N fluxes, balances & use efficiencies in Australia. - a focus on grazing-based dairy production

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Agriculture in Australia

Agriculture ~4% of GDP

500 M ha of farming land (~60% of total area)
- 50 M ha cropping, 1 M ha intensive pasture
- EU-28 ~176 million ha (~40% of the total area)

Agriculture ~12% of export earnings (was 66% in 1980s)
- Beef and sheep meat = AUD $9 billion (Euro $7b)
- Grains Industry = AUD $7 billion
- Dairy Industry = AUD $2.5 billion
- Sugar Industry = AUD $1.3 billion
World and Australian use of nitrogen fertiliser.

N based fertilisers applied to 33 M hectares of farm land.
Cereal Production N balance - (inputs minus outputs) and efficiency

Source: FAO STAT, IFA and IPNI.
BNF and manure not included.
UN Country 3 letter code.
Specific Regional Concerns

Reef Plan
- GBR Protection Act (2009)
- $250 M over 5 years Qld and Federal Govt.
- Targets broad-scale grazing in the dry tropics, sugarcane in the wet tropics.
Nitrogen imports, exports, and surplus (kg N/ha) for an average Australian dairy farm between 1990 - 2012
Nitrogen inputs and milk production

Strong link between nitrogen inputs and productivity

- $R^2 = 0.6317$
- $R^2 = 0.81$

Gourley et al. 2012
Victorian dairy farm

- 167 cows
- 67 ha
- 2.9 cows/ha
- 29% reliant imported feed