



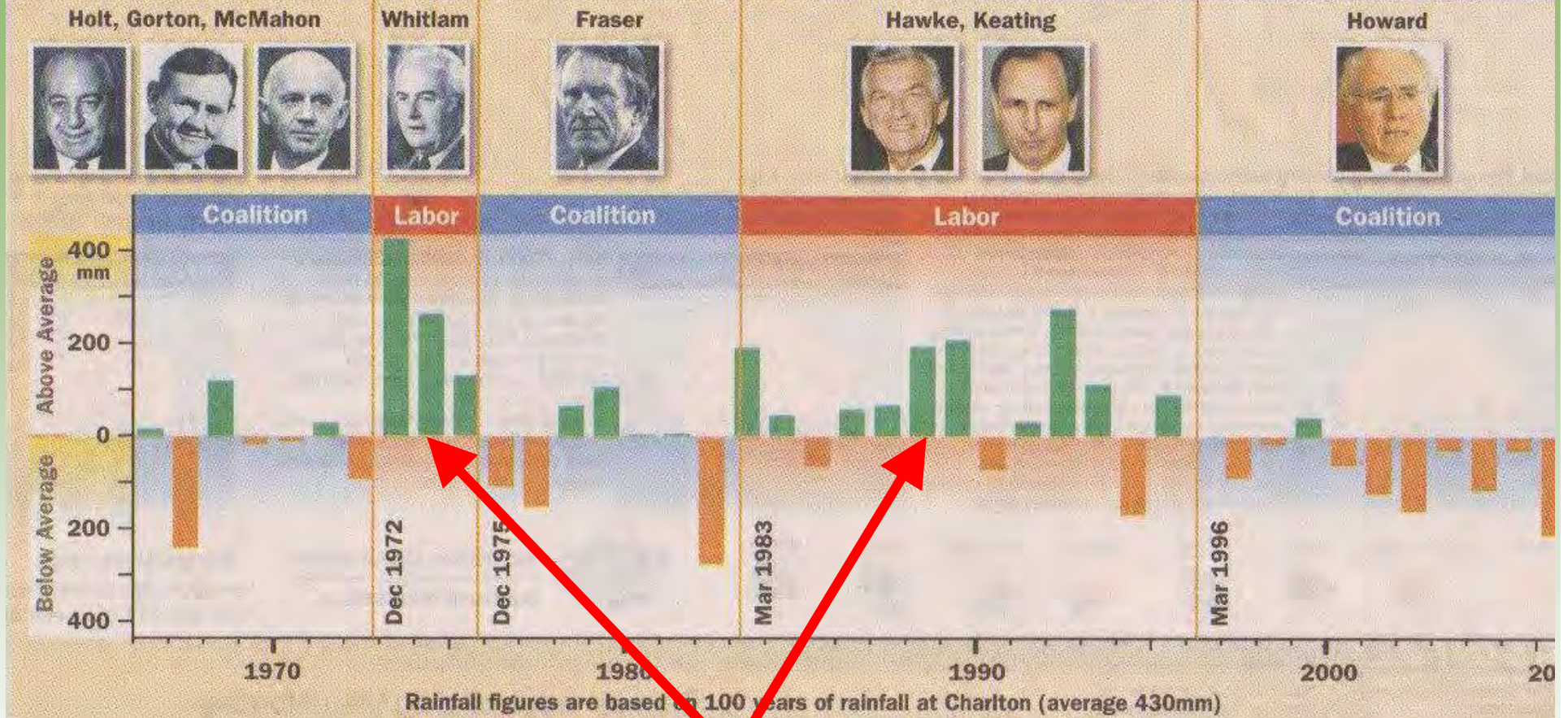
The Challenges and Opportunities for the Agriculture Sector under an Emissions Trading Scheme

Richard Eckard

The University of Melbourne

Dept of Primary Industries

RAIN MAKERS



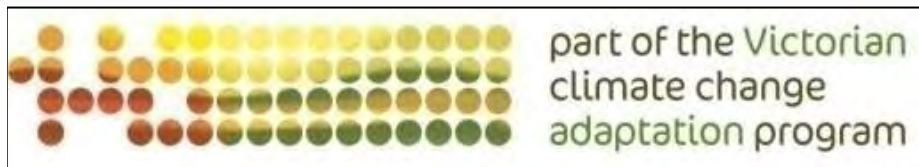
- Hope of more rain?

3-'P's of climate change

- Physical
- Policy/Political
- Peripheral

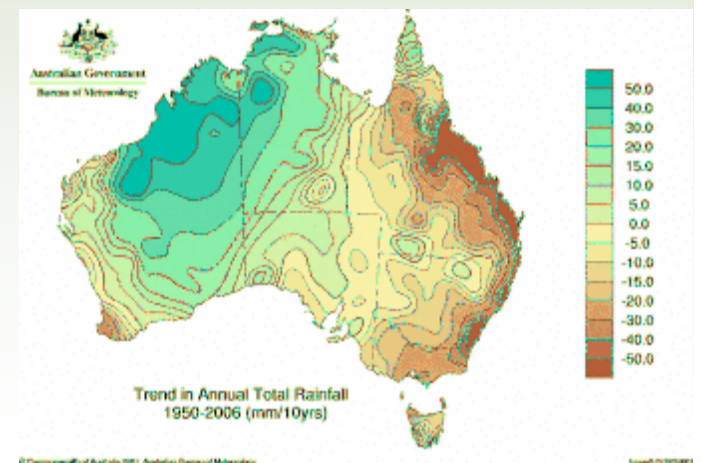
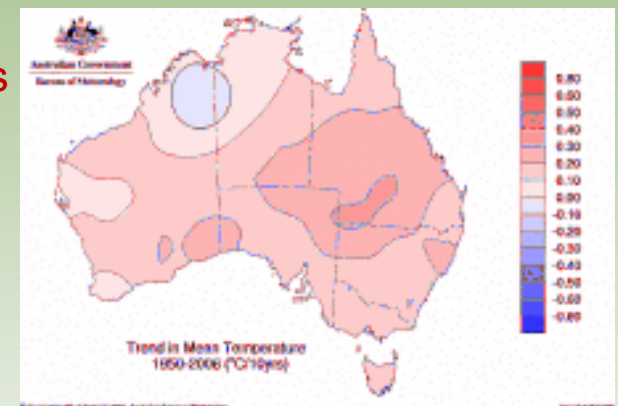


Even if you are a Global Warming Skeptic
This talk is relevant to you!



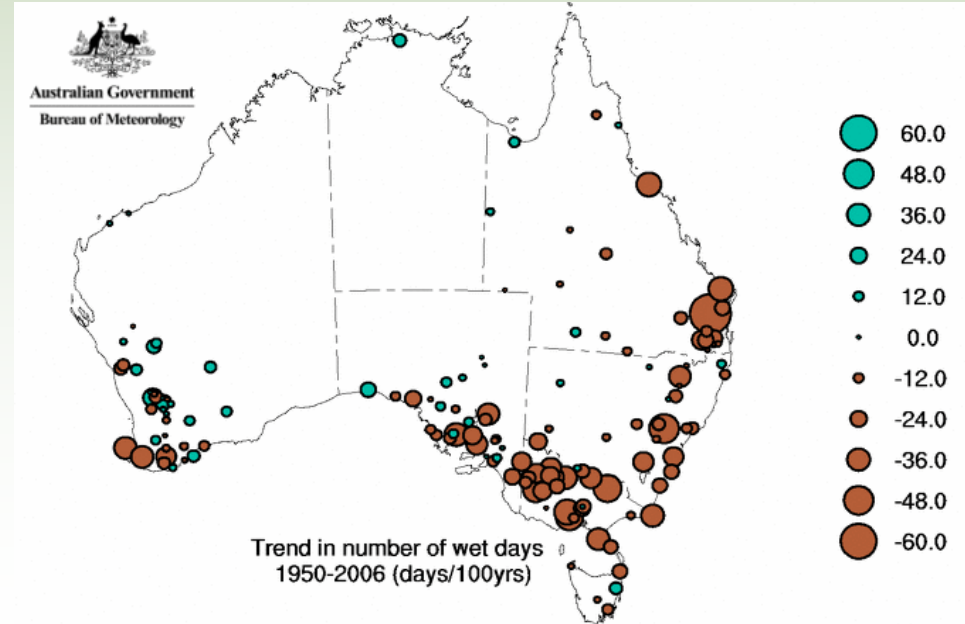
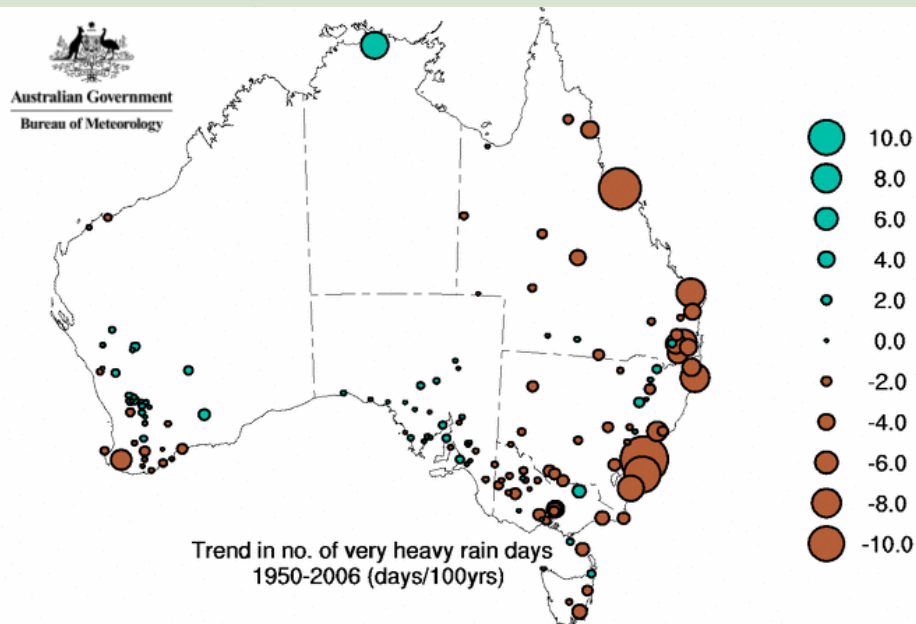
'Physical' Impacts

- IPCC 4th report
 - Consensus view of +2500 climate scientists
 - CC is occurring
 - CO₂ >30% higher than the worst IPCC 2000 Scenarios
 - > 90 % probability - is due to human activities.
- Temperature change (1950-2007)
 - 0.9°C average temp increase
 - More heat waves & less frost
 - Hot days and nights - increased
- Rainfall change (1950-2007)
 - Drier in E and SW
 - Wetter in NW



'Physical' Impacts

- Extreme daily rainfall intensity
 - Increased in north
 - South:
 - Less heavy rainfall days (exceeding 30 mm)
 - Less wet days



'Policy' Impacts

- Kyoto Protocol
 - Ratified by PM Rudd in Bali 2007
 - *A political decision that will have policy implications for agriculture*
- A National Emissions Trading Scheme (ETS)
 - Starts 2010
 - Will impact on fuel and energy prices



'Policy' Impacts

- Renewable energy targets
 - 20% National Target
- Exceptional circumstances funding*
 - What is exceptional in future?
 - Shift to
 - Structural adjustment?
 - Adaptation funding?



* note: Presenters personal opinion only

'Peripheral' Impacts

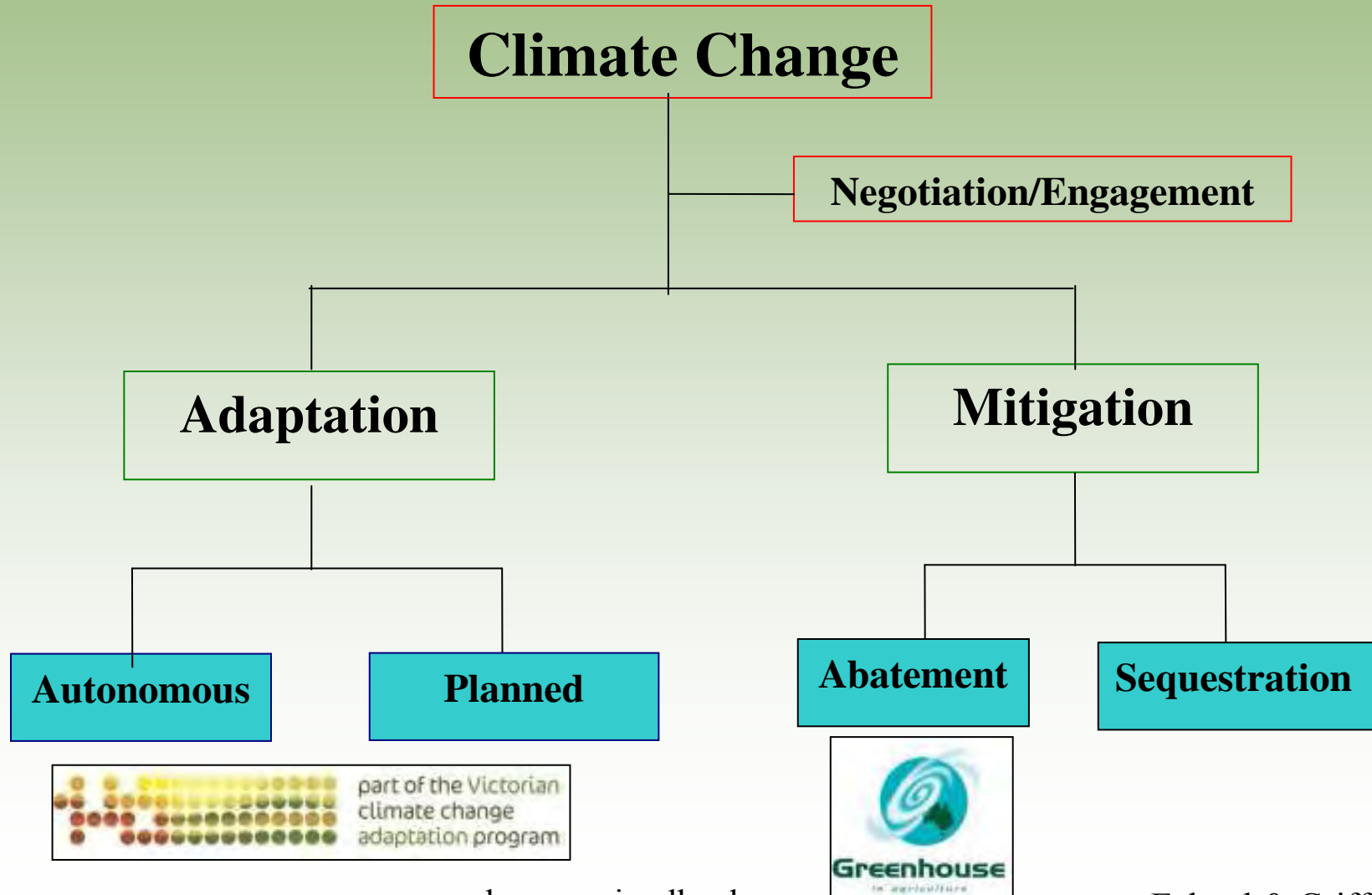
- Food Labelling
 - UK Carbon Trust's Carbon Reduction Label
 - Tesco – Carbon footprint label
 - Future Climate Australia
- Consumer perceptions
 - Increasing environmental awareness
 - Reduced red meat and milk consumption
 - Local farmer markets (opportunity?)
- Carbon Neutral Companies
 - May include processors some day
- Insurance and Financing
 - Extreme climate events?
 - Long-term loans



Food Miles
How well travelled is your dinner?



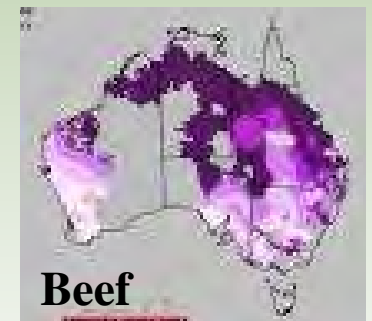
Strategies for Agriculture to Address Climate Change



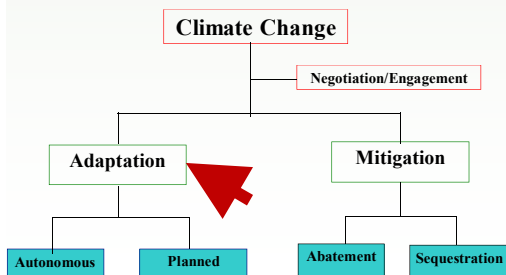
Adaptation

- Australian Agriculture spans

- >3,000 km in latitude
- >4,000 km in longitude
- Covers a wide range of
 - Temperatures
 - Rainfall distribution



- A wide pool of experience to learn from each other



Possible Adaptations to 'Physical' Impacts

Potential CC Impact

- Animal Heat Stress
- Pasture Heat Stress
- Pests, Weeds and Disease
- Grain Availability
- Reduced Irrigation Supply
- Increased winter temps
- Decreased frost frequency
- Decreased winter rainfall

Possible Responses

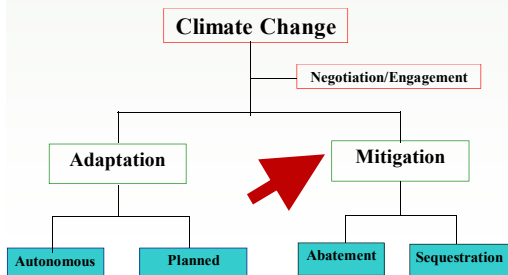
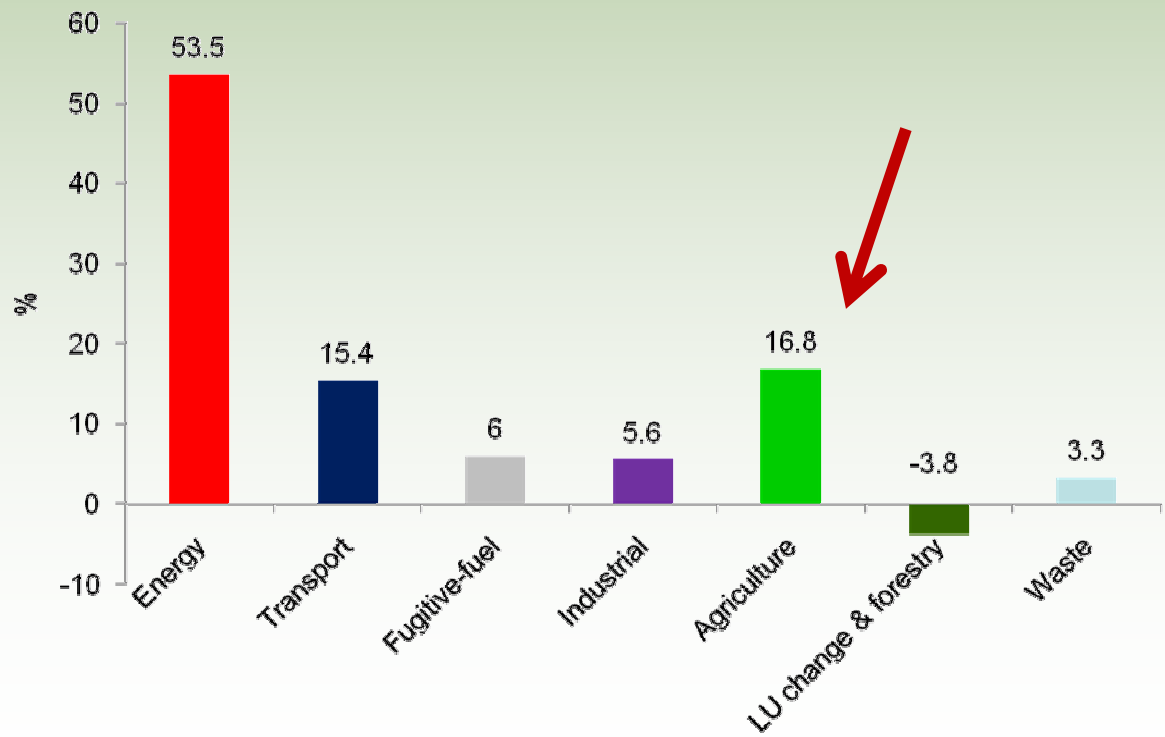
- Breed, Breeding, shade, infrastructure
- Breeding, species change, system change
- Comparisons with northern latitudes
- Contracts, home grown feed
- Major system or technology change
- Improved winter milking conditions
- Improved winter pasture growth
- Still adequate for pasture/crops



Mitigation

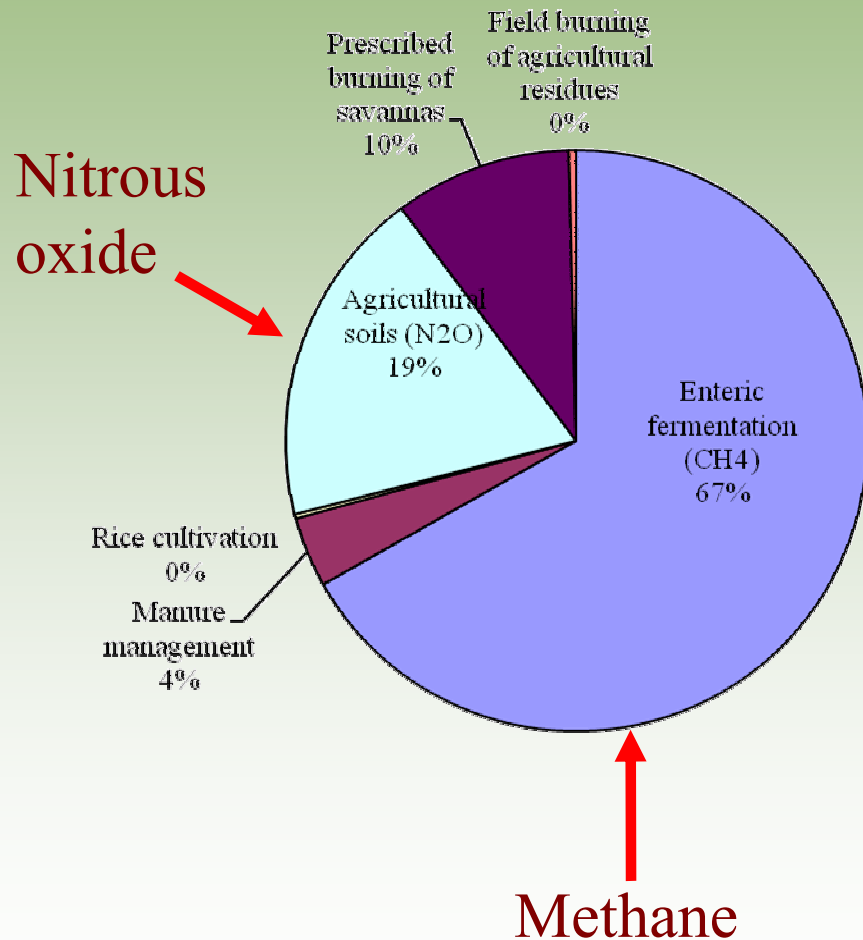
The Problem of Emissions

- Agriculture 16.8%



Mitigation

Sources of Agricultural Greenhouse Gas Emissions 2005



- Agriculture
 - 59% of all methane
 - 84% of all nitrous oxide

Mitigation

Methane Research

- Breeding, Feeding and Animal Management
 - Breeding (-20%)
 - Feeding (-30%)
 - Dietary oils (1:6)
 - Tannins
 - Animal numbers (-10 to 15%)
- Longer-Term options (5 – 20 yrs)
 - Vaccination, Biological Control, Acetogens etc.



Mitigation Nitrous Oxide Research

- Fertiliser management
- Soil management
- Fertiliser formulation
 - Sources
 - Inhibitors
 - Coating on fertiliser
 - Spray for urine



GreenUrea™

eco-n



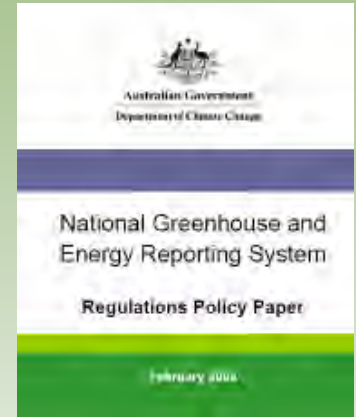
Emissions Trading

- EU GHG Trading Scheme
 - Started January 2005
 - Covers over 11,500 energy-intensive companies
 - €93M/day or > €20 B in 2007
- Chicago Climate Exchange
 - Started in 2003
 - \$6 M/month or > \$53 M in 2007
- NSW GHG Reduction Scheme
 - Started 1 January 2003
 - 1st mandatory GHG – ETS
 - Focused on electricity generation in NSW



Emissions Trading

- Australian Federal Government
 - ETS to start in 2010
 - Designed by 2008
 - Target
 - 60% less GHG by 2050
 - Cap applied to 700 companies & > 70% of GHG
 - Processors and fertiliser companies included
 - Agricultural emissions not included (initially)
 - Can trade in offsets



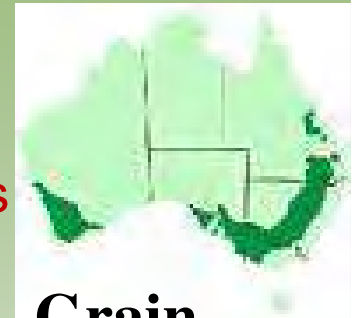
What are Offsets?

- Offset credits
 - New projects or actions to abate emissions
 - NOT already covered by ETS
 - Eg. saving electricity is NOT an offset
 - Liability already covered by power station
- Offset trading
 - Once verified, eligible offsets can be
 - Sold to a company to meet their cap
 - Banked against a future liability



Some Issues in Applying ETS to Agriculture

- Highly trade exposed
 - Insulated by some free allocation of emission permits
- > 130,000 farms in Australia
 - Appropriate & agreed methods for accounting?
 - Simple tools still needed
- Verifying and monitoring of emissions and abatement
 - High transaction costs eroding profits
 - Possible to aggregate abatement activities



Grain



Dairy



Beef



Carbon is well on its way to becoming the world's largest traded commodity.

Agriculture is in the business of using carbon to produce carbon-based products.



Myths and Opportunities

- Tree plantings
 - Generate offsets
 - Need sound advice first
 - Consider forming collectives
 - 1 ha trees (*E. nitens*)
 - 8-20 t CO₂/ha/y for 30 y
 - @ \$38/t CO₂e = \$300 and \$760/ha/y
 - Need to include other benefits
 - Shelter belts, riparian habitats, salinity etc.



Myths and Opportunities

- Agriculture is a natural life-cycle

BUT

- The landscape is now vastly different to 150 years

- Pastures and Crops

- Carbon recycled within 12 months

- Largely neutral

- Except

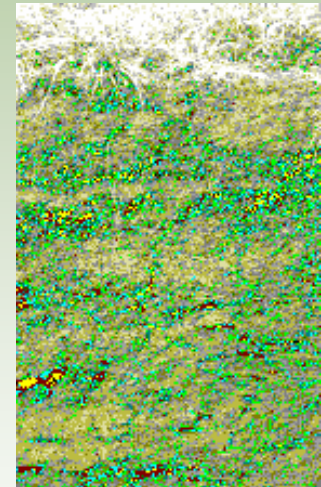
- Cows produce methane (21 times CO₂e)
- N fertiliser is used (310 times CO₂e)
- An emission liability under ETS



Myths and Opportunities

- **Soil Carbon**

- Significant technical and logistical barriers
 - Difficult to monitor and quantify in short-term
- A big Input vs Output balance
 - Inputs = plant residues and fire
 - Outputs = decomposition and mineralisation
- Affected by
 - Solar radiation, temperature, water & nutrients
 - Water mainly sets the upper limit
- BUT – in principle a good practice!



Myths and Opportunities

- Issues with Trading Offsets
 - Once sold, you manage for the new owner
 - eg. no ploughing
 - A drought can mean a liability is created
 - You have to pay the new owner back
 - Additionality
 - Not just Best Practice
- Beware of 'evangelastic' snake-oil merchants



Myths and Opportunities

- What are likely offsets?
 - Trees on farm
 - Net soil carbon change?
 - Wool, Cotton, Wood, Bagasse
 - Needs negotiation
 - Reductions in methane & nitrous oxide
 - Dietary supplements, animal numbers
 - Fertiliser coatings and inhibitor sprays



Conclusions

- Physical, Policy and Peripheral impacts of Climate Change
- Currently options for Ag under ETS are limited
 - But research on mitigation options is promising
 - Agriculture needs to engage in negotiations
- Climate Change does not have to spell ‘disaster’
 - May be as many opportunities as threats
- To capture the opportunities
 - Information and Negotiation
 - Mitigation and Adaptation

