

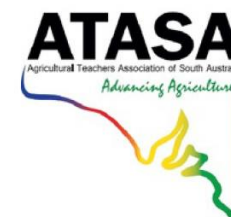


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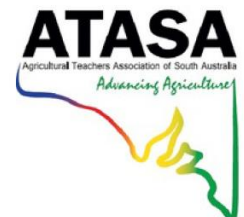


agcommunicators.



Special thanks

The following slides were produced by Landscape SA Northern and Yorke team **Molly O'Dea** (Sustainable Agriculture Facilitator) and **Elly Pratt** (Climate Adaptations Facilitator) for their Carbon Calculator workshops and kindly shared for school use.



Carbon Calculator Deep(er) Dive

Kangaroo Island Landscape Board

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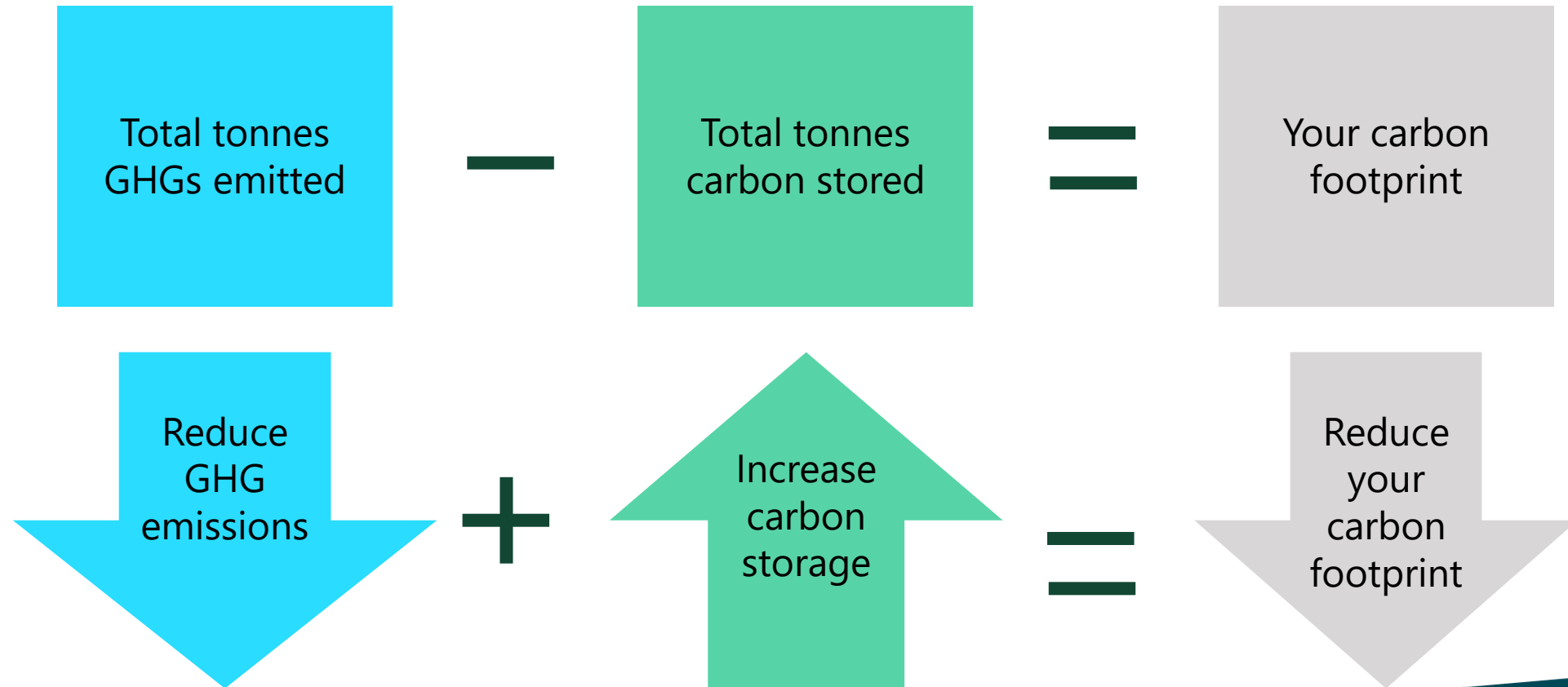
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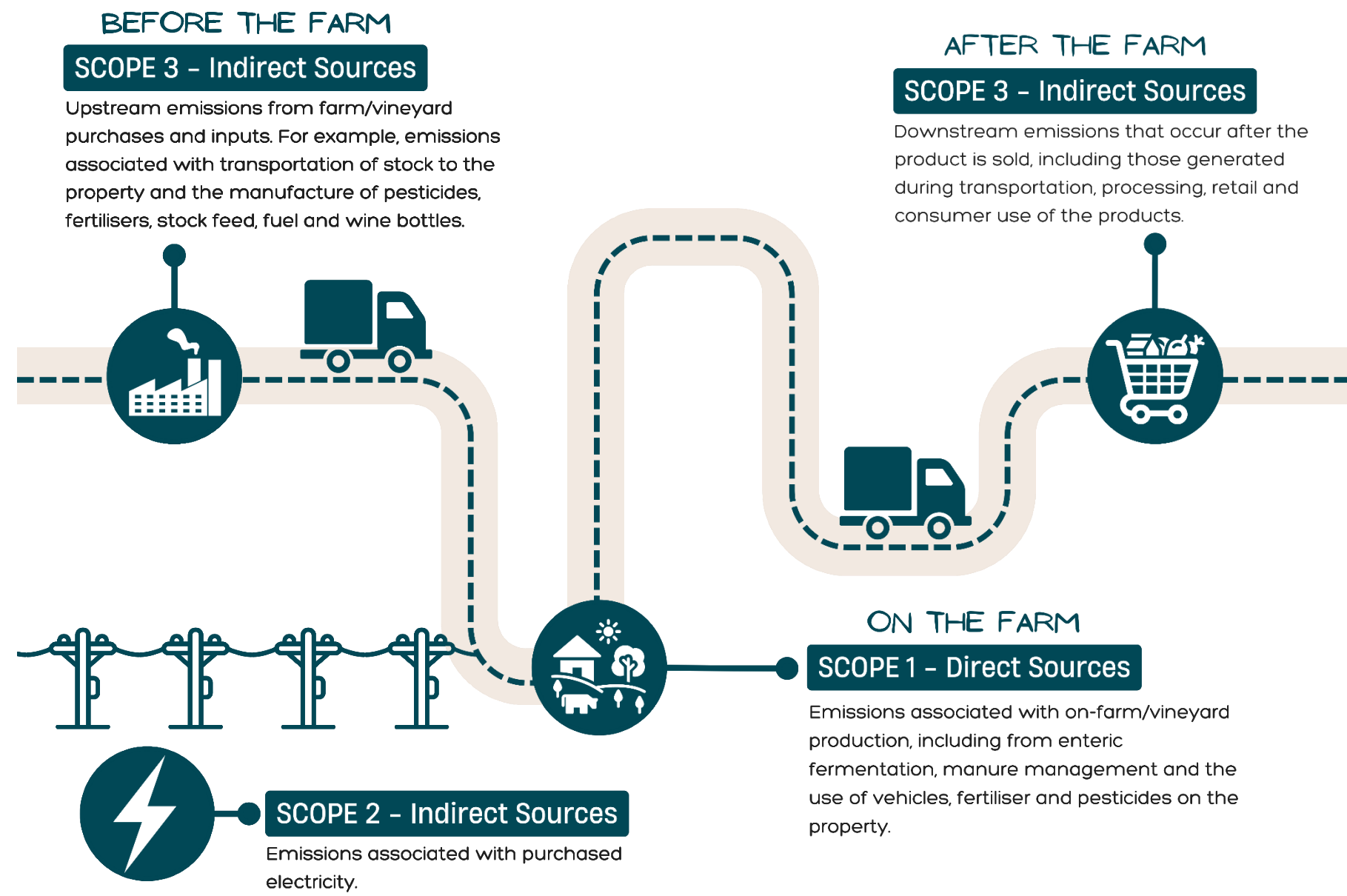
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Calculating Your Carbon Footprint

Carbon Footprint



A farm's carbon footprint is split up into different 'scopes':



Carbon Calculators: livestock, cropping, horticulture

- Lots out there!
- Which one you use will depend on your industry and supply chain requirements, and if you are involved with Climate Active or the ACCU Scheme

Greenhouse Accounting Frameworks (GAF)

- Sheep and Beef (SB-GAF), cropping/grains (G-GAF), feedlot (F-GAF), dairy (D-GAF), horticulture (H-GAF) etc
- Several different tools available that use the same GAF calculations in the background
 - Primary Industries Climate Challenges Centre (PICCC) - [Tools | PICCC](#)
 - Meat and Livestock Australia (MLA) - [MLA Carbon Calculator](#)
 - Agricultural Innovation Australia (AIA) Environmental Accounting Platform (EAP)- [AIA EAP](#)
 - MLA - [Quick Start Carbon Calculator](#)

GAF Tools

Primary Industries Climate Challenges Centre (PICCC) - [Tools | PICCC](#)
Meat and Livestock Australia (MLA) - [MLA Carbon Calculator](#)
Agricultural Innovation Australia (AIA) Environmental Accounting Platform (EAP)- [AIA EAP](#)

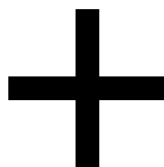
PICCC	MLA	AIA EAP
Free	Free	Free
No account needed	Create an account	Create an account
Downloaded excel spreadsheet template	Online	Online
Save spreadsheet on your computer	Saves to your account	Saves to your account
Redownload after each update	Updates automatically	Updates automatically
Easy to look at impact of different practice changes	A lot of clicking in and out of tabs	A lot of clicking in and out of tabs

They all collect the same info and give the same answers so which one you use is up to personal preference!

Cattle and Sheep - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



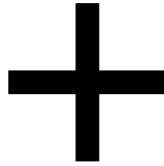
Cattle / sheep *(monthly or seasonally)*

- Stock numbers by class (e.g., bulls/cows/steers/heifers)
- Liveweight and liveweight gain by class
- Stock purchase and sale history by class
- Timing of calving/lambing
- Mineral supplementation
- Purchased feed tonnage
- **Sheep only:** number shorn and wool yield per head

Cropping - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



Cropping *(annually)*

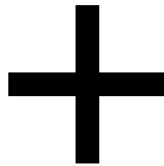
For each paddock managed differently...

- Crop type
- Production system type (e.g., irrigated, non-irrigated, horticulture etc)
- Average yield
- Area sown
- Potassium, sulfur, phosphorous applications
- Area burnt off

Dairy - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (in LITRES)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



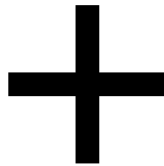
Dairy_(annually)

- Production system type (e.g., non/irrigated crop or pasture)
- Stock numbers by class (e.g., milking cows/heifers/dairy bulls)
- Liveweight and liveweight gain by class
- Crude protein content and dry matter digestibility of feed
- Milk production
- Area cropped and/or improved pasture
- Purchased feed tonnage
- Transportation within farm
- Manure management

Pork - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



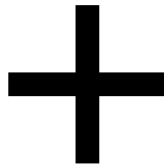
Pork *(annually)*

- Numbers by class (e.g., sows/boars/gilts etc)
- Purchase and sale history by class
- Feed mix products tonnage and emissions intensity (if known)
- Hay/straw purchased as bedding

Goats - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



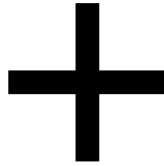
Goat *(annually)*

- Numbers by class (e.g., bucks/wethers/does)
- Purchase and sale history by class
- Number shorn and wool yield per head
- Timing and proportion of does kidding
- Mineral supplementation
- Purchased feed tonnage

Horticulture - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



Horticulture *(annually)*

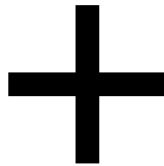
For each crop managed differently...

- Crop type (perennial/annual hort, hops, pulses, tuber and roots, peanuts)
- Average yield
- Area sown
- Potassium, sulfur, phosphorous applications
- Refrigerants and recharges

Poultry (layers) - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



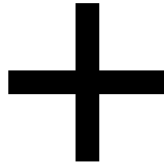
Poultry – Layers *(annually)*

- Flock numbers by class (layers vs meat chicken layers)
- Purchase history by class
- Production system (conventional vs free range)
- Egg production by class
- Feed mix products tonnage and emissions intensity (if known)
- Hay purchased
- Manure management
- Litter recycling

Poultry (broilers) - What data do I need?

Standard information

- Approx. annual rainfall
- Energy and fuel use
- Fertiliser, lime and pesticide/herbicide use (as kg of active ingredient)
- Vegetation (carbon storage)
 - Species of tree
 - Soil type
 - Area of trees
 - Age of trees



Poultry – broilers *(annually)*

For each group managed in a year (up to 4)...

- Total bird numbers, average length of stay and liveweight by class (meat chicken layers vs growers)
- Purchase history by class
- Production system (conventional vs free range)
- Feed mix products tonnage and emissions intensity (if known)
- Hay purchased
- Manure management
- Litter recycling

Carbon Calculators: viticulture

- Lots out there!
- Which one you use will depend on your industry and supply chain requirements, and if you are involved with Climate Active or the ACCU Scheme
- A good resource that breaks it all down for you - [WineAustralia CarbonToolsDocument.pdf](#)

Australian Wine Research Institute (AWRI) - [Carbon Calculator](#) *(same as available through Sustainable Winegrowing Australia (SWA))*

Others:

- International Wineries for Climate Action (IWCA) - [Reducing GHG Emissions](#)
- Sphera (formally SupplyShift)- [Supply Chain Sustainability](#)

AWRI Calculator - What data do I need?

Vineyard *(annually)*

- Vineyard area
- Tonnes grapes harvested
- Vine area harvested
- Biodiversity area
- Fuel and electricity use
- Vineyard floor cover crops and bare soil
- Irrigation types and area
- Water use by source
- Detailed fertiliser use

Winery *(annually)*

- Tonnes grapes crushed
- Biodiversity area
- kL finished wine
- Fuel and electricity use
- Water and wastewater volumes
- Tonnes solid waste by disposal type
- Purchased CO₂
- Synthetic refrigerants

Don't panic!

For Production Investigations, the data entry will be simpler because there are usually less inputs.

And, for extra simplicity, you could leave vegetation (carbon storage) out of the calculation (but make sure they have entered “0” for the “Area of Trees” under the DATA INPUT – VEGETATION tab).

The student could then reflect on the impact of adding vegetation as a strategy to reduce carbon emissions if this was a commercial scale enterprise.

Which calculator to use?

For a school setting, consider the PICCC calculator for livestock, cropping and horticulture as students do not have to create an account or provide any personal data. For viticulture, use the AWRI calculator.

The actual calculator is exactly the same in each one, so the results will be the same no matter which one you use.

With PICCC and AWRI, students just download the relevant Excel worksheet and enter the data using the DATA INPUT tab then find their carbon emissions on the DATA SUMMARY tab.

Which enterprises are covered by PICCC?

- [\(D-GAF\) Dairy GHG Accounting Framework V14.8](#)
- [\(SB-GAF\) Sheep & Beef GHG Accounting Framework](#)
 - [\(SB-GAF\) Monthly V2.4](#)
 - [\(SB-GAF\) Seasonal V2.5](#)
- [\(G-GAF\) Cropping GHG Accounting Framework V11.0](#)
- [\(F-GAF\) Feedlot GHG Accounting Framework V4.2](#)
- [\(S-GAF\) Sugar GHG Accounting Framework V1.27](#)
- [\(C-GAF\) Cotton GHG Accounting Framework V1.37](#)
- [\(H-GAF\) Horticulture Greenhouse Accounting Framework V1.47](#)
- [\(P-GAF\) Pork Greenhouse Accounting Framework V1.36](#)
- [\(Bu-GAF\) Buffalo Greenhouse Accounting Framework V1.5](#)
- [\(De-GAF\) Deer Greenhouse Accounting Framework V1.3.2](#)
- [\(Go-GAF\) Goat Greenhouse Accounting Framework V1.25](#)
- [\(Po-GAF\) Poultry Greenhouse Accounting Framework V1.47 \(batches not seasons now\)](#)
- [\(R-GAF\) Rice Greenhouse Accounting Framework V1.1](#)
- [\(WF-GAF\) Wild Sea Fisheries Greenhouse Accounting Framework V1](#)

HINT:

For lambs or wethers in a feedlot
use Sheep & Beef SB-GAF

For cattle in a feedlot, use
Feedlot F-GAF

Using the PICCC Calculators



- 1) Scan the QR code to go to the PICCC Tools website
<https://www.piccc.org.au/resources/Tools>
- 1) Under 'Latest Versions' select the required GAF for the enterprise being investigated
- 2) Download
- 3) Open in Excel
- 4) Enter data into 'Data input' tabs (the other tabs are the calculations in the background, no need to touch)
- 5) Look at 'Data Summary' tab for your net farm emissions and emissions intensity

Using the AWRI Calculator



- 1) Scan the QR code to go to the AWRI website https://www.awri.com.au/industry_support/sustainable-winegrowing-australia/carbon-calculator/
- 2) Click on 'Excel xls 4.3MB' to download the calculator
- 3) Open in Excel
- 4) Enable Content/Macros
- 5) Start entering your data into the 'Vineyard' and 'Winery' tabs

A couple of tips for crops

For a broadacre cropping investigation being conducted in pots or plots, calculate the emissions as if it was a 1 hectare plot as you cannot enter a value less than 1

For the “fraction of lime” data use 1 if it is Limestone or 0 if it is dolomite

For herbicides, you need the kg of active ingredient – you will find this on the herbicide label

How can students use this in the Production Investigation?

Students can enter their predicted inputs and target weight or yield etc in the calculator to create a **carbon emissions production goal**.

They can compare the result to the expected range (see next slide).

And then re-calculate their carbon emissions once they have completed the investigation and know exactly what their inputs and yield/growth/production were.

The carbon emissions production goal could be the focus of the investigation or an addition to more traditional production goals. **Be mindful of having enough word count to discuss it adequately if it is an additional goal.**

Emissions Intensity Comparisons

Chicken meat:

- 3 to 5 kg CO₂e/kg LWT

Pigs:

- 4 to 7 kg CO₂e/kg LWT

Wheat

- 0.1 to 0.5 kg CO₂e/kg grain

Canola

- 0.5 to 0.75 kg CO₂e/kg grain

Dairy:

- 8 to 21 t CO₂e/t MS

Beef:

- 11 to 18 kg CO₂e/kg LWT

Sheep:

- 6 to 8 kg CO₂e/kg LWT

Wool:

- 21 to 28 kg CO₂e/kg wool

Wine:

- 0.6 to 4.68 kg CO₂e/L

Key Take-aways

- Carbon footprint = total CO₂e emissions - total carbon storage
- To calculate your carbon footprint, you need a carbon calculator
- There are lots of carbon calculators out there
- Greenhouse Accounting Framework (GAF) calculators are the most commonly used for cropping and livestock in Aus
- There are several tools that use the GAF calculator – you can choose which one to use depending on your personal preference
- Start recording your data now!



Government of South Australia

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