Global Food

Waste Not, Want Not

Tim Fox

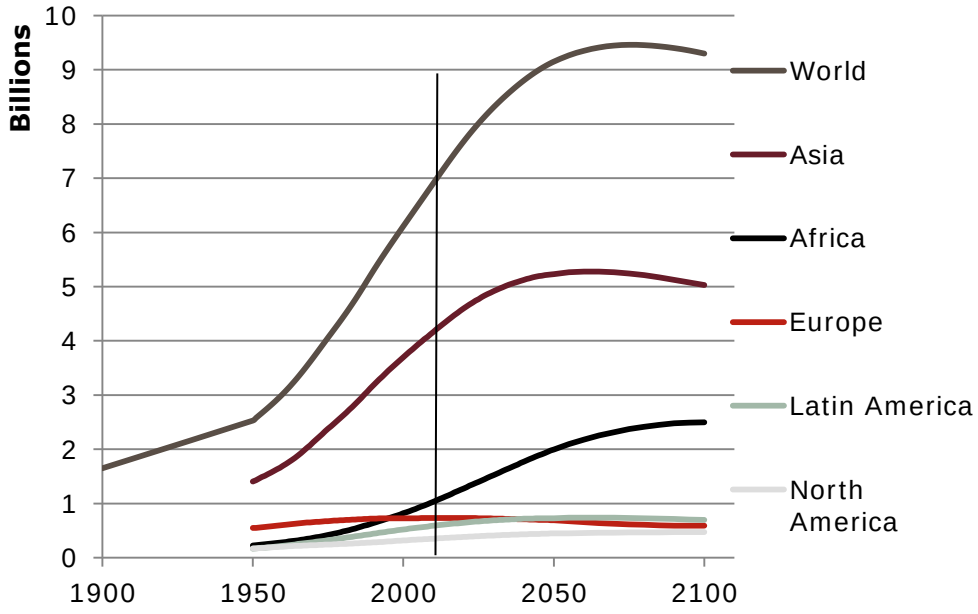
Head of Energy and Environment
Institution of Mechanical Engineers

Our planet under pressure

- 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

Engineering the basics

- 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

Food waste

- 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

Conclusions

- 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.

Thank you

Questions?