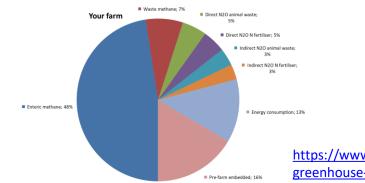


How do we estimate greenhouse gas emissions?

- Australian Federal Government estimates and reports GHG emissions every year to IPCC
- Calculated using the Australian National Greenhouse Gas Inventory (NGGI)
 - contains a series of equations and emission factors to estimate GHG emissions
 - methane and nitrous oxide reported in Agriculture,
 - electricity and fuel reported in Energy,
 - tree and soil carbon sequestration reported in Land Use Change.
- Developed the DGAS/ ADCC calculator to bring together pre-farm (embedded emissions), on-farm methane and nitrous oxide and energy consumption into the one tool

Dairy greenhouse gas emissions

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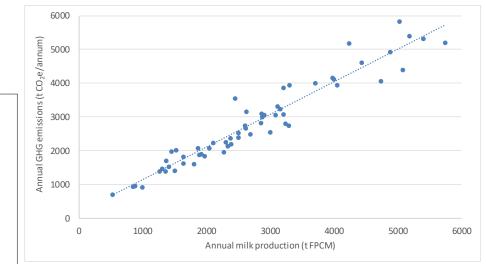


- Herd numbers, liveweights, liveweight gain (young stock)
- Milk production
- Diet quantity and quality
- Fertiliser inputs, especially N
- Electricity and diesel consumption
- Purchased supplements
- Manure management (default or user defined)
- Carbon sequestration in trees (static approximate)

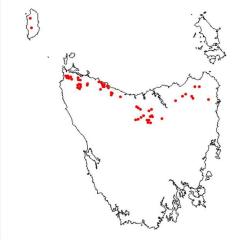
https://www.dairyingfortomorrow.com.au/tools-and-guidelines/dairygreenhouse-gas-abatement-calculator/



Dairy greenhouse gas emissions



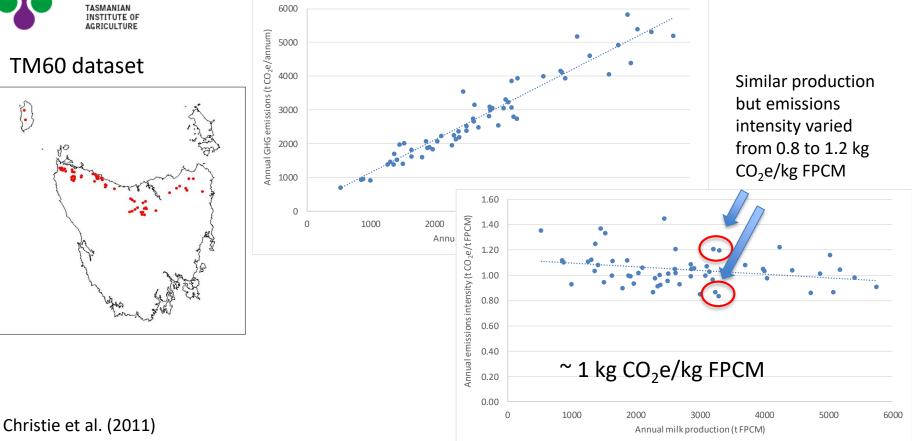
TM60 dataset





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Dairy greenhouse gas emissions

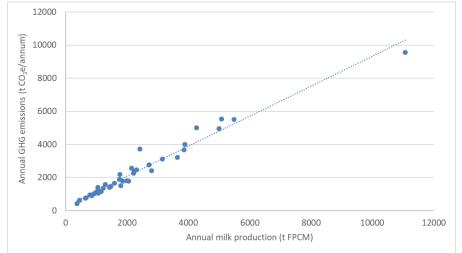




A4N dataset

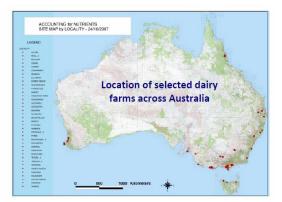


Dairy greenhouse gas emissions

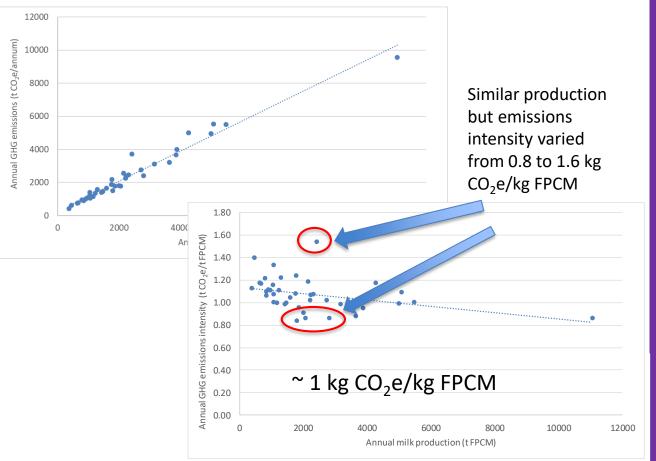




A4N dataset



Dairy greenhouse gas emissions



Christie et al. (2012; 2018)



Dairy greenhouse gas emissions

- NGGI methodology is updated as new science emerges
- We have a range of tools to estimate dairy GHG emissions (all based on national inventory methodology)
 - DGAS/ADCC (DairyingforTomorrow website)
 - DairyBase/ Dairy Farm Monitor Project
- Estimate tree and soil carbon sequestration, we need to use FullCAM
- There currently appears to be a lower limit of around 0.8 kg CO_2e/kg FPCM
 - Need new science to help us reduce this further
 - Need carbon sequestration to offset the balance

Carbon Neutral Accounting

- Greenhouse Gas emissions
 - DGAS/ADCC
 - Consistent with national inventory

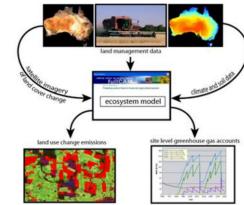
		Milking Cows	Heifers >1	Heifers <1	Mature bulls	Immature bulls	•
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Liveweight gain	•		0.7	0.7	1	0.7	kg/day
Milk production	•						
•	Select option for milk production	litres per h	erd per annum	Amount of	Amount of milk produced		litres of milk
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14.7 kg DM/cow.day	Hav						
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Click here for help with feed quality	Other						
Check here for help with feed quality	Total (kg DM/day) or average (%)	18.0		1	6.0	18.6	
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ADCC/DGAS can be found at

https://www.dairyingfortomorrow.com.au/tools-andguidelines/dairy-greenhouse-gas-abatement-calculator

- Carbon stocks and fluxes
 - FullCam
 - Soil carbon
 - Vegetation carbon

– Note – only fluxes count!



FullCAM can be found at

https://publications.industry.gov.au/publications/climatechange/climate-change/climate-science-data/greenhouse-gasmeasurement/land-sector.html