AGRISTA

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MEAT & LIVESTOCK AUSTRALIA

PRODUCTIVITY & PROFITABILITY
series

The ‘so what’ of carbon in agriculture

Presenter: Cam Nicholson

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Why should we care about carbon?

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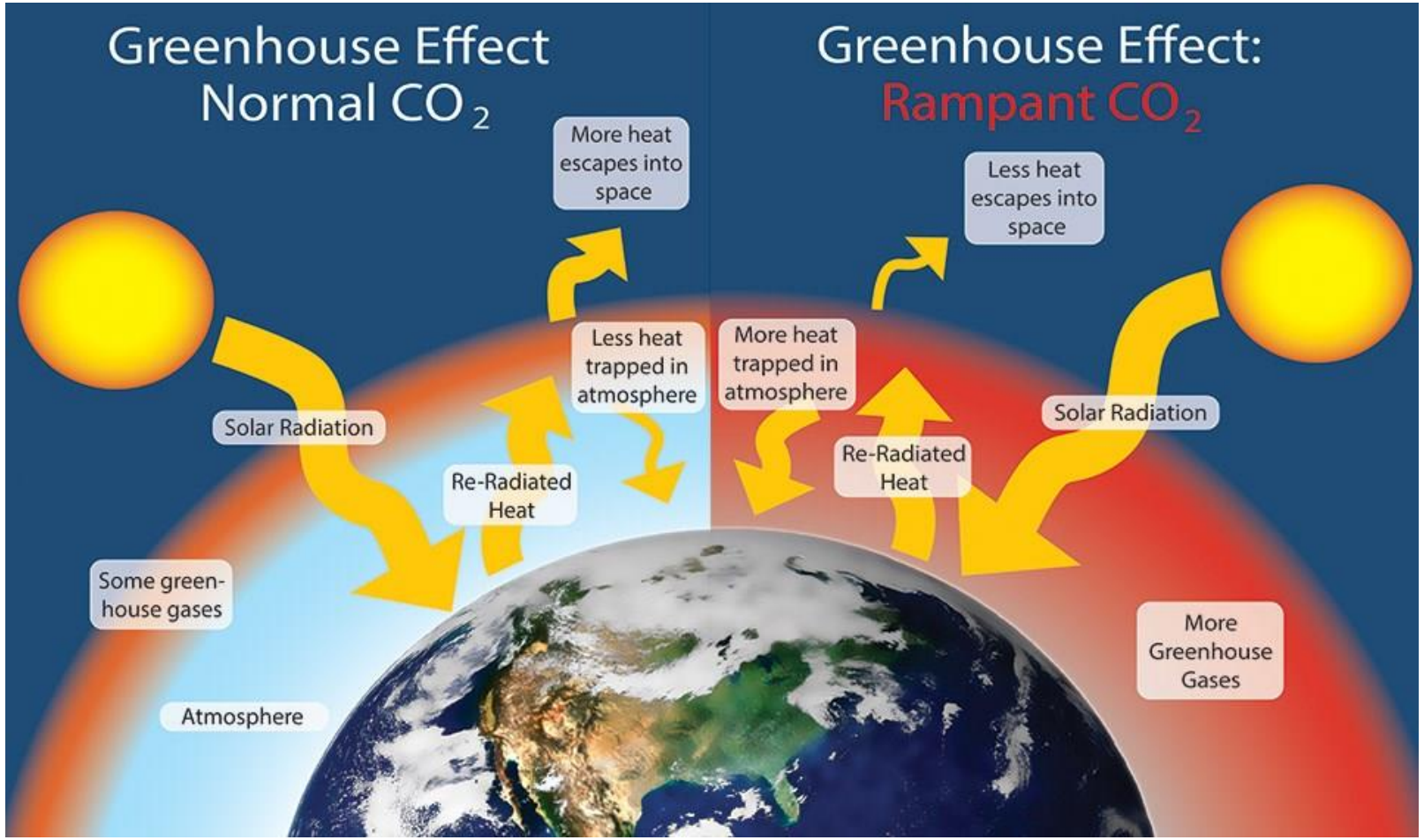
Why should we care about carbon?



Need to consider carbon on 2 fronts:

- Productivity / resilience
- Climate implications

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Why should we care about carbon?

The carbon issue WILL impact your farming business.

- Government agreements (international)
- Supply chain / markets increasingly on board

"Of the 100 largest economies in the world, 69 are companies and 31 are countries. Government policy may now be less influential than market forces".

Prof Richard Eckhard (UoM)

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Why should we care about carbon?

Sectors that can store carbon will attract interest from sectors who can't.

- Opportunity / threat?
- How much do we need?

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Why should we care about carbon?

Learning on the job

What should we do?

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Where has this carbon thing has come from?

Intergovernmental Panel on Climate Change (**IPCC**). Estab by UN in 1988.

- AIM: *To stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*.

IPCC meet annually - since 1995 (Conference of Parties – COP) – COP 28 Dubai.

- **Kyoto protocol** 1997 (COP 3) – benchmarks, submit inventories
- **Paris** 2015 (COP 21) (legally binding treaty – CN by 2050)

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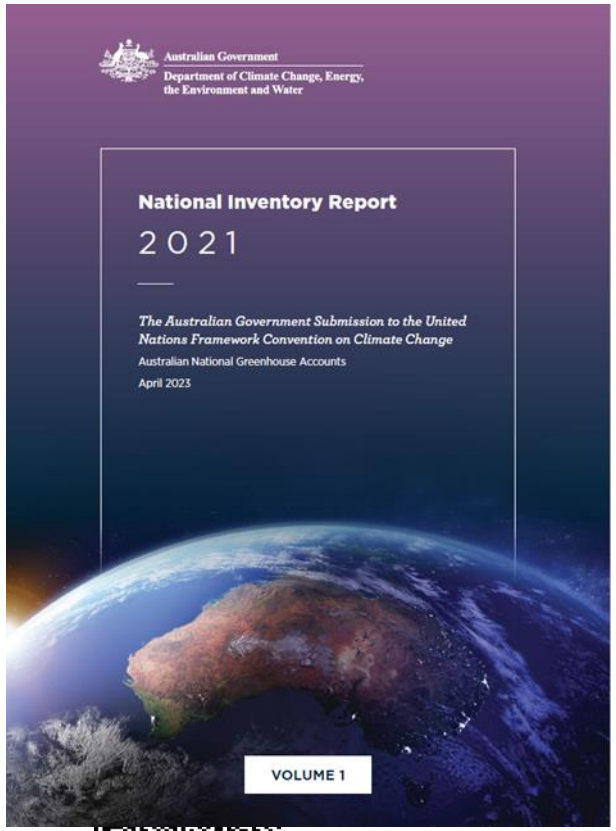
Where has this carbon thing has come from?

IPCC also put out assessment reports (**AR6** - 2022) – the 'rules' based on best science. ***But this changes the goalposts***

Greenhouse gas	AR2 (2008/9 to 2014/15)	AR4 (2015/16 to 2019/20)	AR5 (2020/21 onward)	AR6 (2022*)
Carbon Dioxide (CO_2)	1	1	1	1
Methane (CH_4)	21	25	28	27 (biogenic)
				29.8 (fossil)
Nitrous Oxide (N_20)	310	298	265	273



Created private sector opportunity

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What are we really trying to do here?

Reduce certain greenhouse gases from the atmosphere and store them ‘permanently’ (25 yrs, 100 yrs, >100 yrs).

Actions to take:

- Reduce what is emitted in the future (**emission reduction** / avoidance)
- Drawn down what is already in the atmosphere (**carbon sequestration**)
- Both

Targets

Australia - **43%** net emissions (from 2005) by **2030** and **net zero** by **2050**

Methane pledge (voluntary) - 30% less methane by 2030

Scientists (Arndt et al. 2022) To meet 1.5 ^{0}C, methane must reduce by:

- 11-30% by 2030
- 24-47% by 2050

Government and the private sector

Government

Publish **methods** (sequester / avoid)

Issue Aust Carbon Credit Units (ACCU)

ACCU (financial product, audited, register etc).

While not perfect, the methods provide a useful reference point to compare what is being offered in the private sector

- Additionality, permancy, future use
- Leakage (net emissions)
- Measurement & calculation approach
- Register, auditing

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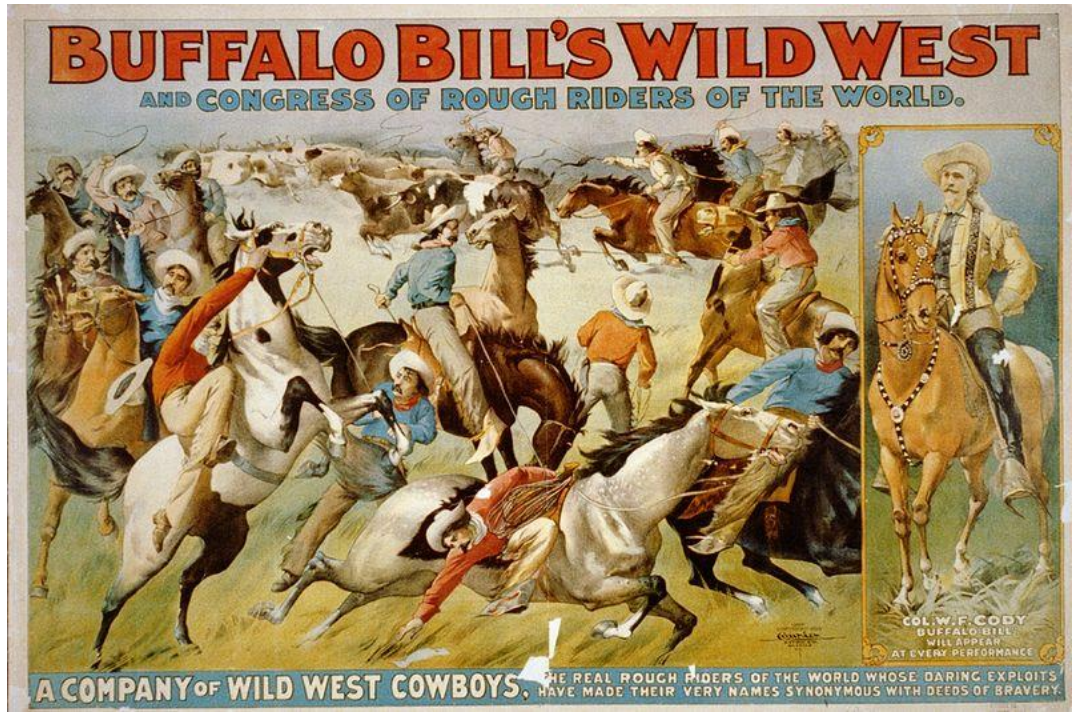
Government and the private sector

Private sector



Credible ⟷ **Junk**

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

Australian Carbon Industry **Code of Conduct**

Forest, Land and Agriculture (FLAG)

The SBTi's FLAG Guidance provides the world's first standard method for companies in land-intensive sectors to set science-based targets that include land-based emission reductions and removals. The guidance enables companies to reduce the 22% of global greenhouse gas emissions from agriculture, forestry and other land use.

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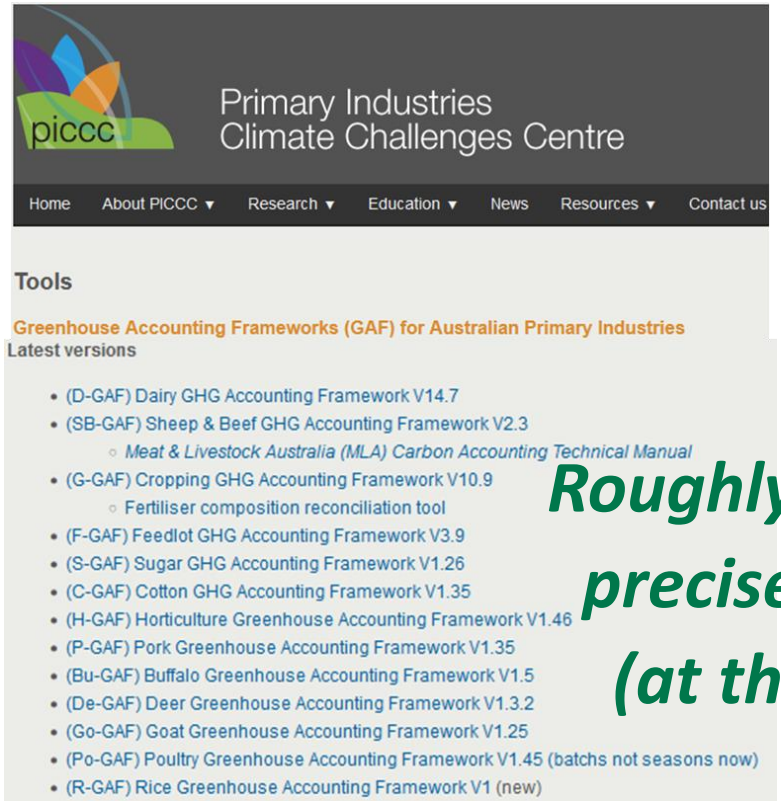
What should you do?

1. Know your emissions (history)



Roughly right, but precisely wrong (at this stage)

AGRICULTURAL INNOVATION AUSTRALIA

- Retrospective?
- From today (update when you prepare your BAS)

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What should you do?

How the Greenhouse Accounting Framework (GAF) tool works

General

Meets the National Greenhouse Gas Inventory (NGGI) standards

Assumptions in the GAF tools change when the Aust Govt adopt them (multiple versions, regularly updated)

Emissions (CO_2, CH_4, N_2O) – multiple sources

- Scope 1 (all direct greenhouse gas emissions inside the farm boundary)
- Scope 2 (electricity)
- Scope 3 (products brought onto the farm)

What should you do?

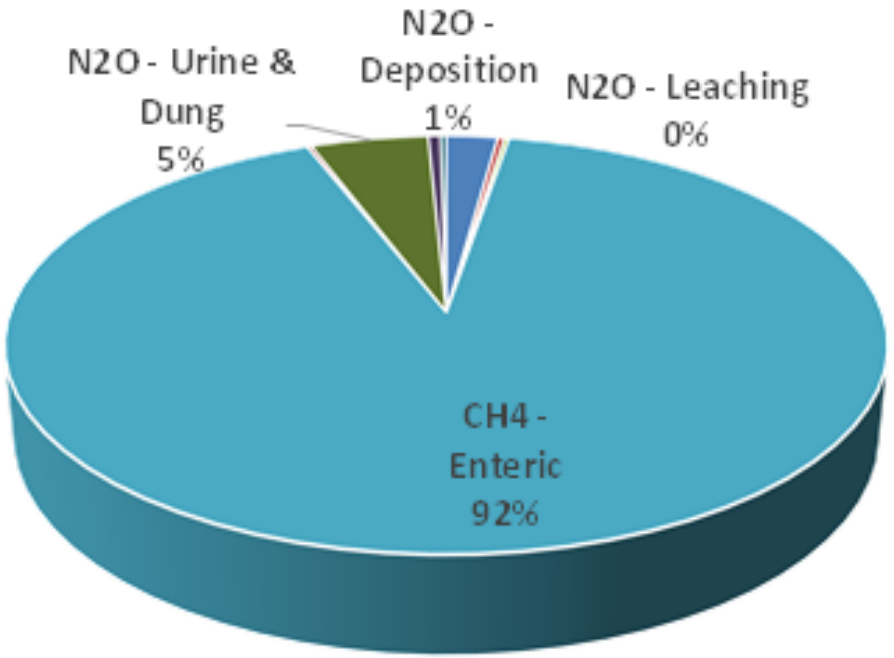
How the Greenhouse Accounting Framework (GAF) tool works

Calculations

- Annual / seasonal (livestock)
- Carbon account (CA). Net emissions = Scope 1 & 2 emission, less tree sequestration
- Carbon footprint (CF). Net emissions + Scope 3. **Emissions intensity** (net carbon emitted per unit of product).

What should you do?

Calculation to get right



Beef / sheep

Methane (g/day) = 20.7 x Intake (kg/day)

Intake influenced by:

- Liveweight
- Weight gain
- Lactation
- Numbers

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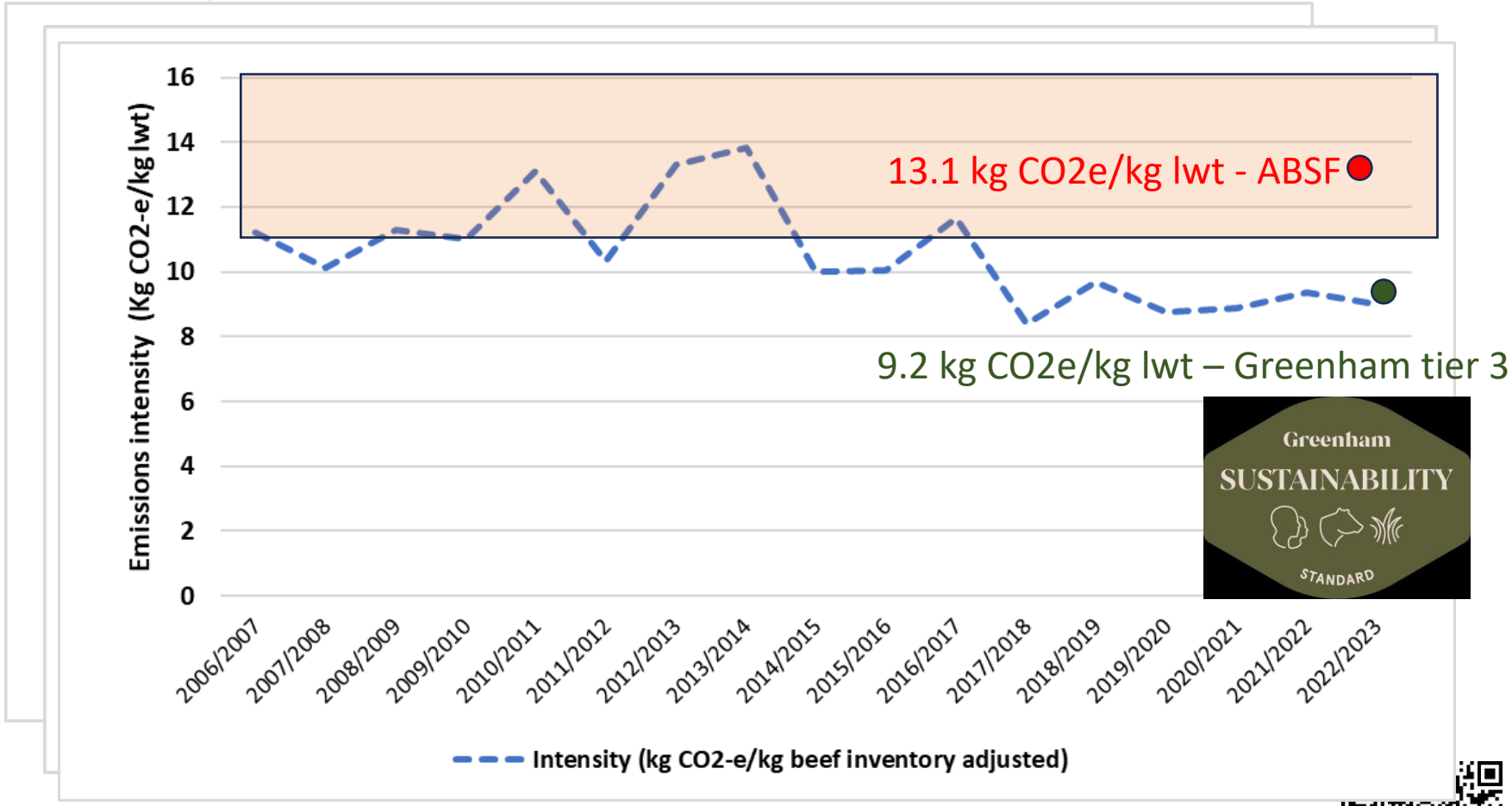
What should you do?

Emissions intensity



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What should you do?

How to lower emissions intensity

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What should you do?

Sequestration / carbon capture (NEW, PERMANENT)

Credible sequestration requires emissions calculation anyway!

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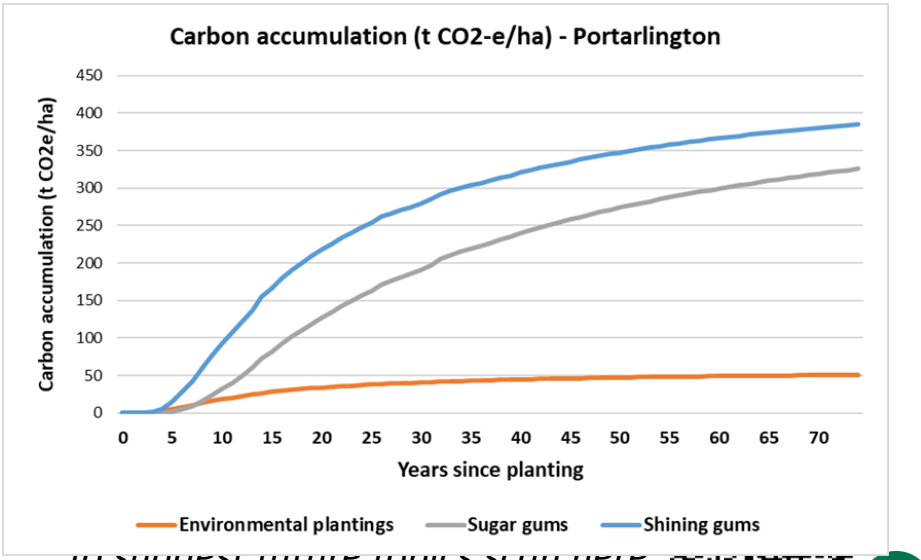
What should you do?

Trees

- ACCUs generated using FullCAM (underestimate?)
- Species and location influence



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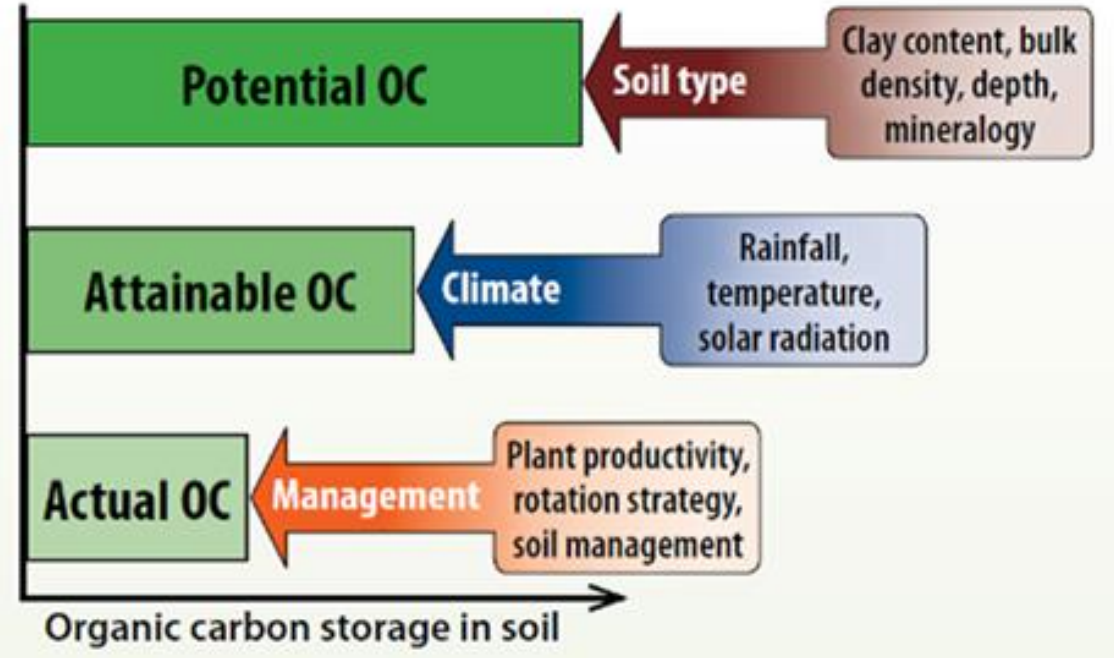
What should you do?

Soils

1. There is an **upper limit** to what a soil can store (potential – attainable – actual).



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What should you do?

Soils

2. Soil carbon stocks are the results of the **soil carbon balance** (inputs less losses) – highly rainfall dependent.

3. To build stable soil carbon takes **nutrients.**

4. Permanent increases in soil carbon require **sustained additional carbon inputs.**

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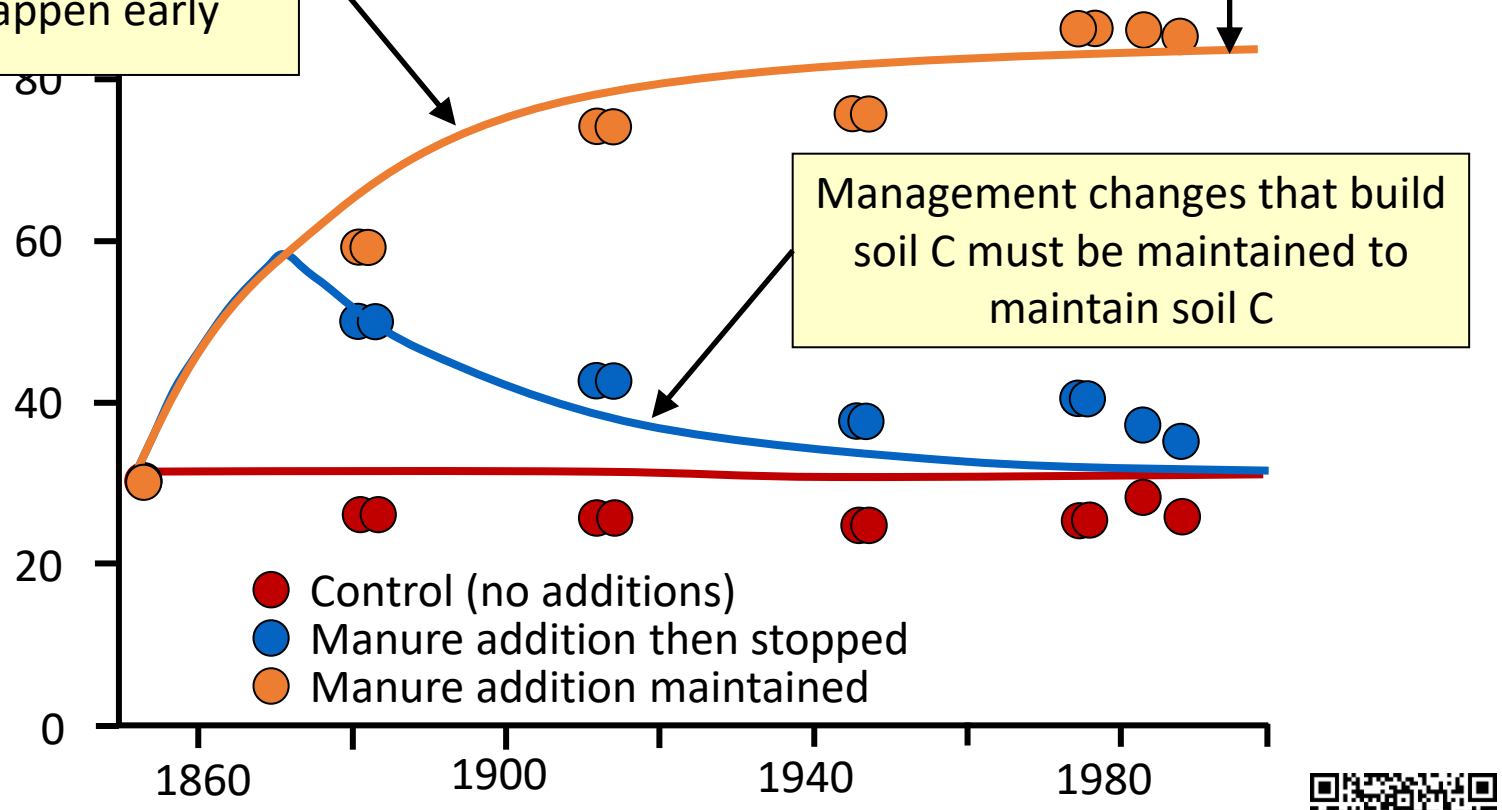
4. Soil permanence

Soil C storage capacity is finite for a defined rate of input and the largest changes happen early

Soil C changes take place over long time periods

Management changes that build soil C must be maintained to maintain soil C



Source: Dawson et al. (2005) Soil Biol Biochem

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What should you do?

Soils

5. Tension between **stable carbon** (carbon credits) and **labile carbon** (mineralisation) – hard to have both!

What should you do?

Whose carbon is it anyway?

If you create carbon credits (offsets) and **sell them** they are no longer yours to use, but you are responsible for maintaining them (25 yrs)

If you create carbon credits **for your own use** (insets) they are yours to use (5 year vintage), but you are responsible for maintaining them (25 yrs).

Australian Government
Clean Energy Regulator

Climate Active

Private

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To conclude

Carbon in agriculture is an issue we **cannot ignore**

Calculate your emissions (and emissions intensity) – it puts you in the game

Focus today on driving your emissions and emission intensity down.

Only enter the carbon credit market if you really appreciate what you are getting into.

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