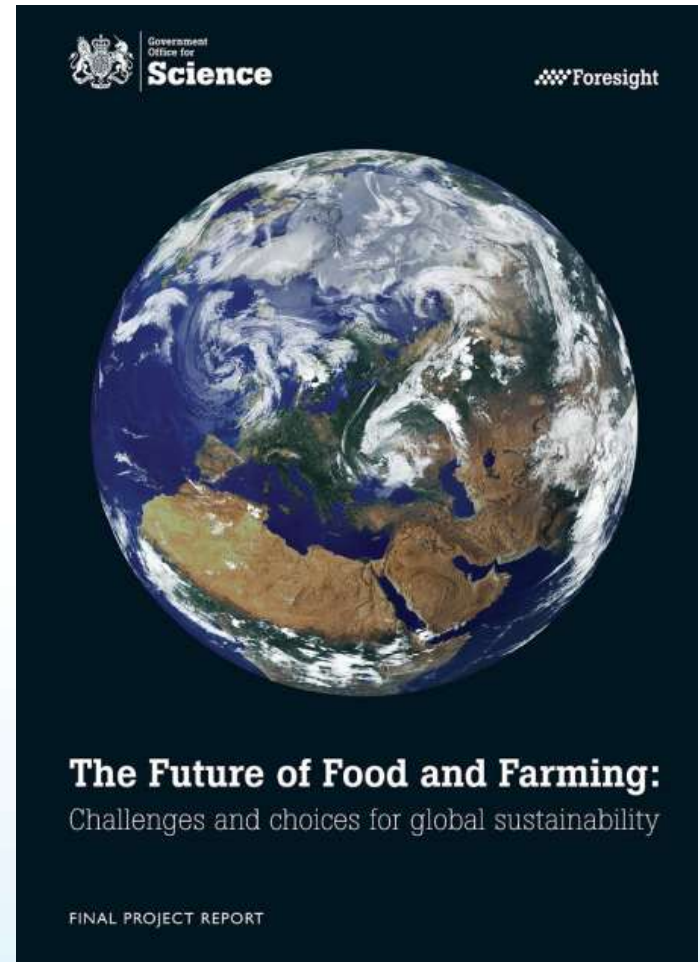


The Joint Challenges of Food Security and Environmental Sustainability

Charles Godfray

Department of Zoology & Director,
Oxford Martin Programme on the Future
of Food





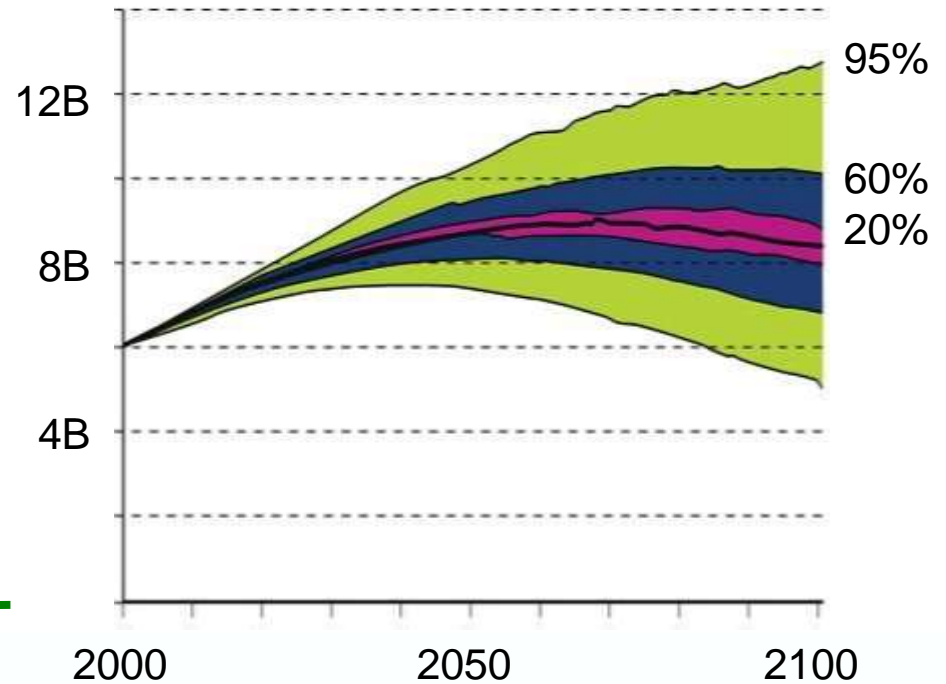
This talk

- The challenge
- High-level conclusions
- Possible issues for today

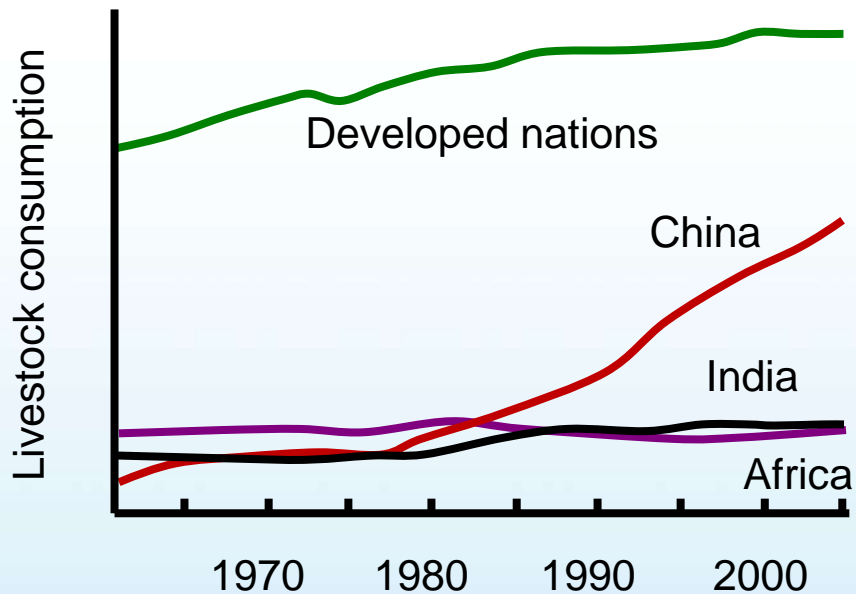
Increasing demand

- Population most likely to peak ~9B

Population projection (Lutz & Samir 2010)



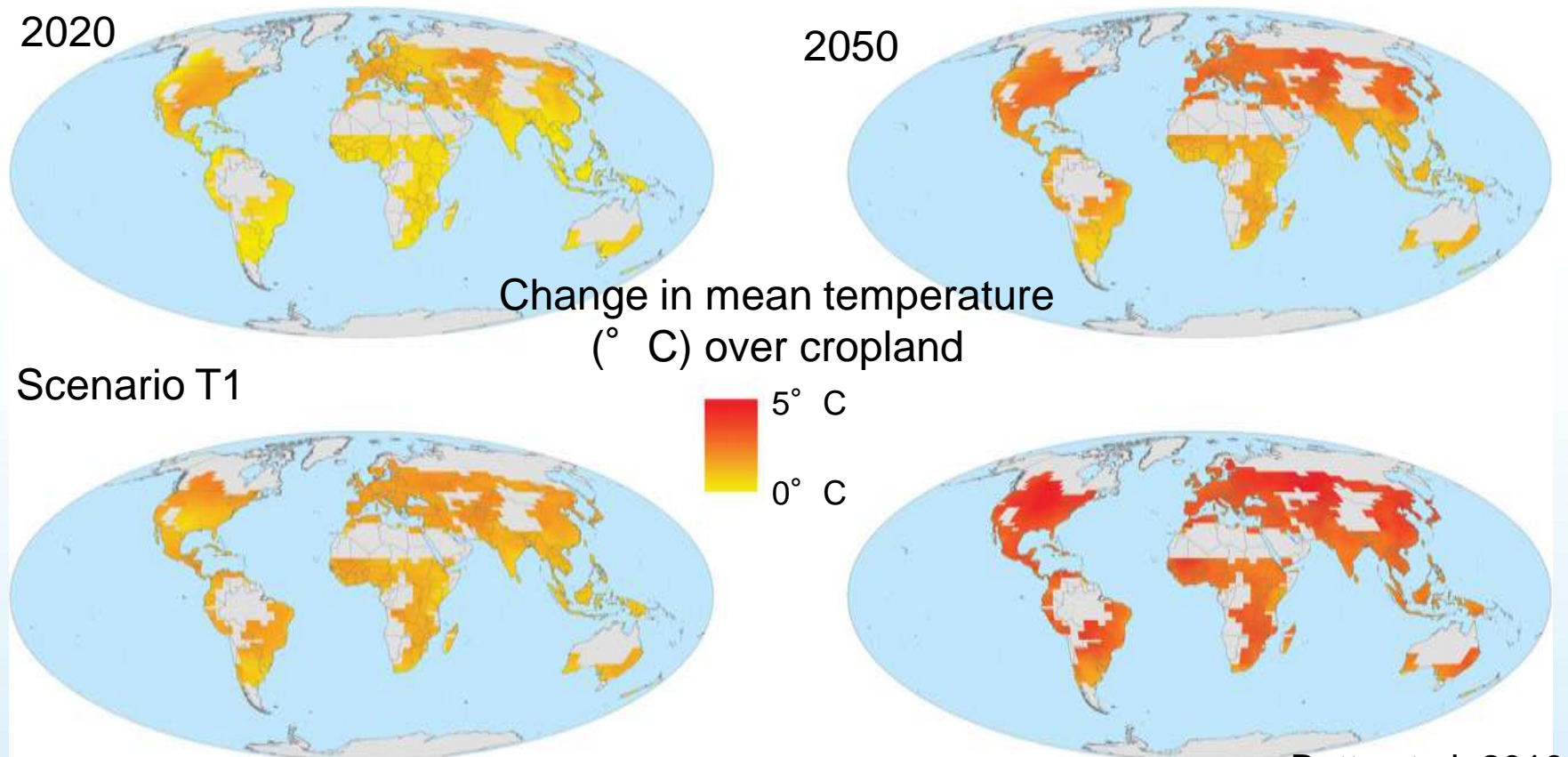
Livestock consumption (FAO 2009)



- People will be richer and demand higher quality diet

Threats to supply

- Increased competition for land, water, energy & other inputs
- Climate change (mean and variance)

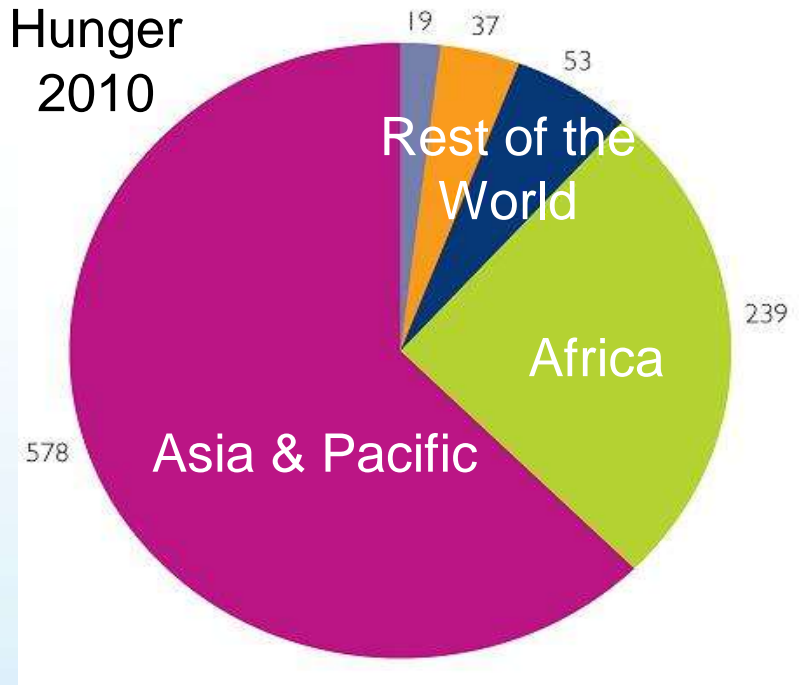
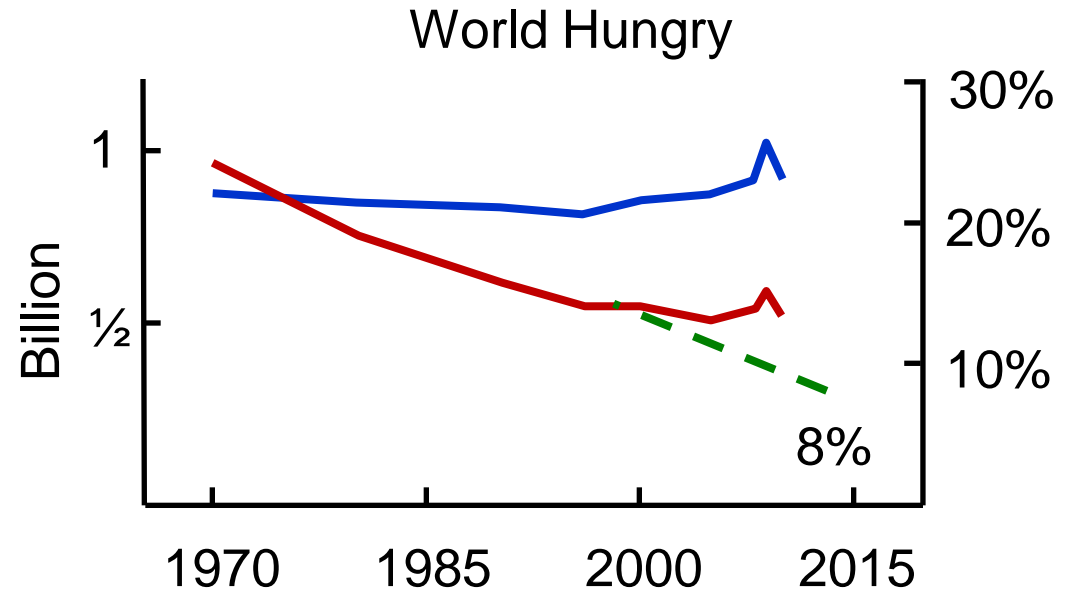


Scenario T2

Betts et al. 2010

Hunger

- ~1B hungry, most in Africa and Asia
- Unlikely to meet MDG 1



- Physical, economic & social access to food
- Non-food system causes
- “Hidden hunger” (~1B)
- “Over-nourished” (~1B)

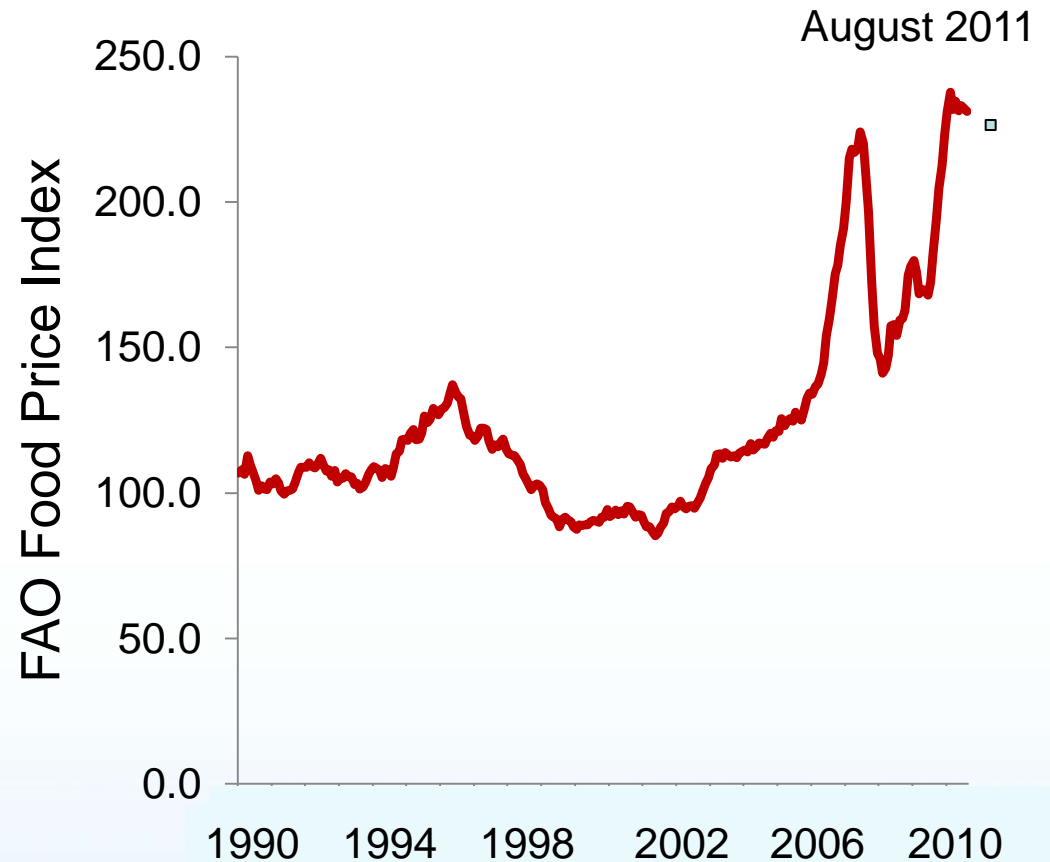
The food system is not sustainable

- Uses ~70% of global water, much non-renewable
- ~24% of vegetated land suffers soil degradation
- ~30% greenhouse gas emissions come directly or indirectly from food system
- Main source of nitrate and other pollution
- Most fisheries over-exploited



Increased recent food price volatility

- FAO Food Price Index currently around highest value since its inception in 1990
- But still historical low



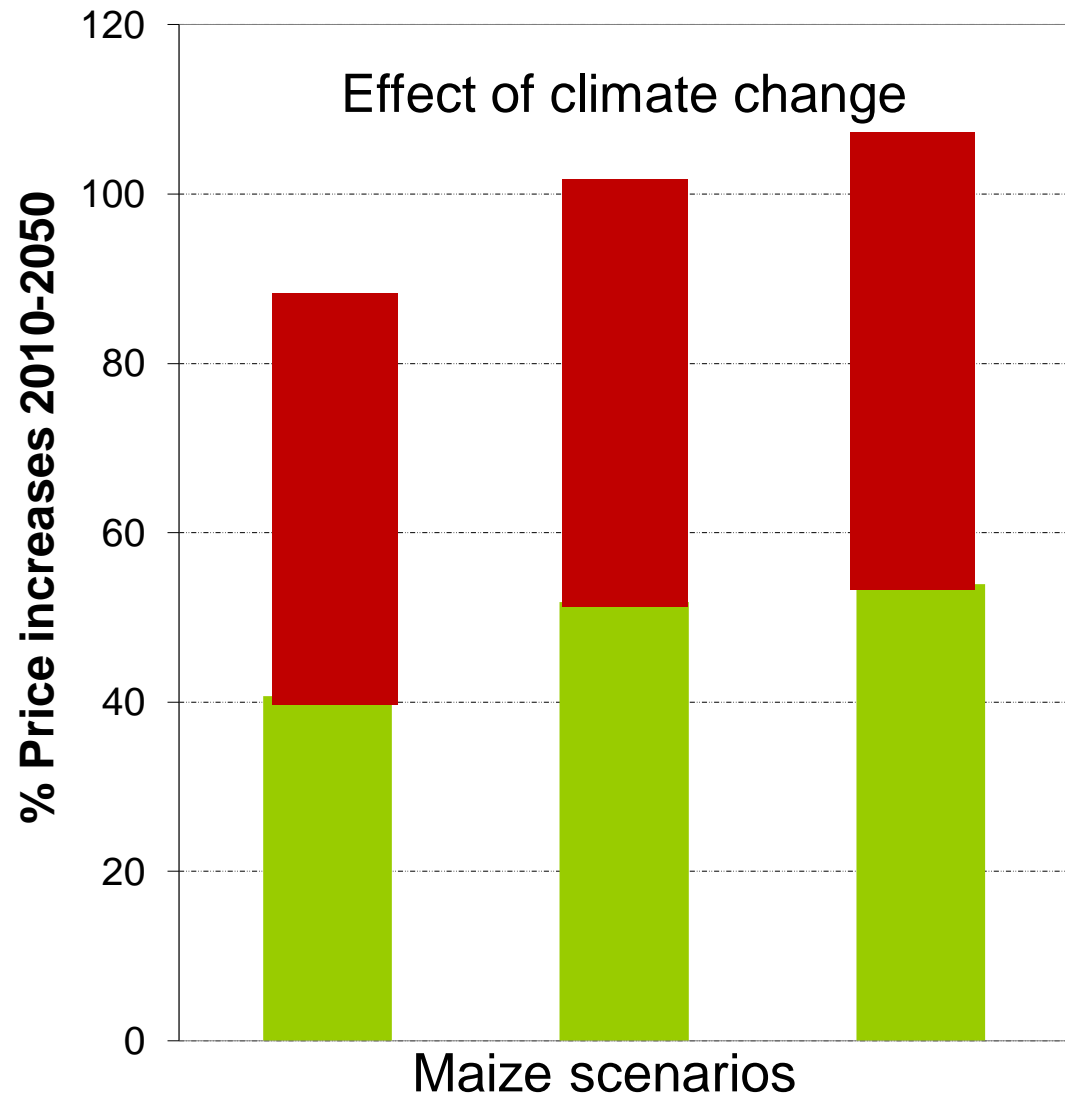
The challenge and food prices

Drivers of change:

- Population and consumption growth
- Competition for water, land, energy
- Climate change

Modelling commissioned by Foresight

- Partial equilibrium economic models of the food system



Source: IFPRI Nelson et al. (2010)

Action needed throughout the food system

- Increase supply
- Moderate demand
- Improve efficiency and governance
- Test against
 - Sustainability
 - Needs of poorest

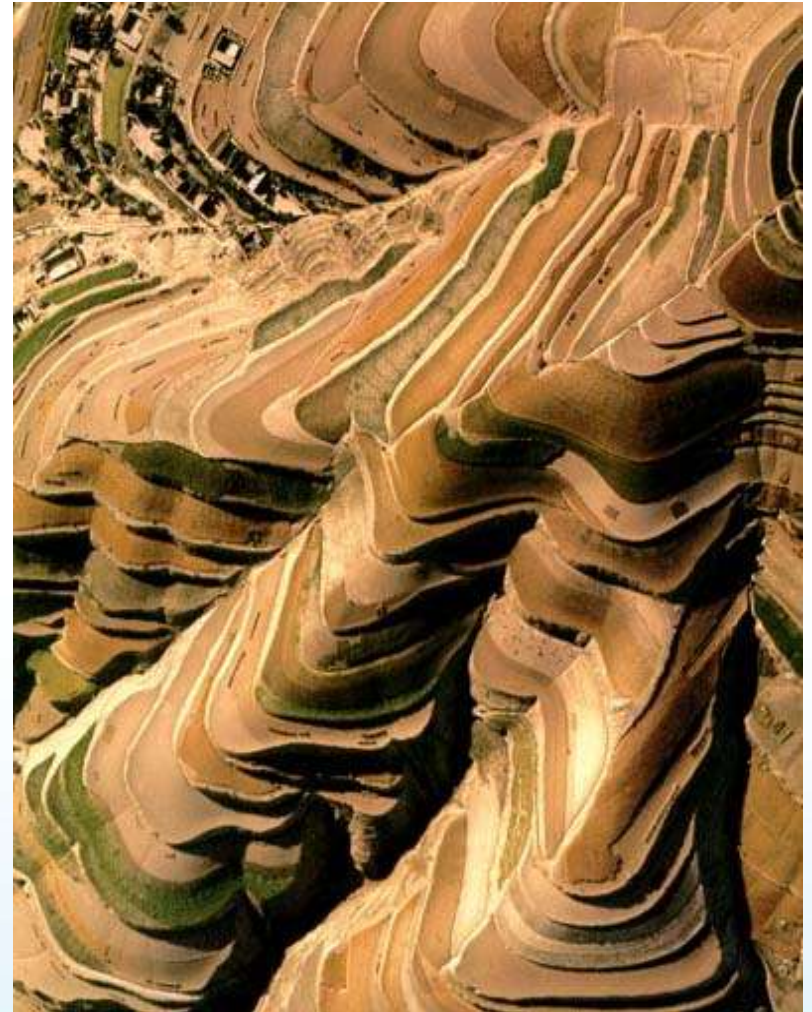


Very limited new land

- Major environmental costs to much land conversion – GHG emissions & biodiversity
- Restoration of agricultural lands a priority

Sustainable intensification

- Increase yields
- Increase input efficiency
- Reduce negative environmental effects



UK Agriculture Policy in a Demand-driven World

- Production
 - Less need for direct support
 - Facilitate efficient response to price signals
- Environment
 - Rewards for public goods (internalisation critical)
 - Treat seriously indirect land use effects
 - Reward carbon-efficient productivity
 - Concentrate biodiversity payments
 - Will we miss the opportunity of CAP reform?



Government
Office for
Science

Foresight



Report available at

<http://www.bis.gov.uk/foresight>

See also, Godfray *et al.* 2010, *Science*
327, 812-8

The Future of Food and Farming:

Challenges and choices for global sustainability

FINAL PROJECT REPORT

Unique time in history

- We can consider an end to global population growth
- Humankind now dominates the global Earth System
- Global consensus on poverty

Key messages

- Phase change in the food system
- Food system and food thinking needs radical and profound change
- We fail on food we fail on everything