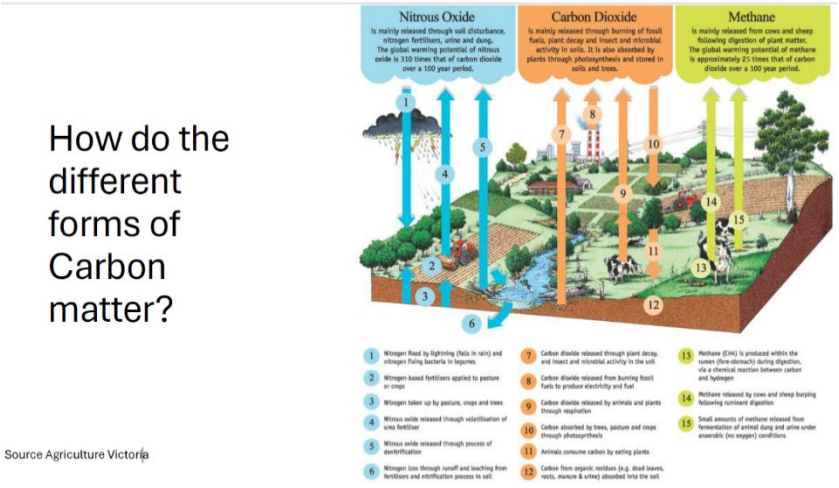
Carbon Farming in the Upper North – UNFS CFOP Workshop Summary

In February Ruth Sommerville and Ed Scott partnered with UNFS to deliver three workshops in Burra, Laura and Melrose as part of the Carbon Farming Outreach Program. The information presented was tailored to agricultural systems typical in the Mid North of South Australia. Ruth and Ed explained carbon cycles, the use of CO_2 equivalents as a global standard for greenhouse gas emissions, and the carbon farming concept. Farm-based strategies to manage carbon in production systems to improve on farm production efficiency and ensure market access into the future were explored.

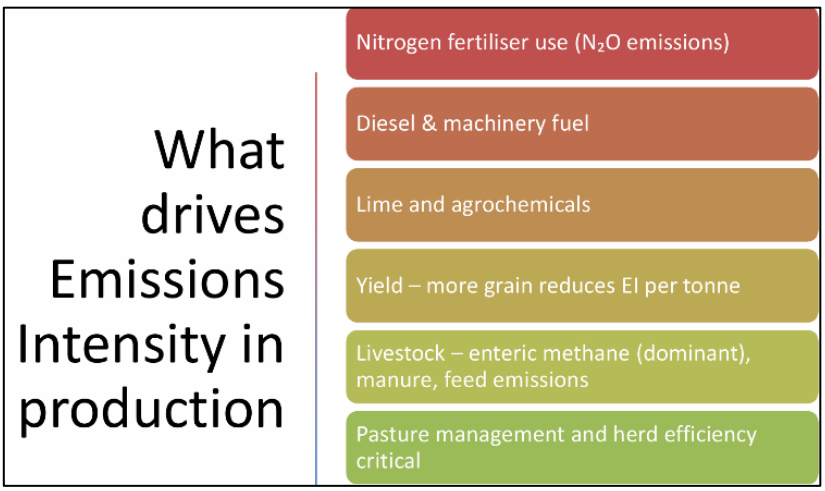
In addition regional case studies were shared, with local farmers and consultants engaging the audience with their carbon journey to date and carbon accounting figures within livestock and cropping businesses at Burra, Hallet, Jamestown and Orroroo.



The concepts of Carbon Emissions and Carbon Sequestration were covered and the value placed on Carbon Farming from our customers. A clear distinction being total Carbon Emissions, emissions produced by a business as a whole, and Carbon Emission Intensity, those emissions produced in growing 1 unit of product (e.g. per tonne of grain or per kg of wool/meat). Calculating farm Greenhouse gas emissions per unit of product i.e. CO2 -e per tonne of grain or kg CO2-e per kg liveweight on farm will help to identify efficiency gains and compare systems. Improving rates of live weight gains and nitrogen use efficiency are key production, profitability and carbon emissions efficiency gains.

Predominant sources of carbon emissions in livestock and cropping systems include methane released by livestock and scope 3 emissions from food on offer, while in cropping systems emissions stem from fertiliser and lime applications, as well as diesel and chemical usage.

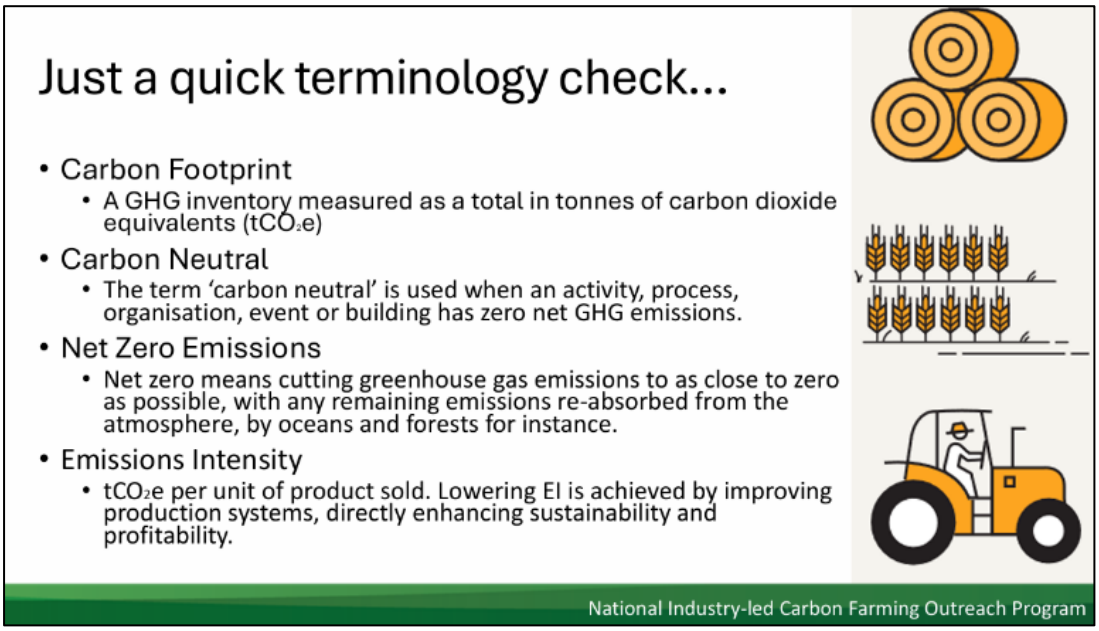
Attendees learned the importance of calculating carbon emissions in a Farm enterprise to establish a baseline and enable a process of data refinement and rolling averages to be developed, to account for seasonal variation. Grain handlers and exporters; processors and supermarkets; banks and investors will need to report scope 3 supply chain data for the mandatory climate reporting. This reporting is being implemented in stages, with the next stage being mid 2026, affecting many of our customers, resulting in requests for this information from farmers in the near future.



So who will ask for your carbon farm figures?
Farmers will not be required to provide their Carbon Footprint (Scope

1, 2 and 3)) to the government in the foreseeable future (not included in Mandatory Climate Reporting).

However, commodity purchasers including BUNGE, JBS, Cargill, Kellogg's, Coles and many more, have carbon reduction targets and mandatory reporting to meet by 2030. These targets and reports incorporate Scope 3 emissions, which is predominantly farm production Carbon Emissions, your Carbon Footprint reported as a Carbon Emissions Intensity number. When companies purchase farm products, they are transferring carbon emissions which impacts their total emissions.



Not just emissions...

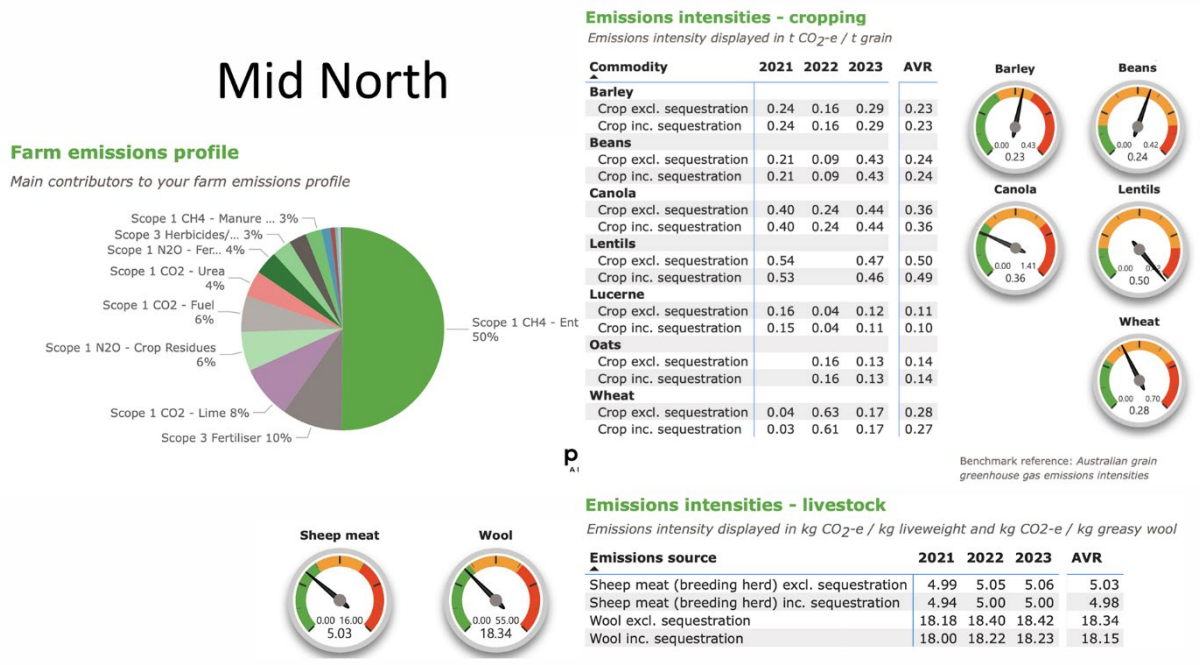
Carbon Farming incorporates both emissions and carbon sequestration. For improved sequestration of CO_2e the topics of insetting and offsetting were discussed, incorporating vegetation and soil carbon sequestration processes.

There was valuable discussion around why farmers are encouraged to invest in soil tests to establish baseline data across their system, improving input efficiency, and to incorporated soil sampling at 30cm depth to meet the baseline requirements for Carbon reporting and management. Improved soil carbon, limited by regional soil characteristics and climate, is a key driver of water holding capacity and nutrient cycling and is driven by ability to grow and retain biomass. Improved input efficiency and production capacity through addressing soil constraints are key drivers in reducing Emissions Intensity and improving soil carbon sequestration.

Carbon sequestration through vegetation community establishment is effective,

although slow in the UNFS regions. It is integral to improving landscape function and production capacity and needs to be planned in accordance with farm production systems and long term farm management plans, including multi-generational consideration. There are proven benefits to farm productivity through the provision of shade and shelter to livestock, pollination and predation habitat for cropping systems and reduction of wind at the soil/crop level to reducing evapotranspiration and nitrogen volatilisation. Establishment of effective and healthy native vegetation on farm, with aims of 10-30% of the farm in a diverse and perennial state, will improve farm productivity and resilience to climate variation and extreme weather events, and can play a significant role in enterprise insetting, or the production of ACCU's for sale to others for off-setting.

<u>Developing a Carbon Account for my Farm...where do I start?</u>
There are numerous tools available, but they are all based on a set of agreed international standards, and Australian agreed data making up the GAF, Greenhouse Accounting Framework. This is available to farmers as the GAF tool. Downloadable here:
https://piccc.org.au/resources/Tools.html



The GAF Tool is excel based, requires the most current version to be downloaded each time you report, and is a great place to start. Different GAF tools are available for each enterprise (cropping, sheep, etc.)

MLA has an online calculator version of the GAF tool, if excel isn't your thing.

AIA Environmental Accounting Platform is an online portal that is live and enables mapping and carbon accounting to be interoperable. It is evolving to enable data upload from current farm software platforms. We suggest working with the GAF tool to understand the data you are entering, then once you've got the hang of it have a go at the AIA platform. Available here:
https://aginnovationaustralia.com.au/ea-platform/

What data matters when talking carbon accounting?

Cropping

By crop-type by production year; paddock area and crop yields, rainfall above or below 600mm/yr (for leaching and runoff), Input use - lime, nitrogen and chemical (by type).

Livestock

By age-class and either monthly or quarterly time-periods; the number of animals, weight of animals, number of animals lactating (&start date), feed quality & feed on offer, purchased fodder and grain, and lime applications.

The better the data, the better the outcome. Understanding where data accuracy matters is important to ensuring a defendable Carbon Account.

Some Farm Data collection tips

- Livestock weights and age class change is important for accuracy
- Urea vs other N sources are entered separately in your fertiliser data entry, and by kg of N, not kg of product.
- Placement of fertilizer can remove leaching – down tube, not broadcast. Surface application – coatings become more relevant. Currently not well accounted for in the platforms.
- Chemical is entered as gram active not as litres/ volume.
- Can use your agronomists recommendations rates for chemical to reduce data handling. Actuals will be best in the long term, but this is a good surrogate in the adoption phase.
- Weight of animal every month! Justify a guestimate of weights – be transparent, how did you arrive at that number?
- Purchase of fodder brings the scope 3 emissions to your farm business – currently presented as an industry standard number, you do not need to ask your suppliers for their emissions intensity number.
- Livestock needs to include lime use/fertiliser on pasture paddocks.

Key messages

- “Carbon Farming is part of what is being done already across the district, but understanding your number can help drive efficiency gains”
- “the businesses you supply are being asked to report their Carbon Footprint, and that encompasses your Carbon Footprint” and
- “Improving the management of Carbon on your farm will make it a more robust and stable production system and improve landscape function across the enterprise.”

Damian Sommerville, Sommerville Partners, Burra and Spalding

The Sommerville' case study was based on a 100% cropping system producing wheat, barley, canola and pulses (beans or lentils) across 3 years 2022-2025.

Drivers for their emissions profile included;

Nitrogen fertiliser brings emissions from manufacture (burning gas to make urea and transport of fertiliser to Australia and to a farm) and releases NO_2 on farm therefore adding significantly to carbon emissions in a cropping system. The rate of volatilisation varies, placement at depth at sowing versus broadcasting fertiliser can change the amount lost to volatilisation and leeching isn't a problem in our region, so down the tube application is most efficient. Utilising variable rate fertiliser placed at depth can reduce a farms' carbon footprint, however cannot be accounted for in the calculators at this stage.

Lime application is integral to manage soil pH, however is a key emitter, due to the neutralising chemical process and the mining emissions. The increase in productivity and soil health outweighs the emissions and precision application will maximise efficiency.

Canola is a high input crop to produce a good yield, the Carbon emissions are high reflecting this, increased by the use of lime prior to break crops in our rotation (lentils of canola). The Carbon emissions from Lime are accounted for in the crop following application, despite the long lasting effect of the liming. This may drive us to change what crop the lime is put on prior to if Emissions Intensity starts to be a driver for market access or prices.

Holly Crawford, Strathdeen, Jamestown

Holly and Luke are 100% croppers outside Jamestown, having recently de-stocked completely. Holly provided a summary of their involvement in the PIRSA Carbon and Biodiversity Pilot, which included planting 32 ha of trees and shrubs (3,800 tube stock) on their farm, in paddocks previously used for grazing. There's a lot to consider in taking on a project like this, including fire risk and watering to establish the planted trees and shrubs, but they are very happy with positive outcomes such as improved biodiversity, a lower emissions number and an additional potential revenue stream generated through ACCU's if not used for in-setting. Holly mentioned that they may have done it backwards and would, if doing it again, do their carbon footprint accounting first and then undergo the sequestration project, but they are excited by the production, landscape and lifestyle benefits that will come from a planting of this scale, and the support

available through doing it as part of a industry project was fabulous for navigating the new world of ACCU's and large scale revegetation activities. Holly is excited that these trees will be there for their kids into the future, and it doesn't rule out grazing them in the future, they just need to manage the grazing pressure to ensure the trees and understory remain healthy.

Tessa Tiver, Mount Razorback Pastoral Company, Hallett

Tessa and Brad Tiver's sheep meat and wool property Toolangi, near Hallett, was part of a 2023 PIRSA carbon pilot project delivered by UNFS. The Tiver's participated in a project measuring emissions, vegetation and soil carbon and landscape function on their property. Tessa was surprised to learn their farm emissions were significantly higher than expected, albeit relatively low when compared across the industry. The project compared current data with farm management plans to model detailing emissions, biomass, sequestration potential and ecosystem health outcomes, providing recommendations of how to address production limitations and become more carbon efficient. The business has since reduced their stock numbers by 10% to improve pasture management, with the aim of testing if reduced stock numbers can still have the same outputs through improved live weight gains and meat and wool quality. Changes implemented include investment in containment feeding systems and a move away from set-stocking towards rotational grazing to build their biomass and diversity of feed. Future plans include works to reduce the rate of flow of water off their steep hills, increasing infiltration and resulting plant growth, and planting of tussock grasses and shrubs around dams and at creeks to slow the flow into water catchment areas and increase the filtration of water,

improving water quality.

Dan Hanisch, RegenCo, Presenting as project partner in the UNFS Carbon Farming Pilot Project, presenting data from Tim and Christie Luckrafts property at Orroroo and Ryan and Ellie Oates property at Burra.

Dan is a Senior Project Manager with RegenCo with extensive experience in impact assessment across environmental restoration activities. RegenCo is a Natural Capital focussed business specialising in agricultural productivity, land management and carbon projects. Dan worked with our landholders as part of the PIRSA Carbon Pilot project in 2023 and modelled the impacts of proposed management changes and landscape restoration projects on the businesses profitability, resilience to weather extremes and their carbon emissions and overall footprint.

The Luckraft and Oates properties showed significant benefits from the proposed management changes and restoration activities across all accounting areas of their enterprises, their triple bottom line. Improved water cycles on farm, more perennial vegetation communities in areas once cropped, re-establishment of shelterbelts and fodder shrub areas, and establishment of improved grazing management to manage soil cover and vegetation diversity all led to improved long term profitability through improved live weight gains, lower impacts of heat and cold events, improved soil carbon, improved carbon footprint and reduced fluctuation in the production cycles with more resilient production systems.

The full Tiver, Luckraft and Oates Case Studies can be found on the UNFS website.

In Summary;

Developing baseline carbon numbers can inform production management decisions, an efficiency matrix that can be easily compared/benchmarked with industry. Ensuring it is accurate and transparent will enable it to be used to access markets and improve profitability. Building in robust and auditable processes and following agreed methodologies will strengthen credibility with verified evidence for future carbon claims and opportunities.

As farmers, we need to be collecting quality data now in the formats required, to be able to produce a 3-5 year average across the seasonal variability by 2030, when the majority of the mandatory reporting has come into full effect. A proactive approach to carbon accounting may also help your business to present favourably to banks and insurers, demonstrating that you have a plan, you have eliminated some of the unknown, the data and metrics gathered will help to assess farm efficiencies and you are preparing for changes in the marketplace.

A huge thank you to Holly Crawford, Tessa Tiver, Damian Sommerville and Dan Hanisch for sharing their experiences with carbon farming. Thanks to Ed and Ruth for delivering these workshops with UNFS and without the funding partnership it wouldn't be possible to have such great catering, and

knowledge sharing. Thank you to the Carbon Farming Outreach Program for making these workshops possible.

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