ASHEEP & BEEF Grower Group

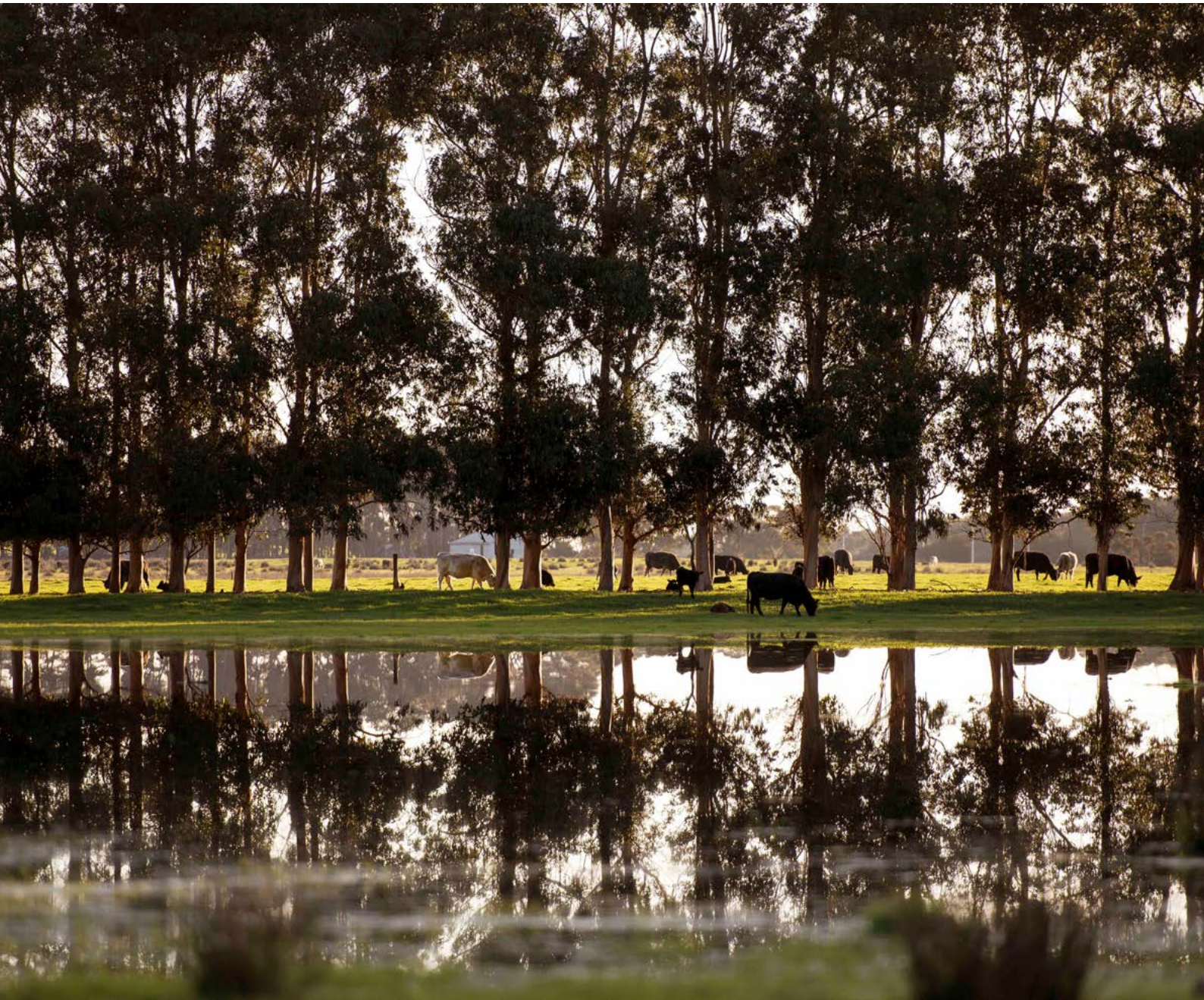
Producer Demonstration Site

CN30

mla MEAT & LIVESTOCK AUSTRALIA

Starting your CN30 journey on-farm

Toolkit



This toolkit is designed to provide the key points for sheep and cattle producers to understand the basics of carbon accounting, create an emissions profile and start identifying strategies to meet the industry target of Carbon Neutral by 2030 (CN30).

Does my farm need to be carbon neutral by 2030?

The Australian red meat and livestock industry set a target to be carbon neutral by 2030. Meeting the target will not necessarily require every farm to become carbon neutral. It is recommended, producers start reducing their carbon footprint in ways that also deliver productivity improvements.

TOOLKIT SNAPSHOT

MAKING A START

Understand the basics

What is an emissions profile and why do I need one?

An emissions profile is a calculation of your net farm emissions at a point in time. It is generated by using a carbon accounting tool. There are many reasons why producers might need to measure greenhouse gases and reduce emissions. An important one is because, in time, you may need a net farm emissions number (total emissions) or an emissions intensity figure (emissions per kg of product) to access a market. This could come from a buyer that you're hoping to sell your cattle or sheep to or from a processor wanting to market a net zero product.

What do I need to know before I start?

Carbon accounting is a complex topic involving a lot of science, much of it is still being refined. Here are some key basics to get you started.

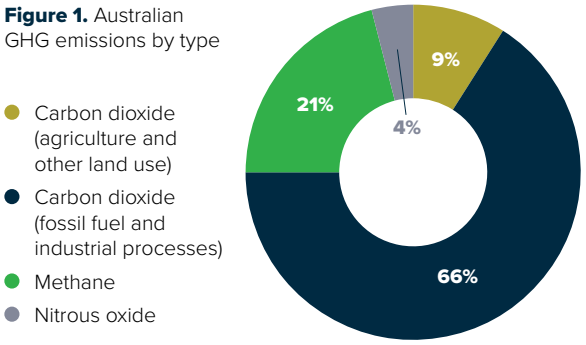
Understanding greenhouse gases

The major greenhouse gases (GHG) reported under the Australian Government's National GHG Inventory (also known as the National Inventory Report (NIR)) include:

- carbon dioxide (CO2)
- methane (CH4)
- nitrous oxide (N2O)
- sulphur hexafluoride (SF6)
- other hydrofluorocarbons and perfluorocarbons.

The main emissions from agricultural production are CO2, CH4 and N2O. GHG emissions are measured in carbon dioxide equivalents (CO2-e) to allow for comparison in terms of the quantity and potency of emission sources. Each gas has a different capacity to contribute to global warming. For example, methane, a potent GHG, is expressed as 25 CO2-e. This is the largest source of sheep and cattle emissions.

Figure 1. Australian GHG emissions by type



Understanding scopes

According to the GHG protocol, emissions are defined into three scopes:

Scope 1: your business (GHG emissions from sources that are owned or controlled by your company)

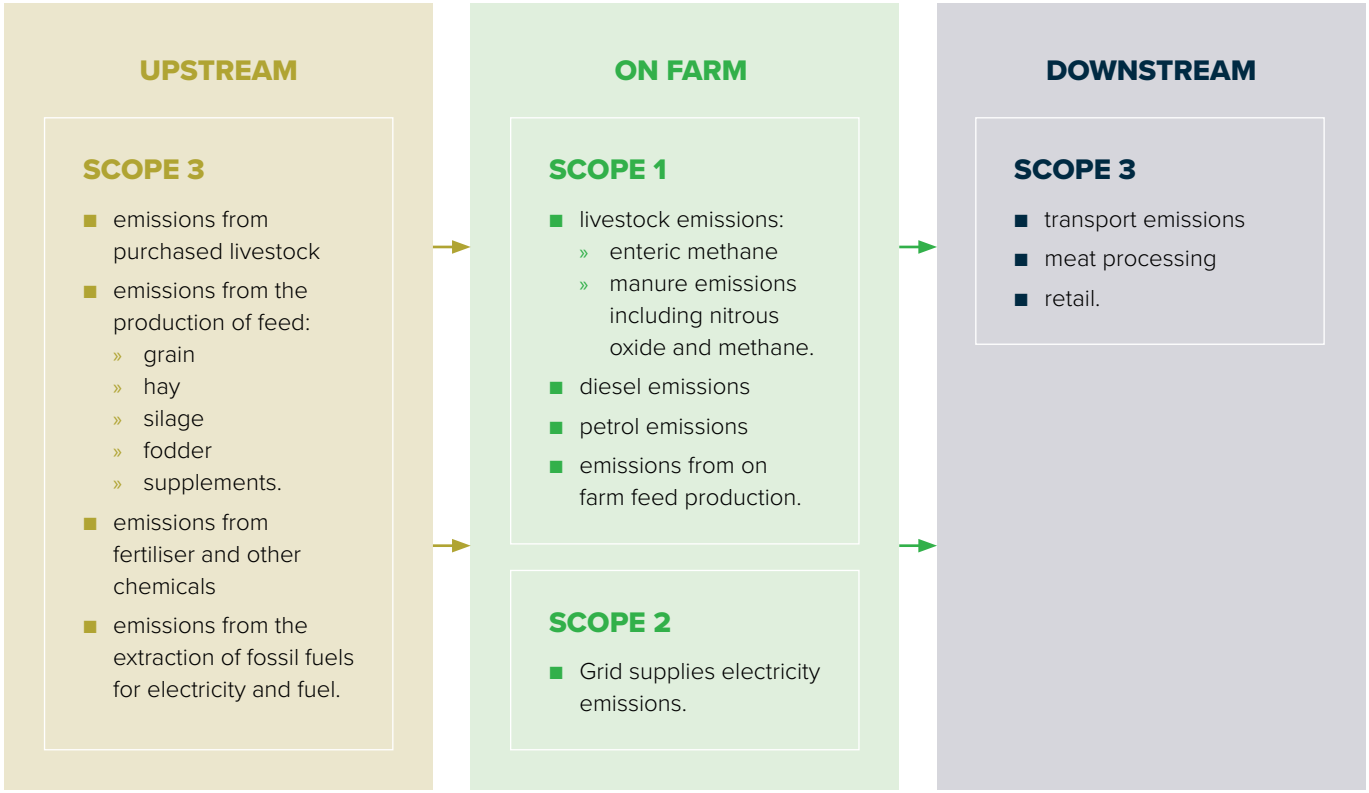
Scope 2: electricity used by your business (GHG emissions from the generation of purchased electricity consumed by your company)

Scope 3: is broken into two; upstream and downstream (emissions are a consequence of the activities of your company but occur from sources not owned or controlled by your company):

- upstream: emissions from pre-farm sources, such as the production of purchased supplementary feed, fertilisers and purchased livestock
- downstream: Emissions from post-farm sources, such as meat processing.

An emissions profile requires Scope 1, 2 and 3 emissions to be included. Your buyer will want to know your net farm emissions because your Scope 1 is their Scope 3 upstream.

Figure 2. GHG protocols – emission scopes



Create an emissions profile

Carbon accounting tools and calculators

There are a few calculators available. Richard Brake, the consultant ASHEEP & BEEF is working with, recommends using the Primary Industries Climate Challenges Centre (PICCC) Sheep and Beef Greenhouse Accounting Framework (SB-GAF). It is freely available as an Excel document. The calculator is in ongoing development – updated versions are released based on feedback and new information (see the link to the calculator below).

What information do I need?

The information needed should be available from your farm taxation records, management records, or your memory. This includes:

- **livestock numbers:** Births, deaths, purchases, sales, weights and liveweight gain (LWG), weaning rates and reproductive status of animals. These figures are used to predict livestock-related emissions, such as enteric methane. This information could exist in livestock reconciliation records for taxation purposes or in a livestock management program
- **records of farm inputs:** Fertilisers, brought-in animal feed, fuel, electricity and purchases. This information is needed to estimate GHG emissions resulting from goods that you purchase from other companies. The figures should be available in your tax records
- **tree planting:** including area (ha), species and planting date (if available)
- **general farm information:** such as your region, rainfall, soil type etc (usually you can do this from memory).

Accessing and using the carbon accounting tool

To access and download the Sheep and Beef GHG Accounting Framework tool (SB-GAF), go to **piccc.org.au/resources/Tools** then click on the **(SB-GAF) Sheep & Beef GHG Accounting Framework** link (current version at the time of publishing V2.3).

The Microsoft Excel file should automatically download into your 'downloads' folder on your computer or ask you to download.

1. Open the file.
2. Rename the file – include the year the carbon accounting tool applies to.
3. Save the file.

You will notice this is a very complex spreadsheet with many tabs. Don't let that frighten you! Most of the tabs are the background calculation sheets. You only use the first three tabs:

- Start entering as much information as you can. As you enter information you will get a better understanding of what is required and why.
- The 'Data summary' tab is where you will find the summary of your information and the Carbon emission profile with your 'net farm emissions' and 'emissions intensity' breakdown.
- Remember, you can always go back and update the accounting tool with more accurate information as it becomes available. For example, if you had already averaged your power use but later received the actual usage, it can be updated. You will also see how different information has a greater or lesser effect on your final numbers.
- If your enterprise includes cropping, you will need to complete the Cropping GHG Accounting Framework tool (G-GAF). Visit **piccc.org.au/resources/Tools** then click on the **(G-GAF) Cropping GHG Accounting Framework** V10.9 - current version at time of publishing and combine the two numbers.

TIPS & TRICKS

Adjust display size of spreadsheet: Check that you can see all the fields across the spreadsheet. Use the + - at the bottom right of the screen.
Also, check the little red triangles for additional information.

Entering liveweight gain (LWG): Use the increased weight amount and divide it by 91.25 days to get kg/day i.e. 10kg divide 91.25 = 0.11 kg/day LWG.

If you have made it this far, you have started the CN30 journey. Congratulations!

WHAT'S NEXT

What to do with this number now?

Your net farm emissions number is your starting point.

This number is probably as high as it gets because we haven't done any work on the carbon sequestration part of the calculator. You can also start to think about the numbers you entered and how you might reduce some of those inputs.

Enteric methane will be a big number and will look impossible to reduce, but there is hope. There are ways to reduce enteric methane, including anti methanogenic pastures and pasture composition, but the most important factor is production efficiencies such as increased lambing/calving rates, reduced mortalities and shorter turn-off time.

Also, in Australia there is no requirement for producers' enteric methane emissions to be zero. Under the Global Methane Pledge there is only an expectation to reduce enteric methane by 30%. This is in recognition of the shorter lifespan of methane in the atmosphere compared to carbon dioxide.

More information and training options

To learn about carbon terminology, GHGs and carbon farming, we recommend you complete the freely available self-paced MLA Carbon 101:

mla.com.au/elearning-carbon101

For more detailed training, we recommend the University of Melbourne Carbon Neutral Agriculture online short course. The course consists of six one-hour modules to be completed over two weeks, finishing with a four hour webinar that works through your own data:

mla.com.au/uom-cnag-course

MLA has developed the Carbon Calculator – a digitised version of the Excel SB-GAF calculator. It is a simplified version for producers to try before diving into carbon accounting:

carbon-calculator.mla.com.au

MLA has developed a Carbon EDGE training package. Carbon Edge is a new two-day training program for the red meat industry, providing participants with an understanding of the opportunities for emissions reduction and carbon storage activities in a livestock grazing business.

Participants use their own information to develop an action plan for their business as they learn about the practices and technologies that could reduce their carbon footprint and improve sustainability and productivity.

mla.com.au/carbonedge

Consultants can also help complete a carbon emissions profile. If you do use a consultant, it's a good idea to check that they will provide a breakdown of how they calculated your farm emission so you can work on reducing them. Also check the data sharing and ownership arrangements.

Richard Brake from Richard Brake Consulting Pty Ltd is the consultant ASHEEP & BEEF has engaged to support the delivery of the **Carbon Neutral 2030: Getting started on farm** PDS project.

richardbrakeconsulting.com.au

CASE STUDY

Alan and Bec Hoggart, Condingup

Alan and Bec Hoggart run a shedding sheep enterprise in the Condingup area, on the south coast of Western Australia.

Alan was part of the first group of producers in 2023 to join ASHEEP & BEEF's Carbon neutral 2030: Getting started on-farm – a Meat & Livestock Australia Producer Demonstration Site project. Alan spoke with project coordinator Jan Clawson on his thoughts so far.

Why did you join the project?

"I wanted to become more informed on carbon. I was interested in completing an emissions profile to understand why livestock were being portrayed as the bad guys and to be able to stand up for livestock production," Alan said.

Following the first project workshop Alan completed his first carbon emissions profile using the PICCC SB-GAF tool.

"We run, what I would call, a medium sized basic sheep only enterprise so I found completing the calculator a simple exercise. I know my sheep numbers for each time of the year, so it was straightforward to complete, especially with no wool to consider," Alan said.

Alan estimated the calculator took less than two hours to complete. He had to go through the diary for a few things and he did round some of his sheep numbers, but being sheep only made it easy.

"Probably the only thing that took a little more work was the herbicide figure," Alan said.

The calculator asks for kilograms of active ingredients per enterprise. Alan knew how many litres of herbicide he'd sprayed so it was a quick calculation to get it back to active ingredients weight.

What is your advice to someone thinking about completing a carbon emissions profile?

"Complete the tool for your own interest, so you know where you sit. Just do it! Get informed and keep learning," Alan said.

Alan found the percentage pie chart and the data summary table interesting. Seeing where the information came from and identifying what might be able to be moved or reduce. Alan wants to lower his emissions and understand what's involved so he can better inform non-agricultural people and defend the livestock production industry.

"Complete the tool for your own interest, so you know where you sit. Just do it! Get informed and keep learning."

In the original emissions profile Alan averaged his ewe weights. After weighing 50 sheep he found they ranged from 75kg to 105kg. He entered this information into the calculator which increased his enteric methane figure. This left Alan wondering if he could save emissions by running more 75kg ewes which produce the same number of lambs, and therefore, whether the heavier ewes were less efficient.

The Hoggarts' feedbase is predominantly permanent pastures, and the farm has a small pine plantation and an area of native bush. Over the years they have increased the farm's soil carbon from 1% to between 3–4%. Not all these points can be captured in the current calculator, but the calculators are still evolving.

The Hoggarts haven't yet identified a specific strategy to reduce carbon emissions, but Alan is thinking that a way to increase production might be to plant shelter belts against the prevailing winds across the farm, which is quite close to the coast, which could contribute to increasing his lambing percentage. They have also considered planting trees on marginal land to sequester carbon.

CASE STUDY

Bruce and Trudy Pengilly, Cascade

Bruce and Trudy Pengilly run a Merino sheep flock including a stud and a cropping enterprise in the Cascade area with their son Thomas and his wife Courteney.

Cascade is 100km northwest of Esperance, in the south of Western Australia. The Pengillys were part of the first group to join ASHEEP & BEEF's Carbon neutral 2030: Getting started on-farm – a Meat & Livestock Australia Producer Demonstration Site project. Bruce spoke with project coordinator Jan Clawson on his thoughts so far.

Why did you join the project?

"We had been thinking a carbon profile was something we would need to do in the future but didn't know where to start. We saw joining the ASHEEP & BEEF project as a great opportunity, especially being involved right from the start of the project," Bruce said.

They have now completed two Carbon emission profiles with the first being completed by their bank as part of their farm review. The second was completed after the first project workshop.

"We found the second profile a lot easier to complete, maybe because we had learnt more, but also, because during the workshop Richard Brake, the consultant for the project, recommended we refer to the net farm emissions as a 'profile' as opposed to a baseline or benchmark as we had been calling it. A profile feels more like a snapshot in time requiring less rigorous data," Bruce said.

The Pengillys used the PICCC SB-GAF tool. While Bruce felt they could have completed the calculation in about an hour, they actually took a couple of hours because they completed it as a family, with a lot of discussion.

They had no trouble finding any of the required information. What they did find difficult was where to record some information like planted trees or soil sample results. This information is not required in the SB-GAF tool.

Bruce noted that the accounting tool is constantly changing, the first profile they completed didn't have provision for wool, which has now been included in the second profile.

What advice would you give someone thinking about completing an emissions profile?

"Don't over think it, just make a start. Don't stress the little stuff like how much fuel went into the generator or even chemical use. The big ones are fertiliser and enteric methane," Bruce said.

Now that they have their net farm emissions number and emissions intensity, they plan to concentrate on improving their production efficiencies and let the carbon emissions reduce over time. The strategies they are using include reducing the age of the flock by selling older ewes, mating ewe lambs, sowing more vetch to increase legumes in the system, as well as applying to join a sheep methane trial to get a better understanding of sheep methane production.

In future, Bruce is interested in using the Feed Efficiency Australian Sheep Breeding Value (ASBV) which is being developed. In the meantime, they are looking to reduce the overall frame size of their sheep, having come to the view that bigger sheep can be less feed efficient.

"Don't over think it, just make a start. Don't stress the little stuff like how much fuel went into the generator or even chemical use."

GLOSSARY

Carbon accounting	The process used to quantify greenhouse gas (GHG) emissions from an enterprise.
Carbon foot printing	The process of quantifying GHG emissions emitted directly or indirectly by an individual, company or product.
Carbon neutrality	Net-zero carbon emissions.
Carbon sequestration	The process whereby carbon dioxide is removed from the atmosphere and stored in carbon sinks such as soils and vegetation.
Carbon sink	A reservoir that absorbs carbon dioxide from the atmosphere. Natural carbon sinks include plants, soil and the ocean.
Carbon stocks	A carbon stock refers to the quantity of carbon that has been sequestered from the atmosphere and is stored in a carbon sink.
CO2-e	Carbon dioxide equivalents are a unit used to compare emissions from different GHGs based on their global warming potential (GWP) over a specified time period, typically 100 years (GWP100).
Emission intensity	Emission intensity values are based on the net emissions relative to the output (e.g. per kg beef, sheep meat or greasy wool). Emission intensity values allow for comparison and benchmarking between farms of different sizes. They are the standard unit for a product carbon footprint.
Enteric methane	Enteric methane is produced through enteric fermentation where plant material is broken down in the rumen. Enteric methane is the by-product of this process and is expelled by the animal through belching.
ESG	Environmental, Social and Governance is a term used to represent an organisation's interests that focus mainly on sustainable and ethical impacts. Markets use ESG to evaluate organisations and determine societal integrity.
GHG	Green House Gases – Collective term encapsulating all gases that contribute to global warming.
Insetting	Insetting carbon emissions involves an organisation reducing its own carbon emissions or carbon projects without purchasing carbon credits from a third party.
Livestock inventory	All information relating to livestock such as births, deaths, sales, purchases, weights and weight gain, and pregnancy status. Typically reported either at a point in time (such as June 30) or over a whole year.
Net emissions	Net emissions = total emissions minus carbon sequestration.
NGGI	The National GHG Inventory (NGGI) accounts for and estimates Australia's GHG.
Offsetting	Offsetting carbon emissions allows an organisation to purchase carbon credits from a carbon project they do not own or operate.
SOC	Soil organic carbon (SOC) is the carbon component of organic matter in the soil.
SOM	Soil organic matter (SOM) is the living and dead organic materials, other than living plant roots, found in the soil.
SB-GAF	The Sheep and Beef GHG accounting tool which can be used to generate a carbon account. The current version at the time of publishing: (SB-GAF) Sheep & Beef GHG Accounting Framework V2.3

RESOURCES

Scan or click the QR code to download the *Carbon Accounting Technical Manual* – developed for wider industry use, is based on the outcomes and feedback received from a series of pilot carbon accounting workshops run in early 2020 across Australia. The manual provides background information on carbon accounting and guidance around building a carbon account using the GHG Accounting Framework calculators developed by the University of Melbourne.

ACKNOWLEDGEMENTS

This publication was developed by ASHEEP & BEEF and its producers participating in the MLA funded Producer Demonstration Site project **Carbon Neutral 2030: Getting started on farm.**

mla.com.au/cn30-get-started

Producer Demonstration Sites are funded by MLA to support producers through peer-to-peer groups to pursue new skills, knowledge and management practices applicable to their own commercial livestock production systems.

mla.com.au/pds

ASHEEP & BEEF is a grower group formed by producers in 2003 in Esperance, WA. The group has a core focus on raising sheep and cattle production standards and maximising profitability.

asheepbeef.org.au

MLA acknowledges the matching funds provided by the Australian Government to support the research and development detailed in the Starting your CN30 journey on-farm toolkit.

Cover image by Dan Paris – Merivale, Esperance WA.