water, energy inputs and leads to avoidable greenhouse gas emissions associated with transport, processing and refrigeration (Baker et al., 2009). In Australia, the food system is estimated to be responsible for approximately 23% of Australia's total greenhouse gas emissions, making it the second largest emissions-generating activity after power stations (Garnaut, 2008).

While food waste is generated across all stages of the food supply chain, a substantial proportion of food waste in industrialised countries occurs at the household level (Kantor, 1997; Baker et al., 2009; Quested et al., 2011). This tends to be made up from perishable food items (such as fresh fruits and vegetables, dairy products, bread, and some meats) and uneaten products that were cooked in the kitchen (Baker et al., 2009).

The causes of avoidable food waste vary at different points in the food supply chain and are influenced by the specific socio-economic context. It is therefore important to examine the causes of avoidable food waste at every point between food production and consumption, and to do so in a manner that accounts for the unique cultural, political, geographic and economic forces that influence behaviour in each specific context. This article reviews international and Australian literature to investigate the extent, drivers and potential solutions to household food waste in Australia. This is particularly significant as recent findings state that post-purchase accounts for the greatest amount of food waste in affluent economies (Parfitt et al., 2010).

Due to the limited amount of data that has been collected on all facets of food waste in Australia, this study also draws on international food waste research conducted in similar socio-economic contexts. Although it is recognised that these findings cannot be directly translated to the situation in Australia due to different place-based influences, they still provide valuable insights into common trends and drivers that may be broadly informative and applicable.

## **Methodology**

A review of the literature on household food waste was conducted (in March 2013) of six databases (PUBMED, CINAHL, EBSCOHost, SCOPUS, SAGE Journals Online and Google Scholar). Results were limited to human studies published in English from January 1980 onwards. Search terms were 'food waste', 'food discard', 'avoidable food waste', 'consumer', 'household' and 'post-consumer'. Both published academic journals and grey documents (government and industry reports) were included. Literature was examined to answer the following research questions: What

is the extent of household food waste? Why does food waste occur in households? Who wastes food? And how can food waste be prevented?

## **Results**

The results from the literature review identified only three publications providing information that is specific to the Australian context, all of which are reports.

Baker et al. (2009) conducted a study examining who is wasting food, and the drivers of this behaviour, through an online survey of 1,603 main grocery buyers across Australia. Their findings indicate that there is a direct relationship between food waste, household income and number of household occupants. Food waste decreases when there are more occupants, yet increases with household income. Their findings also suggest that better planning by shoppers and government policies that promote improved public understanding are likely to be the most effective ways of reducing household food waste. However, they also note that retailers currently present a significant barrier to the reduction of food waste because their profits are based on how much food is sold. Therefore, their advertising is directed to encourage shoppers to purchase more, and more impulsively, which has the potential to increase the amount wasted.

Mason et al. (2011) developed a report based on a data assessment project that collated and reviewed studies on food waste in Australia, ranging from national studies to regional waste management authority reporting. This report found that the data on food waste in Australia is disaggregated, fragmented and scarce. However, using estimates compiled from the numerous studies examined, the authors found that household consumer food waste is substantial and that post-consumer food waste management practices are inefficient and contributing to Australia's greenhouse gas burden.

Finally, in 2010 Sustainability Victoria (2011) carried out an online survey of primary food buyers, including approximately 1200 Victorian households. The primary

objective was to determine “people’s knowledge, perceptions, attitudes and behaviour about food waste are, and why so much food is wasted”. Although there are recognised limitations of research methods based on consumer self-reporting, the research consistently found that, among other things, buying and cooking too much, not finishing meals and inappropriate food storage techniques were recognised as significant drivers of food waste by consumers. This is consistent with the findings presented in the other two Australia-specific studies presented above and the international findings presented throughout the rest of this article.

The following results represent a synthesis of information from these three publications. This has been augmented with information that is relevant to the culturally specific situation for food waste in Australia from other publications, both reports and academic articles, from other countries.

### *What is the extent of household food waste?*

There is a limited amount of information on the extent and causes of food waste globally, nationally, at the city level, and in the household (Lebersorger and Schneider, 2011). However, the small amount of data available indicates that food waste in Australian households is significant.

In 2009, the Australia Institute conducted a survey of food wasted by Australians which found that the total amount of food wasted in all Australian households was around AU \$5 billion per year, which equates to around AU \$250 per person per year or as much as 5% of their food expenses (Baker et al., 2009). More recent estimates suggest that the amount might be even higher, with the annual per person estimate of food waste being around AU \$400 in NSW (NSW Government, 2011) and AU \$800 in Victoria (Sustainability Victoria, 2011).

### *Why does food waste occur in households?*

Research indicates that food waste results from the interaction of multiple behavioural drivers relating to planning, shopping, storage, preparation and

consumption of food (Quested et al., 2011). Moreover, it has been found that domestic food behaviours are linked to the ways in which habitual behaviour relating to the domestic environment and everyday practices are constituted more generally (Evans, 2012). Based on a synthesis of the literature surveyed, these behavioural tendencies arise from nine behavioural drivers that relate to individual consumers.

(1) *Unaware or don't care.* Literature on food waste consistently reports that consumers are unaware and or unconcerned about food waste. In the NSW Government's *Food Waste Avoidance Benchmark* survey it was found that despite food being identified as the most prevalent form of household waste, the level of concern over wasted food was low (NSW Government, 2011). Concern for food waste was rated lower than concern about wasted electricity and interest paid on credit cards, with only 47% of respondents indicating any concern for food waste at all.

The literature also indicates there is a lack of awareness about how much food waste is generated in the home. It has been reported that Victorian householders spend over AU \$2000 per year on food that is wasted. However, only 9% of survey respondents thought they were throwing away more food than they should (Sustainability Victoria, 2011). While another report states the average value of food wasted by a typical NSW household is around AU \$1000 per year, only 14% of respondents felt that they were throwing away more uneaten food than they should (NSW Government, 2011). These large differences in estimates of annual household expenditure on food that is wasted further emphasise the limited amount of information in this area.

(2) *Can afford to waste.* The United Nations Food and Agriculture Organisation suggest that the careless attitude of consumers who can afford to waste food is a large contributor to food wastage in households (Gustavsson et al., 2012). This may indicate that an important driver of consumer-generated waste in wealthy countries is that people can afford to waste food.

Evidence from Australia supports the link between higher household incomes and larger amounts of household food waste, with high-income households (more than AU \$80,000 per annum) wasting 60% more food than low-income households (less than AU \$40,000 per annum) (Baker et al., 2009).

(3) *High quality standards*. Individuals with high quality standards have been cited as a contributing factor to large amounts of food waste. In a study of American households, younger households in particular identified poor food quality as a very important factor in their discards (Van Garde and Woodburn, 1987). Participants indicated that they would throw out food that could be eaten because the quality was no longer 'perfect'.

Similarly, Evans (2011) found that high nutritional standards and the imperative to eat 'properly' contributed to food waste in some households in the UK. Health messages encourage fresh food over frozen. The shorter storage life means that these foods were more likely to be wasted. In an age where myriad food options are available, 24 hours a day, at relatively low cost, there is minimal incentive to use food that is past its prime.

(4) *Insufficient purchase planning*. Insufficient purchase planning is frequently cited as a cause of food waste. Gustavsson et al. (2012) are critical of the shopping behaviour common to medium and high income countries where large amounts of food are purchased with little thought to how it will be used. In contrast, consumers in developing countries generally buy smaller amounts of food products each time they shop, often just enough for meals on the day of purchase, and consequently less food is wasted.

A survey of New South Wales (NSW) households found that 66% of respondents reported that they 'mostly' or 'always' check what food is in the house prior to going shopping and over half reported writing a list and sticking to it. Only 35% reported they 'mostly' or 'always' plan meals in advance. And younger people aged 18-24

and 25–39 years were less likely to write lists and were less likely to plan meals in advance (NSW Government, 2011).

(5) *Buying too much.* Research indicates that the over-purchasing of food is a considerable contributor to food waste. A survey of NSW households found 17% of total households indicated that buying too much food contributed to their food waste. Reasons for buying too much included overestimating how much food was required (61%), being tempted by supermarket specials, such as '2 for 1' deals (44%), neglecting to check the cupboard or fridge before shopping (35%), and size of food portions and packages being too large (35%) (NSW Government, 2011); a survey of Victorian households found similar results (Sustainability Victoria, 2011).

(6) *Cooking too much.* Cooking too much food has also been found to contribute to food waste. Victorian households have indicated they find it difficult to estimate how much to cook per person but also that they prefer to serve too much food rather than not enough (Sustainability Victoria, 2011). It seems that there is both unintentional and intentional over-provisioning. Similarly 25% of NSW survey respondents indicated that they cook too much food. Stated reasons for this include that it is preferable to serve too much than not enough (48%), it is difficult to know how much to cook per person (32%), and it is difficult to know how to cook the right portions (28%) (NSW Government, 2011).

(7) *Deskilling in the kitchen.* A deskilling in the kitchen or lack of general home economic skills (Foley et al., 2011; Begley and Gallegos, 2010) is frequently cited as a contributor to food waste (NSW Government, 2011; Sustainability Victoria, 2011). Research indicates that many people are not comfortable across all food management areas, including: pre-shop planning, discipline in store, looking at labels in store, meal planning, cooking skills, and recombining leftovers into new meals. Of the NSW respondents who indicated that not using leftovers was a reason for their level of household food wastage, 19% identified that they were unsure about how to use leftover ingredients (NSW Government, 2011).

(8) *High sensitivity to food safety.* Inadequate knowledge, misconceptions about food safety or high sensitivity to food safety have been identified as key contributors to food waste. Studies have found that confident, accurate estimations of food safety were not the norm among householders and a key conclusion was that education about food safety is required to reduce food waste. For example, 22% of NSW households held the attitude that cooked leftovers that had been in the fridge for more than one day were unsafe to eat (NSW Government, 2011). The potential food safety issues associated with the passing of a ‘use by’ or ‘best before’ date stamp is a key reason for throwing away food.

(9) *Change of plans.* Changes in meal plans due to unanticipated alterations in people’s schedules have also been cited as a major contributor to food waste. Food is purchased for a reason, and consumption is anticipated. However, due to circumstances that appear beyond the respondents’ control, some food items are not eaten. In the ‘temporal dynamics of everyday life’ food gets displaced and wasted as a result of a mismatch between the food that is provisioned and the food that is eaten within a given period of 7–10 days (Evans, 2011). For example, the food spoils before it can be eaten, the food is no longer fancied or the food is forgotten (WRAP, 2007a).

### ***Who wastes food?***

The current literature indicates that food waste is generated by all demographics (Baker et al., 2009; NSW Government, 2011). However, there are some correlations with socio-economic characteristics.

*Age.* Consistent evidence suggests that young people waste more than older people (Hamilton et al., 2005; Sustainability Victoria, 2011). Surveys from the UK indicate older people are more able to cite many strategies for actively managing their food such as shopping more carefully, recipes for using up ingredients, better food management skills and knowledge about how much food they need to cook after years of experience (WRAP, 2007b). It is unknown if young people will waste less as their knowledge and lifestyle changes with age, or if they will carry their tendency to waste with them.

*Income.* Food is wasted across all levels of household income. However, Australian data suggests that households with higher incomes have higher levels of food waste (Baker et al., 2009) with similar results reported for households in Victoria (Sustainability Victoria, 2011). Both these sources quantified food waste based on the amount of money spent. It is possible that higher income households do not actually discard a greater volume of food, rather they discard a similar volume, that was more expensive in the first place.

*Household size.* While larger households waste more food in total than smaller households, on a per capita basis, single person households waste the most food. The Australia Institute found that single-person households waste the most amount of food on a per person basis (Baker et al., 2009). This report put forward explanatory factors including that single person households are more likely to be younger and to have lifestyles attuned to irregular patterns of eating at home, and that food is not packaged for single-person households.

*Household type.* Research indicates that the makeup of the household may be just as influential as household size. Single households, share households, and households with young children are identified as among the highest wasters (Hamilton et al., 2005; Baker et al., 2009; Sustainability Victoria, 2011)

Share houses in the Australian population were found to waste even more food than the single-person households with the reason, at least in part, being the separate cooking habits of individuals (Baker et al., 2009). Families with young children consistently report high levels of wastage (Baker et al., 2009; Sustainability Victoria, 2011) with explanatory reasons include fussy eaters, more ‘pester power’ at supermarkets and more sensitivity to food hygiene concerns (WRAP, 2007b).

### ***How can food waste be prevented?***

The literature consistently discusses the challenge of understanding and hence being able to influence the behaviours that give rise to food waste. As yet no simple

approach to addressing it has been identified. Experts call for further research to better understand the extent and causes of food waste (Kantor, 1997; Sonesson et al., 2005; Owen et al., 2007; Quested et al., 2011; Gustavsson et al., 2012). However, they all see that education will continue to play a key part. Further, when an individual becomes aware of the scale of the food waste issue most appear keen to learn how to minimise it (Sustainability Victoria, 2011). Although the circumstances that give rise to high levels of food waste are many, which suggests that a combinations of interventions will be required, there are pervasive educational messages.

*Cost of food waste.* Information about the financial cost of food waste is seen as being the most relevant message for consumers. In a recent study in Australia most (85%) respondents cited financial savings as their motivation to reduce the amount of food they waste, being twice as prevalent as contributing to protecting the environment or humanitarian concerns about those who do not have sufficient food (Baker et al., 2009).

*Environmental impact of food waste.* The environmental cost of food waste is a significant global issue that could be used to encourage consumers to change their behaviour. Existing evidence suggests that consumers will need to be educated about the connection between food waste and environmental impact before this driver becomes effective (WRAP, 2007a).

*Shopping behaviour.* Shopping behaviour is viewed as key to reducing food waste. Meal planning, shopping to a list and buying suitable portions are all behaviours associated with less food waste (Kantor, 1997; NSW Government, 2011). It is recognised that achieving change in these behaviours will benefit from working with food retailers, and in particular the major supermarket chains, to align the food waste reduction agenda with their profit objectives.

*Kitchen skills.* Consumers could benefit from a better understanding of how to cook suitable quantities of food, store food, assess whether food is safe to eat and incorporate leftover food into the weekly meal plan (Kantor, 1997). Information that

helps consumers understand the meaning of ‘use by’ and ‘best before’ date labelling is particularly important (Kantor, 1997; Van Garde and Woodburn, 1987; WRAP, 2007a).

*Food retailers.* Partnerships with food retailers have the potential to be very effective in identifying new approaches to ensure that less food ends up being wasted. The voluntary Courtauld Commitment in the UK now includes over 40 major retailers, brand owners, manufacturers and suppliers who have signed an agreement to improve resource efficiency in the food retail sector (WRAP, 2012). Visible outcomes include Waste Resources Action Program (WRAP) partnering with major supermarket chains to run education campaigns, such as Sainsbury’s ‘Love Your Leftovers’ and Morrison’s ‘Great Taste Less Waste’.

## **Conclusion**

Food waste is a significant problem both locally and globally. The reduction of avoidable food waste at household level could contribute significantly to global food security and help reduce greenhouse gas emissions. In addition, it would address the indirect economic and environmental impacts of avoidable food waste on people’s living conditions and wellbeing.

While food waste occurs at all stages of the production chain, households in developed countries such as Australia are a major contributor to its overall volume. A large part of this is avoidable food waste, that is, food that could have been consumed but has been discarded instead. This source of food waste results from the interaction of multiple activities relating to planning, shopping, storage, preparation and consumption of food. The nine interrelated and overlapping behavioural drivers of food waste identified emerge when individuals are unaware (or don’t care), can afford to, have high quality standards, insufficient purchase planning, buy too much, cook too much, lack kitchen skills, have high sensitivity to food safety, or finally experience a change of plans.

Given the unique features of each region's cultural, demographic, economic and geographic conditions, further research must be conducted to identify the specific needs of and constraints influencing residents in each specific place. This findings presented in this article could provide the basis for more tailored, location-specific investigations and interventions into avoidable household food waste. It may also provide a platform for further research into how the behavioural drivers identified herein could be targeted for the creation of effective policy.

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