

Ashes to ashes,

Dust to dust...





Food to food?



Food waste, composting & urban ecology

Food waste:

- Edible products that are discarded by retailers and consumers
(FAO, 2011)

Composting

- Recycling food scraps and organic waste into fertilizers

Urban ecology:

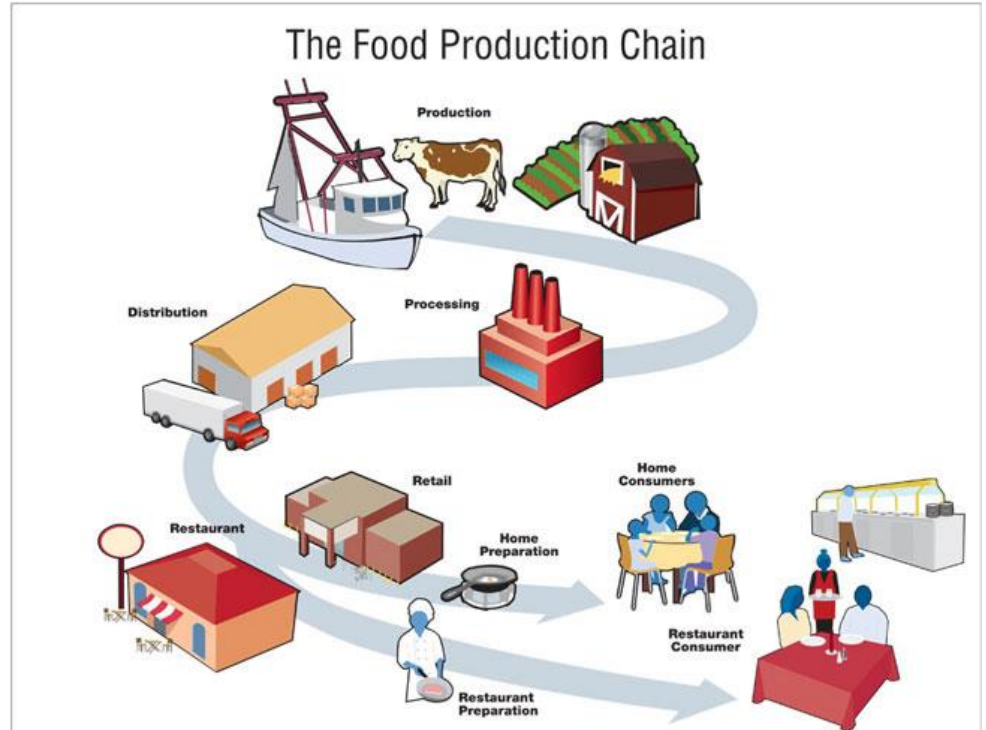
- Flows of energy and materials through urban systems, e.g., wastes and nutrients (Deelstra & Girardet, 2000; Gaston, 2010)
- Linear vs circular metabolic system (Deelstra & Girardet, 2000)



Environmental impacts of food waste

- Singapore imports > 90% of her food (AVA, 2015)
- **Huge carbon footprint:**
2.7 million tonnes CO₂/ year
(Mcloughlin, 2015)
- Water footprint


1170 litres of water for
one breastfilet (300g) of
Chicken



Urbanization amplifies food wastage

- Globally, $\frac{1}{3}$ of all edible food is wasted each year (FAO, 2011)
- In high-income countries, **consumers** are the main culprit (Graham-Rowe *et al.*, 2014)
- Reasons (Parfitt *et al.*, 2010):
 - 1) Higher disposable income → food is relatively cheaper
 - 2) High standards for appearance of food → more selective in choice of food
 - 3) Live further from where food is grown → don't appreciate true cost of food production



Singapore – Whither our Food Waste?

- Singapore generated **788.6 million kg** of food waste in 2014 (NEA, 2015a)
- Set to ↑ further due to growing population and rising affluence (NEA, 2015a)
- Only **13%** of Singapore's food waste is **recycled**; the rest are incinerated and sent to Pulau Semakau (NEA, 2015a)
- Need to adopt more **circular metabolic systems** for LT sustainability (Deelstra & Girardet, 2000)

= 108 fully loaded



So we begin...

1. Do consumers waste more food in hawker centres or at home?
2. What are Singaporeans' perceptions on composting?



Phase 1 - Quantifying food waste

- 3 categories of food waste:
 - 1) Edible solids
 - 2) Liquids
 - 3) Compulsory (includes inedibles, such as chicken bones)
- Waste measurements were taken by estimating the volumes in 200 ml cups
- For consistency, only main courses were considered

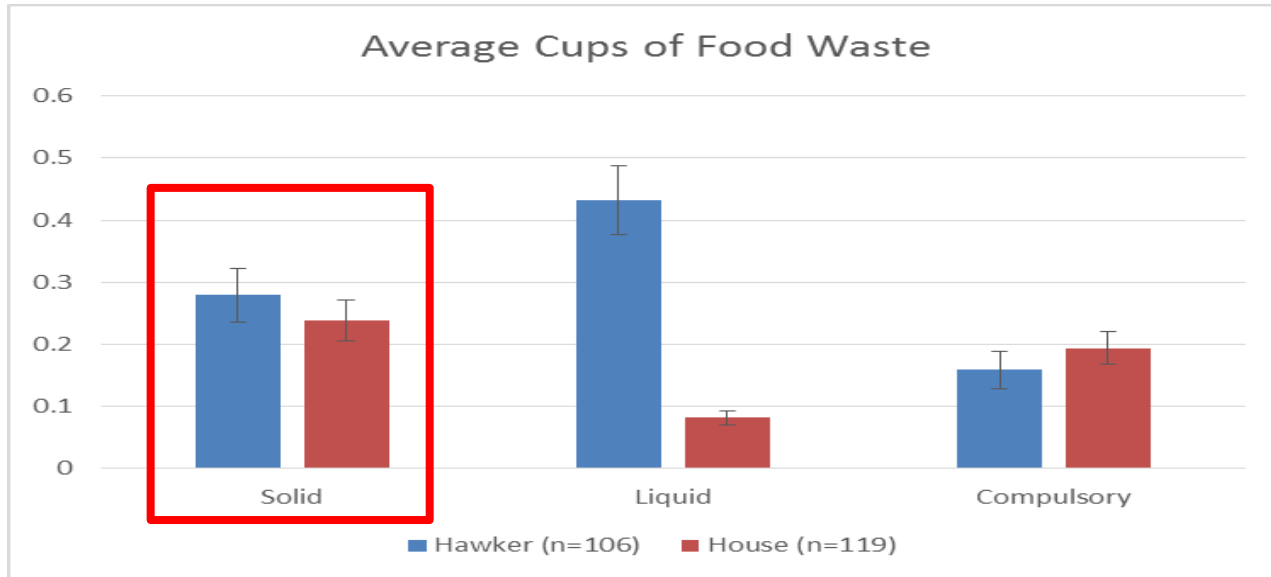


Phase 1 - Quantifying food waste

- Study period: February 2016 – March 2016
- Sampling time: 6.30 p.m. to 7.30 p.m. (dinner hour)
- Data collected for 106 individuals in households and 119 individuals in hawker centres
- 10 out of 107 National Environment Agency (NEA) managed hawker centres chosen for the survey (~10%)
- Investigated the behaviours of Singapore residents, tourists were excluded

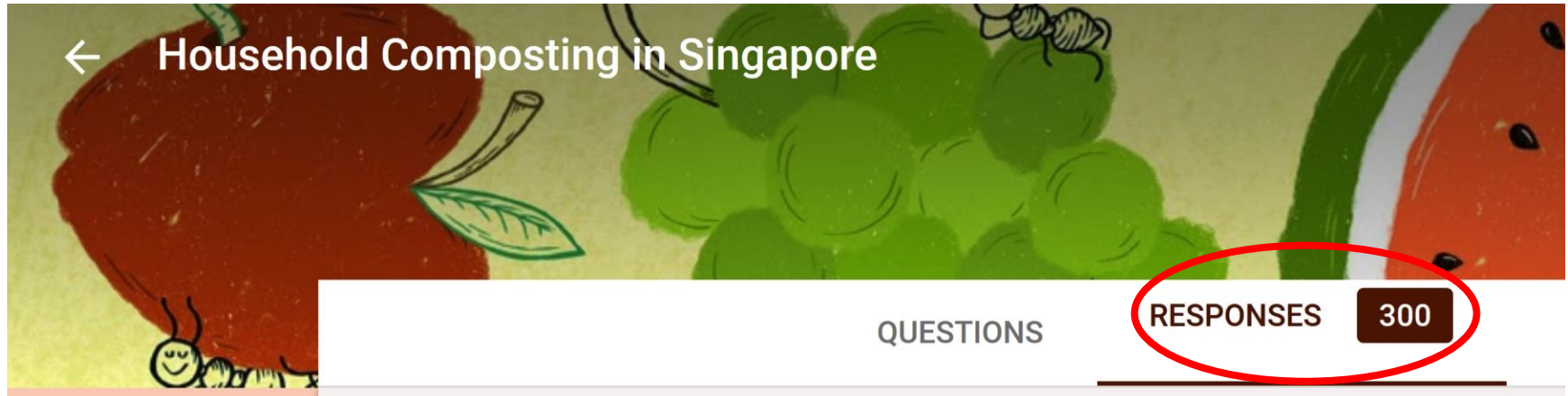
Household VS Hawker food waste

- Student's t-test to compare household and hawker food waste
- No significant difference in solid waste (p-value > 0.05)



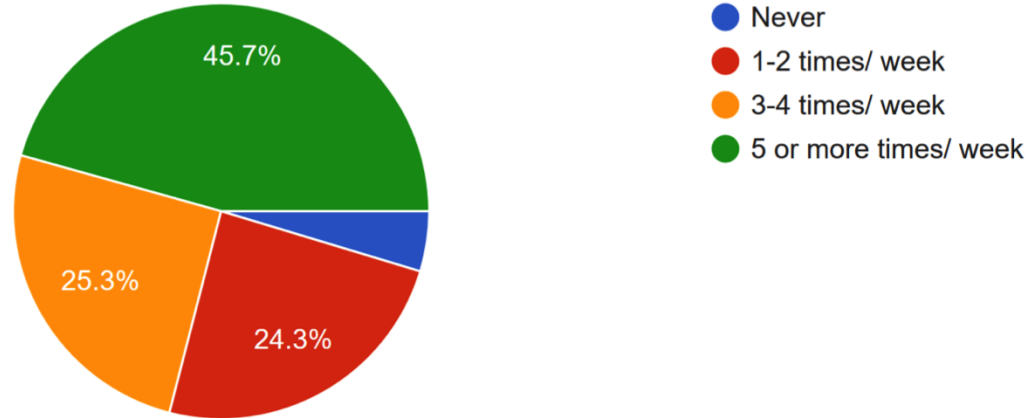
Phase 2 – Online survey

- What is household waste data like, more specifically?
- What do people know about household composting in Singapore?
- How feasible would the introduction of compost bins be?



Household waste data

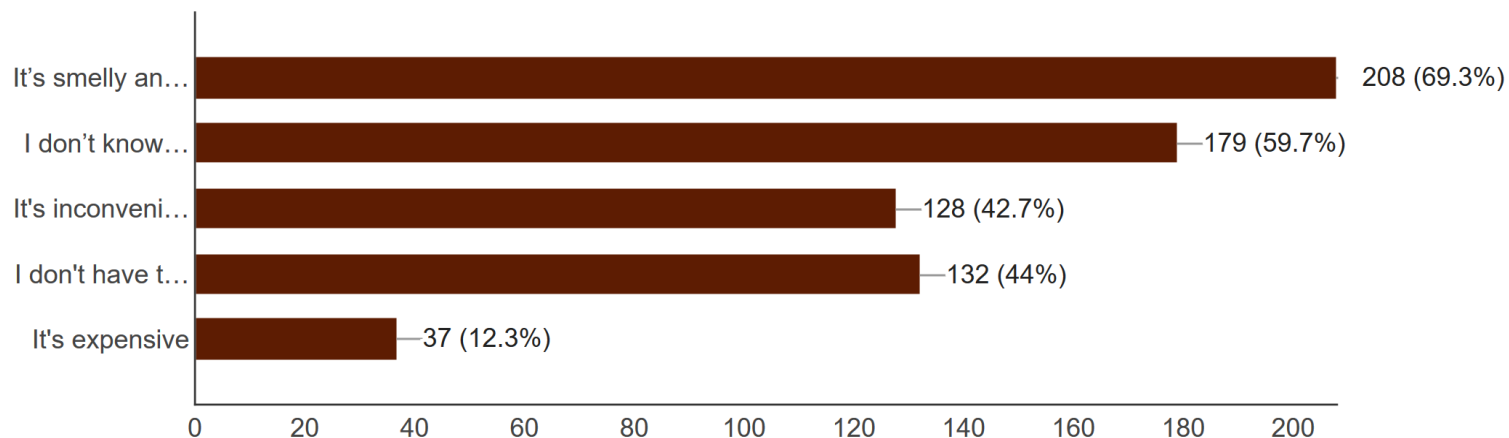
How often does your household cook at home? (300 responses)



- Edible food waste → an average of 1.07 bowls per person per day
- Green waste → an average of 1.13 bowls per person per day

Composting perceptions

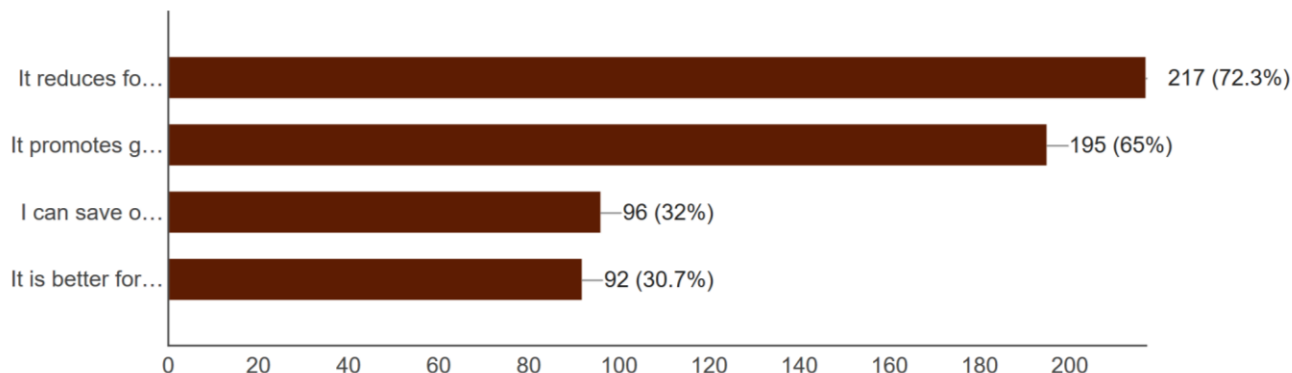
What are your top 3 concerns about composting at home? (300 responses)



- 69.3% of respondents expressed concerns of smell and pests, with the second greatest concern **not knowing where to obtain materials**

Composting perceptions

What are 2 key benefits of composting at home? (300 responses)




- 72.3% saw it as a **good way to reduce food waste** and 65% saw it as a good way to **encourage environmental awareness** in their families
- Good indicators overall that a trial would be well-received

Key findings

- Food waste is just as much a problem in households as hawker centres
- Household food waste has higher green waste proportion
- Residents are inclined to participate in the pilot test and learn more about composting




Business Proposal to NEA

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Current situation









- Zero Waste Nation
- Target overall recycling rate of 70% by 2030 (NEA, 2015a)




Ministry of the Environment
and Water Resources


Singapore Government
Integrity · Service · Excellence

Resize text   


 ABOUT US  CAREERS  NEWS  ACTIVITIES  SITE MAP  CONTACT INFO  FEEDBACK  FAQs



LEARN THE ISSUES
Singapore's environmental issues, and
the policies to tackle these issues.



GRAB OUR RESEARCH
Statistics, reports and publications by
our ministry and statutory boards.




GET INVOLVED
Report incidents, participate in public
consultations and suggest ideas.

**COMMITTEE OF SUPPLY
TOWARDS ZERO WASTE NATION**

*As we move towards becoming a 'Zero Waste Nation', we will
also continue to ensure that waste collection, disposal and
treatment methods are safe and sanitary.*

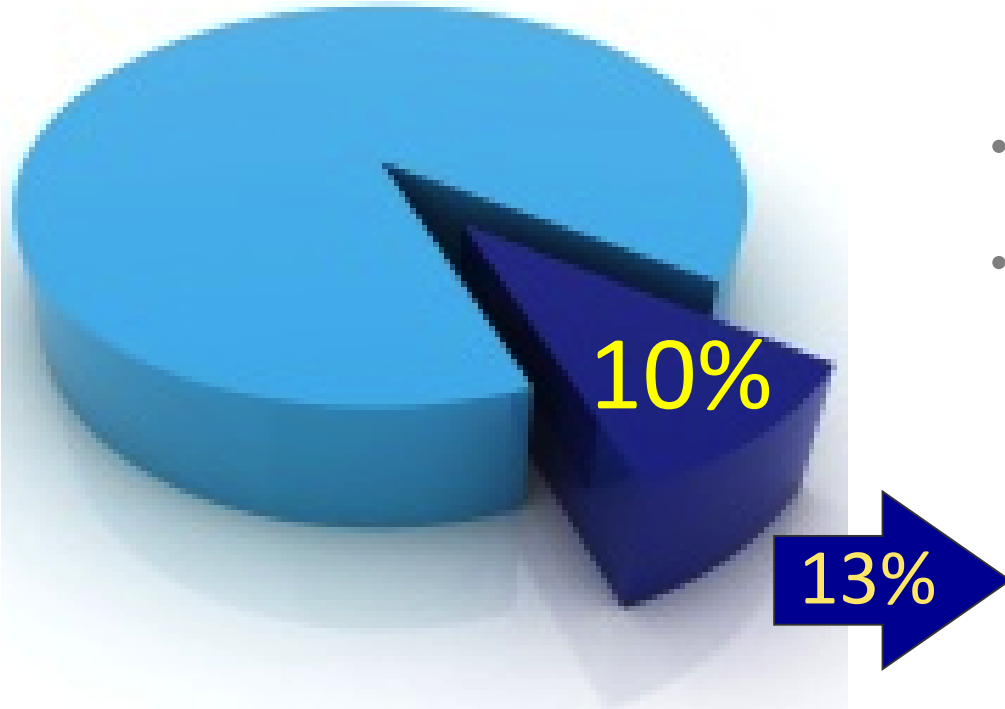
5/6 COS 2015 - Managing Waste



Ms Grace Fu
Committee of Supply 2015

Second Minister's COS Speech on Towards Zero Waste Nation

Current situation



- 10% of total waste = food waste = **788.6 million kilograms** (NEA, 2015a)
- Only 13% of food waste recycled
- Food waste projected to increase with growing population and rising affluence



Ongoing measures – NEA pilot project I

- On-site segregation of food waste at two hawker centres



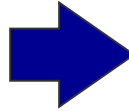
Tiong Bahru Market



Ang Mo Kio Block 628 Market

Ongoing measures – NEA pilot project II

- District-level pilot at Clementi
- Food waste collected from the area transported to an off-site facility for recycling



Gap identification

- Consumers are one of the key contributors to food waste
- Lack of food waste reduction measures targeted at consumers



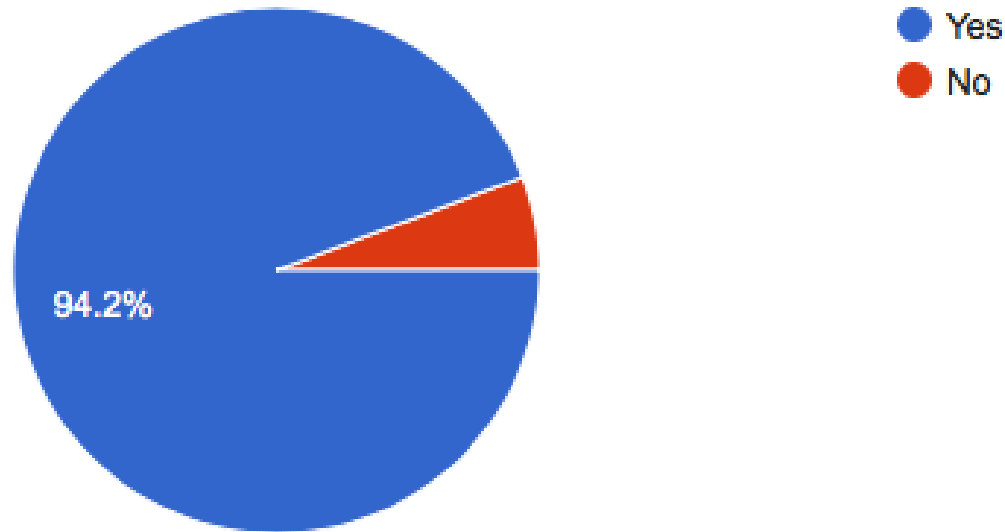
Business proposal – Objective

- To encourage household food waste recycling by providing Singapore residents free DIY Composting Starter Kits (one-year pilot test)



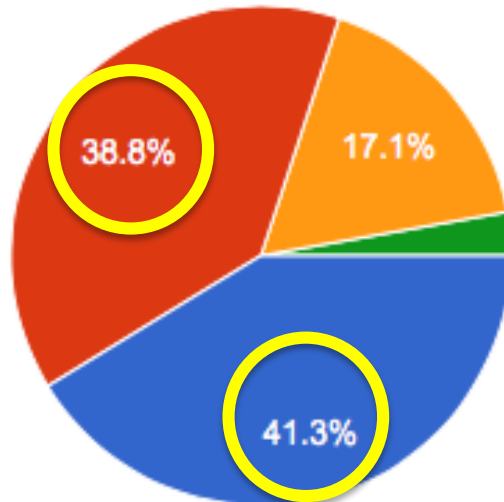
Responses from online survey

Do you think food waste is a big concern in Singapore? (295 responses)



Responses from online survey

What do you know of composting? (299 responses)



- No idea what it is!
- I've heard of it before, but I don't really know what it is/ how to do it
- I know what it is and how to do it, but I don't compost
- I know what it is, and I do composting at home!

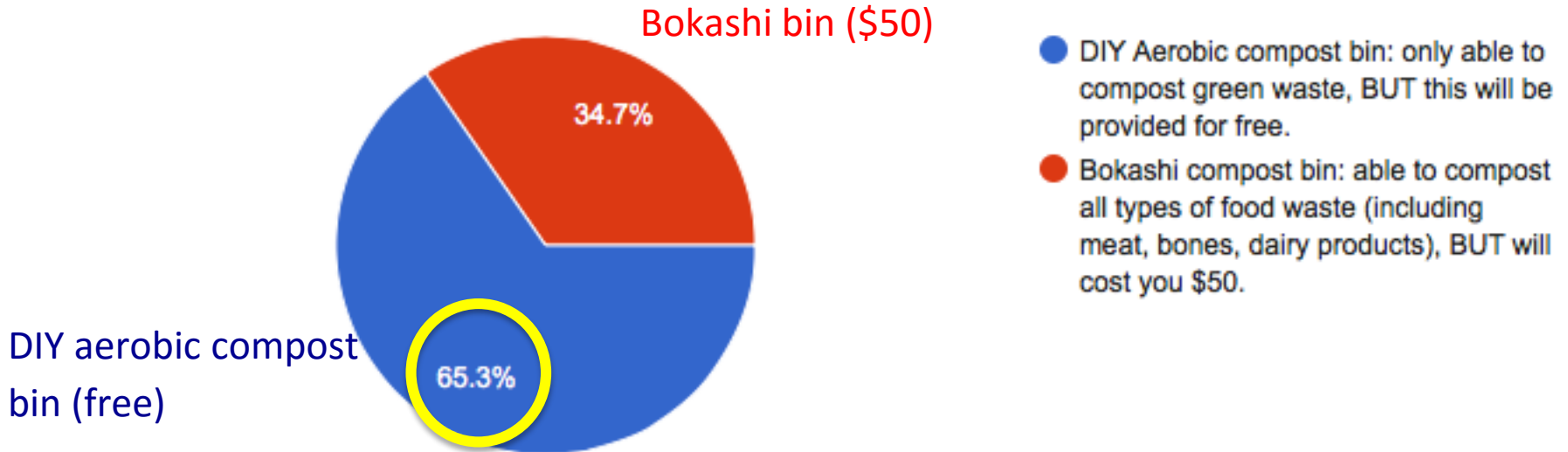
The bins



Responses from online survey

If NEA is doing a pilot test to encourage household composting, what kind of composting system would you prefer?

(300 responses)



Responses from online survey

Top three concerns regarding composting

1. Risk of odour and pests
2. Lack of knowledge on how to carry out composting
3. Lack of time for composting



Response to online survey

If composting is done correctly

- Does not cause odour
- Does not attract pests
- Available online resources on procedure



DIY Composting Starter Kit



Semi-transparent bins



Garden soil



Garden hand shovel

Implementation



Eco Town





COMMUNITY GARDEN

The Eco-Deck incorporates a community garden to facilitate communal gardening activities for the residents. Residents of Treelodge@Punggol can participate in gardening and consume its produce. This helps promote community cohesiveness amongst the residents.



One-year Composting

DIY Composting Starter Kit



A plastic bin with
lid to seal off
odour



A hand shovel for
you to turn your
compost



Garden Soil



Your Green Waste!

Your compost bin from the inside!

50 : 50
GREEN : BROWN

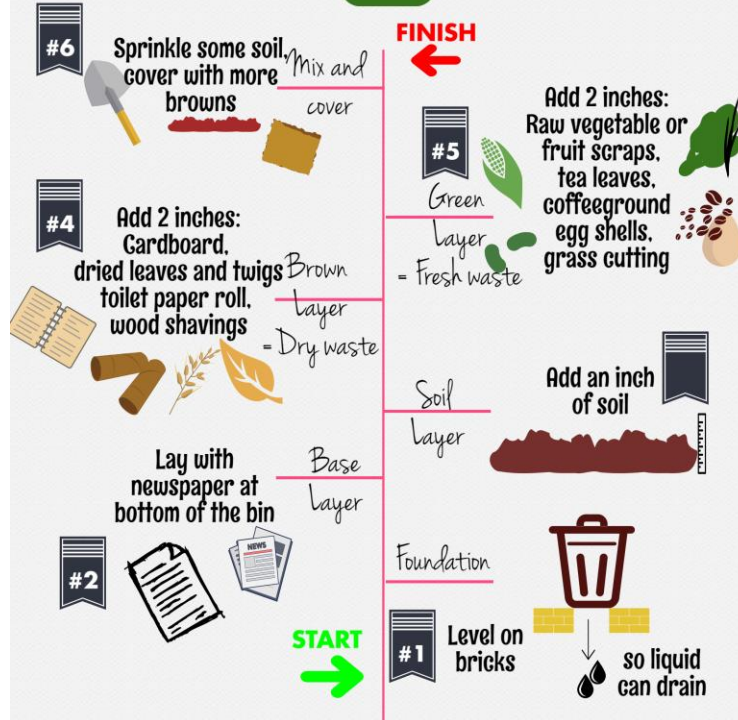


What is composting?

Process of turning food scraps and organic waste into fertilizers that can be used for gardening



+ Composting Guide



Partnership



TreeLodge @ Punggol



712 households

Project timeline

the pilot test
for DIY composting



Preliminary survey
to screen specific
audience



Identify households
willing to try



Opening ceremony



Mid-pilot survey
to monitor progress



Workshops to teach
the keen ones



Distribute **Starter kit**
to compost



Post survey
to gather feedback



Post pilot test
report & evaluation



25,000KG
waste reduced



Project timeline

the pilot test
for DIY composting

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Preliminary survey
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Identify households
willing to try



Opening ceremony

Recycle!

Think before you throw



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DIY Composting Starter Kit



A plastic bin with
lid to seal off
odour



A hand shovel for
you to turn your
compost



Garden Soil



Your Green Waste!

What you need



Green Waste

Compost Bin

Regular Turns

Wait

Fertilisers for
plants!

Project timeline

the pilot test
for DIY composting

brought to you by :



Urban Solutions



Preliminary survey
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Post pilot test
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25,000KG
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Treelodge @ Punggol



712 households

An estimated budget of

\$S 18,500

dollars will be spent.

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Cost Breakdown



\$500 - admin fee
x 16mths

\$12 - bin
\$2 - soil
\$2 - shovel

x 60%
participation
x 712
households
\$60 - tools

Transport
Delivery of kit
Miscellaneous

\$500 workshop
fee
x 3 session

Opening
ceremony

logistics
printing
food

\$8,000

\$7,120

\$780

\$1,500

\$1,100



Treelodge @ Punggol




712 households

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Conclusion

- Solution targeted at consumers
- Household composting kit + complements NEA's efforts in reducing food waste
- \$0.74/kg highly cost effective
- Possible upscale in future
- Zero Waste Singapore



We thank...

- Dr. Joanna Coleman
- Composting in Singapore (CIS)
- Respondents of our survey

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Questions?

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