Greenhouse gas emissions from Australian beef cattle feedlots



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OBJECTIVES

- 1.To measure CH₄, N₂O, NH₃ and NOx from representative Australian beef cattle feedlots, to update the livestock emission accounting system.
- 2.To demonstrate the link between livestock management practices and greenhouse gas emissions











Of 28.8m beef cattle, 680,000 are on a feedlot at any one time.

Atmospheric dispersion modelling WindTrax[©] used to calculate emissions,











RESULTS

113 g CH_4 head⁻¹ d⁻¹, (similar to IPCC Tier II)

176 g head⁻¹ d⁻¹ (3 times IPCC Tier II)

 N_2O emission was 3.3 g head⁻¹ d⁻¹ (50% of IPCC).

□5 tones urea equivalent of NH_3 lost per day , Direct and indirect N_2O (in CO2-e) is equivalent to 60% of the feedlot CH_4 emission.



WNMM—spatially referenced water and <u>nutrients</u> <u>management mode</u>, it simulates:

- Soil water dynamics
- Plant growth
- Comprehensive C and N cycling, including N₂O emissions





Soil type: 88 in village: Nanliu Recommended Agricultural BMPs	√B/ba/yr
Recommended Agricultural BMPs N Fertiliser Application Individual Evaluation Indices No Date Amount (kg N/ha/yr Method No Individual Evaluation Indices	/B/ba/yr
N Fertiliser Application Individual Evaluation Indices Integrated Evaluation Index Thousand R No Date Amount (kg N/ha/yr Method No Index Amount 1.2	MB / ha / yr
No Date Amount (kg N/ha/yr Method No Index Amount 1.2	ner ner yr
	T 20
1 277 50 DP 1 Crop yield (kg/ha/yr) 15266	20
2 82 50 DP 2 Irrigation water (mm/yr) 420 High	
3 192 100 DP 3 N fertiliser (kg N/ha/yr) 200	
4 U U DP 4 NH3 Volatilisation (kg N/na/yr) 21.20	
Irrigation Operation 6 N2O emission (kg N/ha/yr) 3 39 MEDIUM 0.6	- 10
No Date Amount (mm) Method 7 N leached beneath 1.8 meters 9.51	
1 278 60 Flood	
4 102 60 Flood	
5 118 60 Flood Price of grains (RMB / kg) : 1.02 N input Gr	ain Outnut
6 140 0 Flood	an output
7 171 60 Flood	
8 192 60 Flood	
✓ User specification	
Becommended Agricultural BMPs under User Specification	
N Fertiliser Application Index Operation Individual Evaluation Indices Integrated Evaluation Index Thousand D	4B/ha/vr
2121 Amount No Date Amount (ka MbaAr Method No Date Amount)	
2127 1 277 75 DP 1 Crop vield (kp/ha/r) 15403	20
2124 2 82 100 DP 2 Irrigation water (mm/yr) 420 HIGH	
2125 3 192 120 DP 3 N fertiliser (kg N/ha/yr) 295	
24125 4 0 0 DP 4 NH3 volatilisation (kg N/ha/yr) 22.48	
21118 Irrigation Operation Charles Charles (kg N/ha/yr) 7.91 MEDIUM 0.6	- 10
21211 6 N2 Cernission (kg N/ha/yr) 3.98 21115 No Date Amount (mm) Method 7 N leached beneath 1.8 meters 10.53	
21119 1 278 60 Flood	
2131 2 329 60 Flood	
Ninput Gr	an Output
0 140 0 160 7 171 60 Flood 8 192 60 Flood	





NH₃ loss accounting for 11-48% (up to 90kgN/ha) of N applied to maize with two days after application.

Measured and simulated NH₃ volatilisation in alkaline soil in north China WNMM





N₂O Emissions in China



Winter wheat and summer maize rotation in Fengqiu County in The North China Plain (Li et al., 2005. GBC)

Validation: three key outputs should be validated before validation of N₂O, example of WA Rain-fed



Irrigated pasture at Kyabram, VIC



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Identifying BMPs







