

Global Food Waste Not, Want Not

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- Overview

- Towards the peak
- Increased demand
- Food-Water-Energy Nexus
- Engineering the basics
- Food – the good news
- Waste and loss
- What needs to change?
- Conclusions



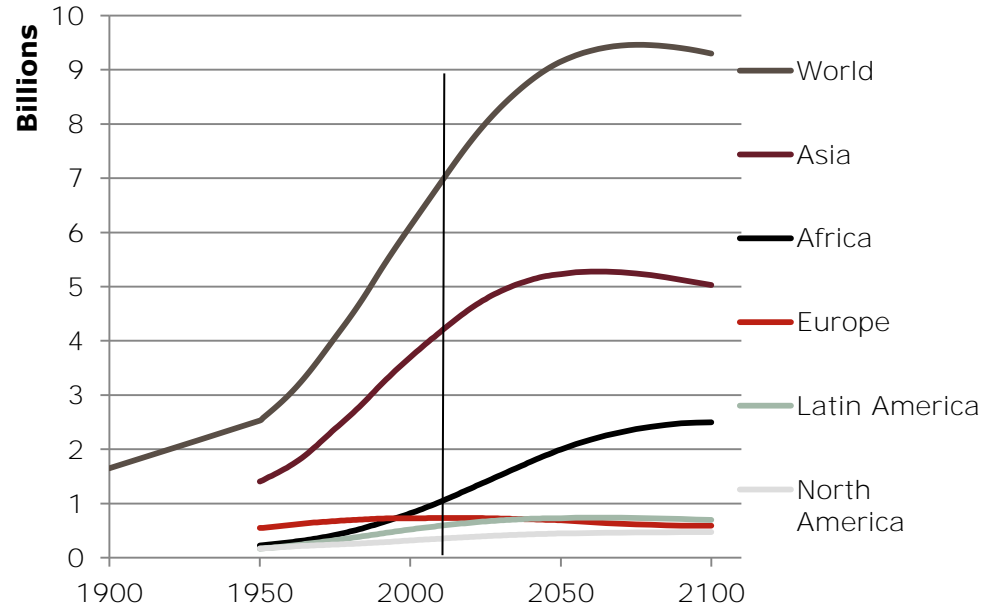
More people

• 21st Century growth

- Increasing by c. 75 million/yr up to 2016 then slows
- Additional 2.3 billion by 2050
- Peak at 9.5 billion in 2075

• Regional variation

- European, North American, Australasian and Japanese close to stable and/or decline
- Asia currently has half world total but peaks at 5.3bn in 2065
- Africa expands most relatively, more than doubling by 2100



Source: United Nations 2009, Adapted from United Nations 2004

Increased global demand

- Basic needs
 - Food – 70% increase in agricultural demand by 2050
 - Water – global consumption up 30% by 2030
 - Shelter – 75% of people urban by 2050 (3 billion more)
- Supported by
 - Energy – 40% demand increase by 2035, double by 2050
- Changing tastes
 - Most populous region becoming more affluent, fuelling unprecedented demand for goods and dietary changes
- Exacerbated by climate change & geopolitical tension
 - Extreme weather, droughts, floods, sea level rise
 - Finite resources and finite usable land

The Food-Water-Energy Nexus

- The defining challenge of the 21st Century:

<http://www.youtube.com/watch?v=uCAO8yga5NM>



• Global Food: Waste Not, Want Not

- Demographic change in 21st Century presents mankind with wide-ranging social, economic, environmental and political issues
- How to help ensure a sustainable future for all?
- FOOD is KEY and Developing World is KEY



• Global Food: The Question

- How much additional food do we really NEED to deliver?
- Answer involved our Members and Fellows in professional engineering practice around the world

Food – the good news

- Answer – maybe not so much
 - Total tonnage of around 4 billion (bn) produced today
 - Estimated 30-50% wasted and lost (1.2 – 2 bn tonnes)
 - Opportunity – reduce and help feed future population
 - Basic maths:
 - Feeding 6 bn people on 2 – 2.8 bn tonnes
 - Feed 9 - 10 bn on a little more than 4 bn tonnes
 - Radically reduce pressure on water, energy, land-use



Waste and loss – where?

- Food Loss – developing and emerging economies
 - Poor harvesting techniques, inadequately engineered storage and transportation infrastructure
- Waste – mature developed economies
 - Retailer practices encouraging over purchasing
 - Supermarket contracts requiring cosmetic perfection
 - Consumer behaviour in the home and marketplace
 - Hospitality industry procurement practices



Food loss

- Poor harvesting and inadequate infrastructure
 - India / Sub-Saharan Africa 35% - 50% fruit & veg
 - SE Asia typically 35 – 80% rice (China 45%)
 - Eastern Europe 25 – 50% grain (Australia 0.75%)
 - 40% losses result from poorly engineered storage
 - ~21 million tonnes of wheat annually in India
 - ~3.2 million tonnes annually in Pakistan



The unique opportunity

- Rapidly developing world
 - Infrastructure – minimize losses and maintain
 - Dietary preferences – build on traditions and culture
 - Consumer behaviour – avoid loss of perceived value
- Emerging economies
 - Population demographics – 21st century growth focus
 - New infrastructure – transfer sustainable practice and localised cleantech

Facilitate a **Cleantech 'Leapfrog'** over the resource-hungry unsustainable phase of industrialisation; avoid our previous failures and mistakes

- Retailers

- 30% of harvest wasted before reaching marketplace
- Crop rejections; 20 – 30% UK/USA, up to 40% Kenya
- Sales promotion encouraging over purchasing

- Consumers

- 30 – 50% of what's purchased is wasted at home

- Hospitality industry

- 1/3 of food procured for industry is thrown-away

What needs to change?

- International

- Enable, facilitate and broker transfer of sustainable engineering practice knowledge and localised technology

- National

- Reclaim national food policy
- Raise public awareness of food waste issues
- Deploy sustainable infrastructure, training and management

- Retailers

- Reform procurement contracts and promotional practices
- Audit supply chains for food loss reduction and elimination
- Assist public reconnect with culinary and food skills

- Citizens

- Put pressure on politicians to change retail practices
- Actively re-engage with food and food value

- Reducing food waste and losses could significantly help meet the challenges of food security for 9.5bn people by late 21st Century.
- Unique opportunity exists to help newly developing **world 'leapfrog' the resource-hungry unsustainable** phase of industrialisation; avoid our failures and mistakes.
- Finance, politics, regulation, ethics, access and ownership are the key barriers to meeting the challenge.

Questions?

