



Food and Climate Change

From plough to plate to bin and beyond:
exploring the food chain's contribution to the
greenhouse gas emissions and the options
for emissions reduction

British Council, Vienna, 7th September 2005

This presentation

1. GHGs – what does food contribute?
2. Where are the emission hotspots?
3. What do we know about ways to reduce food related greenhouse gas emissions?
4. How does the Food Climate Research Network engage with the issue?

1. Food and GHGs: the problem

- EU level analysis: 31% GHG emissions
- Food in the UK: 22% GHG emissions
- Dutch study: 15% carbon emissions
- US study: 10% total energy use

2. The hotspots: where are they?

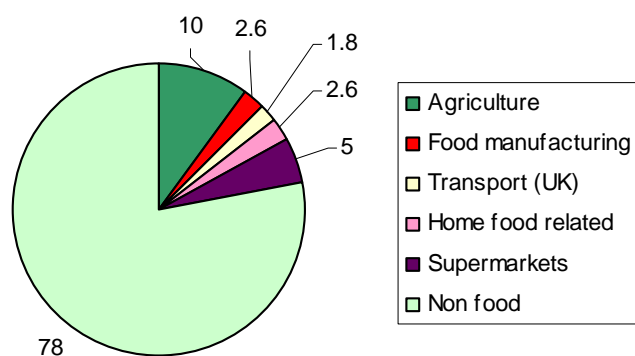
Two ways of approaching the question:

- a. By food life cycle
- b. By food type

a. Hotspots by food life cycle

- Agricultural production
- Processing and manufacturing
- Cold storage
- Transport and distribution
- Packaging
- Home consumption
- Waste

Food life cycle GHG impacts



But the hotspots vary by food

- | | |
|----------------|---|
| 1. Agriculture | 1. Meat & dairy; glasshouse veg |
| 2. Manufacture | 2. Bread baking (unless driving to store) |
| 3. Storage | 3. Ice cream; frozen peas |
| 4. Transport | 4. Cherries |
| 5. Cooking | 5. Baked potato; pasta, tea, coffee |
| 6. Packaging | 6. Can of beer |
| 7. Waste | 7. 11% food is wasted |

And there are many complexities...

- Relative contribution of a life stage may be small but large in absolute terms – eg. transport for ketchup vs fresh tomatoes
- Specific behaviours vary – farmer fertiliser applications; you in your kitchen
- No 'absolutes' – sliding scales - relative importance of a life stage varies according to technology type, exact distance travelled etc.
- What are you measuring (KG? Protein? Vitamins? Kcal? Pleasure?)
- What are the system boundaries – what are you including?

What about food miles? Is nearer better?

- **Juice:** not necessarily
- **Apples:** maybe
- **General rules of thumb?**
 - * Efficiency of production / distribution system
 - * Seasonality
 - * Within Europe rather than beyond
- **The solvability question:** best decision now may be less good in five years (horticulture?)
- **Localism:** other non GHG issues to consider
- **Food miles are growing:** 12% CO₂ rise in 10 yrs

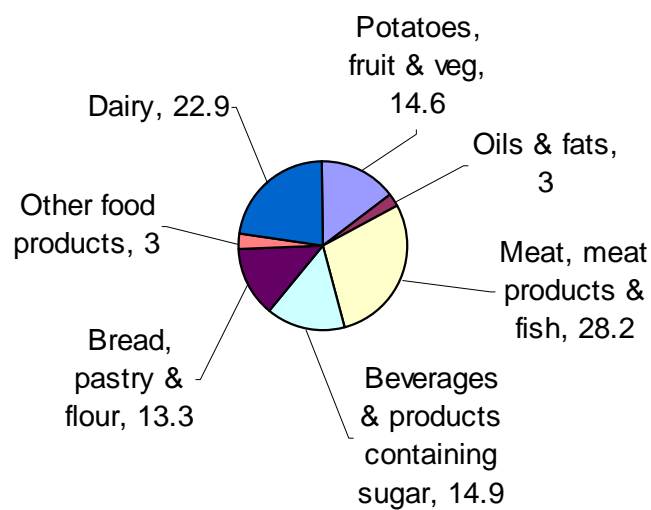
Flying is always a bad idea!

- While < 1% food t/km is air freighted it = 11% food transport CO₂e emissions
- **Fruit and veg:** 6% non-EU imports come by air accounting for 81% non EU fruit and veg import emissions
- Growth in air freighted fruit & veg is faster than overall growth in f&v imports
- **Food is the fastest growing air freighted commodity**

b. Hotspots by food sector

- It's not just food miles / refrigeration / cooking
- It's also about the balance of foods on our plate:
 - * Meat & dairy
 - * Cereals and carbohydrates
 - * Fruit and vegetables
 - * Fats
 - * Sugars
 - * Beverages

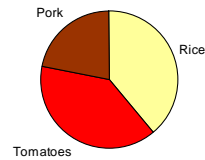
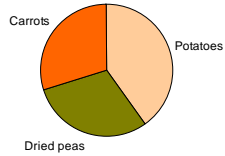
Contribution of food groups to Dutch GHG emissions KG/CO₂e



The Balance of Good Health



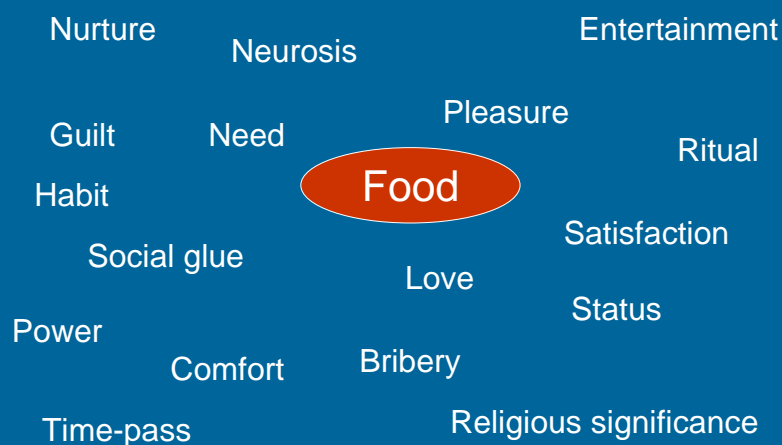
Two balanced meals... A ninefold GHG difference



A few questions:

- Meat & dairy = 13.5% total EU GHG emissions: could we get our protein / iron / calcium in other ways? (NB: not all veg diets are lower in GHGs)
- What about sweets, confectionery and alcohol? Are they 'empty' calories and empty GHGs? Do we 'need' these foods?
- But these are very difficult to answer...

Food and consumers?



Influenced by wider forces

- Price / affordability
- Availability
- Time – work / 'stressed leisure' syndrome
- Culture, social & family expectations, norms, aspirations
- Knowledge, information, fashions & beliefs (education, media, marketing)
- Demographic changes: ageing population, single person society, wealth
- Technological changes
- Season
- Tastes and habits

3. So how do we reduce food GHGs?

- Two and a half approaches?
 - a. Improve the technology
 - b. Change lifestyles
 - c. Explore the relationship between the two
- Governments mainly techno-oriented
- But some consumer related activity

How far will technology get you?

- Lots of potential
- CHP and renewables (eg. horticulture)
- Plant and animal breeding
- Cutting waste
- Energy efficiency (industrial & domestic)
- Cleaner vehicles / better logistics
- But what happens when the easy wins have been won?

Changing consumer behaviour

It's complicated:

- Different types of consumer
- We're different people at different times
- We're individuals and social beings
- Knowledge \neq action
- Is calling us consumers part of the problem?

Who is to distinguish between needs and wants?

How far down do we dig?

For example: food waste

- Wasted food = wasted CO₂ + CH₄
- 11% food bought is not eaten
- US study = 50% food lost along chain
- **The technology approach:** Improve packaging, portion size (no leftovers), food life span to match our lifestyles?
- **The behaviour approach:** Plan your meals, use your leftovers, compost scraps, shared living?



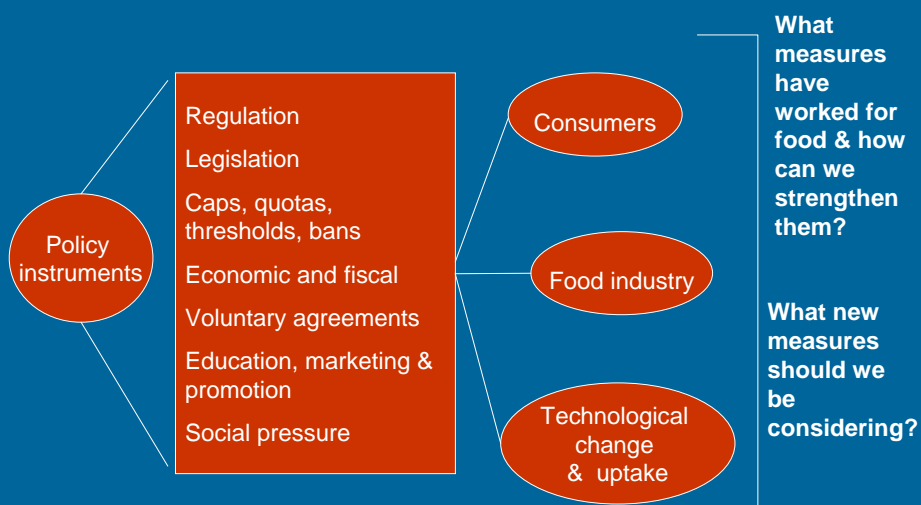
2 1/2th approach: technology and behaviour interact

Eg: the ready meal vs home cooking

- Ready meal:
 - * No trimmings or scraps: less waste
 - * Production stage scraps can be used for animal feed
 - * No pckgng for individual ingredients: less pckgng
 - * More efficient industrial ovens
 - * Only transport what is eaten: less transport

But: complex multi-ingredient, elaborately prepared food reliant on long supply chains and refrigeration becomes the norm

What are the policy options?



We also need to think about the synergies and conflicts...

- Nutritional health?
- Pesticide reduction?
- Economic development?
- Food security
- Animal welfare?
- Biodiversity?
- Other land use demands – eg. biofuels?

How are we doing?

- 6% cut in GHG from EU agriculture in 10 yrs
- 5% cut in EU food manufacturing
- UK cold storage 7.5% cut over 10 yrs
- Home food related?
- Transport – growth despite improved efficiency
- UK food industry – doing worse than other manufacturing sectors
- **We need to do much more**

The Food Climate Research Network

An interdisciplinary, intersectoral initiative set up to research & promote ways of achieving absolute reductions in GHG emissions from the whole UK food chain

- UK research council funded – 3 years
- Based at University of Surrey
- 250 members: Govt, industry, NGO & research institutes

It seeks to

- **Highlight** the problem
- **Link** technological and behavioural approaches
- **Research solutions** for the system-as-is as well as alternative food systems
- **Get people to work together** across disciplines & sectors
- **Show connections** between the apparently unconnected
- **Stimulate** the necessary research
- **IN OTHER WORDS:** tackle the issues raised in this presentation

What we're doing

1. **A mapping study:** What do we know? What don't we know? What are the research priorities?
2. **A series of working seminars:** To inform mapping research
3. **Conferences**
4. **Website:** With food/GHG related research
5. **Networking:** To catalyse further research

PLEASE JOIN

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Food Climate Research
Network