Reducing nitrogen losses & greenhouse gas emissions

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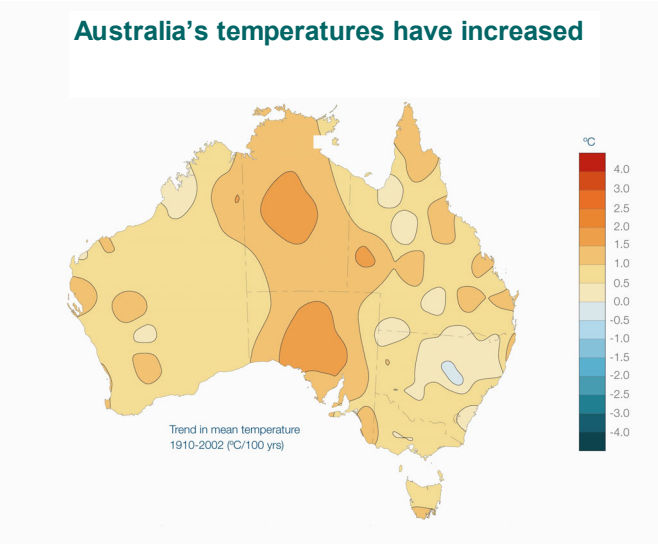
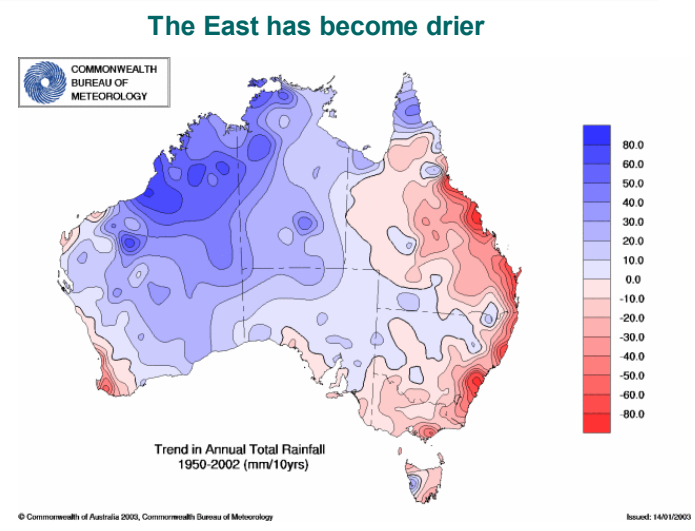
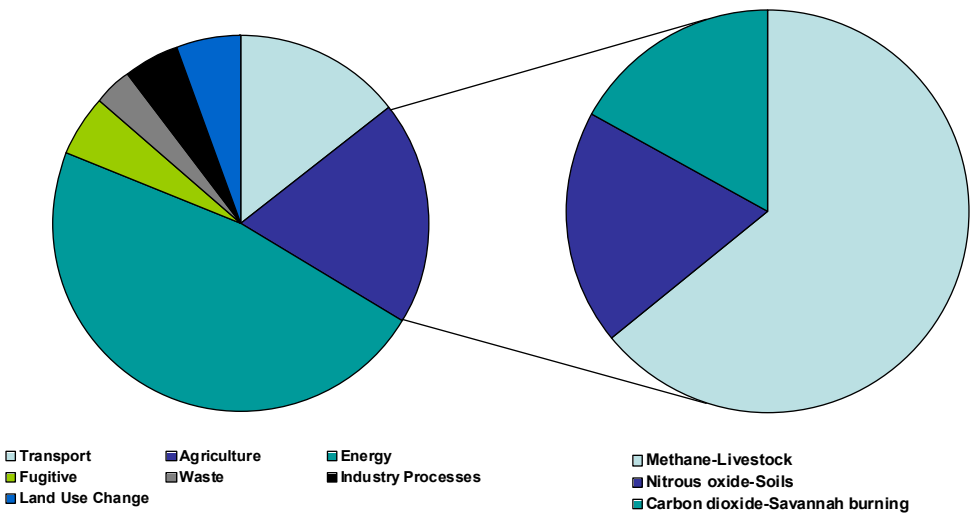
The facts





- These climate changes are attributed to global warming, a direct result of increased emissions of greenhouse gases.
- The agricultural sector is the Australia's 2nd highest emitter of greenhouse gases (106 MT CO_2-e) and largest emitter of nitrous oxide (N_2O) – the latter from soils receiving mineral N fertilizers or organic manures.
- N_2O is over **300** times more potent as a greenhouse gas than CO_2
- N_2O emissions have **increased by 25%** since 1990.

Sources of emissions in Australia

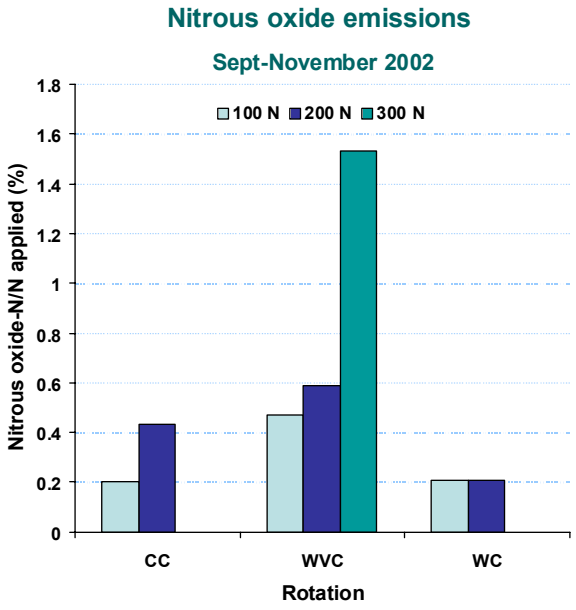


What does this mean in the cotton industry?

- In a normal season, the Australian cotton industry uses up to 100,000 tonnes of nitrogen fertilizer.
- Up to **one-half** of this fertilizer may be lost to the atmosphere after application.
- Total cost of this loss alone may be as much as $6000 for every 100 ha of cotton – a significant economic liability.
- A proportion of this nitrogen lost is N_2O - BUT we don't know how much!
- N_2O may also be considered a potential indicator of total N loss.
- This loss is an environmental liability and if not well understood must be considered a business risk.

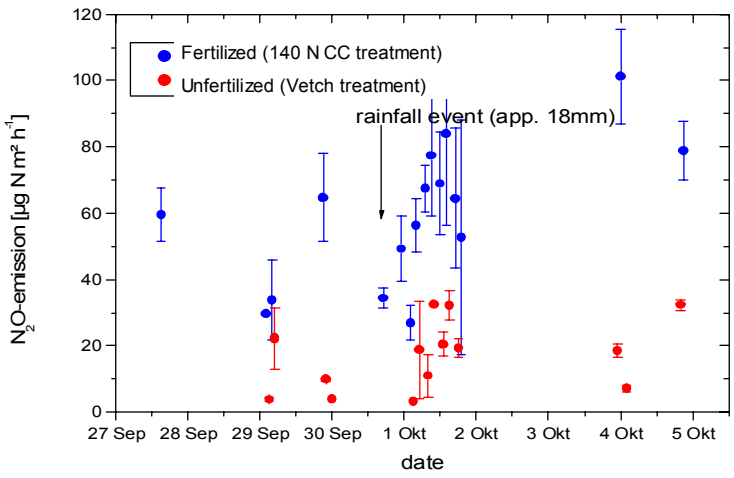
What is being done?

- Preliminary field studies have been conducted at ACRI Narrabri in 2002 to determine N_2O emissions in continuous cotton (CC), wheat-vetch-cotton (WVC) and wheat-cotton (WC) rotation systems.



- The full season estimate for the 300 kg N WVC treatment is 3% of applied N - well above the global average.
- Estimated total N loss from CC exceeded 40% of applied N.

- In collaboration with the Institute for Meteorology and Climate Research (Germany) and the Australian Greenhouse Office, continuous monitoring equipment is now measuring all greenhouse gases – CO_2, N_2O and CH_4
- Data from 2003-04 confirms that the magnitude of N_2O emissions is highly dependent on the source of available N (see figure below).



Conclusions

- Agricultural practices which maximize nitrogen and water use efficiency and increase soil organic matter stores will also reduce greenhouse gas emissions and provide a win-win situation for cotton growers in terms of economic & environmental sustainability.
- Soil and region specific Best Management Practices are being developed to reduce greenhouse gas emissions and ensure N losses are minimized for maximum return.

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Australian Government
Cotton Research and Development Corporation

Cotton CRC

Greenhouse Accounting CRC

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