Systems Analysis Applied to Environment and Health

Health-Environment Co-benefits of Diet Change

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Modelling Strategy

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What if we eat healthily?

- Assume transition to WHO recommended (regional) diets in 2050
- Calculate diet-related deaths
- ... and GHG emissions
- ... and begin to explore economics
Compared to FAO diet predictions, adoption of a diet meeting nutritional guidelines would in 2050 result in 5.1M avoided deaths per year.
Adoption of a diet meeting nutritional guidelines would in 2050 would reduce the increase food-system associated GHG emissions from 51% to 7%.
There are substantial economic benefits of switching to better diets

GWP (ΣGDP) ≈ $US 80T yr⁻¹
How will climate change affect diet-related mortality by 2050?

- Drive economic/health model by “high” (2°C) emissions pathway and mid population/economic growth
- Derive diets from economic models (supply, demand, prices & trade)
- Derive health from diet (meat, fruit and veg) and weight (under-, normal, over-, obese)
- WHO study estimates extra 85,000 death
Avoided deaths per year (millions)

No Climate change

- Underweight
- Fruit & Veg
- Red meat
- Overweight
- Obesity
What if we taxed climate unfriendly food?

- Use life cycle analysis to assess GHG emissions
- Introduce a proportionate tax, look for perverse effects
- Redesign tax intervention
- (Recognise a rather simplistic first step)
~10% of reduction required for $\Delta T < 2^\circ$
Net ~100K avoided deaths and 1 Gt CO₂ emission reduction yr⁻¹
Net ~500K avoided deaths and 0.9 Gt CO₂ emission reduction yr⁻¹
Conclusions

• Very many modelling caveats
• We are extending to other environmental dimensions
• Substantial health/environment/economic co-benefits/co-risks
• Synergies good place to look for solutions
• We fail on food we fail on everything