Food waste research for South Africa

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Competency Area: Solutions for a Green Economy
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What is the issue?

- Food is treated as a disposable commodity
- A third of food produced for human consumption is wasted globally ~1.3 billion tonnes per year
- Almost one in seven people globally are estimated to be undernourished
- Food waste has a triple negative effect:
  - It impacts on food security
  - Resources used in food production and distribution are wasted
  - Environmental impacts throughout the supply chain
Defining food waste

Food waste is any food, and inedible parts of food, removed from the food supply chain to be recovered or disposed (incl. composted, crops ploughed in/not harvested, anaerobic digestion, bio-energy production, co-generation, incineration, disposed to sewer, landfill or discarded to sea).

(Source: Ostergen et al, 2014)
Defining food waste and surplus

Source: Pagargyropulou et al., 2014
Food loss by region and stage of the supply chain

Food production and sale

- **Sub-Saharan Africa**
  - Food is produced by small scale farmers with inefficient farming, storage, processing and distribution systems
  - Food is mostly sold at local and informal markets

- **South Africa**
  - Agriculture is dominated by large-scale commercial farmers
    - Sophisticated harvesting, storage and processing systems are in place
  - Food production is dominated by large corporation
  - Food retail is dominated by large supermarket chains
Food waste statistics in South Africa

- SA is a net exporter of food (DAFF, 2017)
- ~25% of SA households are at risk of hunger or experiencing hunger
- ~12.6 million tonnes per annum (Nahman and de Lange, 2015)
  - 10.2 million tonnes (avoidable/edible portion) = 27% of available food
  - 2.4 million tonnes (unavoidable/inedible portion)
- R 5 922 per tonne = full cost of disposal to landfill (opportunity + disposal cost) (Nahman and de Lange, 2015)
- ~R61.5 billion per annum total cost of edible food waste throughout value chain (Nahman and de Lange, 2013)
- ~ 2.1% of National GDP
Estimated avoidable food waste throughout the supply chain in SA – 10.2 million tonnes per annum

27% of all food is wasted

Source: Reproduced from data in Nahman and De Lange (2013)
Research on food waste is South Africa

- Research on food losses and waste in SA have largely focussed on reducing harvest and post-harvest losses and waste
- Food waste as portion of municipal solid waste
  - 13 out of 284 municipalities have data on food waste
- National Estimates was done in 2012, 2013
- Household food waste behaviour
- Environmental footprint of food waste
  - Up to 4.14 tCO$_2$e per tonne of food (Bakas, 2010)
  - 4.3% of South Africa GHG emissions are from disposal of organic waste
  - ~22% of water footprint of agricultural production in SA
### Municipality | % food waste | Comment | Source
--- | --- | --- | ---
City of Cape Town | 8 | 2011 study covering households only | CoCT IWMP, 2015
City of Tshwane | 17 | Kitchen waste from households reported as organic fraction | Komen et al., 2016
Nelson Mandela Metropolitan Municipality | 33 | Random sampling of truck entering the landfill site. Include household and commercial waste | Pilusa J. 2017
Polokwane | 31 | | |
EThekwini | 31 | | |
Msunduzi | 22 | Percentage of MSW | McCarthy, 2016
Mbombela | 16 | | |
Mangaung | 15 | | |
Rustenburg | 16 | | |
Mhlatuze | 23 | | |
Emfuleni | 12 | | |
City of Johannesburg | 7 | Percentage of Household waste | Oelofse et al., 2018.
Ekurhuleni Metropolitan Municipality | 3 | | |
Estimated food wastage in SA by commodity group

Food waste (thousand tonnes per year)

- Cereals
- Roots & tubers
- Oil seeds & pulses
- Fruit & veg
- Meat
- Fish & seafood
- Milk and eggs

Legend:
- Agricultural production
- Post harvest handling & storage
- Processing & packaging
- Distribution
- Consumption
Percentage contribution per commodity group in South Africa

Relative contribution per commodity type

- Cereals: Waste 26, Cost 8, Water use 32
- Roots and Tubers: Waste 10, Cost 5, Water use 3
- Oil seeds and pulses: Waste 3, Cost 6, Water use 8
- Fruits and vegetables: Waste 45, Cost 42, Water use 24
- Meat: Waste 8, Cost 32, Water use 26
- Milk: Waste 8, Cost 7, Water use 7
Per capita food waste by consumers

- **Europe and North America**
  - 95 – 115 kg/year

- **Sub-Saharan Africa and South/Southeast Asia**
  - 6 – 11 kg/year

- **Food waste from households in Ekurhuleni**
  - 3% of MSW = 25 198 tonnes/annum
  - 8 kg/capita/annum

- **Food waste from households in Johannesburg**
  - 7% of MSW = 51 462 tonnes/annum
  - 12 kg/capita/annum

Source: Gustavsson et al, 2011; Oelofse et al, 2018
Household food waste
Restaurant waste
Retail Food Waste
Reasons for household food wastage in SA

1. Date codes specifically Sell-by & expiry dates
2. Product appearance (old/off/rotten/smells bad NB Crooked produce feature prominently)
3. Forgotten produce in storage
4. Packaging can’t be resealed and provides poor protection
5. Prepare to much
6. Slow consumption
7. Pests
8. Buying too much
9. Picky eaters
10. Poor cooking skills
Self-reported food waste as a percentage of purchase (N=1154) Gauteng

<table>
<thead>
<tr>
<th>Food category</th>
<th>% of purchase that is wasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>21.10</td>
</tr>
<tr>
<td>Fruit</td>
<td>20.14</td>
</tr>
<tr>
<td>Bread</td>
<td>19.22</td>
</tr>
<tr>
<td>Dairy</td>
<td>14.22</td>
</tr>
<tr>
<td>Cakes and pastries</td>
<td>13.70</td>
</tr>
<tr>
<td>Desserts</td>
<td>12.64</td>
</tr>
<tr>
<td>Condiments</td>
<td>10.55</td>
</tr>
<tr>
<td>Cereals</td>
<td>10.24</td>
</tr>
<tr>
<td>Meat</td>
<td>9.58</td>
</tr>
<tr>
<td>Oils</td>
<td>8.93</td>
</tr>
<tr>
<td>Beverages</td>
<td>8.23</td>
</tr>
<tr>
<td>Sweets</td>
<td>7.80</td>
</tr>
</tbody>
</table>

(Venter 2017)
Household food waste – Kimberley (n=100)

What percentage food would you throw in the bin by the end of each week

19% 69%

8% 1% 3%

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(Cronje et al, 2018)
Household food waste – Kimberley (n=100)

When you throw away food, to what extent, if at all, does it bother you:

- Not at all: 43%
- Not very much: 27%
- A little: 18%
- A fair amount: 7%
- A great deal: 5%
Household food waste – Kimberley (n=100)

- **3 most wasted fruits**
  - Bananas: 42%
  - Apples: 20%
  - Avocado: 8%

- **3 most wasted vegies**
  - Tomatoes: 27%
  - Potatoes: 17%
  - Cabbage: 13%

(Cronje et al, 2018)
What category of food do you tend to overbuy and end up throwing out?

- 42% vegetables
- 22% fruits
- 21% dairy
- 14% meat
- 1% convenience food

(Cronje et al, 2018)
Conclusions

• Food waste is a global concern
• A standard definition of food waste is required to measure food waste throughout the value chain
• Lack of reported data on food wastage throughout the value chain
• South African food wastage is not comparable with the rest of sub-Saharan Africa
• South Africa household food waste behaviour mimics that of developed countries
• Reported reasons why SA households waste food are similar to European reasons
• Food waste reduction can contribute to global food security
• Household food waste can be minimised through proper guidance
Thank You

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