

# Food supply, consumption & waste

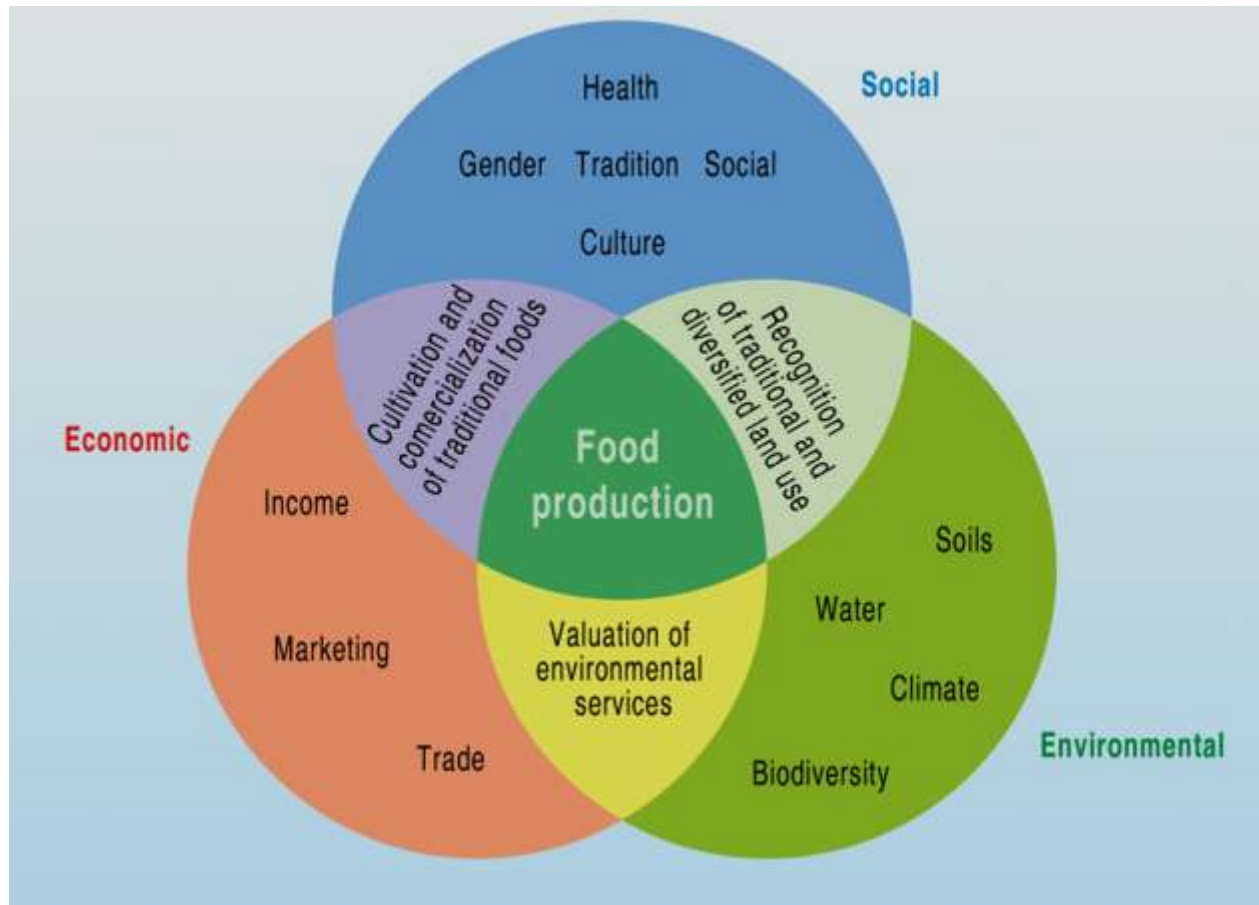
Dr Julian Parfitt  
September 7th 2010

## Linking the issues

- ❁ Food security
- ❁ UK's post-consumer food waste mountain
- ❁ Foresight: food waste goes global!
- ❁ Future food supply chain developments
- ❁ Conclusions & environmental significance



# Food Security



**Defra**



# Food security issues

- ❁ **Availability of food/stability** (how much and how reliable and risk of losing access – climate)
- ❁ **Access** to food(transport and distribution as well as legal political, economic and social)
- ❁ **Affordability** (price people can afford)
- ❁ **Quality** (nutrition/diet/health)



## UK self sufficiency

Date	Sufficiency (%)
Pre-1750	100
1750-1830	95-100
1870s	60
1914	40
1930s	30-40
1950s	40-50
1980s	70
2000s	58

• Defra (2006) *Food Security and the UK*



## Food bought



15.6kg

Per household per week

## Fate of bought food



Food consumed?



Other outlets?



Edible discarded?



Inedible discarded?

## Household food bought and wasted

Can this  
be  
correct?



5kg?

Per household per week

into MSW

Avoidable food and drink waste = 5.3 million tonnes (£12.2 billion)

**'left & unused'**

Food and drink thrown away either completely untouched  
or opened and started but not finished  
= 2.9 million tonnes (£6.7 billion)



**Cook, prepare or serve too much**

= 2.2 million tonnes (£4.8 billion)

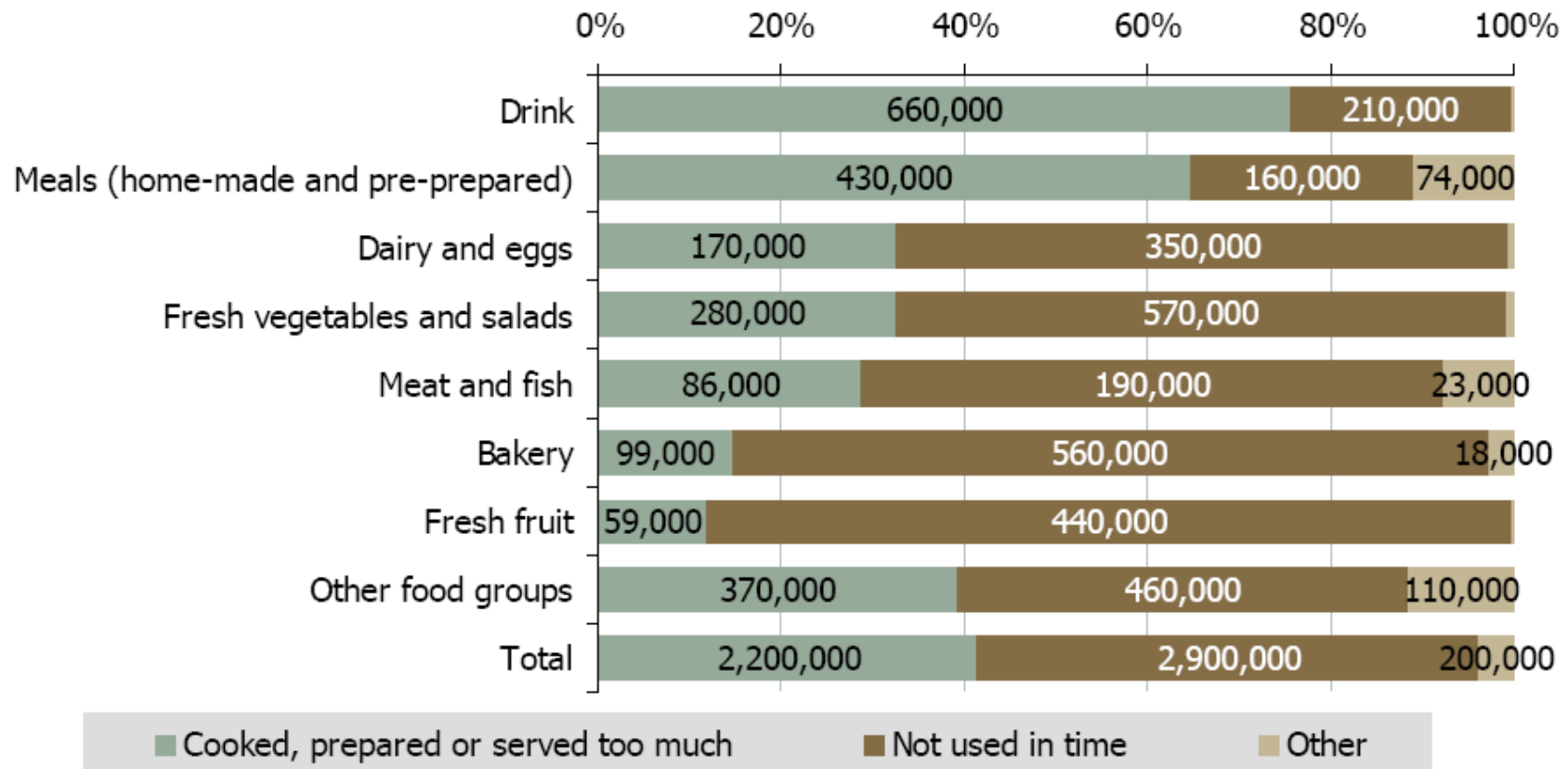
**Other**

= 0.2 million tonnes (£0.7 billion)





## Weight of avoidable food and drink waste by food group, split by reason for disposal



*Figures within bars state waste in tonnes per year*







84% of us  
believe we  
throw **none or  
hardly any food**  
away!





Is the UK unique with respect to  
levels of post-consumer food  
waste?



## Foresight Global Food and Farming Futures

- ❁ Population growth: 9 billion by 2050?
- ❁ Growing demand for processed food, meat, fish & dairy
- ❁ Greater competition for land, water, energy, nutrients
- ❁ Threat of climate change & resilience of global food supply chain



## Foresight Global Food and Farming Futures

- ❁ Food Waste Driver Review
- ❁ International Expert Forum on Food Waste Reduction (February 2010)
- ❁ Interviews with FSC stakeholders



## What is food waste?

- 1. Food waste definition ('waste' focussed):
- 2. Food waste definition ('waste', animal feed and by-products):
- 3. Food waste definition (as 1 and 2, but including 'over-nutrition'):



# Food supply chain & definition of food waste



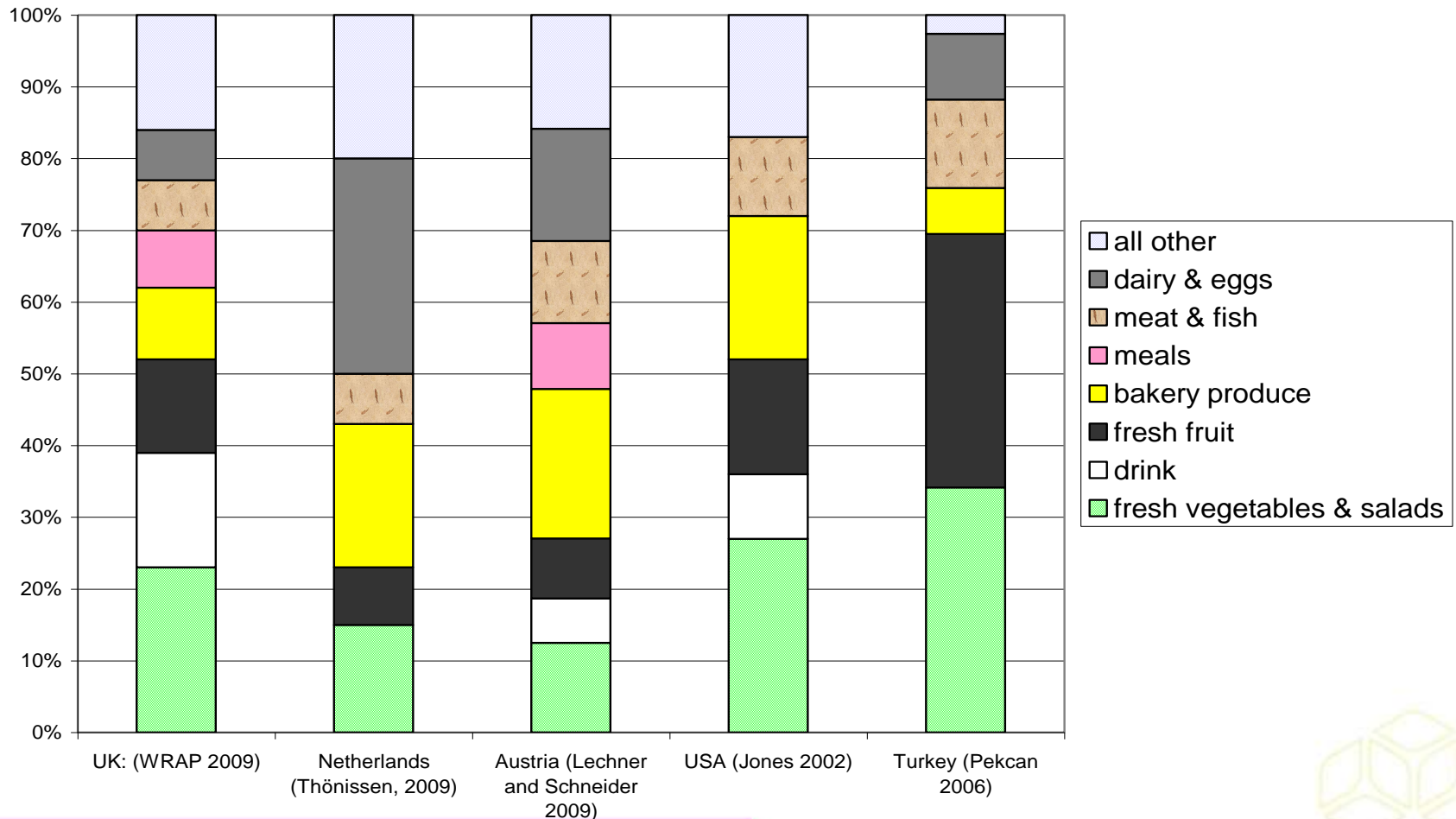
**In Field &  
Harvesting  
Losses,  
  
Spillage,  
Spoilage,  
  
Out-grades**

**Post-harvest  
Losses,  
  
Spillage,  
Spoilage,  
  
Out-grades**

**Loss in Process,  
Spillage,  
Spoilage,  
  
Contamination  
  
Off-spec  
production  
  
By-products**

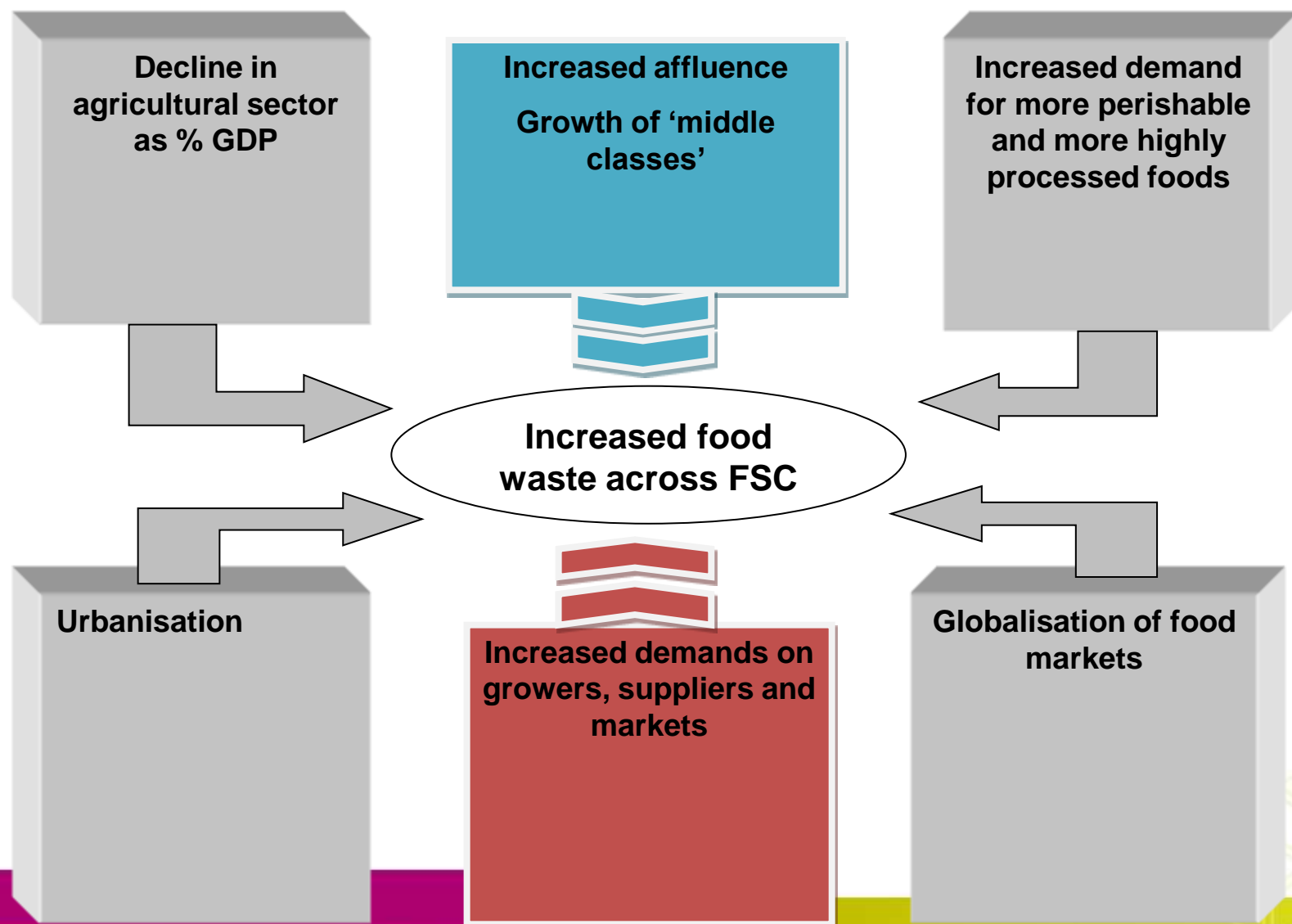
**Food waste:  
  
Avoidable &  
  
Unavoidable  
Food Waste**

# Summary of household food waste across five countries





# Factors driving global food waste

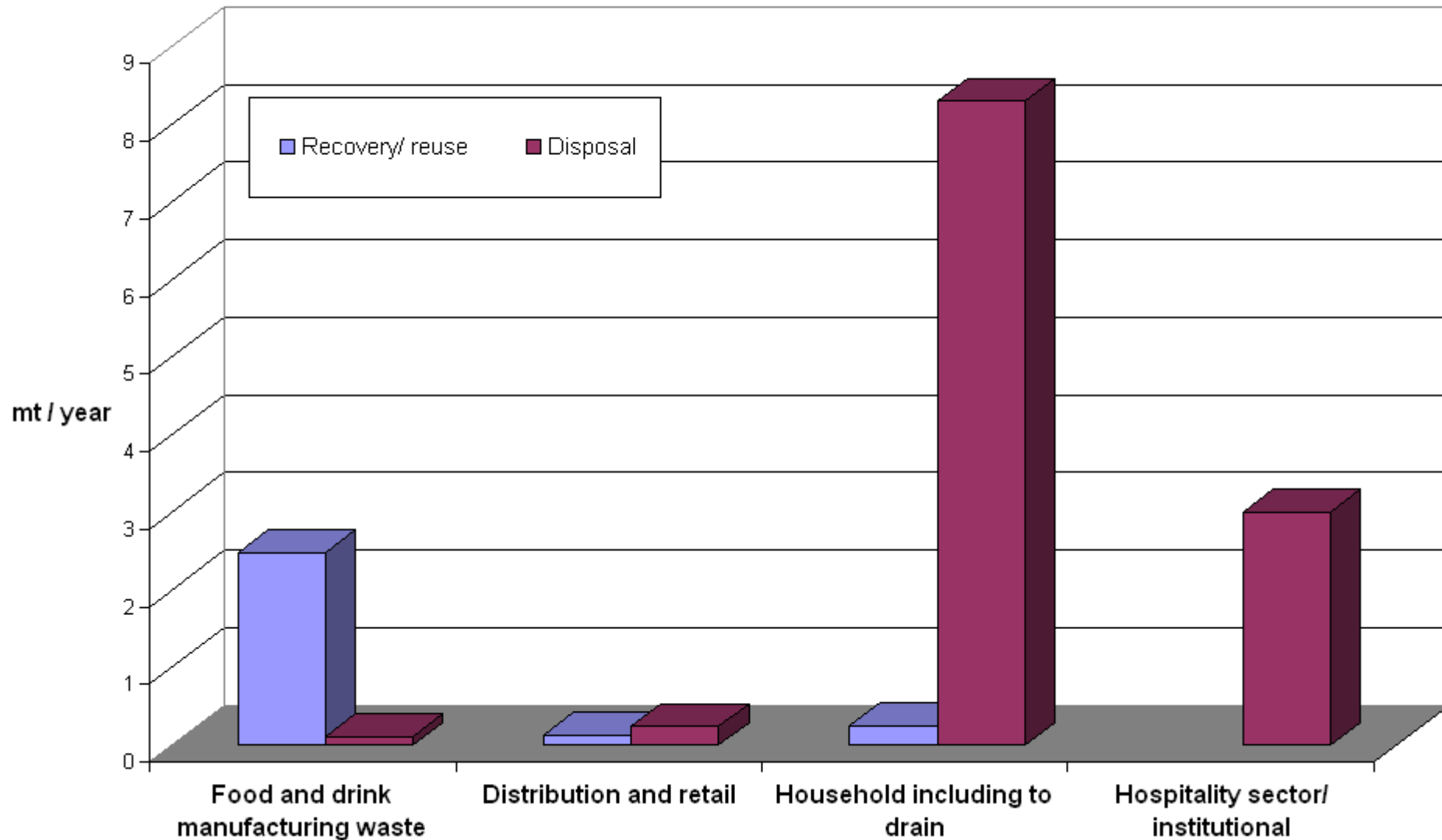


## Food waste: global summary

- No credible estimates, but often quoted: '30-40% global food supply wasted'
- Developing countries: high losses due to poor infrastructure
- Traditional/ small scale agriculture: losses over-estimated?
- Industrialised countries: 'inadvertent losses' post-harvest losses low
  - Out-grades for FFV: high?
  - Post-consumer losses: very significant

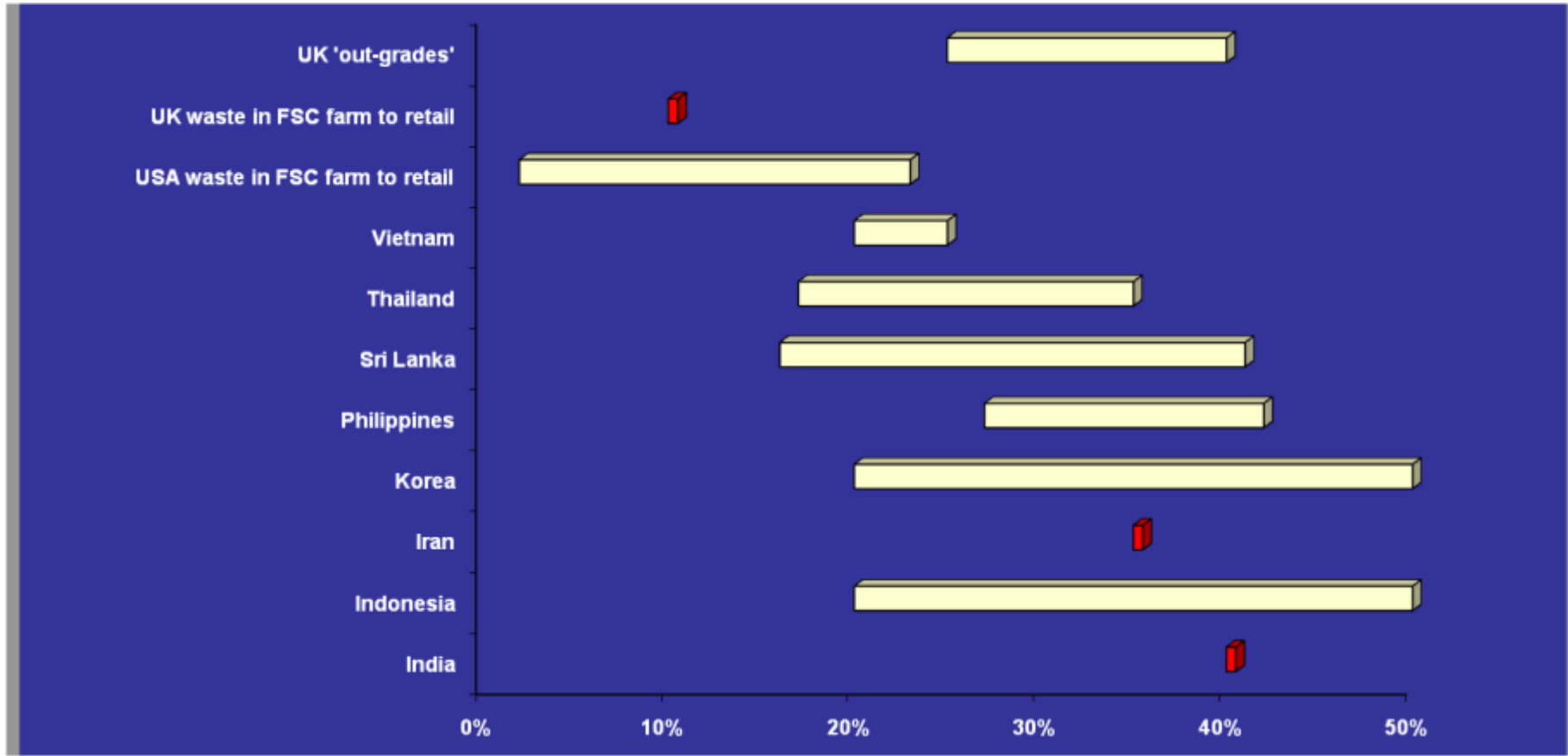


# Profile of food waste: UK (WRAP 2010)



# Global fresh fruit & vegetables: post-harvest losses

% loss, range of values



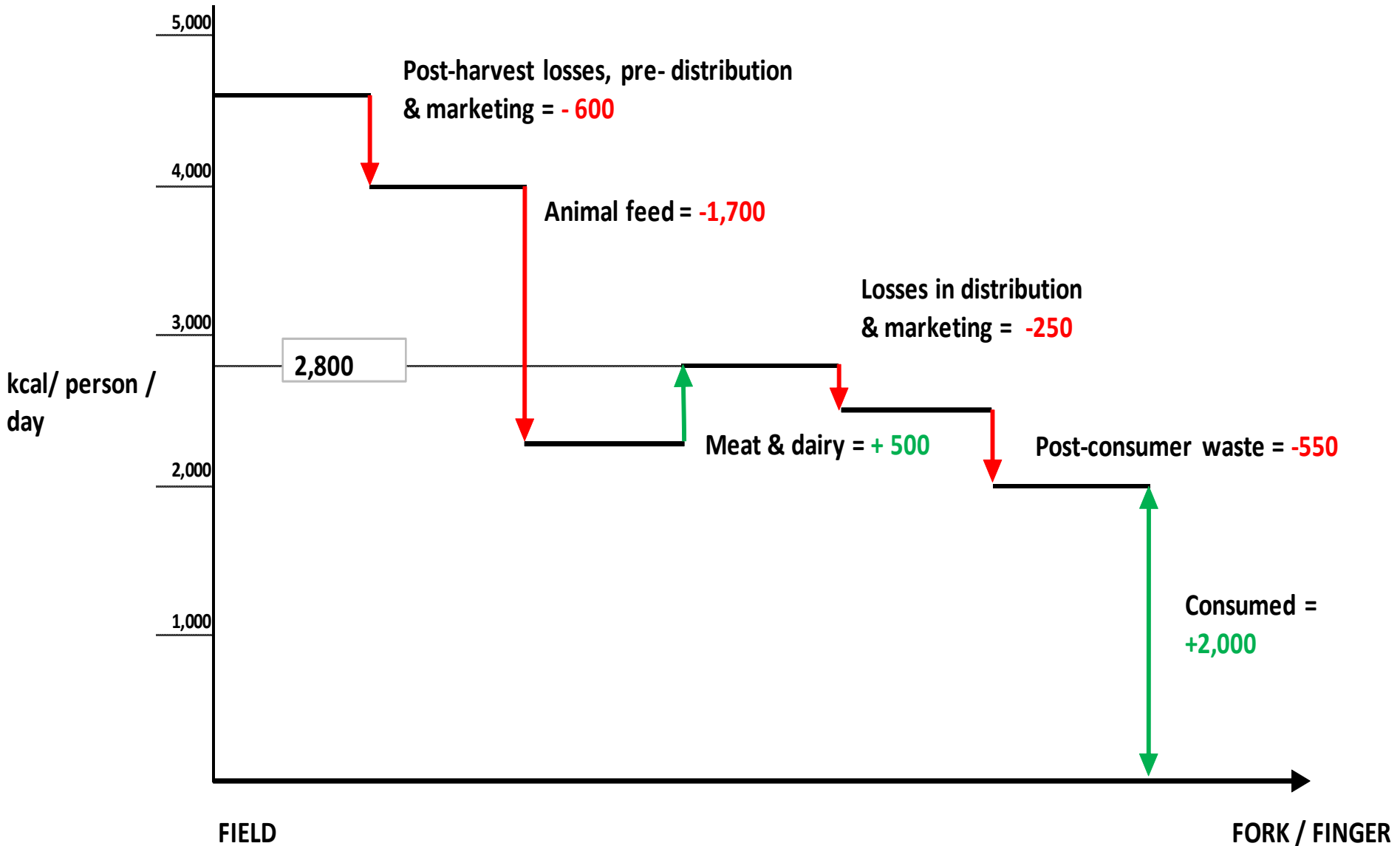
## Economies in transition?

- Growing post-consumer food waste
  - Brazil, China, but less India
- Different patterns of FSC development
- Growth of supermarkets, decline in traditional wholesale & wet markets
- Some transitional FSC models more resource efficient than others:
  - China inter-regional FSCs v India



# Losses in global food supply from field to fork

(adapted from Smil, Parfitt, Barthel & Macnaughton 2010)



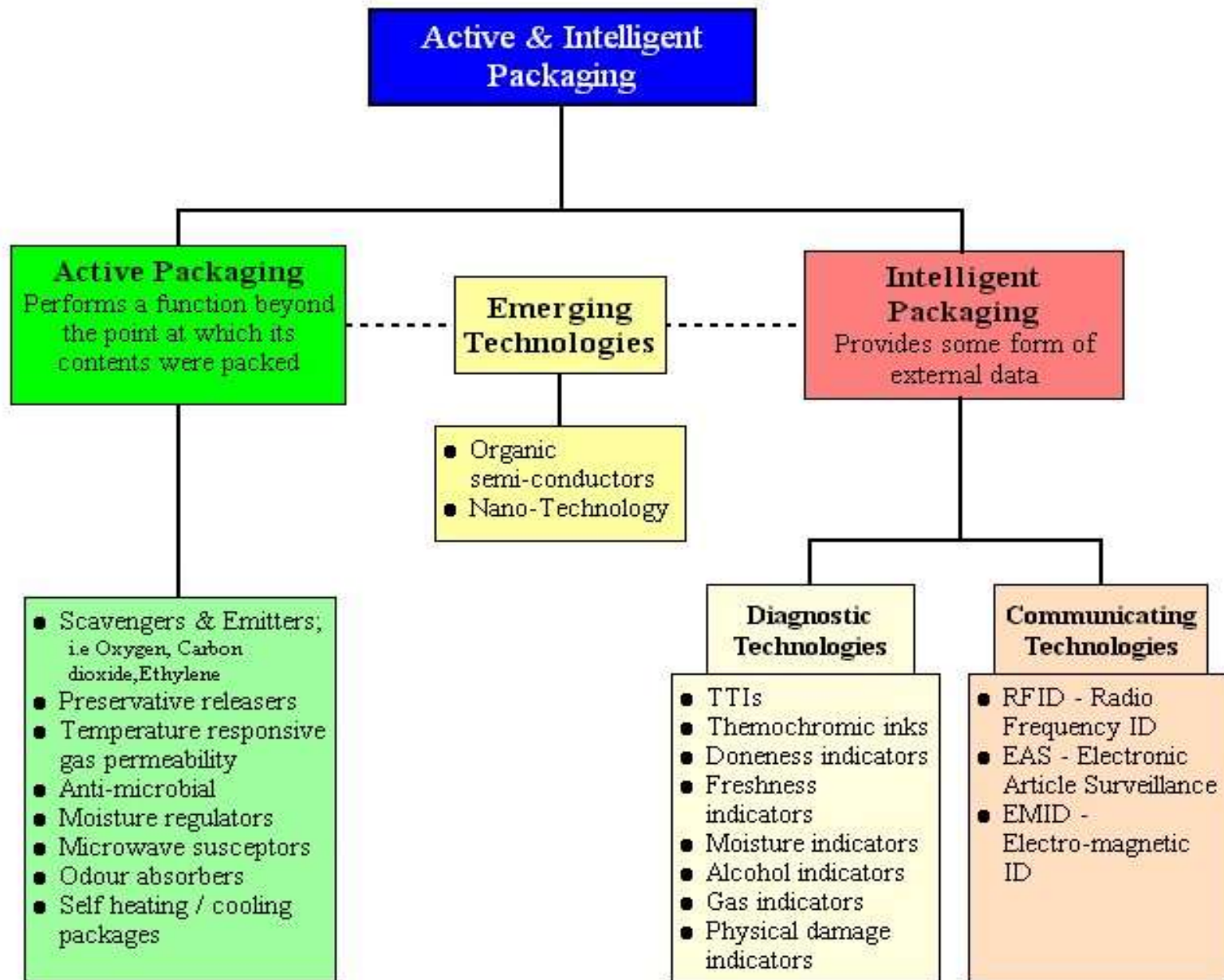
## Global Food Waste Reduction Forum: Actions to reduce retail waste

- ❁ At present there is no financial incentive for retailers to reduce current waste levels in either 'BRIC' or OECD countries
- ❁ Economic drivers behind producing and wasting more food must be reversed
- ❁ Better demand/ supply forecasting by suppliers & retailers to reduce waste
- ❁ Tackling date labelling confusion
- ❁ Whole crop purchasing policies





# Future developments in food packaging technologies?



## Innovations to reduce food waste in the home?

- ❁ Smart domestic kitchen technologies
- ❁ Optimal nutritional mix for each family member
- ❁ Electronic 'master chef' checks cross-references products in stock with food preferences and nutrition targets
- ❁ Food automatically cooked
- ❁ Used products automatically re-ordered



## Forum's forward view to 2050

- ✿ Increased demand for food globally, will make food prices rise, which could act as an incentive to reduce food waste at all stages of the FSC.
- ✿ Increasing fuel, labour and carbon emission costs will also contribute to the increased cost of food.
- ✿ An increased protectionism and a trend towards the purchase of local produce within 'BRIC' countries. Overall, fewer trade barriers and access to global food markets will open up.



## Future of supply food supply chain

- ❁ Increasing choice & increase in the scale of food supply will create larger format supermarkets with enormous waste management challenges.
- ❁ Advances in demand / supply forecasting in OECD and 'BRIC' countries will lead to reduced waste caused by over-ordering, poor stock control and logistical management errors.
- ❁ The nature of the retail supply chain will change, with ++internet sales and more centralized (and possibly shared) distribution systems, resulting in less waste.



## Future post-consumer food waste

- ❁ Health concerns relating to 'over-nutrition' will become more acute in both OECD and 'BRIC' countries, putting pressure on governments to adopt less *laissez faire* policies
- ❁ Better portioning in household convenience foods and hospitality sector
- ❁ Any fall in demand for meat and dairy would contribute towards lower environmental pressures on global agricultural production.
- ❁ But....post-consumer food waste already rapidly approaching OECD levels in Brazil and urban China



## Conclusions

- ✿ UK food supply chain inextricably linked to global markets
- ✿ Scale of global food waste represents a human and environmental disaster
- ✿ Reduction of food waste is part of improved food security, without the need for increased production/ yield
- ✿ More research on post-harvest losses:
  - Less than 5% of global agricultural research is directed at reducing post-harvest losses



## Future: feeding 9 billion by 2050?

- Concern over extra pressures & losses in BRIC FSCs:
- Need to improve post-harvest infrastructure
- Proper sequencing of FSC development
- Early action on post-consumer food waste





Thank you

