



Government  
of South Australia



**Valuing our food waste**  
SOUTH AUSTRALIA'S HOUSEHOLD FOOD WASTE  
RECYCLING PILOT  
*Summary Report - 2010*



Zero Waste SA, established by the *Zero Waste SA Act 2004*, provides strategic policy advice and direction to government and stakeholders. It undertakes programs and projects that maximise waste reduction and promote recycling and sustainability. It engages with the community, business and government, building partnerships for change.

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# Acknowledgements

Zero Waste SA gratefully acknowledges the contributions made by the following organisations participating in the pilot. With the support of the Local Government Association of South Australia, the participating councils were:

## **Metropolitan Adelaide**

Adelaide City Council  
City of Campbelltown  
City of Charles Sturt  
City of Mitcham  
City of Norwood, Payneham and St Peters  
City of West Torrens

## **Regional South Australia**

City of Whyalla  
District Council of Mallala  
Light Regional Council  
Wattle Range Council

The companies that collected and processed the food waste were:

- > East Waste (Eastern Waste Management Authority Inc.)
- > Jeffries Group
- > MASTEC Australia Pty Ltd
- > Peats Soils and Garden Supplies
- > Transpacific Industries Group Ltd
- > Veolia Environmental Services Australia
- > Van Shaick's Bio Gro.

The organisations that provided technical advice and services were:

- > Environment Protection Authority (odour monitoring)
- > EC Environment Consultants (waste audits)
- > Truscott Market Research (householder surveys)
- > Department of Health (public and environmental health).

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## The problem of wasted food

Householders tend not to think of food waste as having an adverse impact on the environment because it is biodegradable.

Most food waste ends up in landfill where it creates methane, a greenhouse gas with 21 times the warming potential of carbon dioxide (CO<sub>2</sub>). Wasted food also wastes the energy, water, money and resources used to produce, process, store and transport the food.

In many Western countries, including Australia, food waste is one of the largest components of household refuse.

In the past five years governments around the world have increased their focus on reducing food waste.

The United Kingdom is extremely active in engaging householders to reduce food waste with more than 137 local authorities providing food waste collections. The European leaders in reducing household residual waste include Belgium, Netherlands, Austria, Germany and Switzerland. Some countries only target vegetable, fruit and garden organics, while others collect all food waste. Householders are generally given a household container, with paper or starch-based liners.

In Australia, the number of councils considering trials or implementing a food waste recycling service is increasing. In September 2005 the City of Burnside, in partnership with Zero Waste SA, East Waste and Jeffries Group, successfully trialled food waste recycling with 1800 households. The trial highlighted a need to understand the financial implications associated with introducing food waste recycling. Therefore, Zero Waste SA commissioned a business case to assess the costs and other issues associated the kerbside co-collection of domestic food waste and garden organics and its relative merits compared with other systems<sup>1</sup>.

Recovering food waste, minimising it, or even avoiding it in the first place is an opportunity to contribute significantly to tackling climate change.

Food waste is also a financial issue. According to the Australia Institute (2009) Australian households throw out more than \$5 billion worth of food each year. This is more than we spend on digital equipment such as flat-screen televisions and ink-jet printers<sup>2</sup>. The Institute estimates that the average household in Australia throws out about \$616 worth of food a year, or \$239 per person. South Australia's figures are substantial; each household wastes around \$517 or \$213 per person.

Reducing this food waste is an opportunity to divert more domestic waste away from landfill. Food waste represents about 44 per cent of household residual waste (waste left over after recyclables are removed) and 19 per cent of total household kerbside waste. In metropolitan Adelaide, food waste makes up about 3.3 kilograms of a household waste bin (typically 140 litres) presented for kerbside pick-up each week.

Food scraps are a valuable resource which can be turned into compost. Soils in South Australia are deficient in organic matter and can benefit from compost in many ways. Composting:

- > decreases water use
- > improves soil structure to aid plant growth
- > reduces crop disease
- > reduces reliance on chemical sprays
- > provides extra nutrient value (less chemical fertilisers are required)
- > improves the quality and nutrition of produce
- > improves germination and crop yields.

The Australia Institute links household size and income to food waste. The higher the income, the greater the amount of food waste produced per capita. The Institute expects this food waste to increase because the population is growing, people are earning higher incomes, and more people choose to live in one-person households<sup>3</sup>.

<sup>1</sup> JAC Comrie Pty Ltd and TJH Management Services Pty Ltd and Sustainable Outcomes, Business case for councils to undertake co-collection of food waste with garden organics, June 2007, viewed 23 January 2010, <[http://www.zerowaste.sa.gov.au/Content/Uploaded/Assets/food\\_waste\\_collection\\_business\\_case.pdf](http://www.zerowaste.sa.gov.au/Content/Uploaded/Assets/food_waste_collection_business_case.pdf)>.

<sup>2</sup> D Baker, J Fear and R Denniss, What a waste: An analysis of household expenditure on food, Policy brief no. 6, The Australia Institute, Canberra, November 2009, viewed 31 January 2010, <<https://www.tai.org.au/index.php?q=node%2F19&act=display&type=1&pubid=696>>.

<sup>3</sup> Ibid

## South Australia's food waste pilot

Since 2005, South Australia's Waste Strategy has aimed to maximise the beneficial use of waste materials, decrease the generation of greenhouse gas and reduce the disposal of waste to landfill. Food waste remains a central pillar in the Waste Strategy because of its value as a resource for compost.

In 2009–2010 South Australian councils collaborated and participated in a pilot project that saw household food waste collected as part of the garden organics kerbside service. South Australia's food waste pilot was undertaken with involvement from waste collection service providers and, of course, with the participation of householders. Engaging some 17,000 households, the project was the largest pilot of its type undertaken in Australia.

Its purpose was to identify factors that contribute to the greatest diversion of food waste from landfill. The pilot incorporated a cross section of South Australian home locations and household types. The pilot tested the following elements:

- > the collection of food waste as part of a fortnightly garden organics service
- > the responses to weekly or fortnightly collection of refuse
- > outcomes using a bench top ventilated container lined with compostable corn starch bags (bio basket) to collect kitchen waste versus using an unlined container (kitchen caddy).



The collected material was then commercially composted.

Councils were expected to either run the pilot across a participating population that, when combined with other participating councils, represented a cross-section of typical South Australian households with regard to income, age, household size, ethnicity, and house and block size.

This report summarises the outcomes of the pilot, drawing on data collected from two waste audits and two telephone surveys with representative samples of participating householders.

Reporting the results is intended to help councils to consider introducing a food waste service and then to select the best system for their community.

The different initiatives were established to assess householder participation and understanding, as well as diversion rates (the amount of material diverted from the general waste bin into the garden organics bin and recycling bin). Two councils, the cities of Whyalla and Charles Sturt, chose to use both the ventilated basket and the kitchen caddy.

**A diversion rate of 60 per cent was agreed as a key performance indicator.**

Collected food waste was sent for processing at commercial composting facilities using a controlled open windrow process.

*The two food waste recycling systems piloted – the kitchen caddy and bio basket with roll of compostable bags.*

## Kerbside audits

Two kerbside audits of domestic waste, recycled and garden organics were conducted, one before the pilot started in Spring 2008 and another in Autumn 2009.

**The audit consisted of visual inspections of bins and separate collection of each waste stream by the contractor's kerbside collection vehicle.**

The separate streams were delivered to undercover sorting sites provided by Campbelltown Council, the Solo Resource Recovery facility at North Plympton and by Light Regional Council at Lower Light.

Data collected from each audit summarised the content of the domestic waste, recycling and garden organics streams. The data revealed which type of kitchen food waste container (bio basket or kitchen caddy) was more

effective, taking into account different domestic waste collection frequencies. The audits also assessed rates for:

- > food waste diversion yields – the amount of food waste diverted from the waste bin and into the garden organics bin
- > presentation rates and participation in the pilot areas
- > incidence and extent of contamination
- > composition of household waste, recyclables and garden organics.

The sample consisted of 1130 households from the 10 participating council areas. Sampling was based on the same households for each suburb in each kerbside audit for each waste stream and was undertaken over the appropriate period to ensure all of the collection services (residual waste, recycling and garden organics) in each area were sampled.

Individual reports were provided to the participating councils.

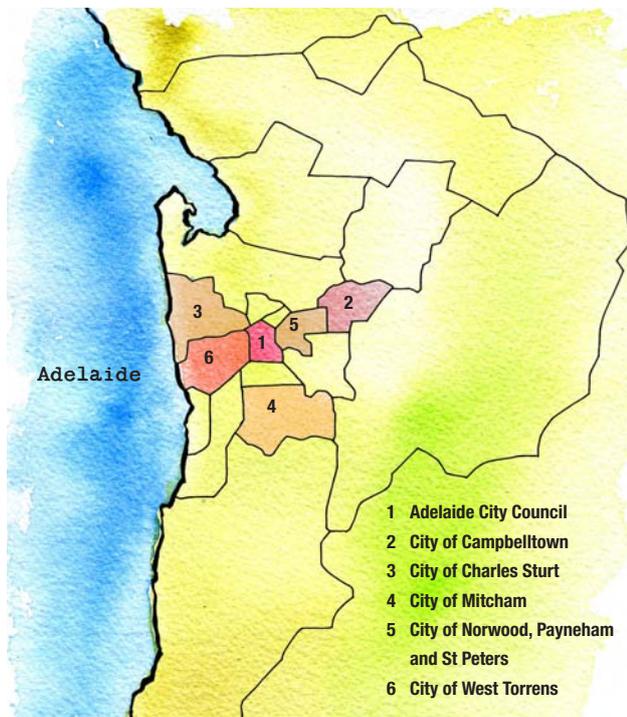


Figure 1 Metropolitan Adelaide pilot councils (selected suburbs within each council participated)

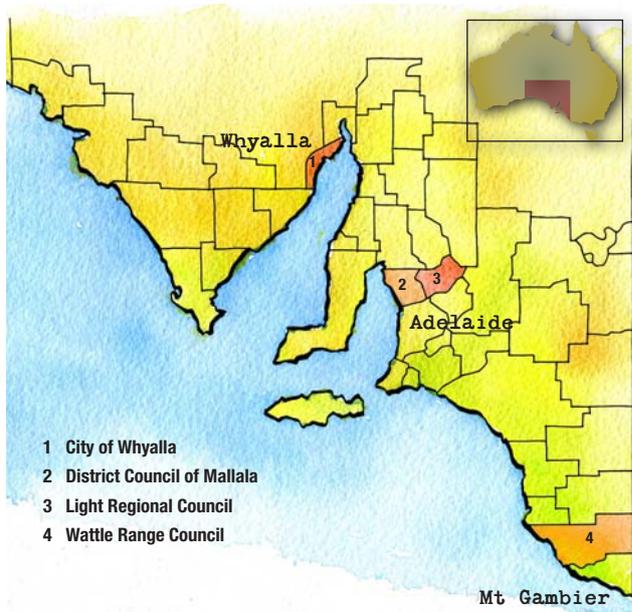


Figure 2 Regional South Australian councils (selected areas within each council participated)

## Yields

A total of 589 tonnes of food waste was collected for processing from participating households during the 12 months of the pilot. When compared with disposal to landfill, this avoided the equivalent of 60 metric<sup>4</sup> tonnes of CO<sub>2</sub> emissions assuming landfill gas is captured and converted into energy.

Food waste collections generally used a 240 litre bin as part of a fortnightly garden organics service. Average food waste yields per household per week ranged from 0.38 kg (kitchen caddy) to 1.30 kg (bio basket with weekly

waste collection) and 1.8 kg (bio basket with fortnightly residual waste collection) as summarised in Table 1a.

The 'capture rate' for food waste, that is food waste placed in the garden organics bin as a proportion of the total food waste presented at the kerbside, ranged from a low of five per cent (kitchen caddy) to a maximum of 74 per cent (bio basket with fortnightly residual waste collection) as summarised in Table 1b. The average across all pilot areas was 54.5 per cent.

**Table 1a Average weekly yields of food waste diverted (April/May 2009)**

Average yield	Kitchen caddy	Bio basket (weekly rubbish collection)	Bio Basket (fortnightly rubbish collection)
Amount of waste in rubbish bin	8.30 kg	7.12 kg	5.54kg
Amount of food placed in garden organics bin	0.38 kg	1.30 kg	1.86 kg
Percentage of food waste captured and diverted from the rubbish bin	9.31 %	28.0%	54.5%
Highest additional diversion achieved from food waste	0.66 kg Seaton North	2.18 kg Whyalla Area H <sup>5</sup>	2.25 kg Dublin
Lowest additional diversion achieved from food waste	0.20 kg Henley	0.10 kg Adelaide City	1.65 kg Millicent North

**Table 1 b Capture rate of food waste diverted (April/May 2009)**

Highest amount of waste in rubbish bin	9.51 kg Seaton North	11.4 kg Richmond	7.28 kg Millicent North
Lowest amount of waste in rubbish bin	7.66 kg Whyalla Area C <sup>5</sup>	3.85 kg Grange	4.3 kg Kensington
Highest amount of food waste placed in garden organics bin	0.66 kg Seaton North	2.18 kg Whyalla Area H <sup>5</sup>	2.25 kg Dublin
Lowest amount of food waste placed in garden organics bin	0.20 kg Henley	0.10 kg Adelaide City	1.65 kg Millicent North
Highest percentage of food waste captured and diverted from the rubbish bin	20.17 % Allenby Gardens	65.86% Whyalla Area H <sup>5</sup>	74.08% Kensington (bio basket with fortnightly rubbish collection)*
Lowest percentage of food waste captured and diverted from the rubbish bin	5.02% Whyalla Area C <sup>5</sup> (kitchen caddy)*	3.89% Seaton South	33.63% Two Wells

\* Highest and lowest range for 'capture rate', that is, food waste placed in the garden organics bin as a proportion of the total food waste presented at the kerbside.

<sup>4</sup>Calculated as per the US EPA WAste Reduction Model (WARM) [http://epa.gov/climatechange/wycd/waste/calculators/Warm\\_home.html](http://epa.gov/climatechange/wycd/waste/calculators/Warm_home.html)

<sup>5</sup>The City of Whyalla allocates letters to identify precincts in the council area to reflect kerbside collection days.

## Diversion rates

Total diversion rates were slightly better in areas with fortnightly rubbish collection. Fortnightly collection averaged 59.7 per cent diversion and weekly collection averaged 55.6 per cent diversion. However despite support from 64 per cent of households, fortnightly rubbish collection proved problematic for some households.

Two council areas piloting the fortnightly collection discontinued this aspect of the project after three months, reverting to the usual weekly collections. Table 2 summarises the diversion rates achieved by each council.

Diversion rates of garden organics typically vary by about 11 per cent throughout the year, depending on seasonal influences. In April-May 2009, the second kerbside audit of the waste, recycling and garden organics streams was undertaken. This is a time when garden waste volumes in South Australia are at a seasonal low.

Contamination remained low throughout the pilot areas for most councils and on average was below 1 per cent of the garden organics bin contents. Contamination in the recycling bin (yellow lid) did not increase as a result of the food waste pilot.

**Table 2 Food waste recycling pilot – diversion rates achieved by councils**

Council	System	No. households	Diversion rate (April-May 2009, audit 2)
<b>Metropolitan</b>			
Adelaide City Council (Adelaide CBD, North Adelaide)	Bio basket	1250	51.53%
City of Campbelltown (Athelstone and Hectorville)	Bio basket	940	56.73%
City of Charles Sturt (Henley/Grange, Allenby Gardens, Welland, Seaton)	Bio basket	1437	66.39%
	Kitchen caddy	2016	56.67%
City of Mitcham (Pasadena, Belair and Glenalta)	Bio basket	1000	57.74%
City of Norwood, Payneham and St Peters (St Peters and Kensington)	Bio basket	1000	71.18%
City of West Torrens (Marleston, Mile End, Netley, Richmond and Thebarton)	Bio basket	2000	55.81%
<b>Regional</b>			
City of Whyalla (Area H)	Bio basket	960	70.42%
City of Whyalla (Area C)	Kitchen caddy	1120	45.63%
District Council of Mallala (Mallala, Two Wells, Dublin)	Bio basket	750	60.72%
Light Regional Council (Roseworthy and Hewett)	Bio basket	1050	57.74%
Wattle Range Council (Penola, Millicent North East and Millicent South West)	Bio basket	3900	62.33%
<b>Total</b>		<b>17,423</b>	<b>59.45%</b>

## Communications

**The ability of participating councils to mount an effective community education campaign was integral to the success of the pilot.**

To assist councils, Zero Waste SA produced *Guidelines for communications planning—pilot co-collection of food waste and kerbside organics*<sup>6</sup> in 2008, along with a range of communications materials.

Materials included an information brochure, kitchen food waste container sticker and street bin lid sticker (see Attachments 1, 2 and 3), a collection calendar, and written materials for websites, newsletters and media releases.

Zero Waste SA's communications responsibilities for the pilot were to:

- > fund and project manage market research services during planning consisting of focus group discussions
- > fund a telephone survey during the pilot to evaluate householder satisfaction
- > project manage the production of core communication materials which councils could tailor, print and distribute to their own branding requirements.

Councils funded:

- > the distribution of kitchen receptacles and compostable bags
- > the printing and distribution of communication materials
- > communication activities other than those specified and managed by Zero Waste SA
- > the management of enquiries and advice to participating households
- > any and all other costs associated with conducting the pilot
- > progression beyond the pilot phase.

Zero Waste SA met the cost of food scrap containers, liner bags, kerbside waste audits and market research.

<sup>6</sup>Zero Waste SA, *Guidelines for communications planning—pilot co-collection of food waste and kerbside organics*, ZWSA, Adelaide, 2008, <[http://www.zerowaste.sa.gov.au/Content/Uploaded/Generic/Documents/pdf/foodwaste/Co-Collection\\_Communications\\_20080.pdf](http://www.zerowaste.sa.gov.au/Content/Uploaded/Generic/Documents/pdf/foodwaste/Co-Collection_Communications_20080.pdf)>.

## Market research

To understand householders' acceptance of the systems used in the pilot, Zero Waste SA commissioned Truscott Research to study a sample of residents in the pilot areas<sup>7</sup>. The survey involved 4260 interviews with participating householders between four and six months after the start of the pilot, from May to July 2009. The households were selected at random from listings supplied by the councils. The sample sizes were calculated to give results that are accurate to five per cent at the 95 per cent confidence level. Most interviews were done by telephone; however, supplementary door-to-door interviewing was undertaken in selected areas.

The survey was designed to:

- > gauge awareness and understanding of the food waste systems
- > determine patterns of use of the systems
- > identify barriers to using the systems and difficulties encountered by users
- > examine future use intentions
- > examine other aspects of behaviour relating to household waste—for example, the use of garden organics bins, composting and disposal of garden organics.

Additional market research commissioned in July 2010 measured the extent to which householders were continuing to recycle their food waste, and to further explore barriers and motivations towards recycling food waste<sup>8</sup>.

### Householder feedback

There was a very high level of householder acceptance for using the food waste recycling systems, evidenced by participation rates during the pilot and the householder surveys that indicated an intention to continue using the systems beyond the pilot period.

Eighty one per cent of all respondents indicated that they used the food waste systems provided as part of the pilot. Most of these (72 per cent of all respondents) were still using it at the time of the interview in May – July 2009. The bio basket system showed significantly higher incidence of continued use at 74 per cent compared with the kitchen caddy at 60 per cent.

As further evidence of a preference for the bio basket system, 72 per cent of people using this system gave it a rating of 8/10 or better. Ratings for the kitchen caddy system were somewhat lower, with 62 per cent giving a rating of 8/10 or better.

At the time of the survey more people in the kitchen caddy areas had given up using the system (19 per cent) than in the bio basket areas (seven per cent). The main issue stated by the caddy users were flies and odours, while the bio basket users said that many had returned to home composting their kitchen organic material.

Most users (61 per cent) did not have any problems with the systems. Of those who did, the most common issue was a smelly garden organics bin (23 per cent of kitchen caddy respondents). Eight per cent of bio basket respondents had problems with the bags or the container e.g. bags splitting or lids coming off containers. Generally users responded that bio baskets were easy to use.

Almost all respondents had a garden organics bin and 81 per cent of householders said the pilot had increased their awareness of what should be put in the bin which reflects the clarity of the communications material. However, awareness of what could be placed in the food waste systems was mixed. Nevertheless, the kerbside audits showed that contamination remained low throughout the pilot areas for most councils and on average was below 1 per cent of the garden organics bin contents. The highest contamination rate was at Mallala Council with 1.91 per cent. The lowest contamination rate was at Adelaide City Council with 0.06 per cent.

**The most common reason given by householders not participating in the pilot was that they already had their own compost system.**

<sup>7</sup> Truscott Research, *Zero Waste SA food waste pilot survey market research report*, report prepared for Zero Waste SA by Truscott Research, Adelaide, September 2009, < <http://www.zerowaste.sa.gov.au/upload/resource-centre/publications/food-waste/Food%20Waste%20Report.pdf>>.

<sup>8</sup> Truscott Research, *Zero Waste SA food waste pilot survey, follow up with continuing system users 2010, market research report*, prepared for Zero Waste SA by Truscott Research, Adelaide, August 2010, < <http://www.zerowaste.sa.gov.au/upload/resource-centre/publications/food-waste/Food%20Waste%20Report.pdf>>.

Home composting can also be an effective way of recycling food waste and has an important role to play in any food waste recovery initiatives. The second most common reason for not recycling food waste was that householders gave their scraps to animals.

Key findings from the market research are summarised at Table 3.

**Table 3 Key findings from the market research**

Awareness of food waste system	97% of respondents were aware of the pilots. 89% were aware of the correct placement of food waste for recycling.
Patterns of use/community acceptance	81% of respondents said they have used the food waste systems provided as part of the pilot.
Predicted future use	72% of respondents overall said they were likely to continue long term use, 74% were using the bio basket and <i>intending to continue use</i> , compared with 60% for the kitchen caddy.
Ease of use (aggregated across the two systems)	92% of respondents rated the food waste system as easy to use. Ratings for the bio basket (93%) attracted stronger support compared to the kitchen caddy (60%).
Main reasons for non use	Home composting (25% of non-using respondents) followed by giving scraps to animals (13% of non-using respondents).

### Willingness to pay

The market research (May - July 2009) showed that 53 per cent of the respondents who were still using the system were not prepared to pay \$5 a year extra for the service through council rates. The most common reasons given were that they were paying too much in rates and that the service should already be included in rates.

Respondents who identified themselves as likely future users and willing to pay at least \$5 a year for the system made up 39 per cent of the total respondent sample. Of this segment, 49 per cent were in the bio basket areas (excluding Campbelltown Council, as residents were not asked this question) and 30 per cent in the kitchen caddy areas.

Interestingly, 53 per cent of the bio basket users indicating they would use the system in the future were happy to pay the cost of compostable bags (\$11 for a roll of 150 bags). This represented 44 per cent of the total sample. The majority of people (70 per cent) who used more than three bags a week said they would continue to use the system if council gave them three free bags a week (in a 150 bag roll) and they had to pay \$11 a roll for additional bags.

### Bin odour

An important issue to address was whether food waste placed in the garden organics bin would increase the amount of offensive odours.

An analysis of 336 bins compared odour levels between garden organics bins containing food scraps and:

- > residual waste bins containing food waste from householders not participating in the pilot
- > residual waste bins of participating householders (noting that these could also still contain some food waste)
- > garden organics bins without food waste.

Results showed that there were negligible differences in the odour from the garden organics bins containing food, particularly when compared with the residual waste bins of residents who did not place food in their garden organics bins. Strong odours are not necessarily unpleasant as vegetative and eucalypt odours were often noted during the monitoring. Nonetheless, the market research showed that a common issue with the unlined kitchen caddy was a smelly garden organics bin (23 per cent of kitchen caddy respondents). This highlights that there are individual responses to waste-related odours.

## Follow up survey

A follow up survey was conducted in July 2010 about 18 months after the systems were introduced. This survey targeted individuals who had been interviewed in 2009 and who, at the time of interview, were still using the food waste system they had been issued.

The people targeted for interview the second time around were not a simple cross section of the population of the survey areas. They were selected on the basis of being continuing users of the food waste system at the time of interview in 2009. The sample consisted of 758 residents.

## Continued use

- > 80 per cent of respondents were still using the food waste system a year after the original survey.
- > Assuming the people interviewed in this follow up survey are typical of continuing users interviewed last time, it is calculated that **58 per cent of the general population in the trial areas would be still using the system.**
- > Extrapolated rates of continuing use were markedly higher in bio basket areas – 61 per cent compared with 43 per cent in the kitchen caddy areas.
- > There was one fifth of households (20 per cent) with no current users. However in 68 per cent of cases, it was reported that all household members used the food waste system.

## Motivations to use food waste systems

Original triggers to use the system and ongoing motivation were similar, as summarised in Table 4 below.

**Table 4 Motivating factors influencing the decision to recycle food waste**

Initial triggers (2009)		Ongoing motivations (2010)	
Because Council provided the container	48%	Ease of use	38%
Good environmental initiative	42%	Just wanted to help environment	52%
Clean, efficient way to dispose of food waste	18%	Just formed a habit	21%

## Reasons for discontinuing use

Those respondents (148 individuals) who were no longer using the food waste system were asked why they had stopped.

Respondents were asked to give the main reason for discontinuing use:

- > 29 per cent of these people stated that they had odour concerns or problems with insects/vermin.
- > This had affected 22 per cent of those in bio basket areas and 55 per cent of former kitchen caddy users (note - this was a small sample size of 31 householders).
- > There were also 18 per cent who preferred to divert waste to compost/feed chooks.
- > An identical proportion (18 per cent) reported that it was simply inconvenient or they were too busy/too lazy.
- > 18 per cent of former bio basket users reported that they stopped using the system when they ran out of bags. Some of these were now aware of how to obtain more bags; others were deterred by the cost.

## Industry perspectives

### Collection contractors

Collection contractors did not report any issues during the pilot. The pilots were largely based on existing waste collection rounds to ensure logistical efficiencies. Council-wide implementation of food waste recycling would negate this logistical issue.

Before the pilots started, the impact on the collection process as a result of having food waste included in the garden organics stream was unknown. During the pilots there were no reported adverse effects relating to truck weights or truck capacity due to the extra material being deposited in the garden organics bin.

### Compost processors

The combined food and garden organics material collected from pilot areas was taken to three composting facilities for processing in open windrows:

- > Jeffries Group, located in Adelaide's northern and outer metropolitan area
- > Peats Soils and Garden Supplies, located in Adelaide's southern suburbs
- > Van Shaick's Bio Gro, located in Mt Gambier, in South Australia's south-east

Compost SA Chair, Lachlan Jeffries said the volume of material coming from the food pilots was very small when compared to the volume of conventional kerbside green organics material and it was all blended into one process and not managed separately.

Contamination and quality of the material presented to the kerbside is the key issue for the processing industry and for this reason householder education was critical. The pilot kerbside audits showed a reduction in contamination rates once the food waste containers were distributed with the education material (stickers and brochures, see Attachment 1, 2 and 3).

Compost SA said that including food into the garden organics composting system will change the nature of the actual composting process, and as volumes increase, food will most likely change the end products:

"Until the volume of food becomes much more significant it is too early to anticipate the degree the change to the end products will be," Lachlan Jeffries said.

There were no reported issues with containment of material or vermin. Nor were there extra requirements to screen processed material. Nonetheless, with the transition to widespread household food waste recycling, close attention will have to be paid to odour, vermin and leachate management.

## Key findings

- > The provision and use by householders of kitchen-based collection containers can significantly increase the diversion of food waste from landfill.
  - > Community support for food waste collection and participation rates was high.
  - > Overall, the suitability of collected food waste for composting was generally high as demonstrated by the low contamination rates.
  - > There were negligible differences in the concentration of odour from the garden organics bins containing food and weekly-collected rubbish bins containing food.
  - > Of the two different bench top containers tested in the pilot, the ventilated and cornstarch bag lined bio basket, and the unlined kitchen caddy, the best diversion performance was achieved using the bio basket. The bio basket with fortnightly rubbish collection achieved 54.5 per cent food waste diversion compared to 9.31 percent for the unlined caddy.
  - > Slightly more householders found the bio basket easier to use than the kitchen caddy system.
  - > Significantly more bio basket users continued to participate during the pilot than caddy users.
  - > The collection of food waste does not appear to pose any additional problems to waste collection services as part of a council wide system.
  - > The attractiveness of the bio basket system comes at an extra, albeit modest cost, to purchase compostable liner bags, and some householders may be reluctant to pay.
- The pilot has reinforced the importance of councils mounting a professionally managed community education campaign. Further attention needs to be given to messages about the different types of food waste which can be recycled.
- Taking into account the market research and anecdotal comments, councils intending to introduce food waste recycling programs should consider:
- > including educational messages on the corn starch bags to avoid mishaps such as bags splitting en route to the waste bin
  - > talking to the composting company that will receive the food waste to identify the preferred type of liner and noting that claims of compostability by the liner manufacturer need to meet Australian standards and be able to be validated
  - > providing simple ongoing communication to householders to increase participation, maximise the capture of waste and minimise contamination because feed back to residents about the pilot's progress will help to maintain engagement and participation offering a range of sizes for the bio basket to enhance convenience and householder commitment, an issue that emerged from informal discussions with users.
- Zero Waste SA, in consultation with councils and waste service providers, will undertake further work on ways to improve the convenience of garden and food waste collection bins and access for waste collection services in multi-unit dwellings.



## Postscript

Following completion of the pilot in early 2010, participating councils continued to offer a food waste recycling service to householders in a variety of ways, for example:

- > providing an area-wide distribution of free compostable liner bags
- > having extra compostable liner bags available at council customer service centres (free of charge or at cost)
- > offering a food waste recycling service to residents on a voluntary 'opt-in' by registering basis.

At the time of finalising this report the several councils who did not participate in the pilot have committed to implementing household food waste collections:

- > Northern Adelaide Waste Management Authority (NAWMA) councils - Salisbury, Playford and Gawler - offer a voluntary (register to participate) food waste collection system using an unlined caddy
- > the cities of Prospect and Port Adelaide Enfield have both separately tendered for the provision of kerbside waste collection services, with food waste integrated with their kerbside garden organics collection
- > Port Adelaide Enfield Council has implemented the bio basket system in more than 50,000 households
- > The cost of the liner bags at the time of the pilot was \$11 per roll of 150. Some Councils reported a slight decrease in the cost of the liner bags as a result of competitive tender processes. At the time of the pilot the bio basket cost \$3.98 (exc. GST) and kitchen caddy \$6.97 (exc. GST).

Meanwhile, in July 2010 Zero Waste SA released a financial incentives program to encourage councils to take up food waste recycling.

In addition, Zero Waste SA introduced measures to improve communications targeting householders keen to recycle food scraps using the bench top system but living in councils which were not yet offering a combined food and garden organics kerbside collection service.

## Glossary

Bio basket	A ventilated container lined with compostable bags made from corn starch, which are replaced every two to three days.
Contamination	Any material found in the recycling or garden organics bin that is not considered recyclable by the sorting and processing facilities.
Diversion	The amount of recoverable material being diverted away from landfill.
Food waste	All food scraps including meat and seafood scraps, vegetable and fruit peelings, seeds/husks and dairy products.
Garden organics	Matter such as prunings, leaves, branches, lawn clippings), food waste and paper (tissues, napkins), teabags and coffee grinds.
Kerbside waste audit	An examination of the contents of a random sample of waste, recycling and garden organics bins to indentify how much material is being recycled, sent to landfill and the extent to which incorrect materials are placed in the bins.
Kitchen caddy	A bucket-like container with a lid that does not need a lining and is used to collect kitchen food waste.
Open windrow composting	The controlled composting of organic materials accomplished in open windrows or open static piles.
Recyclables	Materials considered to be recyclable: steel (including food cans, paint tins, aerosol cans), aluminium cans, paper (including newspaper and magazines), cardboard and some plastics.
Residual waste	The waste that remains after householders have separated materials for recycling and composting, that is, all the remaining waste placed in the landfill rubbish bin.



*Windrow composting, images courtesy of Jeffries Group.*

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# Attachment 1 - Sample household information brochures

## What is the trial about?

It is about finding ways to divert food waste from landfill. Food waste and other organic material makes up around half of what is left in rubbish bins. With support from Zero Waste SA we will measure how much food waste is captured, survey residents about using the containers, and assess how well the containers work.

## Why take part?

By putting food waste into your green organics bin it will be collected and processed into nutrient-rich compost. Using your Bio Basket will reduce greenhouse gas emissions and divert compostable material from landfill. By taking part, you are helping Council select a suitable system for all residents in the future.

## Who is in the trial?

Around 1,000 homes through parts of Athelstone and Hectorville have been selected to participate in this trial. Each household in the trial has been provided a container to use.

## Will my bin collections change during the trial?

No, your collection days will not change, just keep to your current routine.

## What if I already compost or use a worm farm?

Keep up the good work! You may wish to use the Bio Basket for organic materials that you don't currently compost (e.g. meat, citrus, onions) and place the bag in your green organics bin for regular collection.

If you use the compostable bags to collect for your backyard compost system, or worm farm, empty the contents into the system. The bags decompose slower than the food inside, particularly in backyard compost systems, which are not as hot as commercial composting systems. You can reuse bags once or twice.

## What are the bags made of?

The bags are made of biodegradable material from cornstarch, vegetable oil and compostable polyester. When commercially composted (in a hot, moist environment) they break down completely in around 30 days.

## What if I need more compostable bags?

Your supply of 150 bags should last for 12 months. If you do run low, please call council on 8366 9219. **Never** use plastic bags in your Bio Basket.

## I don't have a green organics bin. What do I do?

Please call the council on 8366 9219.

[www.zerowaste.sa.gov.au](http://www.zerowaste.sa.gov.au)

Printed on 100% recycled paper

## Don't waste your food scraps turn them into compost



**Contacts** East Waste 8347 5127 [east@eastwaste.com.au](mailto:east@eastwaste.com.au)  
Campbelltown City Council 8366 9219  
[cityof@campbelltown.sa.gov.au](mailto:cityof@campbelltown.sa.gov.au) [www.campbelltown.sa.gov.au](http://www.campbelltown.sa.gov.au)



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1 Put one of the provided compostable bags into your Bio Basket



2 Place all your food scraps into the lined Bio Basket



3 Remove the bag and contents every 2-3 days, tie a knot in the top of the bag



4 Place bag into your green organics bin, and place bin out for its normal collection, even if it is not full

## What can I put in the Bio Basket?



- ✓ Food scraps, peels
- ✓ Cake, bread crusts
- ✓ Fruit, vegetables
- ✓ Teabags, coffee grounds



- ✓ Meat scraps, bones, seafood (cooked, raw)
- ✓ Egg, oyster shells
- ✓ Cheese, yoghurt



- ✓ Takeaway foods
- ✓ Shredded paper
- ✓ Tissues, paper towels
- ✓ Hair



**Never use plastic bags to line your Bio Basket.**

**Even if they are labelled 'biodegradable', they will not break down in compost.**

## Tips

- Let hot food cool down before placing into your Bio Basket.
- Freeze meat and seafood until your bin collection day (to avoid odours).

## What can't I put in the Bio Basket?

- ✗ Plastic bags/oven bags
- ✗ Cling wrap
- ✗ Dishcloths/sponges
- ✗ Liquids
- ✗ Nappies
- ✗ Cigarette butts or ash
- ✗ Vacuum dust
- ✗ Sharps

These items will not break down in compost.

**If you place these items in your green organics bin, we may stop collecting it.**

For more information call the hotline on 8347 5127

This trial is supported by:



Government of South Australia  
Zero Waste SA





**Who is in the trial?**

Around 2,000 homes in two areas of Whyalla have been selected to participate in this trial. Each household in the trial has been provided a container to use.

**What is the trial about?**

It is about finding ways to divert food waste from landfill. Food waste and other organic material makes up around half of what is left in rubbish bins. With support from Zero Waste SA we will measure how much food waste is captured, survey residents about using the containers, and assess how well the containers work.

**Why take part?**

By putting food waste into your green organics bin it will be collected and processed into nutrient-rich compost. Using your Kitchen Caddy will reduce greenhouse gas emissions and divert compostable material from landfill. By taking part, you are helping Council select a suitable system for all residents in the future.

**Will my bin collections change during the trial?**

No, your collection days will not change, just keep to your current routine.

**What if I already compost or use a worm farm?**

Keep up the good work! You may wish to use the Kitchen Caddy for organic materials that you don't currently compost (e.g. meat, citrus, onions) and simply empty into your green organics bin for regular collection.

**I don't have a green organics bin. What do I do?**

Please call council on 8640 3444.

[www.zerowaste.sa.gov.au](http://www.zerowaste.sa.gov.au)

Printed on 100% recycled paper

**Don't waste your food scraps  
turn them into compost**



**Contacts** City of Whyalla 8640 3444  
gail.rostig@whyalla.sa.gov.au www.whyalla.sa.gov.au



1

You don't need to line your Kitchen Caddy

2

If you did want to line the Kitchen Caddy, paper towel or newspaper may be used

3

Place all your food scraps into the Kitchen Caddy

4

Empty the contents into your green organics bin, and place out for its normal collection, even if it is not full

**What can I put in the Kitchen Caddy?**



- ✓ Food scraps, peels
- ✓ Cake, bread crusts
- ✓ Fruit, vegetables
- ✓ Teabags, coffee grounds



- ✓ Meat scraps, bones, seafood (cooked, raw)
- ✓ Egg, oyster shells
- ✓ Cheese, yoghurt



- ✓ Takeaway foods
- ✓ Shredded paper
- ✓ Tissues, paper towels
- ✓ Hair

**What can't I put in the Kitchen Caddy?**



**Never use plastic bags to line your Kitchen Caddy. Even if they are labelled 'biodegradable', they will not break down in compost.**

- ✗ Plastic bags/oven bags
- ✗ Cling wrap
- ✗ Dishcloths/sponges
- ✗ Liquids
- ✗ Nappies
- ✗ Cigarette butts or ash
- ✗ Vacuum dust
- ✗ Sharps

These items will not break down in compost.

**If you place these items in your green organics bin, we may stop collecting it.**

**Tips**

- Let hot food cool down before placing into your Kitchen Caddy.
- Freeze meat and seafood until your bin collection day (to avoid odours).



### 誰可參與？

已在市政範圍內選出有代表性的樣板戶參與這項嘗試。參與嘗試的每一戶都獲得供其使用的容器。

### 這項嘗試是怎麼回事？

這是尋找不再把食物殘渣當作垃圾填埋的方法。垃圾桶的垃圾大約有一半是食物殘渣和其他有機物。我們將在“南澳無廢物組織”(Zero Waste SA)的支援下，計量能收集到多少食物殘渣，向居民調查使用這些容器的情况，並確定使用這些容器的效果。

### 為何要參與這項嘗試？

把食物殘渣放入綠色垃圾桶，經過我們的收集和處理後變成營養豐富的肥料。使用籃子能減少溫室氣體排放，不再填埋可瀝肥的物質。參與這項嘗試能幫助市政廳選擇將來採用適合所有居民的做法。

### 會在嘗試期間改變垃圾回收時間嗎？

我們多數情況下都不會改變垃圾回收日期，大家可如常生活。

### 如我已在使用食物殘渣瀝肥或養蚯蚓該怎麼辦？

您可繼續做下去！您可把目前不能瀝肥的東西(如肉類、柑橘類、洋蔥)放入籃子，然後把瀝肥放入綠色有機垃圾桶供回收。

### 我沒有綠色有機垃圾桶該怎麼辦？

請聯繫市政廳。

## 食物殘渣不要浪費， 可以用來瀝肥



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Chinese

[www.zerowaste.sa.gov.au](http://www.zerowaste.sa.gov.au)

Printed on 100% recycled paper



不必用任何東西墊在罐子內



若要在罐子內墊東西，可使用紙巾或報紙



把所有食物殘渣倒入罐子



把裏面的東西倒入綠色有機回收桶，即使垃圾桶未滿也應如常按時放出外面待回收

## 什麼東西可放入罐子？



- ✓ 食物殘渣，蔬果的皮
- ✓ 蛋糕，麵包屑
- ✓ 果蔬
- ✓ 茶包，咖啡渣



- ✓ 肉類殘渣，骨頭，海鮮(熟、生)
- ✓ 雞蛋，蠔殼
- ✓ 乳酪，酸乳酪



- ✓ 外賣食物
- ✓ 剪碎的紙張
- ✓ 擦臉紙，紙巾
- ✓ 頭髮

## 什麼東西不可放入罐子？



切勿使用塑膠袋鋪墊罐子。  
即使印著“可生物分解”的塑膠袋也不能用，它們不能在瀝肥中分解。

- ✗ 塑膠袋，烤箱袋
- ✗ 保鮮膜
- ✗ 抹布，海綿
- ✗ 液體
- ✗ 尿布
- ✗ 煙頭或煙灰
- ✗ 吸塵機吸出來的塵土
- ✗ 尖利物

這些東西不會在瀝肥中分解。

如把這些東西放入綠色有機垃圾桶，我們會停止回收。

## 小竅門

- 熱食物殘渣攤涼後才放入罐子。
- 把不能食用的肉類和海鮮冷凍起來，到回收日才放入罐裏(避免發生異味)。

這項嘗試得到以下機構的支持：



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## Attachment 2 - Householder prompts used on food waste container lids

### What can I put in my Kitchen Caddy?

#### Put in

- ✓ Food scraps, peels
- ✓ Cake, bread crusts
- ✓ Fruit, vegetables
- ✓ Teabags, coffee grounds
- ✓ Meat scraps, bones, seafood (cooked, raw)
- ✓ Egg, oyster shells
- ✓ Cheese, yoghurt
- ✓ Takeaway foods
- ✓ Shredded paper
- ✓ Tissues, paper towels
- ✓ Hair

#### Leave out

- ✗ Plastic bags
- ✗ Cling wrap/oven bags
- ✗ Dishcloths/sponges
- ✗ Liquids
- ✗ Nappies
- ✗ Cigarette butts or ash
- ✗ Vacuum dust
- ✗ Sharps

Never use plastic bags to line your Kitchen Caddy. Newspaper or paper towel are OK as they compost.

**Wasteline 1300 558 409**



Government of South Australia  
Zero Waste SA



### What can I put in my Bio Basket?

#### Put in

- ✓ Food scraps, peels
- ✓ Cake, bread crusts
- ✓ Fruit, vegetables
- ✓ Teabags, coffee grounds
- ✓ Meat scraps, bones, seafood (cooked, raw)
- ✓ Egg, oyster shells
- ✓ Cheese, yoghurt
- ✓ Takeaway foods
- ✓ Shredded paper
- ✓ Tissues, paper towels
- ✓ Hair

#### Leave out

- ✗ Plastic bags
- ✗ Cling wrap/oven bags
- ✗ Dishcloths/sponges
- ✗ Liquids
- ✗ Nappies
- ✗ Cigarette butts or ash
- ✗ Vacuum dust
- ✗ Sharps

To avoid odours or liquid buildup, please remove bags and contents every 2-3 days and place into your organics bin.

**Wasteline 8640 3444**



Government of South Australia  
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# Attachment 3 - Stickers for placement on the household garden organics bin lid

Peel here and place on the lid of your green organics bin.

## Food and Green Organics Only

Please put in...



Lawn clippings



Garden trimmings



Small branches



Meat scraps and bones



Egg shells



Tissues



Paper towels



Food scraps



Tea bags



Peels



Shredded paper



Please leave out...



Plastic bags /bin liners



Plastic pots/ seedling trays/hose



Recyclables



Polystyrene or foam



Dirt/rocks



Building material or permaline



Hazardous/ medical waste



Household chemicals



Metal



Batteries



Nappies



Customer Centre 8203 7203



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