

Operationalising Measurement for Management and Benefit Cost Analysis

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Operationalising Measurement

Differences in definitions of food waste

Decrease in the quantity and or quality of food (FAO,2014)

Unrecovered surplus food (Garrone et al.,2014)

Food produced in excess of requirements (Papargyropolou et al. 2014)

Edible product post-harvest available for human consumption but not consumed (Buzby et al. 2014)

Difference between the amount of food produced and the sum of all used for any productive use (Bellemare et al. 2017)

Loss related to production, post-harvest and processing stages of the food supply chain (Aragie et al. 2018; Thyberg and Tonjes 2016)

Food produced for human consumption but re-directed to non-food uses or disposal (Berretta et al. 2012)

End products from food processing that has not been recycled or used for alternative purposes (Lin et al. 2013)

Every food item removed from the Food Supply Chain at any stage, that ends up in landfill (Bellamere et al.2017)

Product which deviates from the food supply chain (WRI,2016)

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Differences in definitions of food waste



Differences in measurement

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Aggregation considerations

- Horizontal/vertical stages of the food chain
- Mass/volume across different food types
- Value aggregation using retail prices

(Koester 2013)



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Components to measure?

- Landfill
- Avoidable v unavoidable losses
- Alternative uses (e.g. animal food, bioenergy)
- Cultural considerations
- Overconsumption



Obesity and associated illnesses cost Australian society millions of dollars per year

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Units of measurement?

- **Mass/volume**
- **Energy (e.g. kcal per capita per day)**
- **Resources: cubic meters for water, square meters for crop land and kilograms for fertiliser.**
- **Value**

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Differences in definitions of food waste



Differences in measurement



Differences in estimates



Implications for actions designed to reduce food waste

What costs to measure?

FAO (2014) calculated three annual costs of food waste

ECONOMIC	SOCIAL	ENVIRONMENTAL
USD 1 trillion	USD 900 billion	USD 700 billion

Total annual costs

USD 2.6 trillion

Benefits of reducing food waste

Improved food security through increased availability of food and effective redistribution of surplus edible food

Reduction in land used to dispose of food waste

Reduced social and environmental costs (e.g. greenhouse gas emissions)

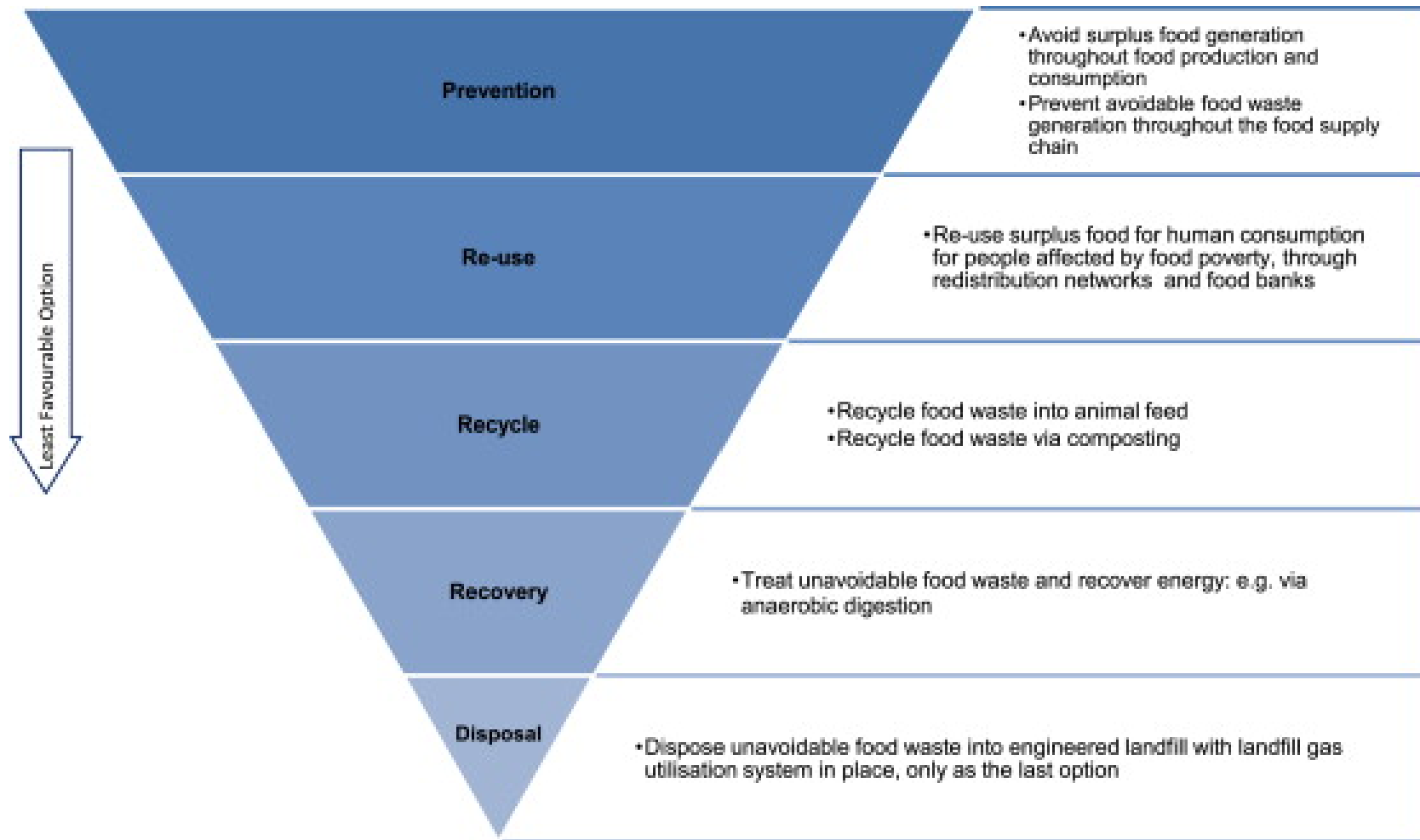
Reduced costs for households by lowering food bills

Reduced costs for businesses in saved resource inputs, reduced waste management and disposal fees, and increased profits through efficiency gains

Increasing profits by converting more ingredients that are saved into a saleable product

Increased economic opportunities, including employment, through the creation and development of new products, services and markets

Costs of reducing food waste



(Papargyropoulou *et al.*, 2014)

How much food waste should be avoided?



Reduction in food waste

Cost/benefit (\$)



Additional benefit of reducing food waste

=



Additional cost of reducing food waste



Conclusions

- Greater focus needed on the origin and nature of food waste for definitional purposes.
- Measurement difficulties – what key indicators to include?
- Consideration of spillover costs to the environment and society.
- Need for standardised data to measure food waste and track its reduction. (Department of the Environment and Energy, 2017)
- The optimal level of food wastage is reached when the costs of additional food wastage reductions = the benefits of additional food wastage reductions