



# Can we achieve net reductions in greenhouse gas emissions and meet global food demand?<sup>RJ2</sup>



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**Slide 1**

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**RJ2**

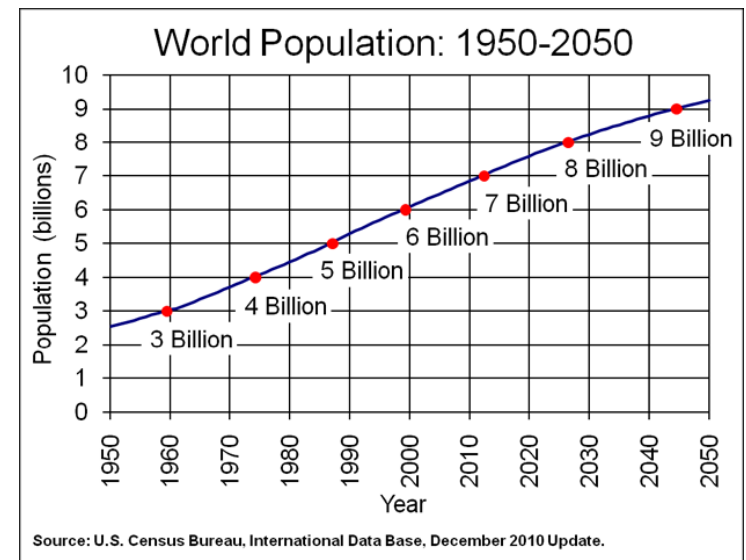
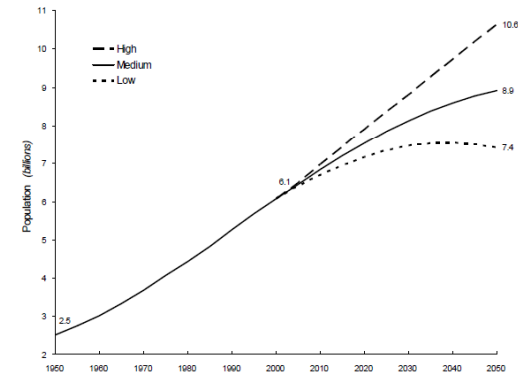
**12 min talk plus 5 min questions**

Richard Eckard, 7/02/2011



# World Population by 2050

- 6.1 B in 2000
- 9.1 B by 2050 (mid scenario)
  - Developing world ~ 54%
  - Developed world ~ 7%
- Sub-Saharan Africa
  - Largest % increase
- South and East Asia
  - Largest population centre





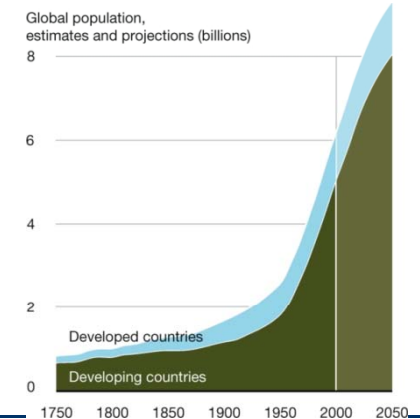
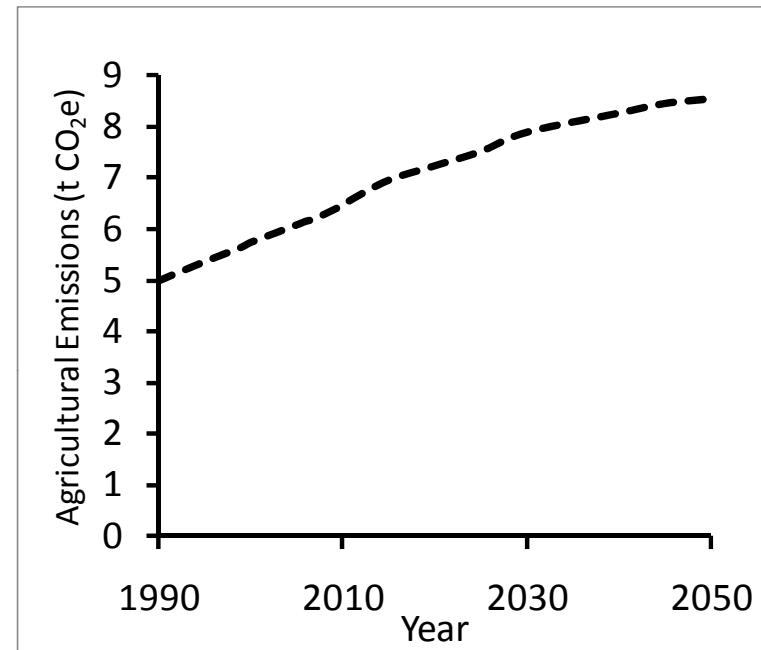
- Additional 3B people
  - Global food production increase 70%
- Developed countries
  - Mostly high value food



*The additional food required will need to be produced locally in developing countries, where research has historically not been as well resourced and communicated as in developed countries*

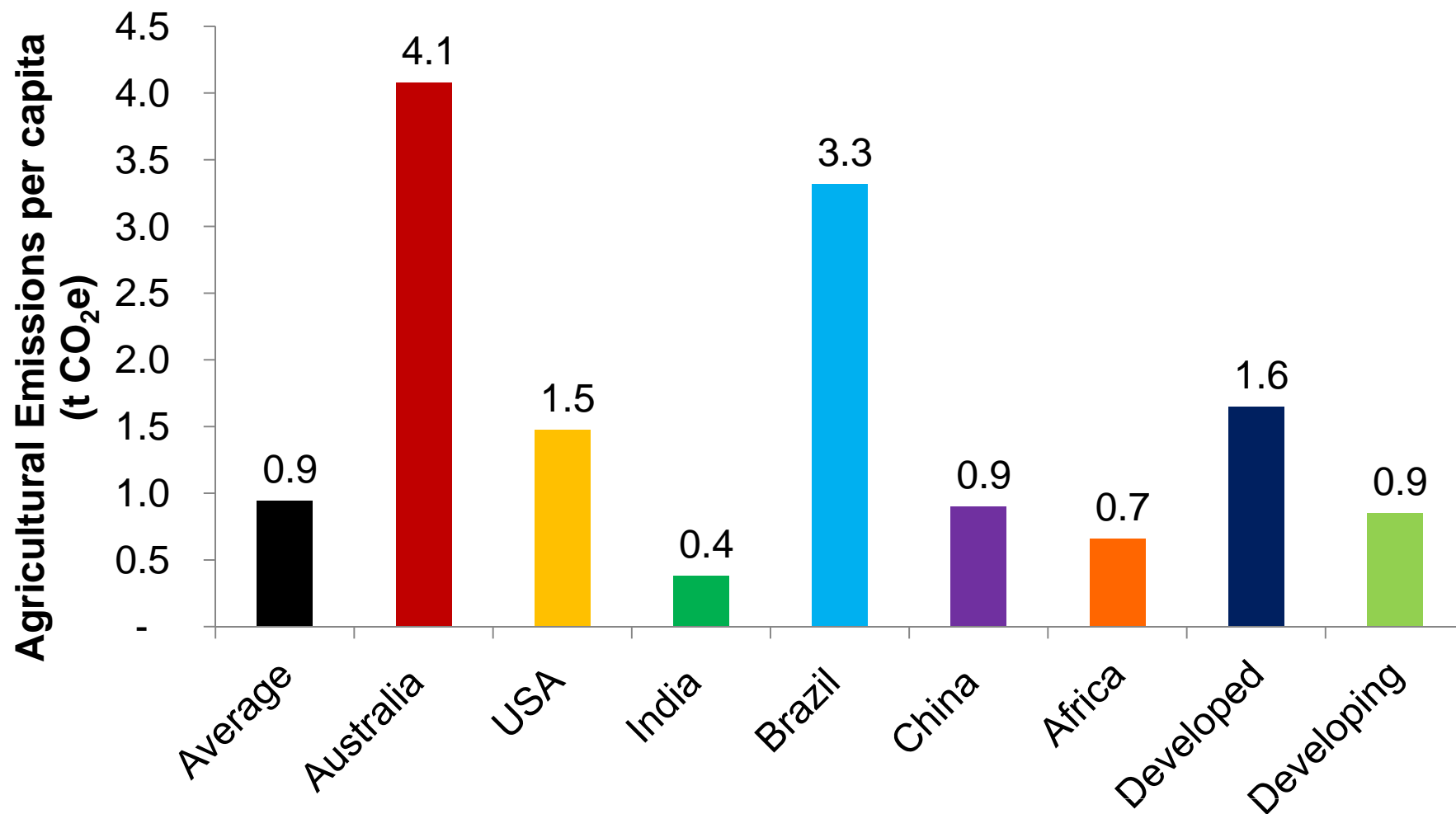


- 5.2 Gt CO<sub>2</sub>e/yr in 1990
- 6.1 Gt CO<sub>2</sub>e/yr in 2005
  - 17% increase
    - 54% CH<sub>4</sub>
    - 46% N<sub>2</sub>O
- 2030 projected increases (AR4)
  - N<sub>2</sub>O emissions +35 to 60%
  - Livestock CH<sub>4</sub> +60%





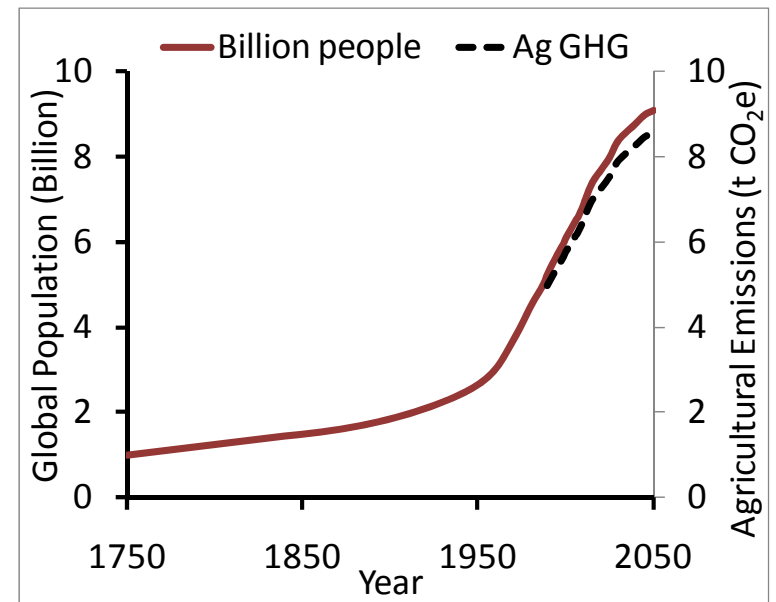
## On farm non- CO<sub>2</sub> emissions



U.S. Census Bureau (2010); US-EPA (2006); Eckard (2011)

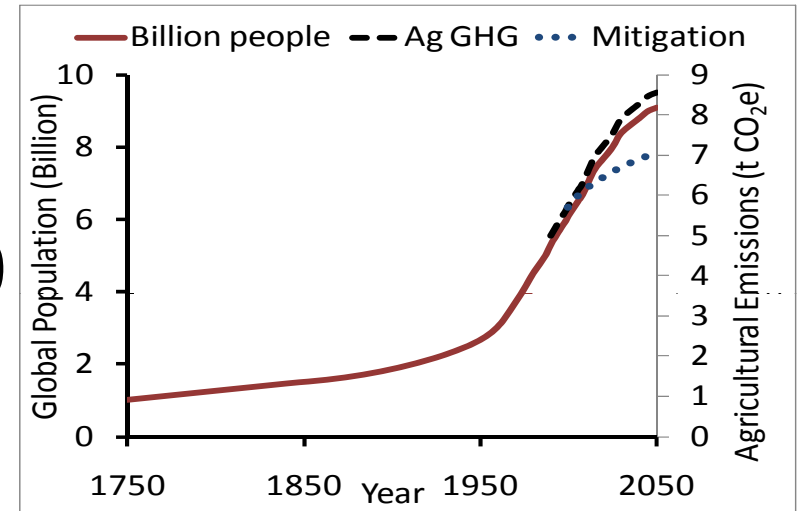


- Developing world
  - Grows by 54% @ 0.85 t CO<sub>2</sub>e/person
- Developed world
  - Grows by 7% @ 1.65 t CO<sub>2</sub>e/person
- Agricultural emissions
  - 8.8 Gt CO<sub>2</sub>e by 2050
    - 54% increase over 2000





- Estimates from currently technology
  - 15 to 56% for CH<sub>4</sub>
  - 9 to 26% for N<sub>2</sub>O
- Likely adoption by 2050
  - Developed countries
    - 20% with policy drivers
  - Developing countries
    - Food production and security a higher priority
    - 0% abatement most likely



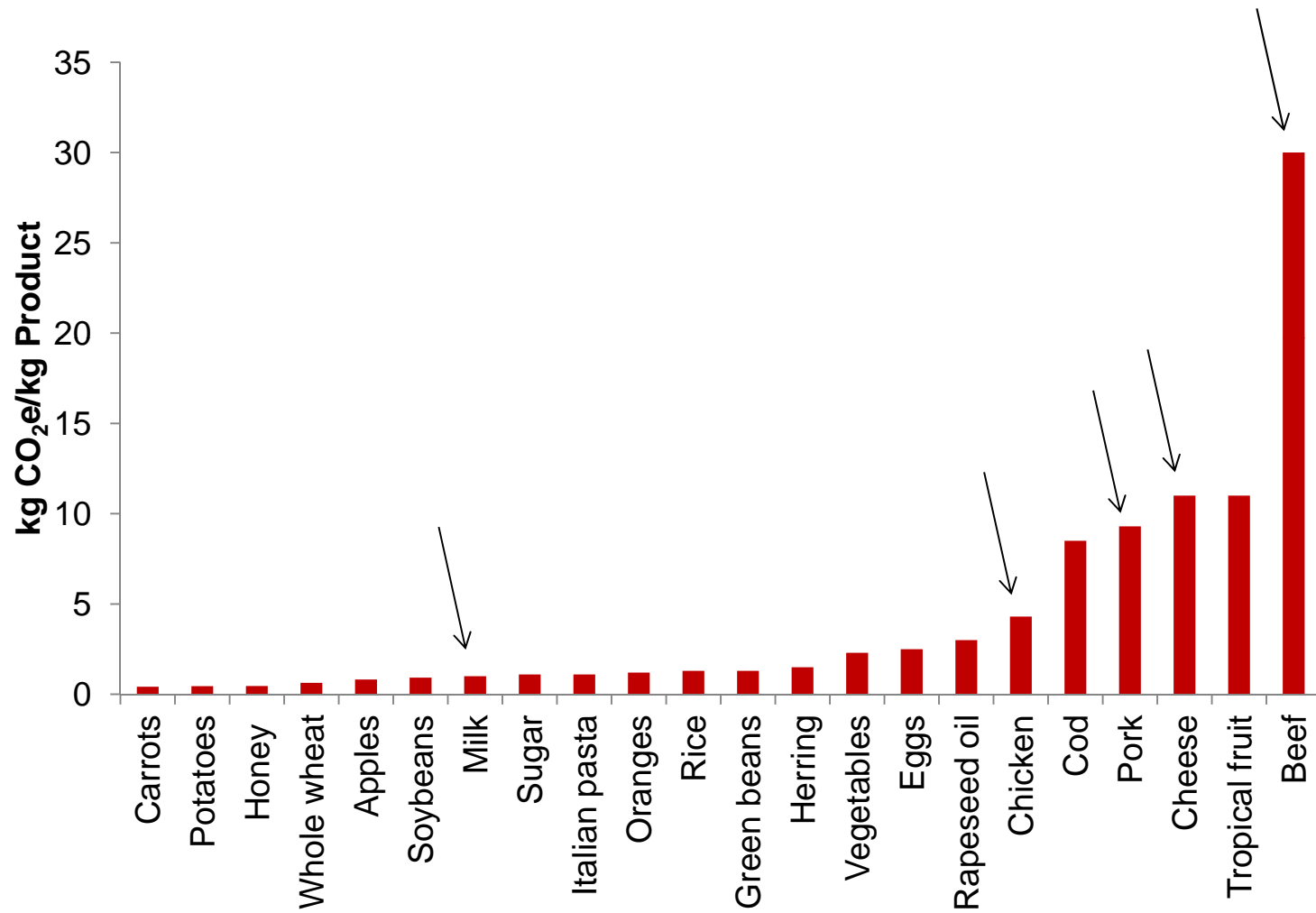
*Net result = 7.0 Gt CO<sub>2</sub>e*

*23% increase in GHG from agriculture by 2050 over 2000*



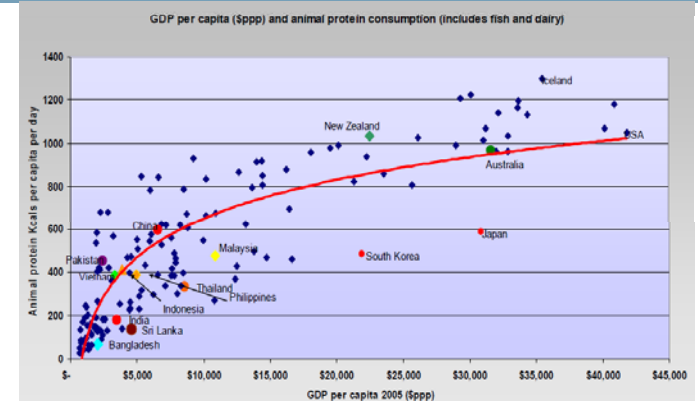


# Emissions per unit product in EU

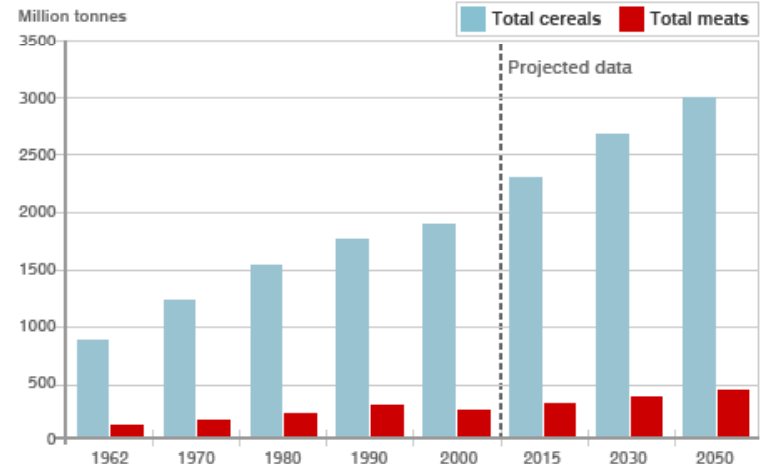




- Livestock products
  - Demand +44% by 2030
    - Increasing wealth
  - BUT
    - Mainly poultry, pork, aquaculture, dairy
    - Less trend for red meat, mainly goats
- East less red meat?
  - Developing world (54%)
    - Cultural or no choice
    - Main trend in white meat
  - Developed world (7%)
    - Decreasing trend, but small contribution



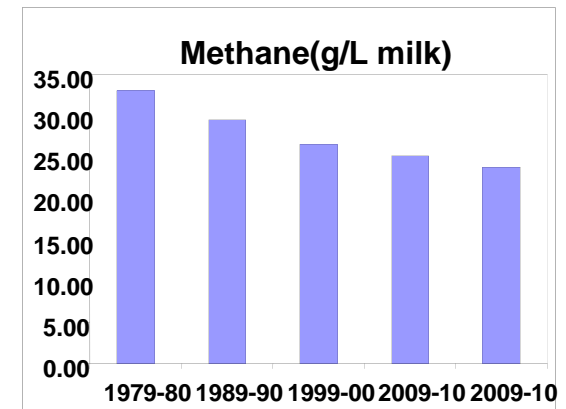
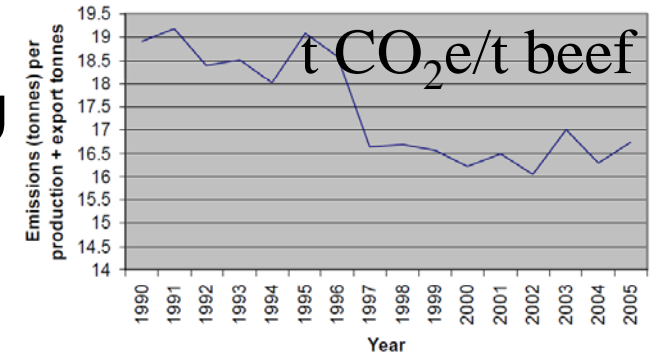
Projected growth in food production, 1960-2050



SOURCE: FAO



- Policy direction needed for research
  - Focus on win-win productivity growth
    - Maintain viable agriculture/rural communities
    - Meet growing food demand
  - But with less emissions than BAU
    - Less t CO<sub>2</sub>e/t product
- Developed world
  - Fund low emissions food research
  - Extend this to developing countries





- Agricultural emissions
  - Will increase to 2050
    - Even with mitigation policy
- Changing diet patterns
  - May not have a big impact
- Win-win research is critical
  - Improving productivity growth AND
  - Emissions intensity of food produced



*This is the only way in which already challenging global food production targets can be met, but with fewer emissions than would have otherwise occurred*



# Greenhouse in Agriculture

[www.greenhouse.unimelb.edu.au](http://www.greenhouse.unimelb.edu.au)



Australian Government  
Department of Agriculture,  
Fisheries and Forestry

