



JAMES MARTIN 21ST CENTURY SCHOOL

Systems Analysis Applied to Environment and Health

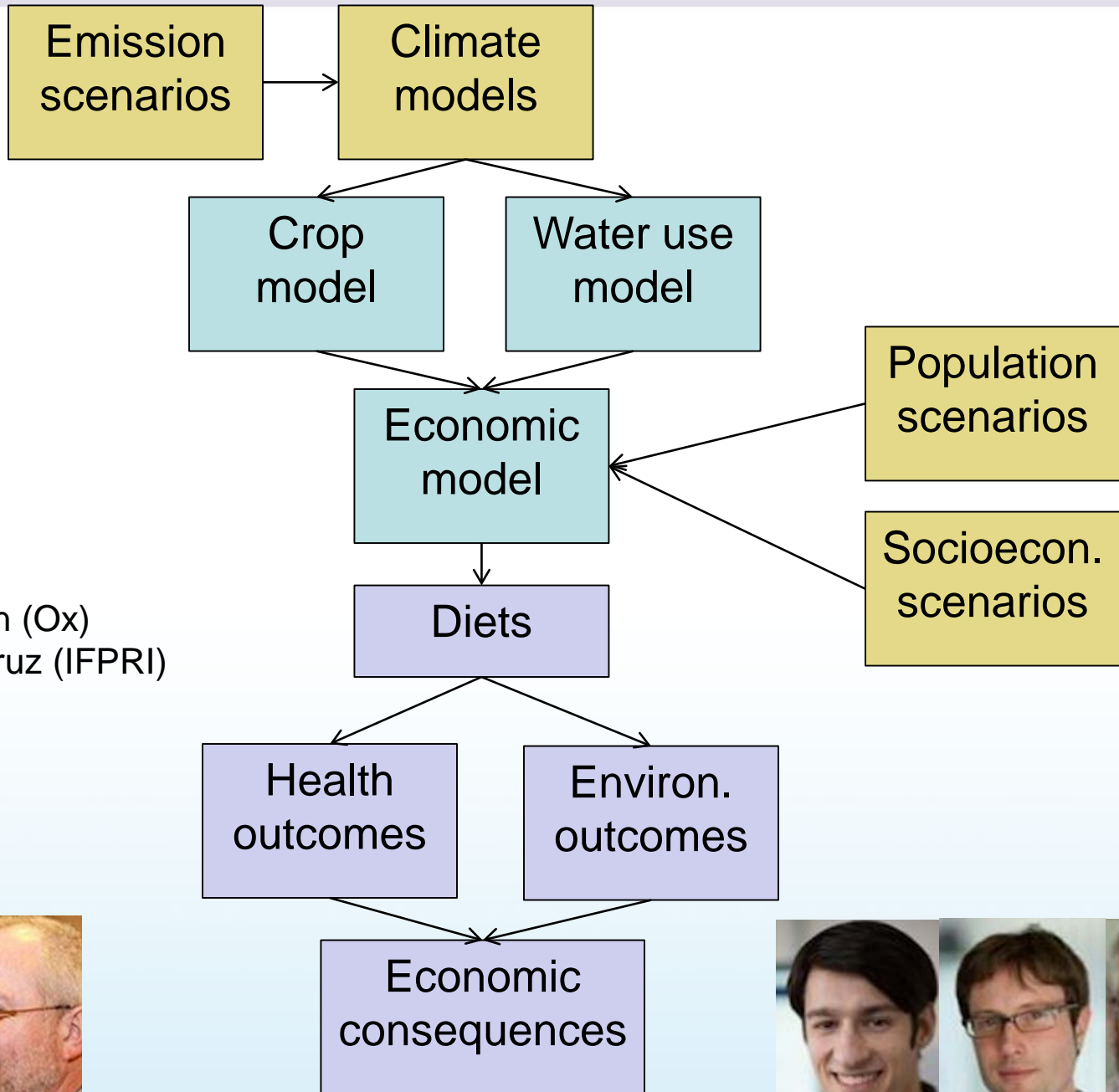
Health-Environment Co-benefits of Diet Change

Royal Society
Dec 2nd 2016

Charles Godfray

Oxford Martin Programme on the Future of Food
(one of the Oxford Networks for the Environment)
Oxford University





Modelling Strategy

Marco Springmann (Ox)
Daniel Mason-d’Cruz (IFPRI)



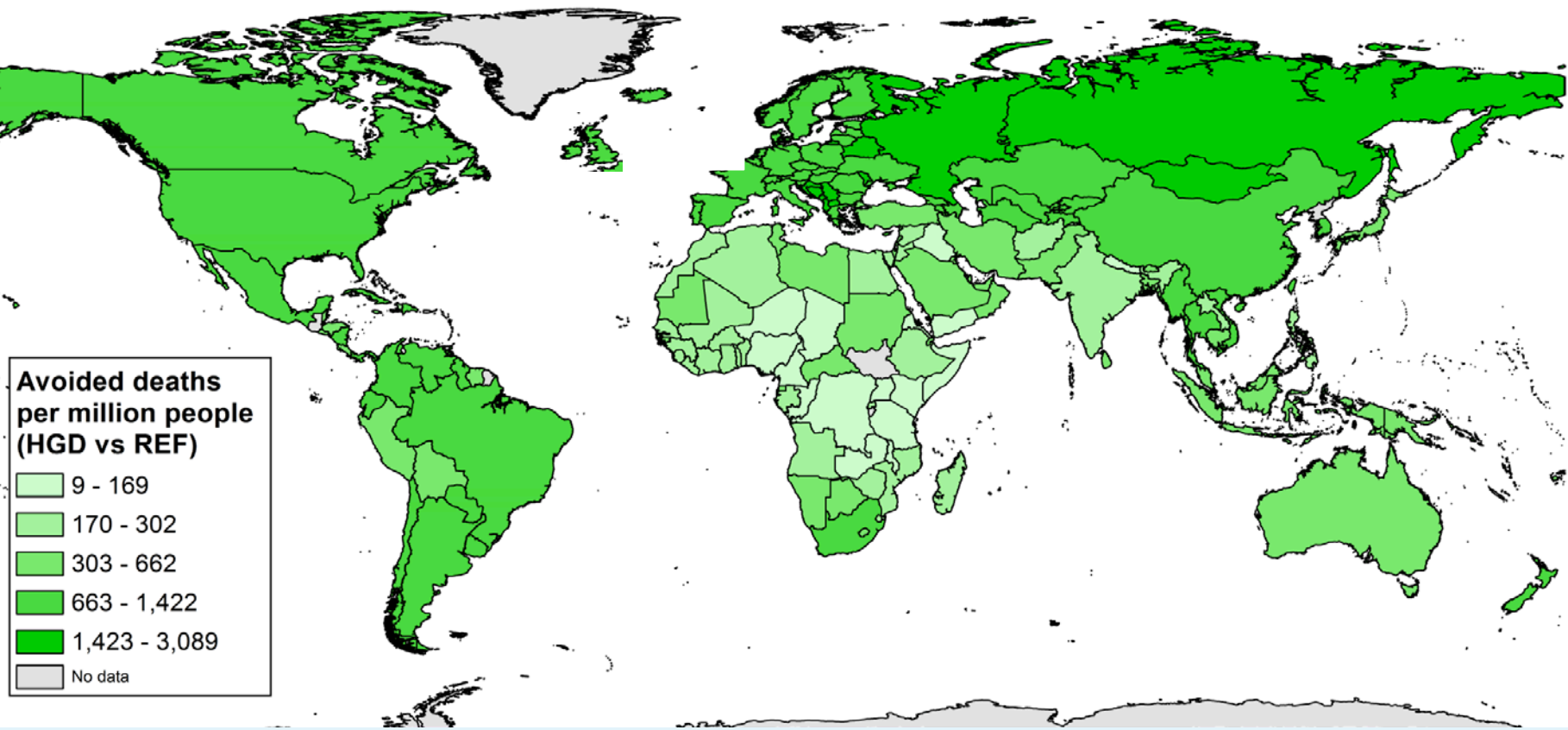
What if we eat healthily?

- Assume transition to WHO recommended (regional) diets in 2050
- Calculate diet-related deaths
- ... and GHG emissions
- ... and begin to explore economics

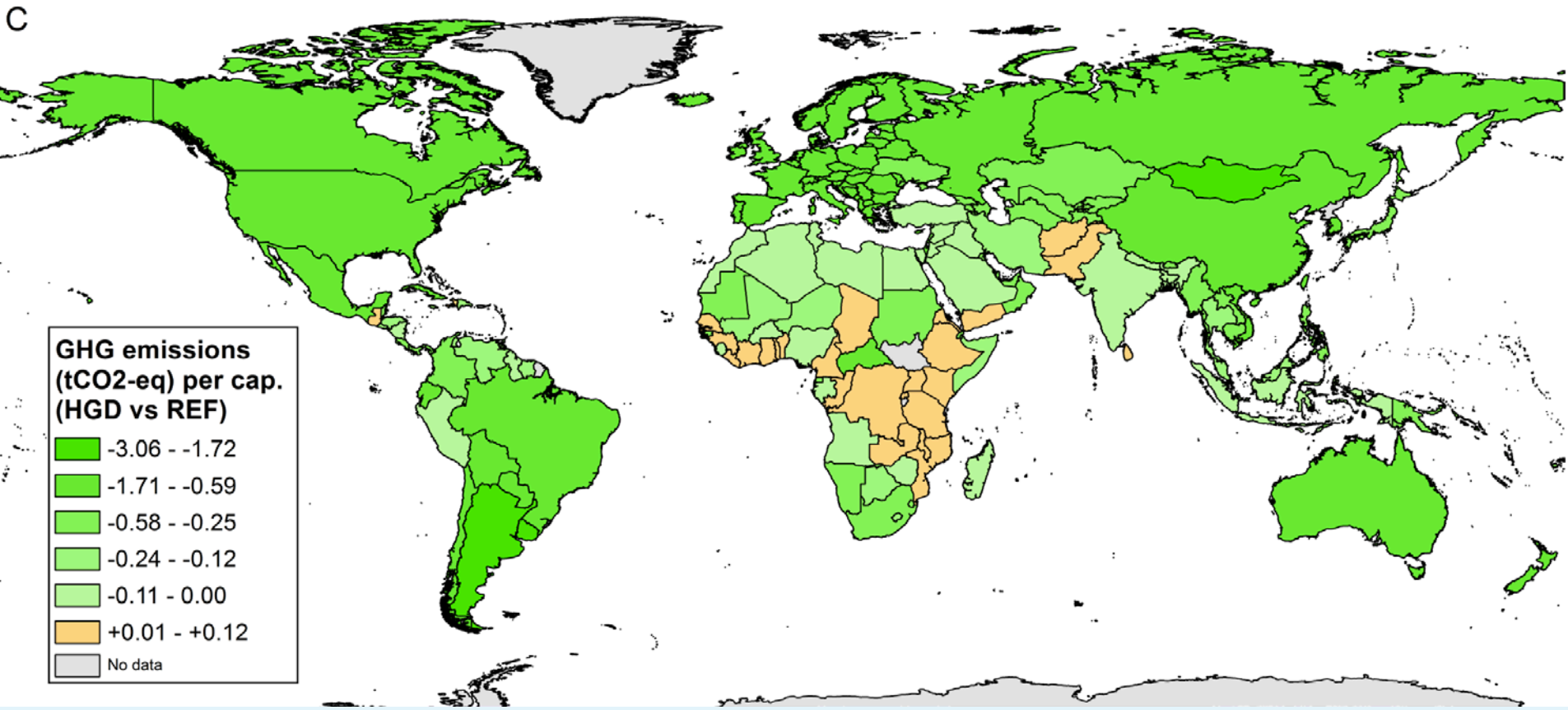
Compared to FAO diet predictions, adoption of a diet meeting nutritional guidelines would in 2050 result in 5.1M avoided deaths per year

Cartography: © Boris Johnson

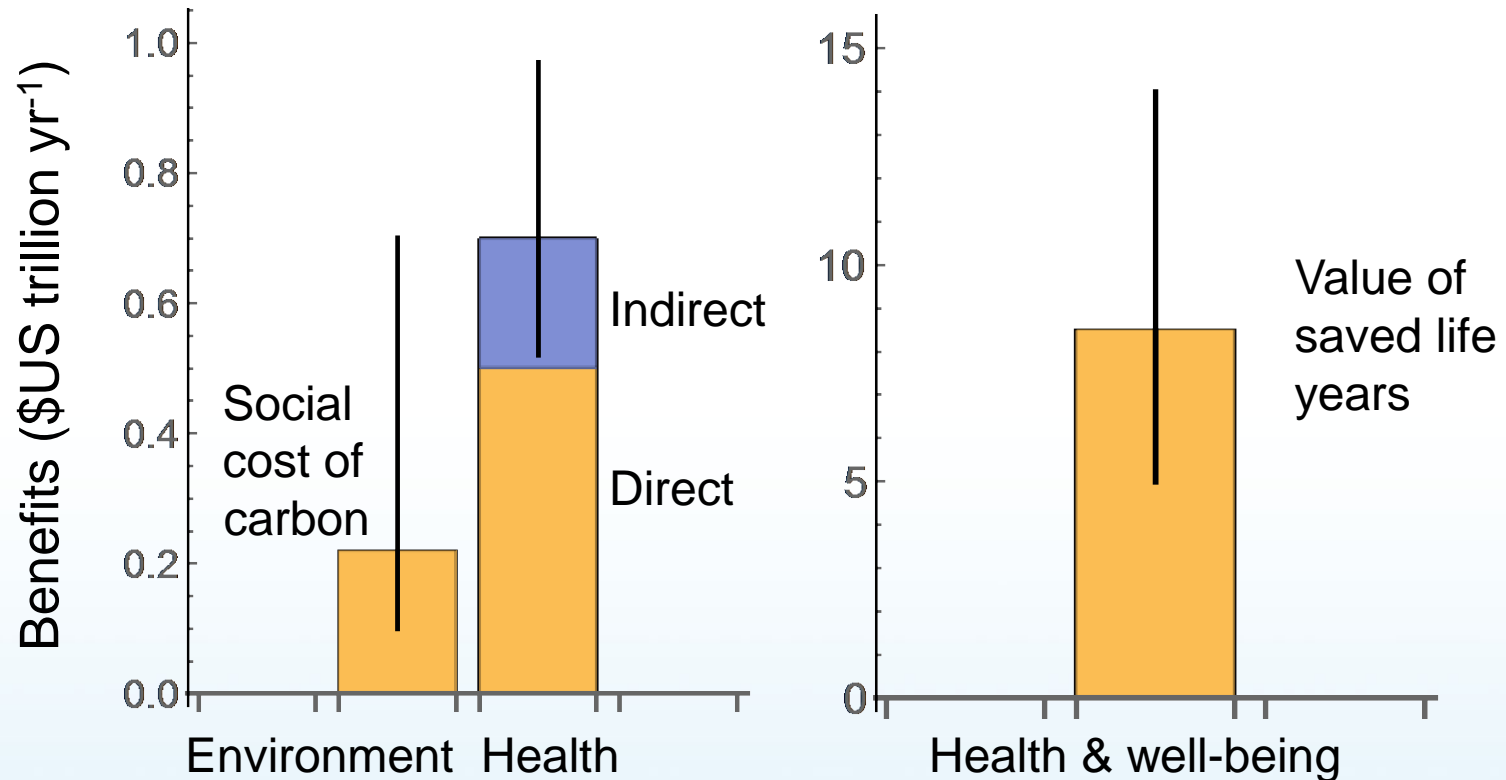
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Adoption of a diet meeting nutritional guidelines would in 2050
would reduce the increase food-system associated GHG emissions
from 51% to 7%



There are substantial economic benefits of switching to better diets

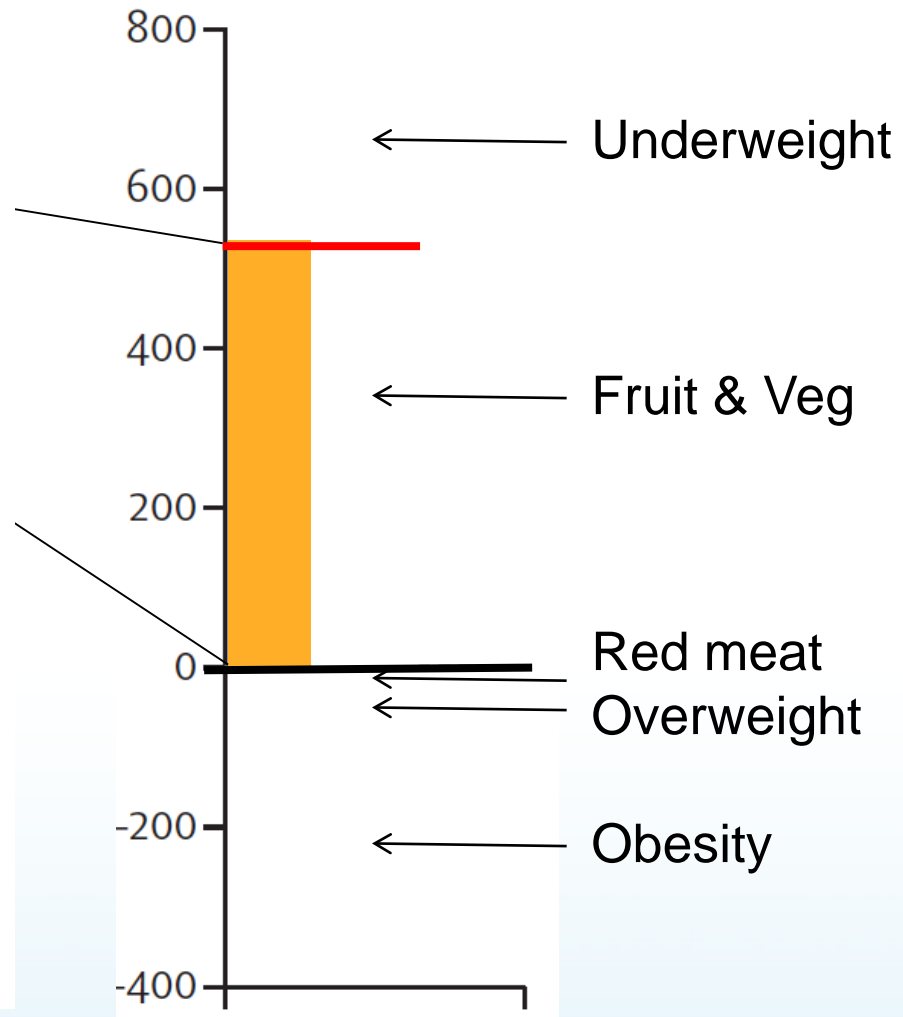
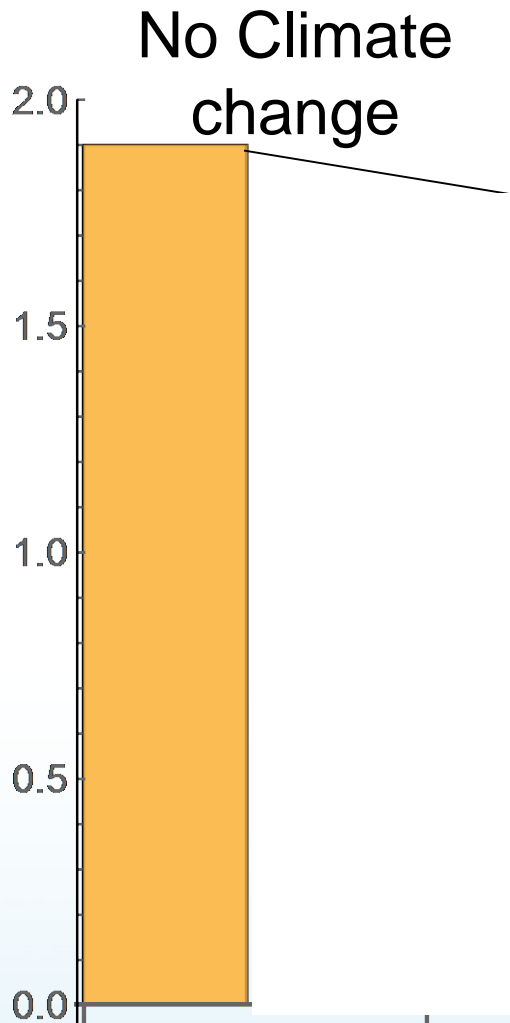


GWP (Σ GDP) \approx \$US 80T yr⁻¹

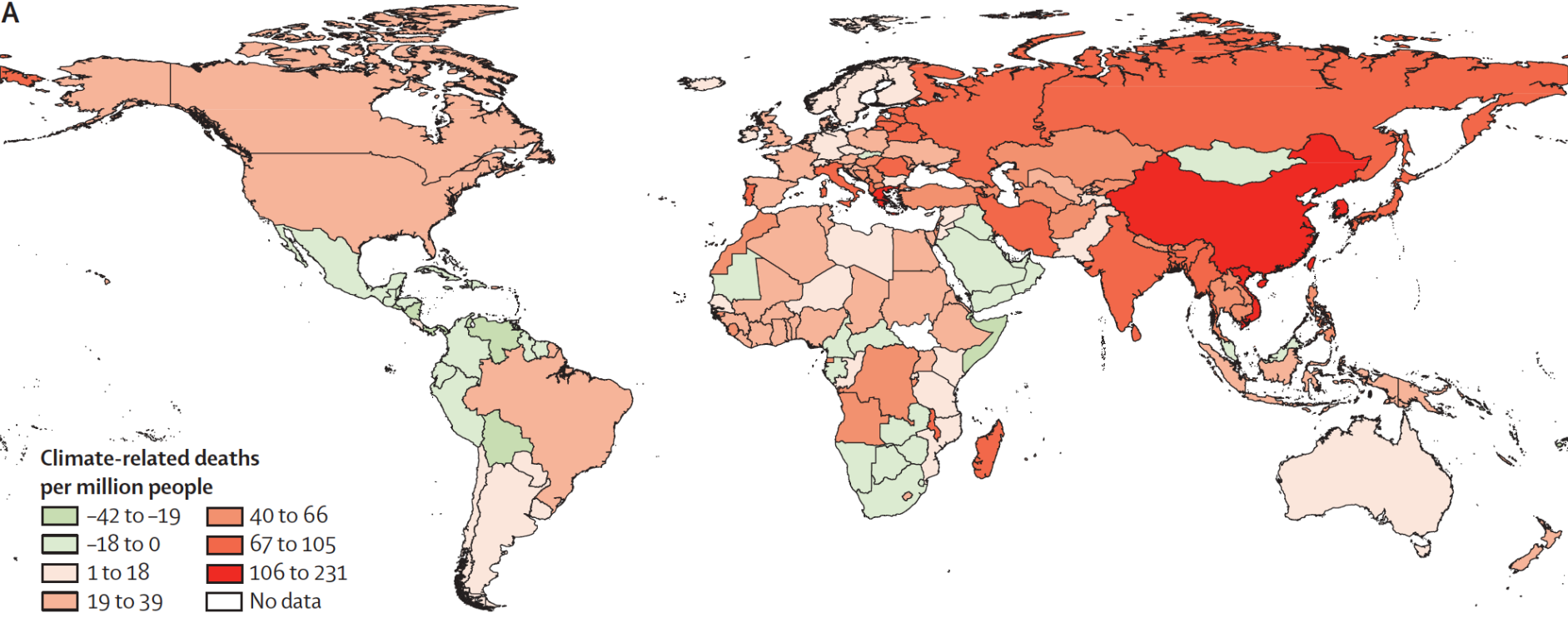
How will climate change affect diet-related mortality by 2050?

- 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)

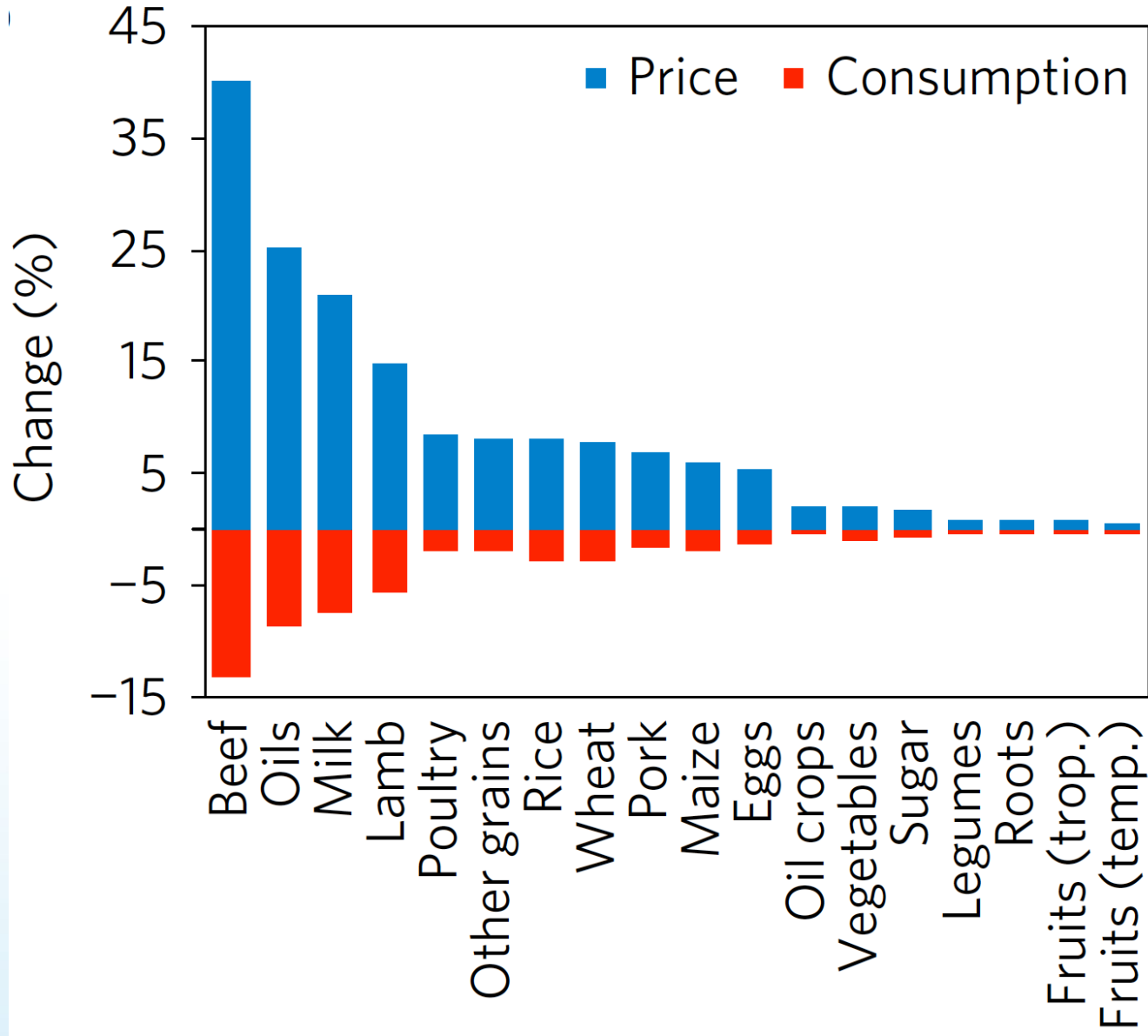


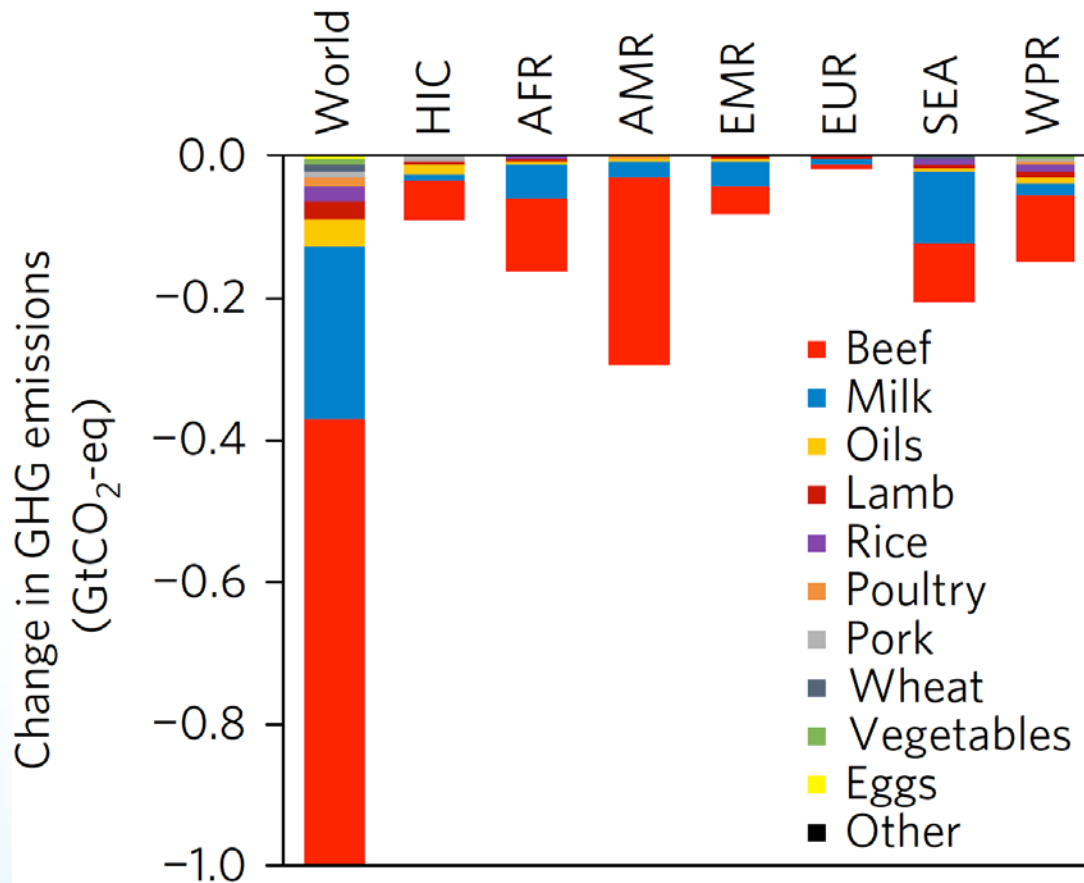
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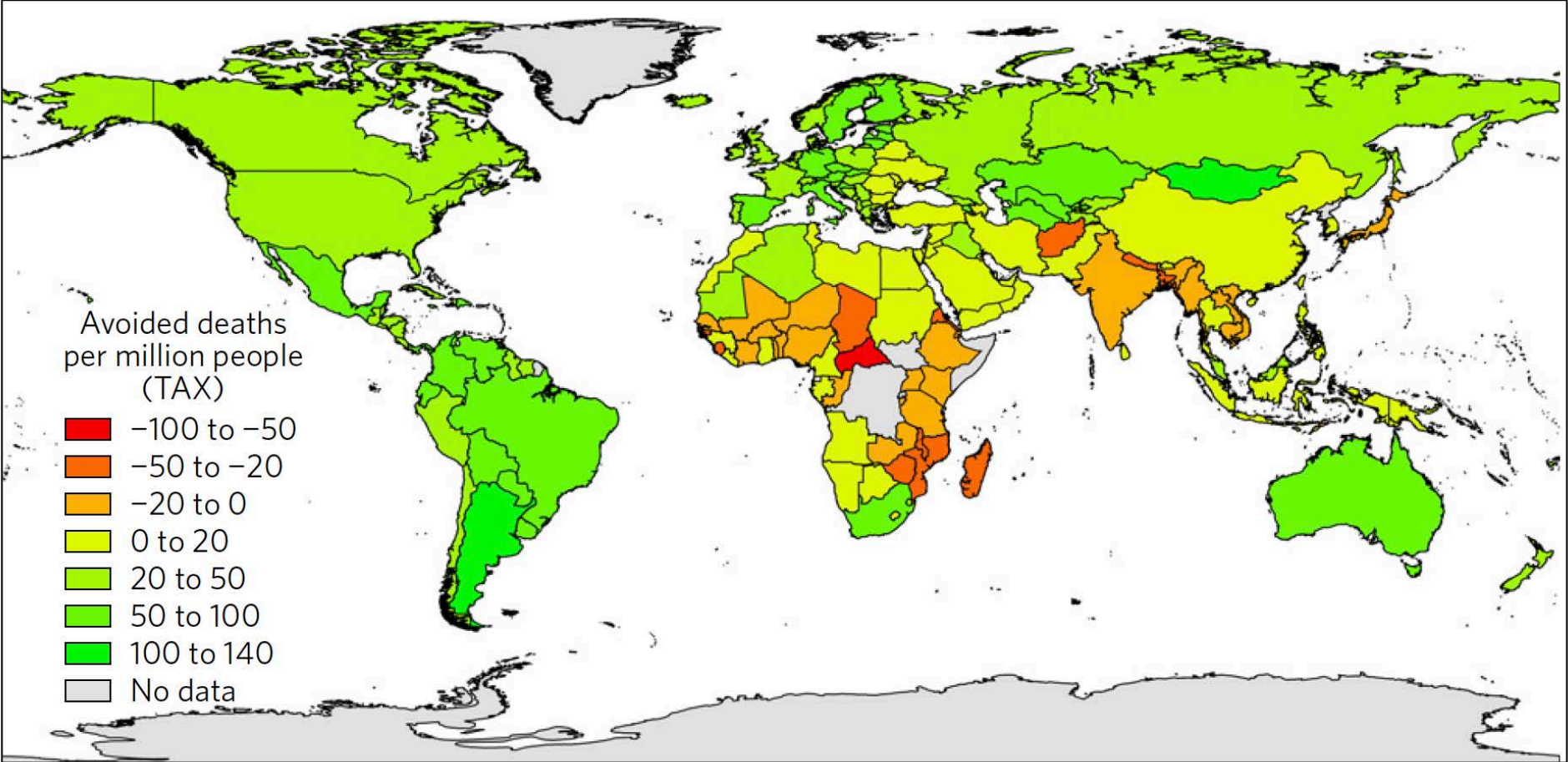
What if we taxed climate unfriendly food?

- 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

Avoided deaths
per million people
(TAXopt)



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

