Reduction of Food Waste Generation in the Hospitality Industry

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Motivation and opportunity

The Current Food Waste Situation in the UAE

- UAE and GCC countries: rapid development in the hospitality sector
- From 2012 to 2013: 37% increase in hotel occupancy in Abu Dhabi (AD)
- Abu Dhabi is in the process of rehabilitating its landfill sites
    - till 2008, many of the landfills were simply unlined dumpsites
- > 75% of UAE waste is now landfilled
- AD waste generation → **1.8-2.4** kg/capita/day

  (50% more than the UK)
- 1/3 of the waste generated in the UAE comprises of discarded food

The Current WM system in AD

- Waste managed by the Centre of Waste Management (CWM)
- Instated a tariff system on waste produced for commercial and industrial establishments
- Large waste producers are asked to prepare audit reports
  – Expensive and time consuming process

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Your Waste, Your Responsibility نفاياتك، مسؤوليتك

The Current Situation in the UAE - *Hefth Al Ne'ma* (Saving Grace) Program

- Started in 2004
- Service available to both the public and hotels/restaurants
- Food leftover must at least be enough for 50 people
- Food distributed to needy families and low-paid workers
- 2012 → Program delivered ≈ 175,000 meals.
- "*None of the recipients of the food have ever reported getting sick from eating it*." Sultan Al Shehi, Manager, Hefth Al Ne'ma Program.

Objectives of our work

- To assess the current performance of the hospitality industry (hotel restaurants in current stage) in AD in terms of food waste minimization
- To develop viable solutions for the food waste reduction/management in AD and UAE and subsequently implement them, while considering the local context
- Work with local stakeholders:
  - Local official entities: E.g., AD Center of WM, AD Tourism and Cultural Authority, AD Food Control Authority
  - Hotels: Management, chefs, staff
- The strategies proposed would be of relevance to all of UAE and to other GCC countries which have fast-developing tourism sectors

Hotels Participating in the Study

- Interviews at various hotels/hotel management companies
- Interviews shed light on the operations of 45 different hotels in UAE

Sample of Participating Hotel Attributes

Hotel	Ownership	HQ Location	Rating (No. of stars)	Hotel size (No. of rooms)
A1	Private	Inside UAE	4	287
A2	Private	Inside UAE	5	565
B2	Private	Outside UAE	3	294
C2	Private	Outside UAE	4	301
E	Public	N/A	5	600
F1	Private	Inside UAE	5	292
F2	Private	Inside UAE	5	382
G1	Private	Outside UAE	4	428
H	Public	N/A	5	394
I	Private	Outside UAE	5	172

Hotel Survey results:
Sustainability

Examining the Problem – Social Perspective

Hotels sell 'experience': not lecture guests on sustainability!!

Cultural issues: Food abundance a good sign!

Multi-culturalism: How to motivate everyone?

Examining the Problem – Regulatory Perspective

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Confusion over continuously changing regulations

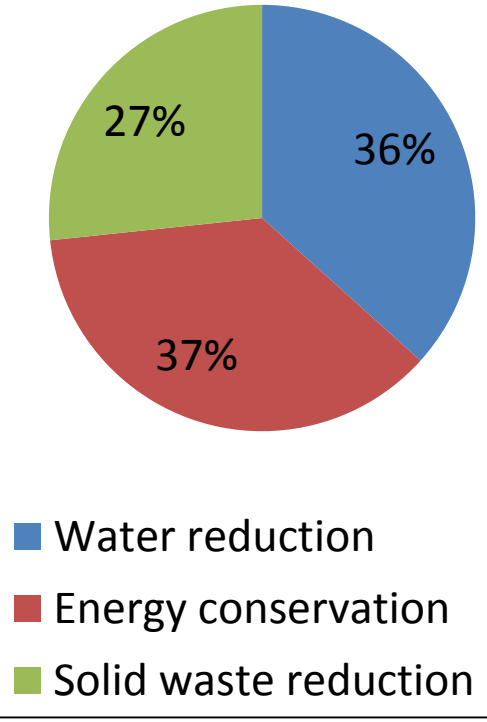
paying fine vs. meeting targets

HACCP* restrictions

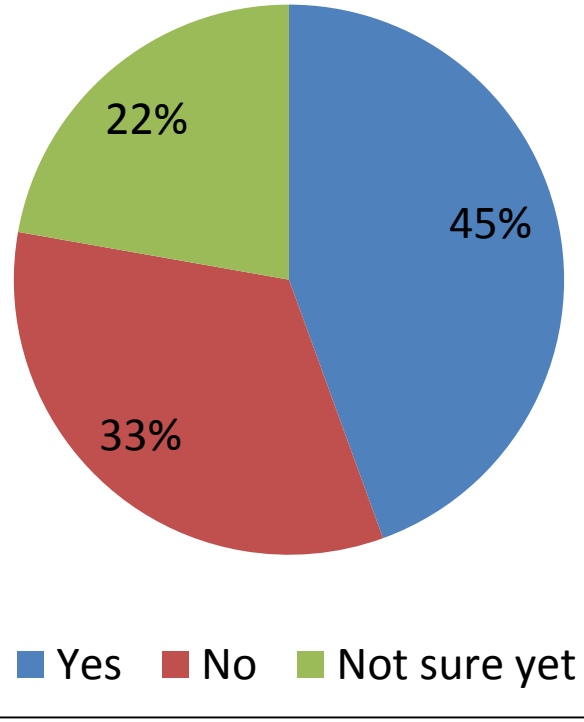
* HACCP: Hazard analysis and critical control points

Results – Hotel Interviews: Sustainability

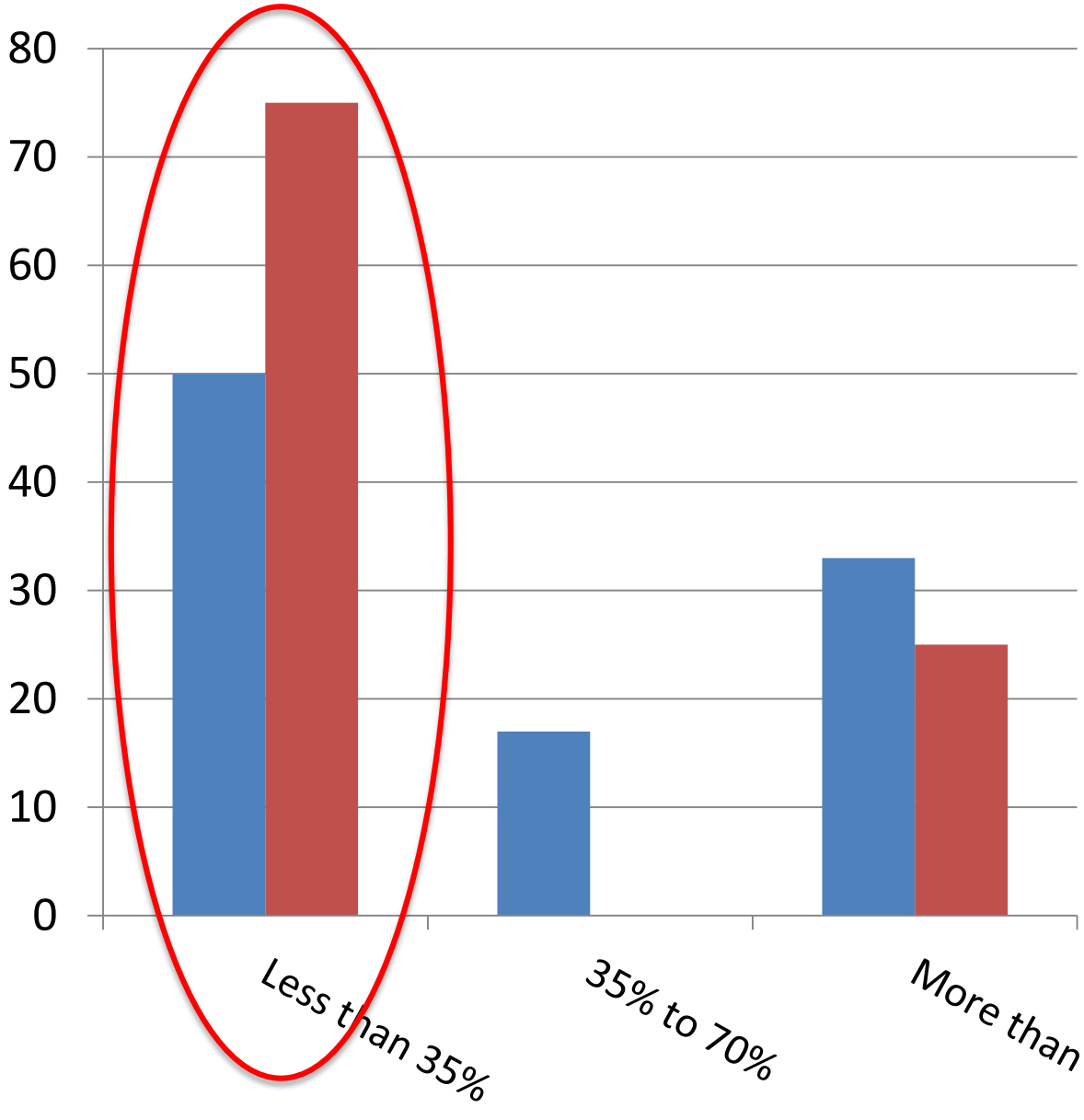
In which areas does your hotel promote sustainability?



Have you reached/are you on track to reach the ADTA 20% diversion rate target?

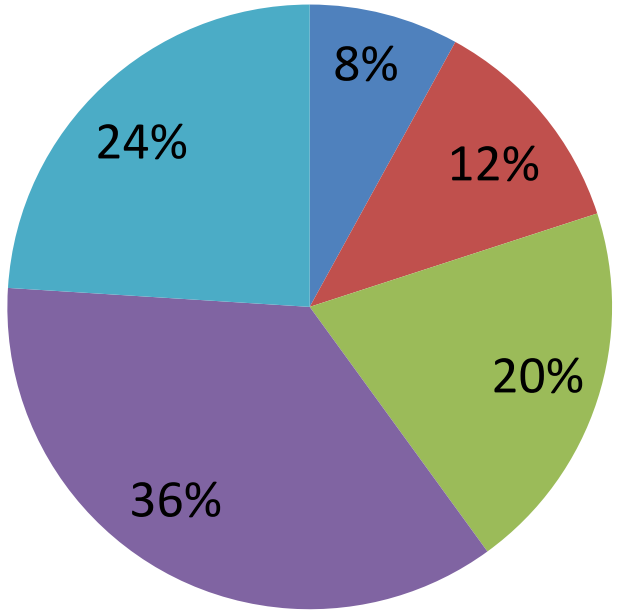


Results – Hotel Interviews: Sustainability



Results – Hotel Interviews: Food service operation

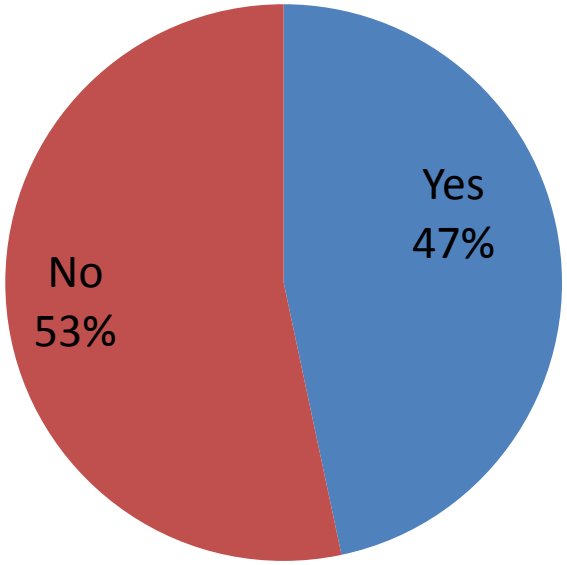
What do you do on site to minimize food waste disposal?



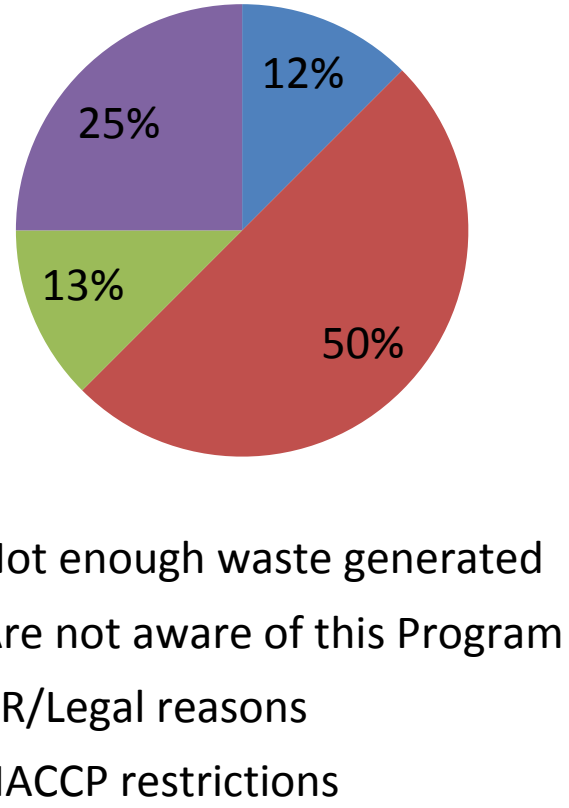
- Nothing
- Give staff leftovers
- Use leftovers in subsequent meals (directly or as ingredients)
- Composting
- Giving to charity

Results – Hotel Interviews: Food waste handling

Does your hotel(s) work with charities (e.g., Hifth an Ne'mah) to collect uneaten food?



If not, why not?



Which hotel attributes determine its approach? – Statistical analysis

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Fisher's Exact Statistical Test was used

		Variable 2				
Variable 1		Reaching ADTA targets	Signs in staff canteens	Using Leftovers	Charity	Composting
	Ownership	0.192	1	0.165	0.165	1
	HQ location	1	0.524	1	0.001	0.559
	Rating	0.772	1	0.748	0.266	0.221
	Hotel Size	0.587	1	0.245	0.558	0.565
	Sustainability Rating	0.352	1	0.45	0.494	1
	FWS rating	0.079	0.238	0.119	0.476	0.7

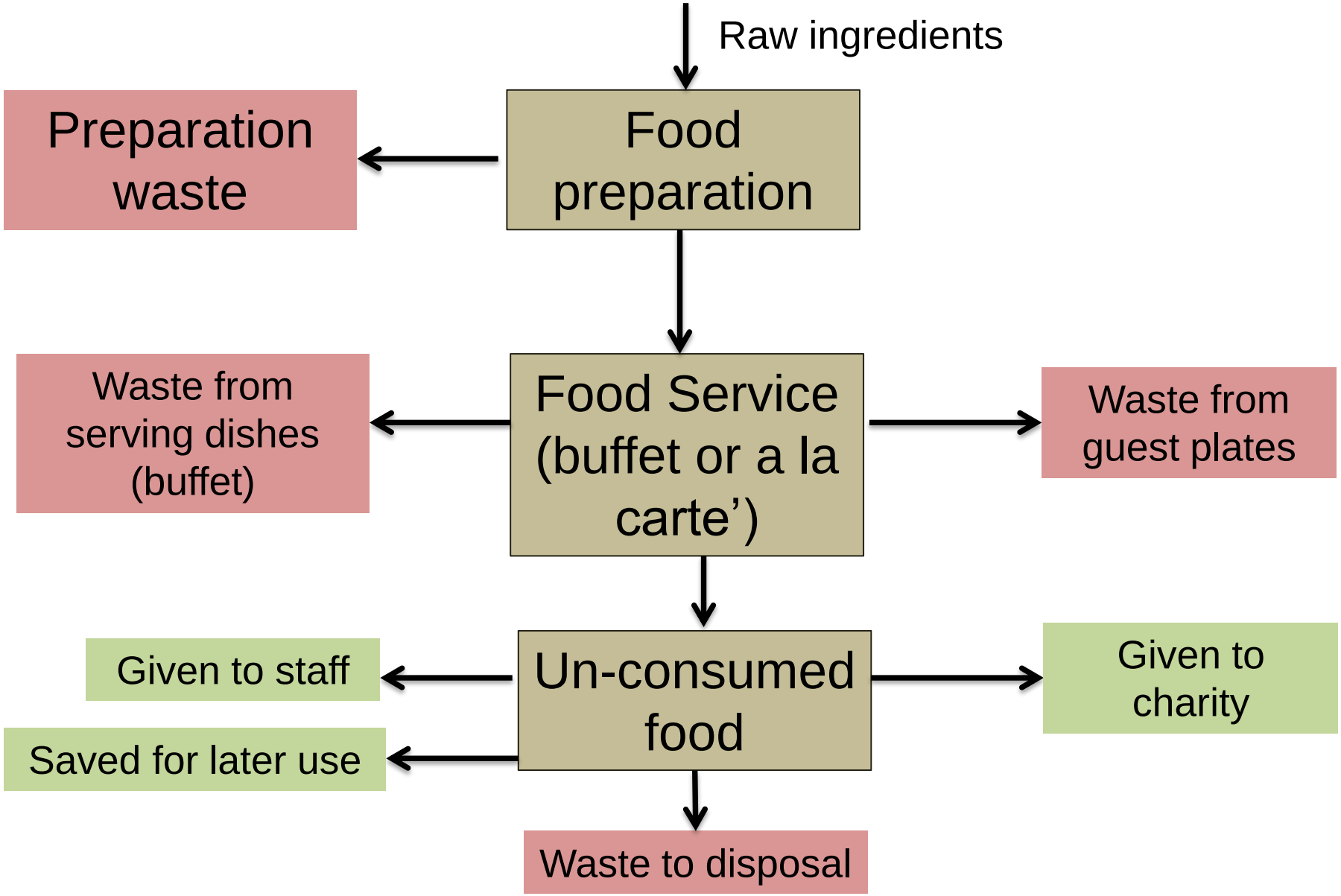
MFA results:

Tracing food waste in the chain.

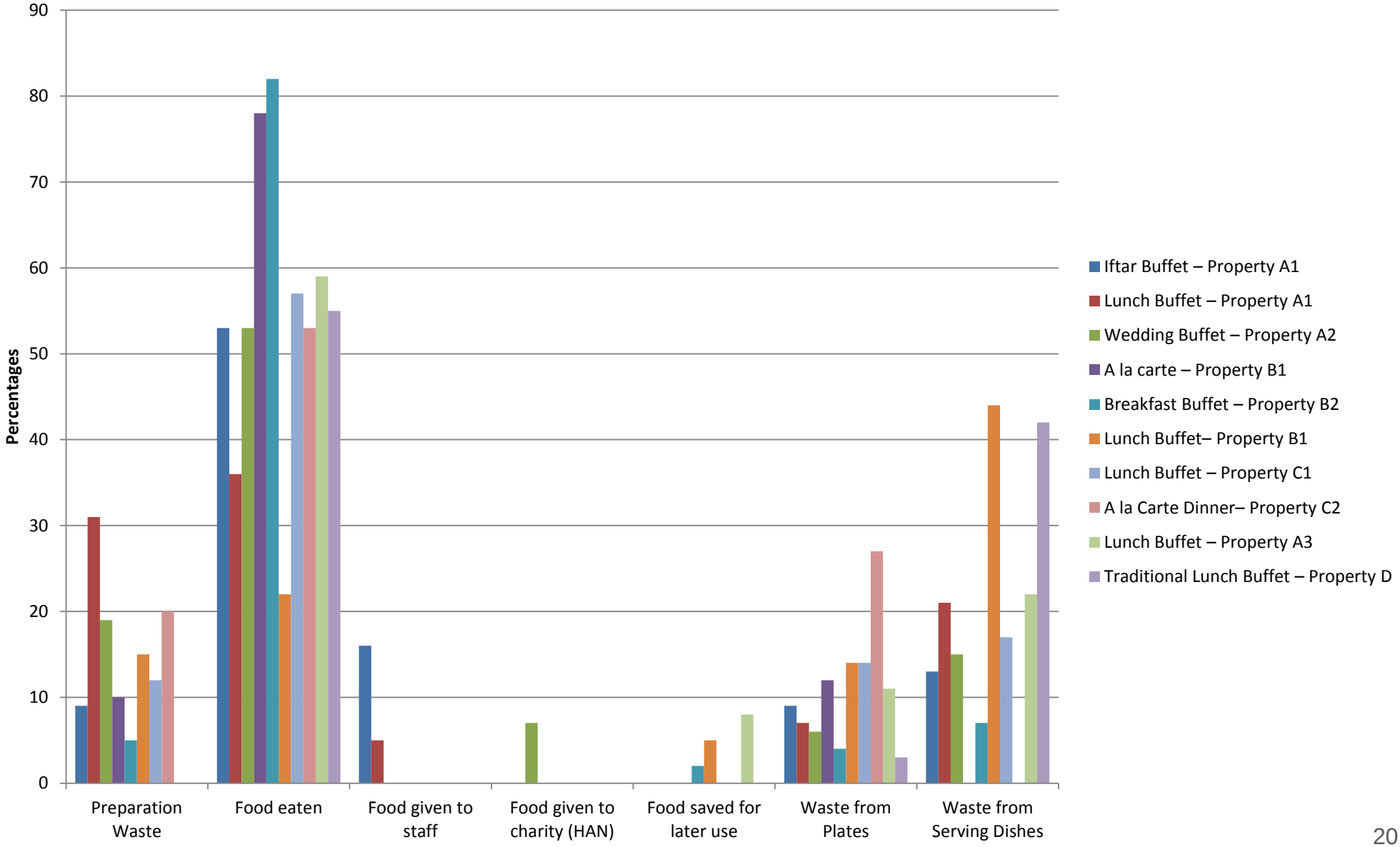
Results –Materials Flow Analysis (MFA)

- Amounts of food waste generated measured at the different stages of the food production and serving process
- Segregation of food waste from all other types of waste at every stage is ensured
- Post-consumer waste data always collected physically during and after the event
- Cooperation of the hotel staff was essential to the success of this study

Food service chain

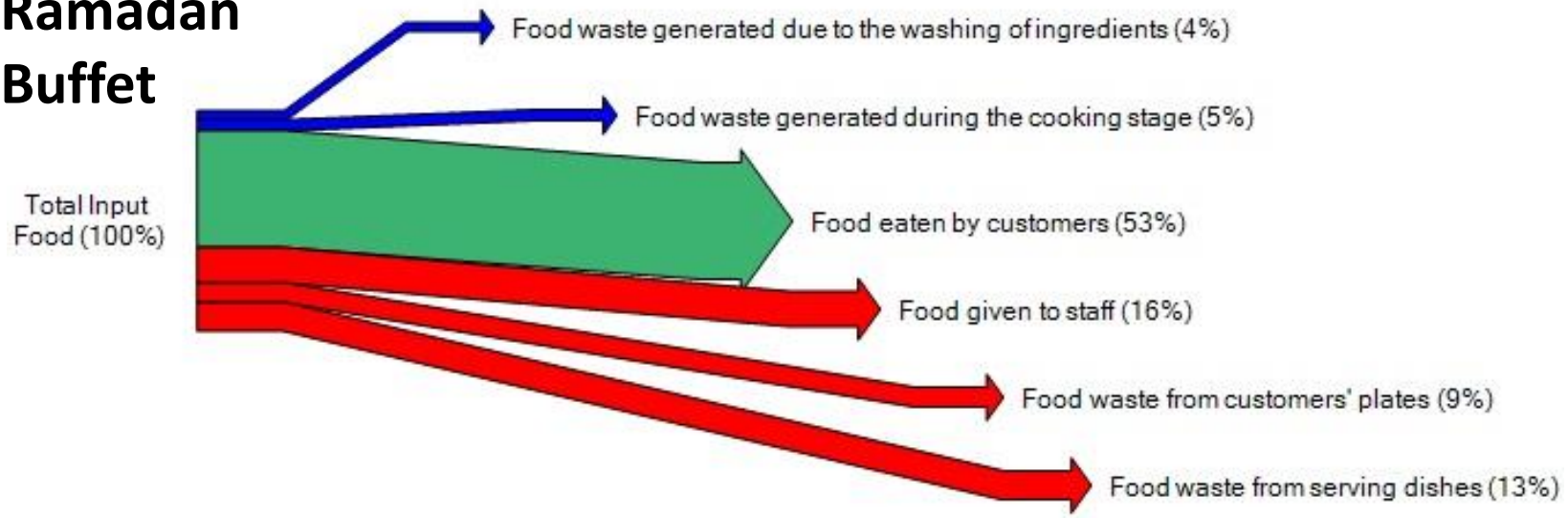


MFA Results- All



MFA Results- The "Ramadan" factor

Ramadan Buffet

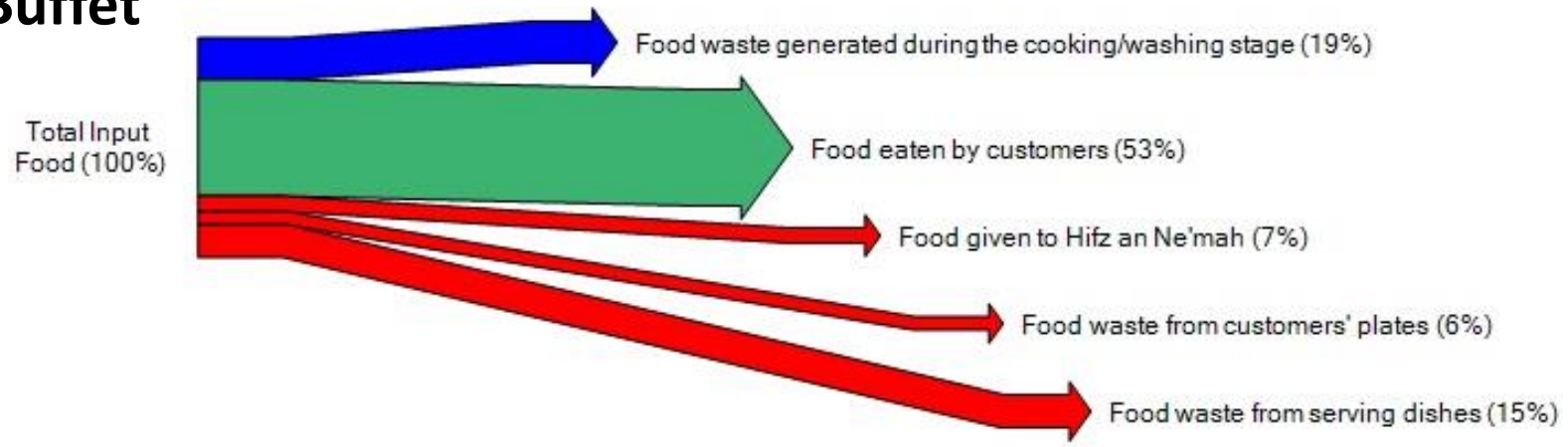


Lunch Buffet

Buffet during Ramadan	Lunch Buffet after Ramadan
48/50 pax.	16/30 pax.
0.999 kg/pax.	2.859 kg/pax.

MFA Results- The "wedding" factor

Wedding Buffet

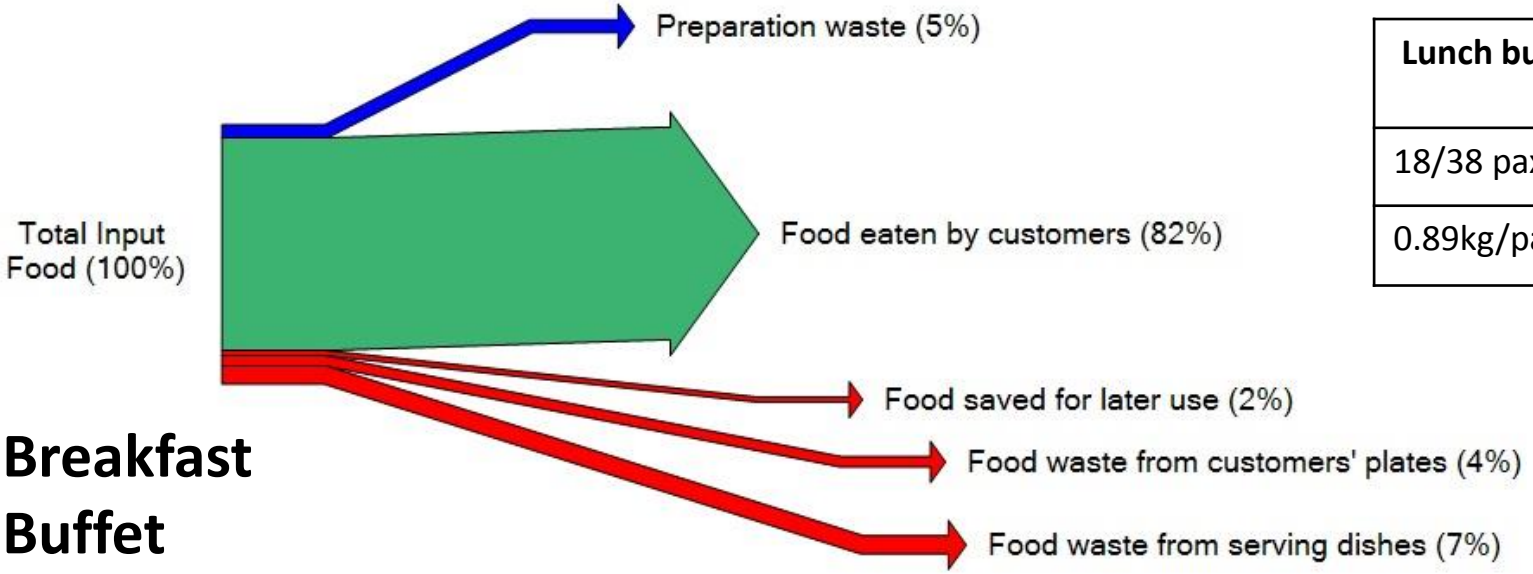


Lunch Buffet

Lunch Buffet	Wedding Buffet
16/30 pax.	300/400 pax.
2.859 kg/pax.	1.758 kg/pax.

MFA Results- The “breakfast” factor

Lunch buffet

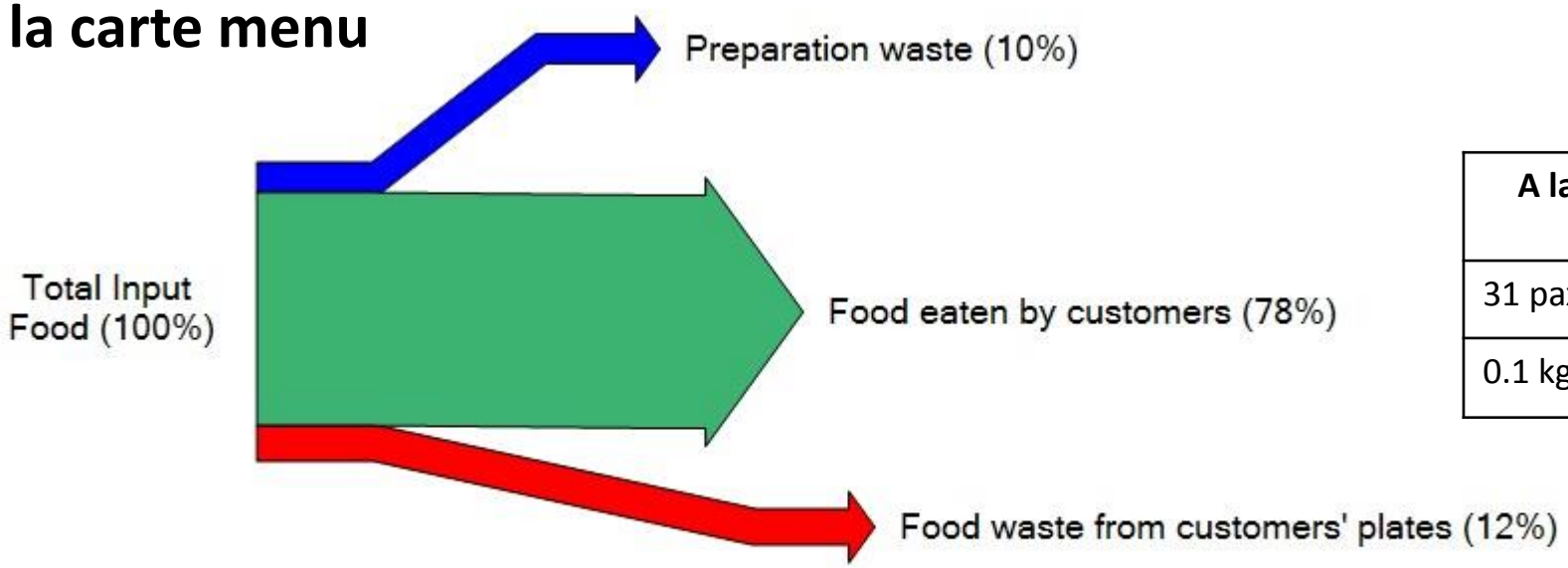


Breakfast Buffet

Lunch buffet	Breakfast Buffet
18/38 pax.	191/220 pax.
0.89kg/pax.	0.0953 kg/pax.

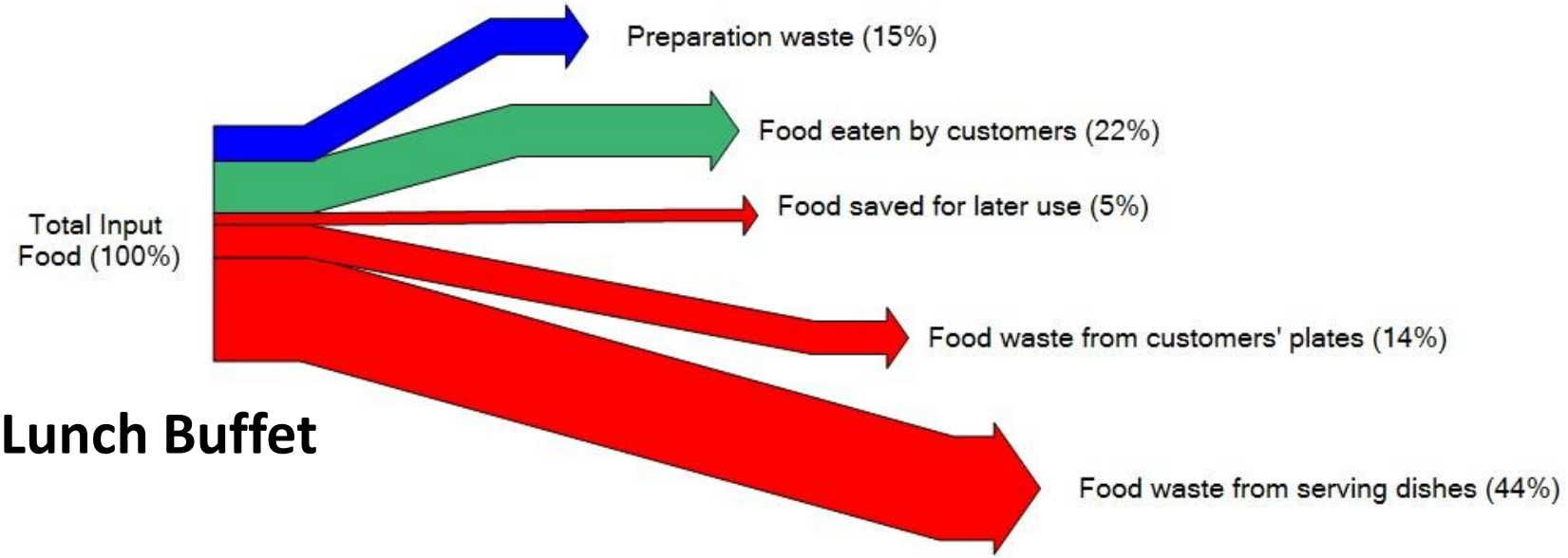
MFA Results- The “A la carte” factor

A la carte menu



A la carte	Lunch Buffet
31 pax.	18/38 pax.
0.1 kg/pax.	0.89kg/pax.

Lunch Buffet



Results – The FRESH Number

Food waste **R**ating for **E**vents vis-à-vis **S**ustainability in the **H**ospitality sector

$$FRESH\ No. = [normalized\ PCFW] \times [show - up\ indicator] \times [planning\ indicator] \times [portion\ size\ indicator] \times [economies\ of\ scale\ indicator] \times [reuse\ indicator]$$

Event Monitored	FRESH No.
Iftar Buffet – Property A1	1.487
Lunch Buffet – Property A1	0.596
Wedding Buffet – Property A2	0.894
A la carte – Property B1	0.099
Breakfast Buffet – Property B2	0.055
Lunch Buffet– Property B1	0.605
Lunch Buffet – Property C1	1.424
A la Carte Dinner– Property C2	0.093
Lunch Buffet – Property A3	2.459
Traditional Lunch Buffet – Property D	1.751

Results – The FRESH Number - Components

$$normalized\ PCFW = \left[\frac{PCFW}{actual\ number\ of\ guests\ that\ attended\ the\ event}\right]$$

$$show - up\ indicator\ = \left[\frac{actual\ number\ of\ guests}{expected\ number\ of\ guests}\right]$$

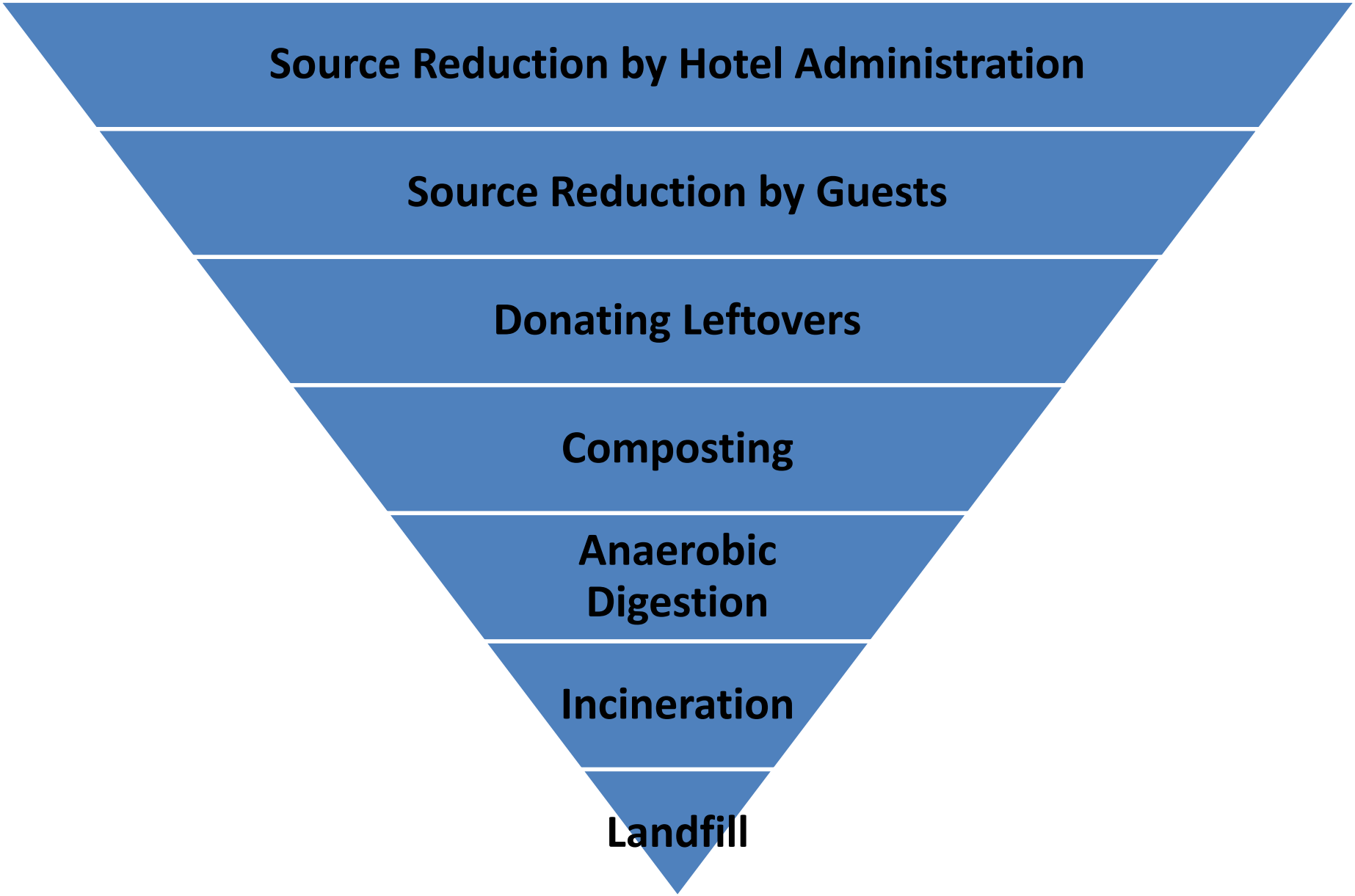
$$planning\ indicator\ = \left[\frac{number\ of\ guests\ cooked\ for}{expected\ number\ of\ guests}\right]$$

$$portion\ size\ indicator = \left[\frac{planned\ portion\ size\ ratio}{actual\ portion\ size\ ratio}\right]$$

$$economies\ of\ scale\ indicator = \left[1 - \left(\frac{1 - \frac{PCFW}{mass\ of\ ingredients}}{actual\ number\ of\ guests}\right)\right]^5$$

$$reuse\ indicator$$
$$= \left[1\right.$$

What's Next?


Source Reduction by Hotel Administration
Source Reduction by Guests
Donating Leftovers
Composting
Anaerobic Digestion
Incineration
Landfill

Potential solutions

Strategy	Pros	Cons
Using a menu engineering software	Can be seamlessly integrated into operations; No involvement of guests required.	May be difficult to implement depending on the original setup of the hotel system.
Decreasing plate sizes	Easy to implement.	May not be effective if unlimited number of plates provided.
Rewarding guests with hotel loyalty program points	Good for marketing; promotes the hotel name as a sustainable brand.	No incentive to not waste for those not part of the loyalty program.
Putting up cards on tables describing global food wastage statistics	A constant reminders to the guests; Relevant reminder for all international guests.	May be perceived as violating the luxurious 'experience' the hotel offers, especially for 5* hotels.
Fining guests	Most likely to be effective.	Must be implemented by law at all hotels to ensure the business of hotels not affected.
Decreasing buffet timings	Food out for less time while being served so leftovers easier to donate.	Hotels would end up with less guests during a smaller time period.

Thank You

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