Climate Clever Beef

FutureBeef

Cattle versus carbon: Finding the win-win

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Thank you to the Gibson family at Coonabar

Regional Group Collaboration
- Fitzroy Basin Association
- Queensland Murray-Darling Committee
- Desert Channels Qld
- Northern Gulf Resource Management Group

Australian Government

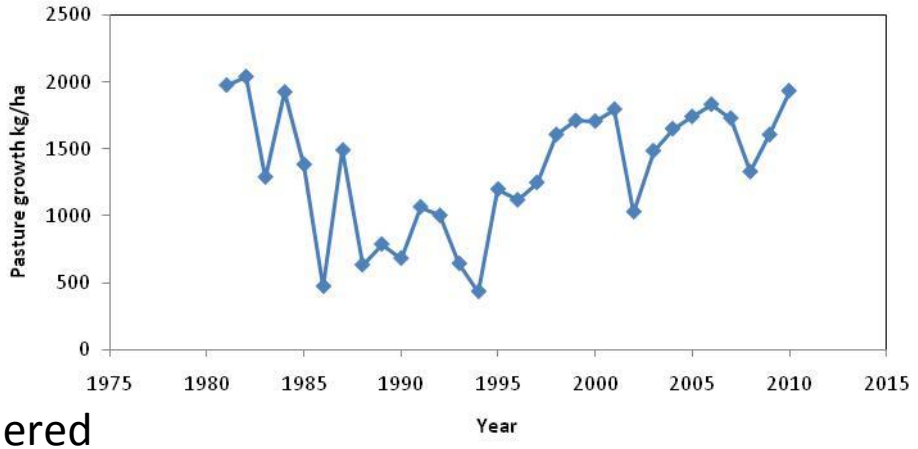
Queensland Government

Northern Territory Government

Northern beef industry

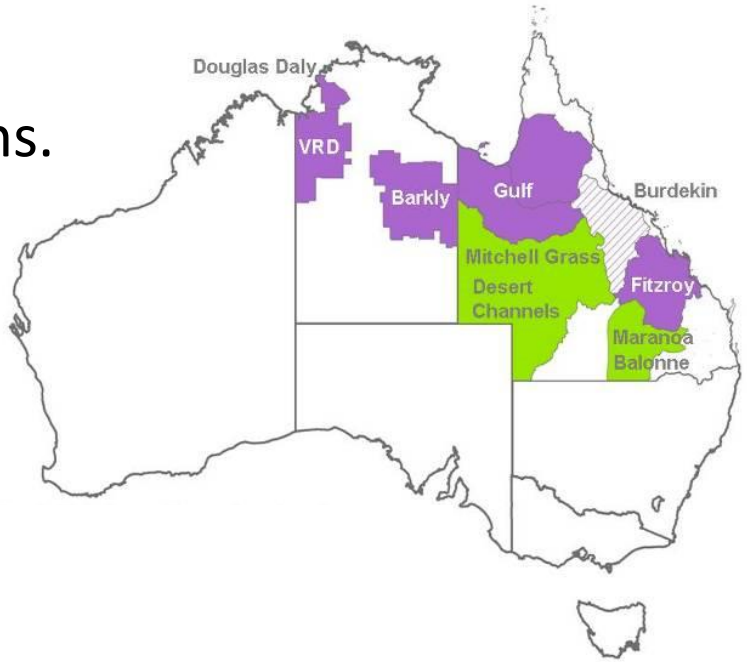
- Aust. beef industry 7th largest in world.
- Nth ~14 million head, ~250 million ha land use

- Water quality (e.g. sediment on Great Barrier Reef)
- Land condition
- Greenhouse gas emissions
- Impact of climate variability
- Profitability pressures



Management change needs to be carefully considered to ensure appropriate productivity and environmental outcomes

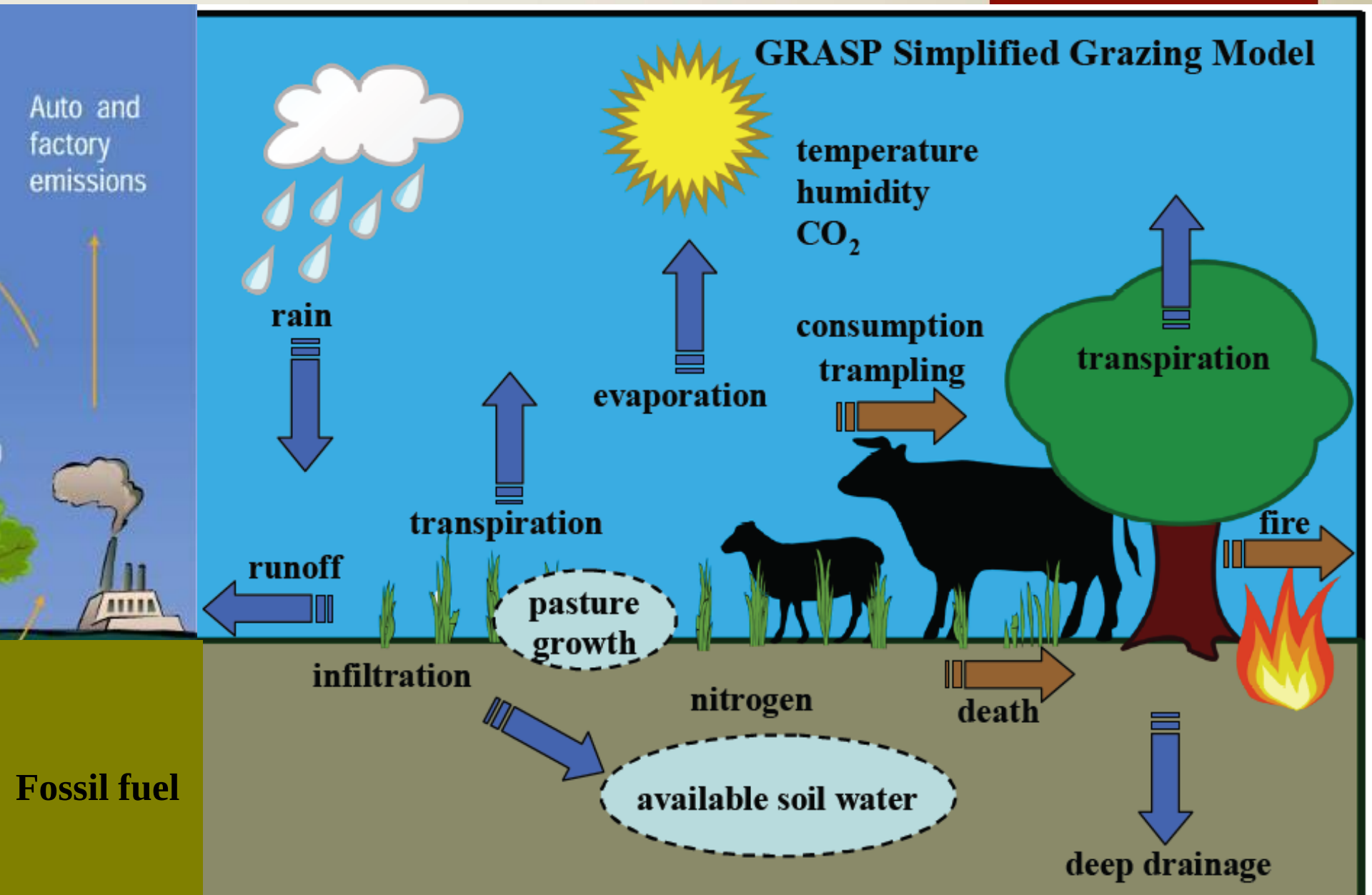
Climate Clever Beef project



- Evaluate ‘Carbon Farming’ project options.
- What impact will it have on the beef business?
- 6 regions, 26 businesses
- Focus on livestock methane, soil carbon and regrowth.

- Improving business efficiency and profitability

What affects carbon balance



Brigalow scrub country

- Fitzroy region is well known for it's productive land types

- High proportion cleared
- Moderate to high soil fertility
- Mostly sown to buffel grass
- Pasture rundown becoming an issue in many areas

- Generally used for cattle growing and fattening
- Most breeding occurs on less fertile land types

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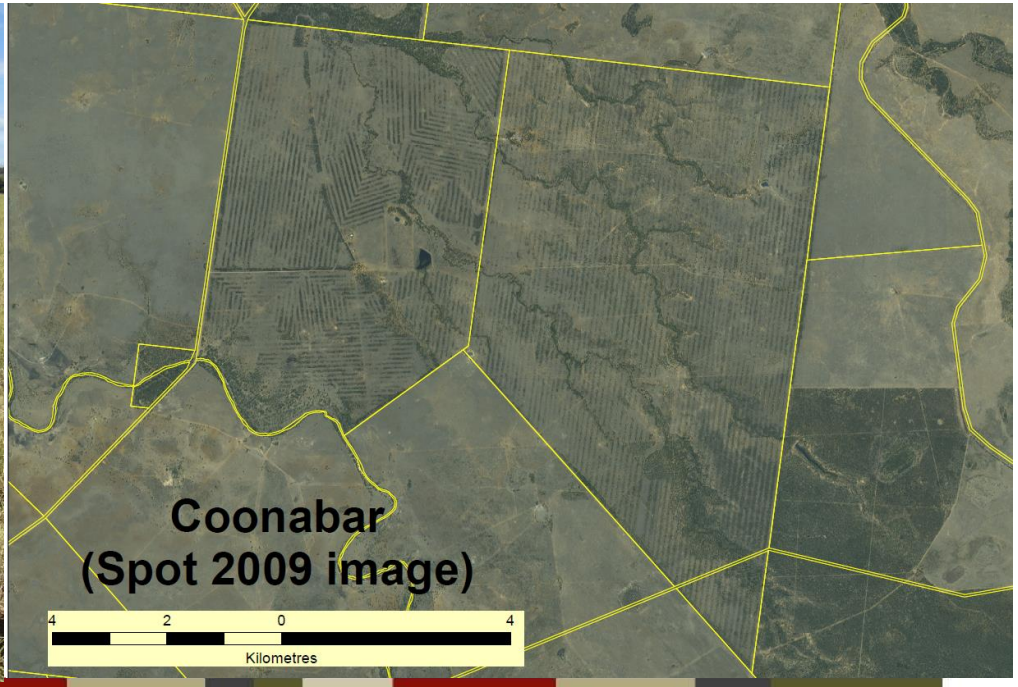
Regrowth has been retained in strips across the property

- Gibson family are interested in evaluating their regrowth management options, particularly as there may be ‘carbon farming’ or ‘environmental offsets’ markets which may contribute to the profitability of their business.



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Key questions are:

- What are the benefits and tradeoffs for retaining regrowth on Brigalow country in central Queensland (soil and vegetation carbon, livestock productivity)?

- What is the optimal level of regrowth retention for beef profitability?

- What is the potential for additional income from retained regrowth through ‘carbon farming’ or ‘environmental offsets’ in combination with the livestock business?

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We measured three treatments

Graslan | Retained regrowth | Remnant



Pasture
Trees
Soil carbon
Livestock

Bioeconomic modelling to assess options at the property-scale

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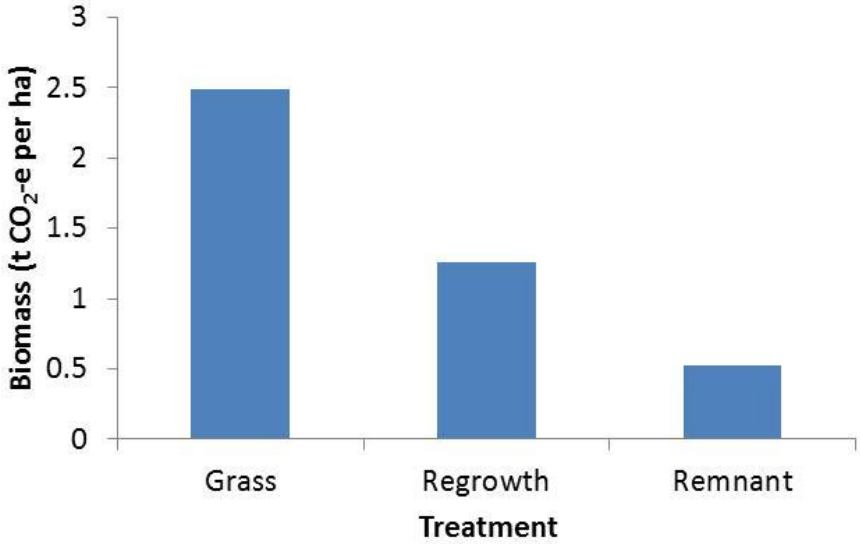
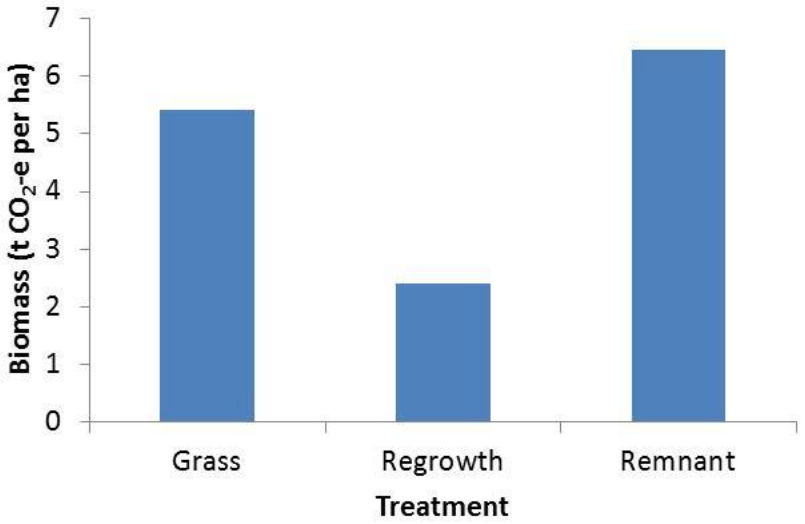
Pasture



Litter



Grass strip had twice as much pasture as regrowth which had twice as much pasture as the remnant strip

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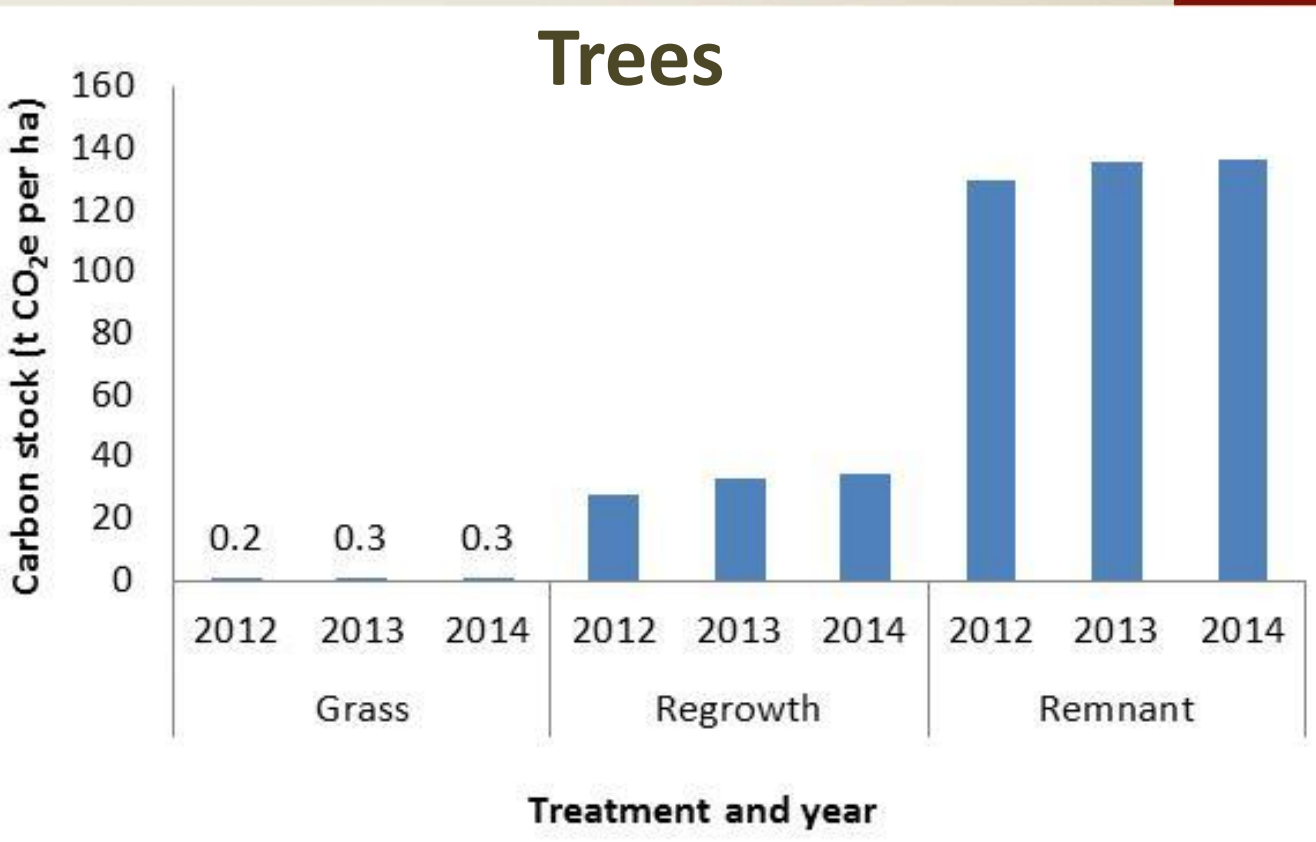

Large potential for regrowth to continue to grow and sequester carbon

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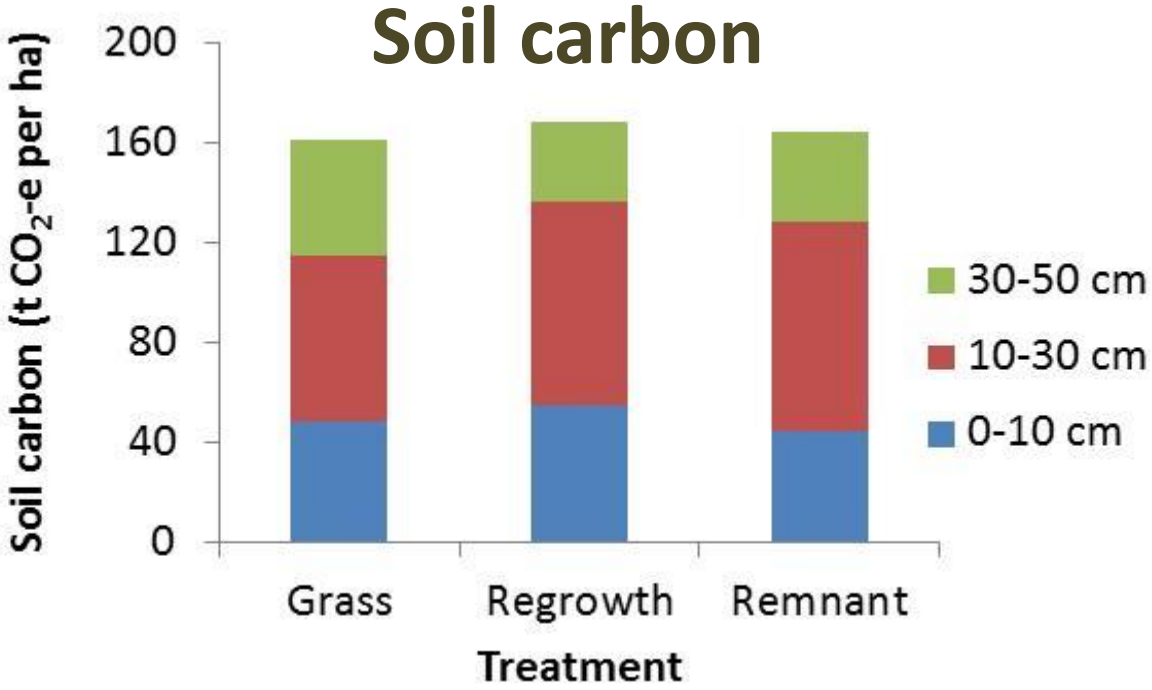

- Little difference in soil carbon with good pasture management
- Variability and results from other studies indicate that a soil carbon project in grazing land would be risky

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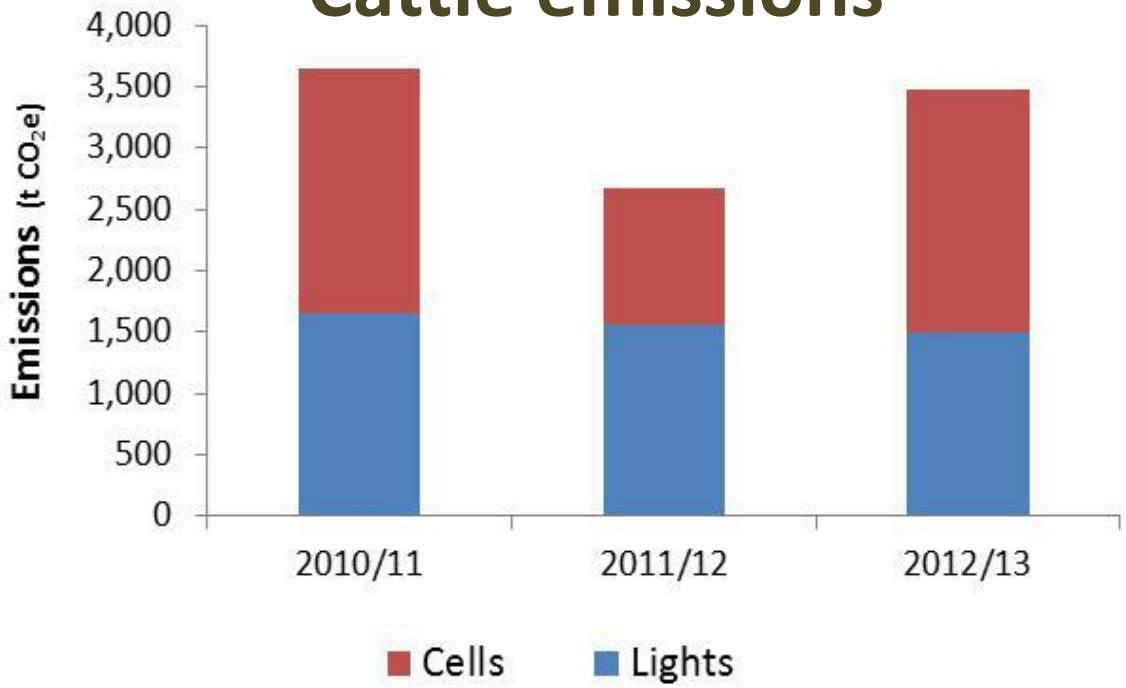
Cattle emissions

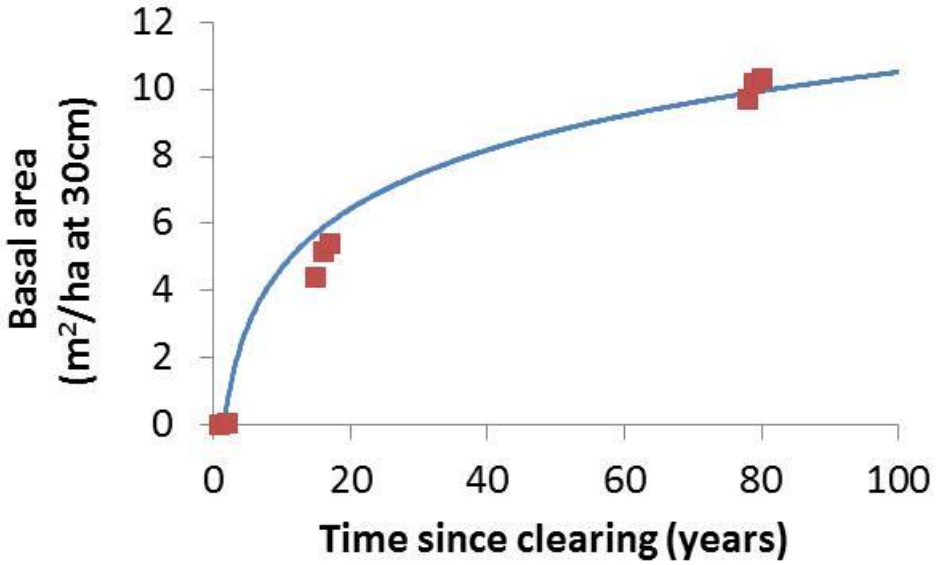


Variable between seasons. Emissions per beast depend on LW and LWG

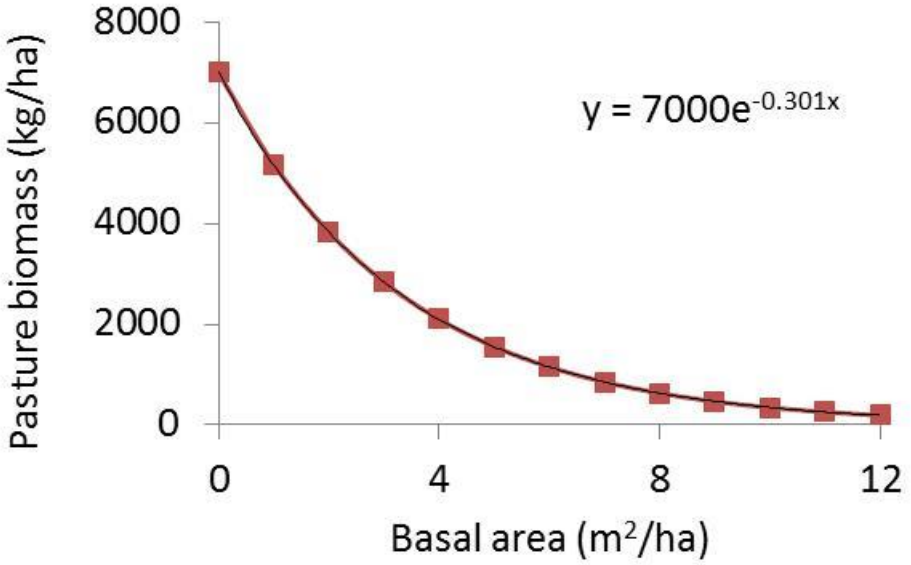
Approximately 2.1 t CO_2e per adult equivalent per year

Coonabar - Bioeconomic modelling

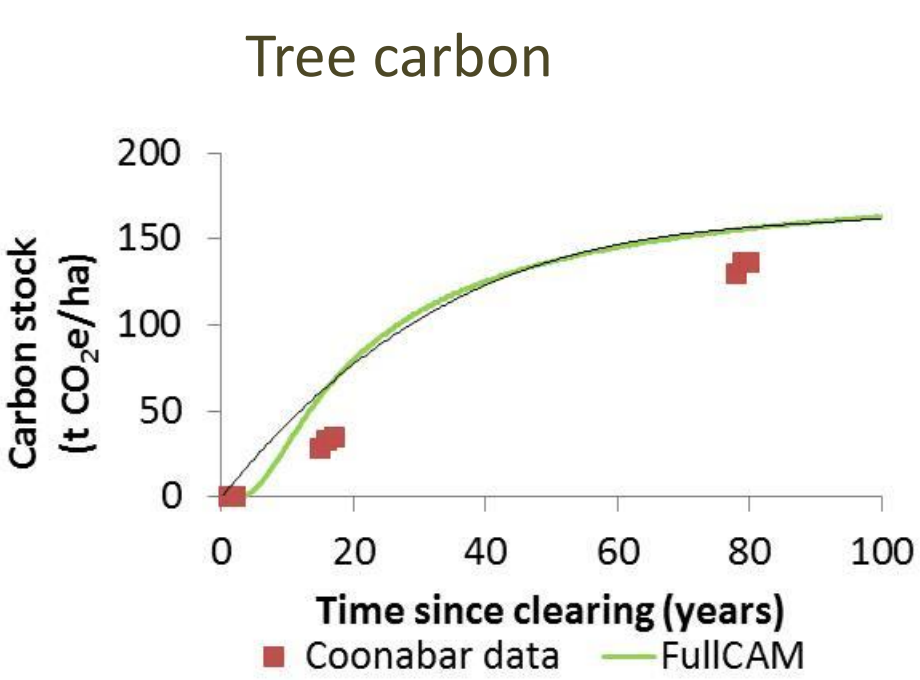
Tree growth



Tree grass relationship



Coonabar - Bioeconomic modelling



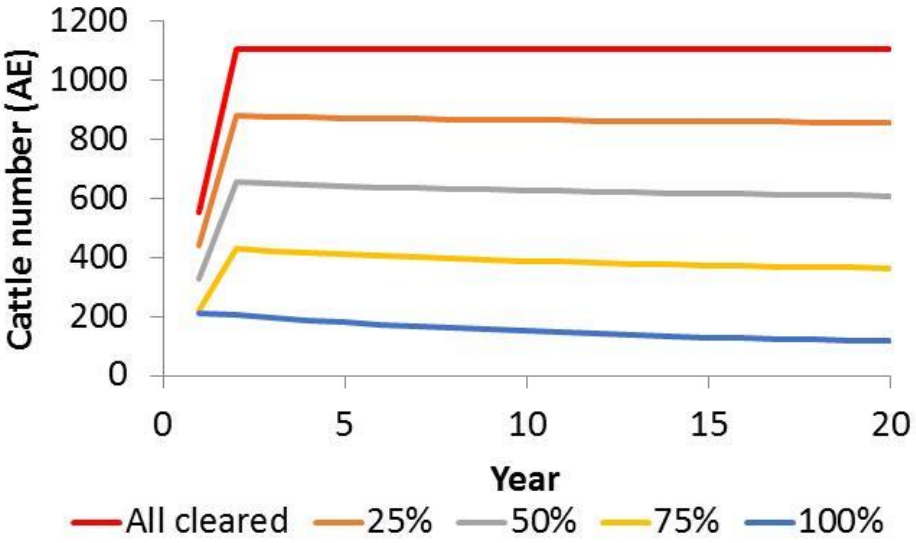
Assumptions

- 2100 ha of Brigalow country
- Paddock was 15 year old regrowth
- Soil carbon no change
- Livestock at safe carrying capacity
- 5 levels of regrowth retained

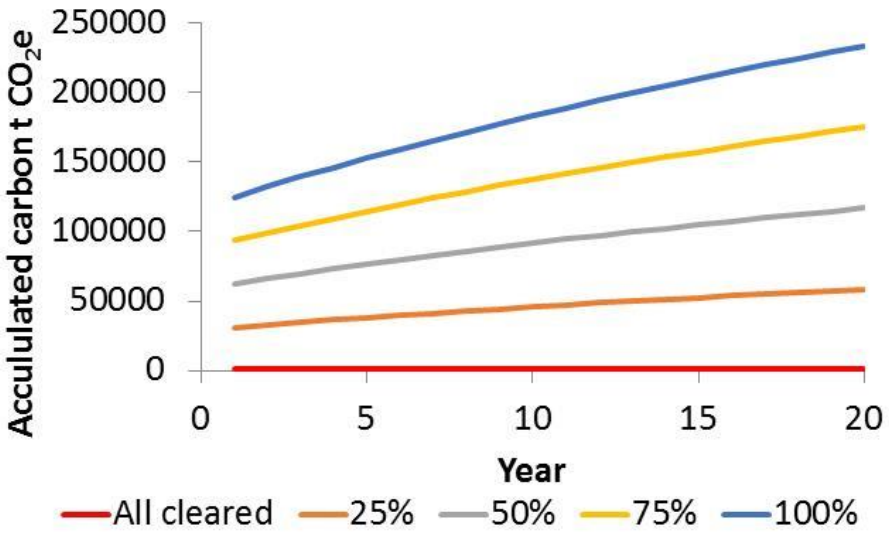
- GM per AE $249
- Clearing costs $150/ha
- Discount rate 6%
- Carbon project costs $9200/year

Coonabar - Bioeconomic modelling

Cattle number



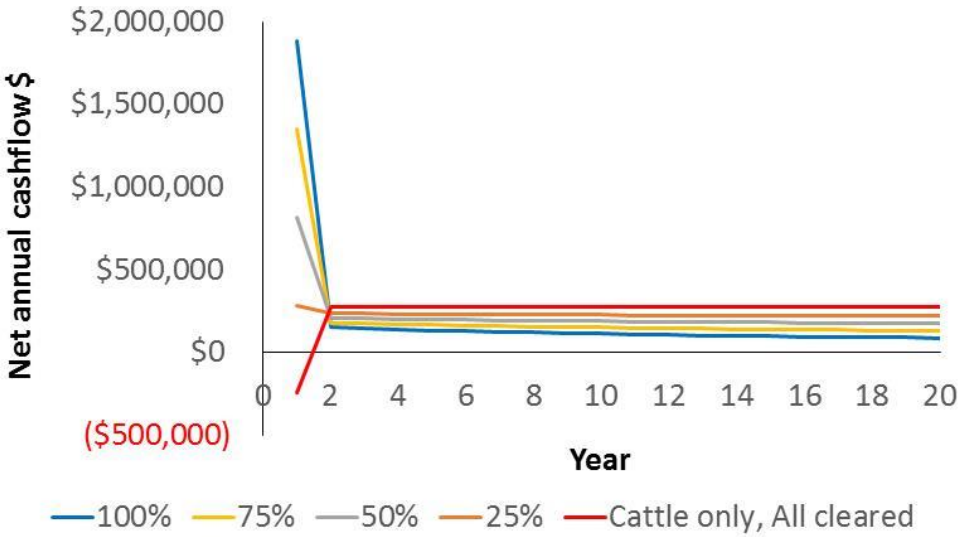
Accumulated carbon



Need to take into account the business objectives and the impact of maintaining regrowth in the long term.

Coonabar - Bioeconomic modelling

Net annual cashflow and NPV at $15 per t CO_2e



Treatment	NPV
100% retained	$3,233,826
75% retained	$3,104,005
50% retained	$2,973,735
25% retained	$2,843,351
Cattle only, All cleared	$2,823,742

NPV was higher with the more regrowth retained due to sale of the current regrowth in the early years and the significant clearing costs if the regrowth was cleared

Coonabar - Bioeconomic modelling

NPV for 100% retained for a range of carbon prices

Carbon price $/t CO_2e	NPV
$0 Cattle only	$2,823,742
$5	$1,316,987
$10	$2,275,407
$15	$3,233,826
$20	$4,192,246

Breakeven price approximately $13.20 /t CO_2e



Comparison to other studies

Oaklands – Eucalypt country

- 25% of the property was Box regrowth
- Tree grass relationship ‘flatter’
- Less severe impact on cattle numbers
- Lower gross margin for cattle

- Breakeven carbon price was around $4

Coonabar - Summary

- The cattle herd declined as regrowth was retained.
- Cattle were still a significant income when regrowth was retained.
- NPV was higher with more regrowth retained due to sale of the current regrowth in the early years and the significant clearing costs if the regrowth was cleared.
- Need to take into account the business objectives and the impact of maintaining regrowth in the long term.
- Cost and benefits of carbon will vary as carbon farming markets evolve, as carbon prices change, as tree growth rates vary and with the amount of regrowth retained.
- Careful business analysis required.



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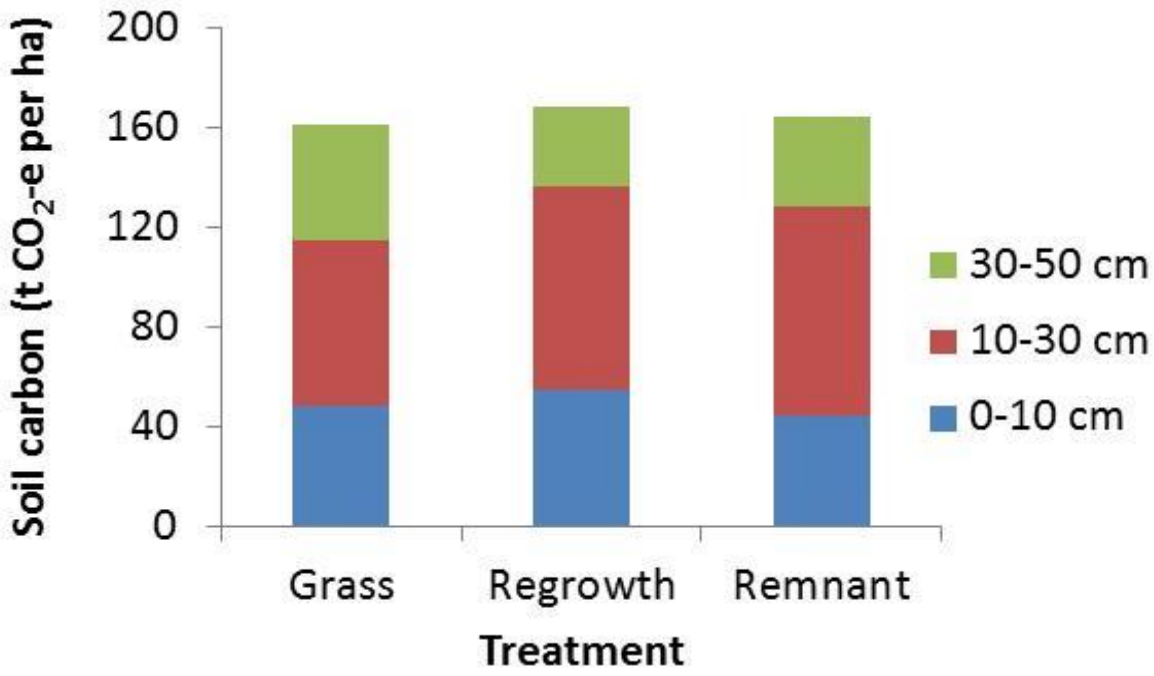
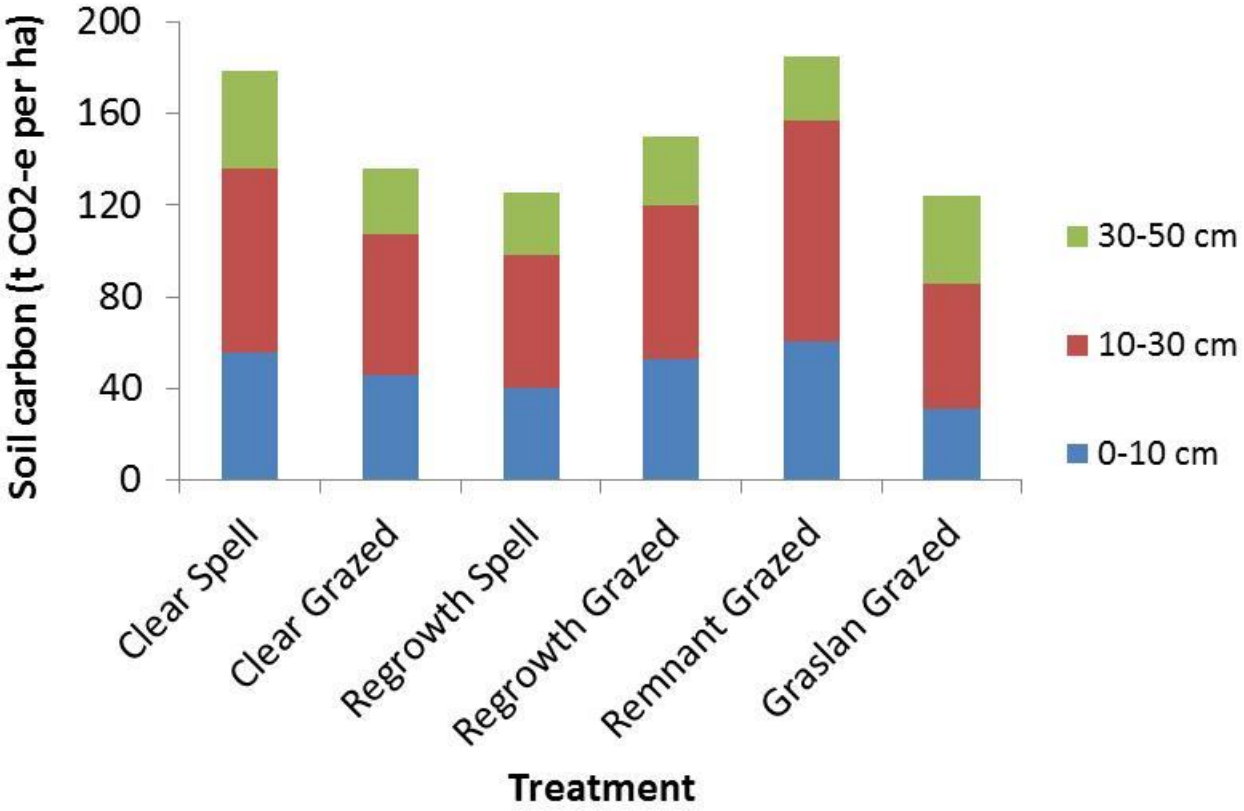
Soil carbon



- Little difference in soil carbon with good pasture management

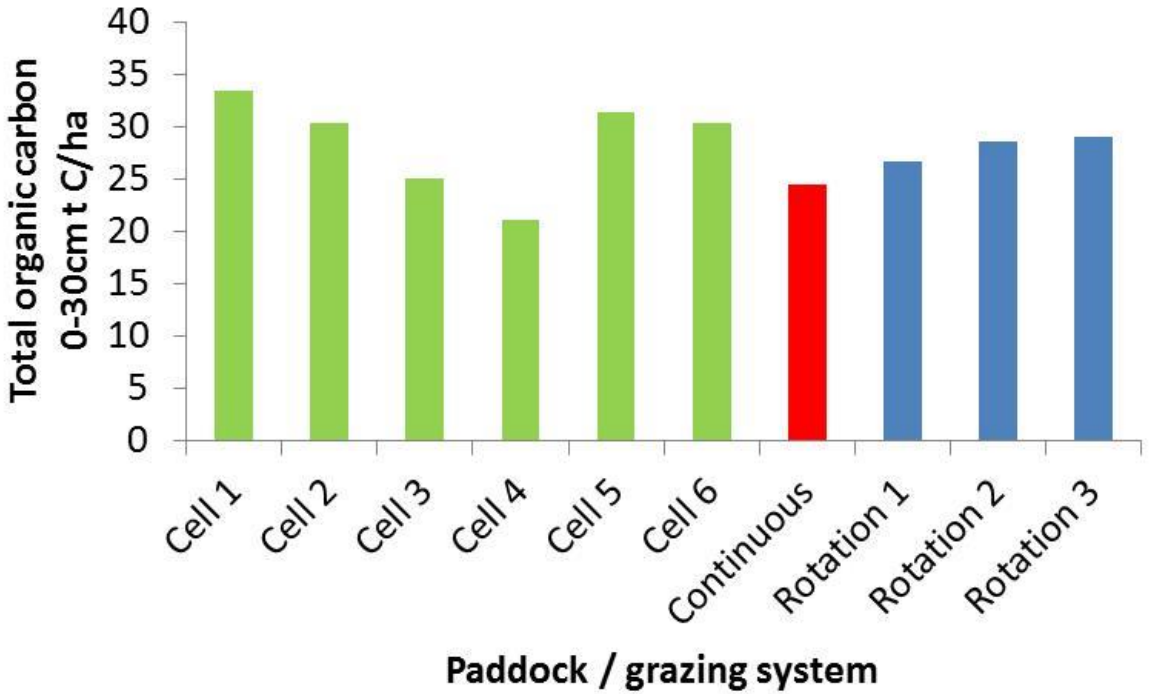
Oaklands - Soil

- Compared: Remnant Box, regrowth, graslan cleared, continuously grazed and spelled
- No consistent trends



Berrigurra - Soil

- Compared grazing systems: cell, rotation and continuous
- No consistent trends
- Variability and results from other studies indicate that a soil carbon project in northern grazing land would be risky

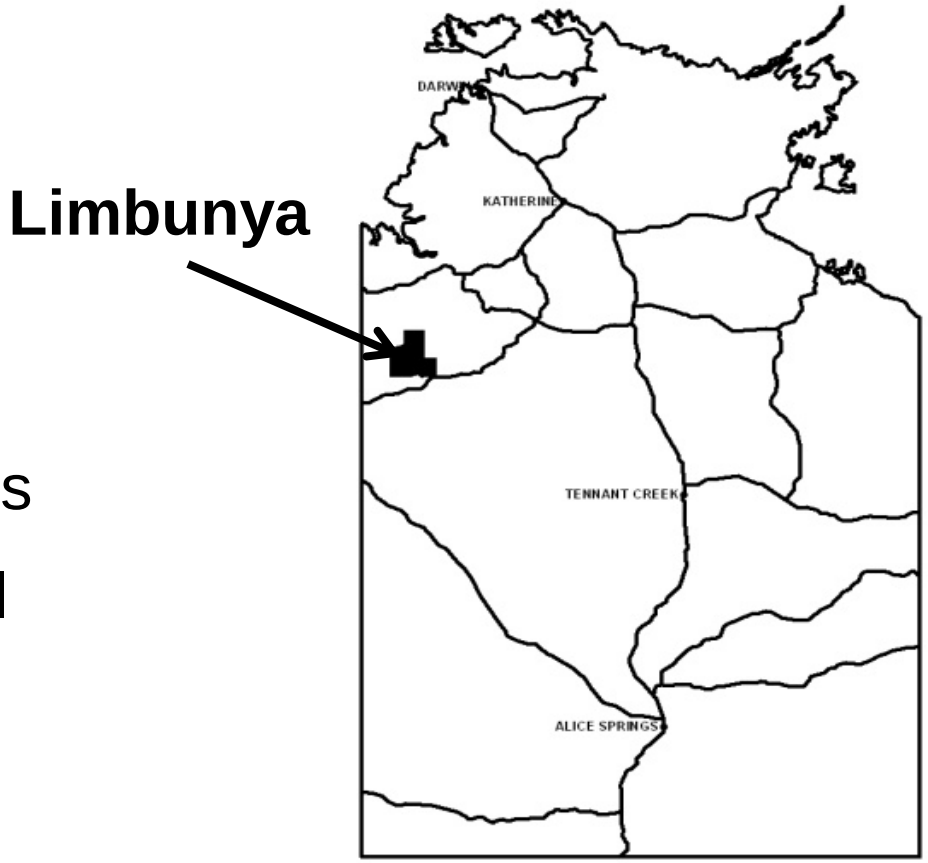


Allen, D.E., Pringle, M.J., Bray, S., Hall, T.J., O'Reagain, P.O., Phelps, D., Cobon, D.H., Bloesch, P.M., and Dalal, R.C. (2014) What determines soil organic carbon stocks in the grazing lands of north-eastern Australia? *Soil Research* **51**(8), 695-706.

Improving weaning rates

Victoria River District - Limbunya station

- 5,222km²
- Private company owned
- ~30,000 adult equivalents
- ~634mm average rainfall



NT DPI Dionne Walsh, Peter Shotton and David Ffloulkes

Improving weaning rates

- Reduce stocking rate by 5%
- Preg-test and sell unproductive breeders
- Best practice weaning incl. weaner supplementation
- Run heifers in “higher nutrition” paddocks
- Keep older breeders if they are still healthy and PTIC

Improving weaning rates - Results

- Smaller breeder herd size but 4% more calves weaned
- Mortality rates 2% lower – better nutrition
- Slightly more live weight sold per year
- Herd GM about 14% better, $30,000 improvement in EBIT
- GM per AE improved from $47 to $57

- Total emissions down from 31,300 to 28,900 tCO_2e
- Emissions intensity down from 17.5 to 16.0 tCO_2e/t LW sold
- Abatement potential $24,000 @ $10 / tCO_2e (gross)

Conclusion

- Will reduction in greenhouse gas emissions be achieved.
  - Depend on the property situation and business goals.
  - Regrowth retention may provide options.
  - Soil carbon is variable and often unresponsive resulting to high soil carbon project risk.
  - Improving herd efficiency and GHG intensity should be a goal for all beef businesses. Win-win situation.

- Need to undertake comprehensive business analysis to assess options and then monitor the benefits

- Other case studies available on Climate Clever Beef website.
  - www.futurebeef.com.au