Food and feed industry players join net zero push

Momentum is increasing for Australia to cut greenhouse gas emissions by 43 per cent by 2030 and produce zero emissions by 2050. Will you be ready?

By Dr Cassandra Schefe, AgriSci

Several food and feed manufacturers have joined FarmLink in supporting grain growers to reduce on-farm greenhouse gas emissions without compromising profitability.

Farmers who partner with FarmLink through the Cool Soil Initiative are given the tools to adopt soil health practices that increase grain yields and improve crop resilience.

The initiative grew from a collaboration between Mars Petcare, Riverine Plains and Central West Farming Systems (CWFS) that started in 2017.

Back then, the aim was to measure and reduce emissions from wheat production and support farmers by focusing on soil health.

The Sustainable Food Lab, an international organisation with experience supporting sustainability projects across supply chains, provided technical support.

Who is involved?

In 2020, the initiative evolved as Kellogg's, Manildra Group and Allied Pinnacle joined, in partnership with Charles Sturt University (CSU)and the Food Agility Cooperative Research Centre.

Accordingly, the aim is to unlock what is happening in the soil to help farmers position their businesses for a sustainable future.

Mars Petcare, Kellogg's, Manildra Group and Allied Pinnacle are committed to sustainable sourcing through their supply chains.

These investors are also working to increase the visibility of the Cool Soil Initiative as they believe it could become an industry-wide framework in the future.

In return, each company can report how they contribute to reducing emissions through their supply chains. This reporting is based on anonymised regional data.

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Dr Cassandra Schefe, AgriSci, at a Cool Soil Initiative soil pit and workshop in Coolamon last month.

Is it science-backed?

While farmer engagement is the initiative's focus, CSU has established research to develop the scientific basis. The research includes:

- a review of the Cool Farm Tool greenhouse gas emissions calculator to explore how well it represents Australian conditions and what modifications are needed;
- an investigation of geographical information systems imagery and whether it can be used in on-farm soil sampling and establishing benchmark sites to be monitored;
- modelling to explore the economic value of practice change and investment returns; and
- developing data management systems for secure interrogation and analytics to explore the associations between on-farm practices, soil carbon and emissions.

Using the Cool Farm Tool enables emissions from Australian farms to be compared with those in other countries, which is important for commodity and processing supply chains.

Why sign up?

Measuring and reporting on-farm emissions is likely to become more important as pressure increases from governments, consumers and commodity buyers.

All information gathered through the Cool Soil Initiative is anonymised, and growers will retain ownership of their data held securely at CSU.

The initiative helps:

- identify how to maintain or increase crop yields more efficiently;
- support long-term soil health, with free soil testing on up to five wheat paddocks;
- determine emissions from each paddock, with anonymised benchmarking against other paddocks in your region;
- reduce emissions from your farm;
- access data for supporting decision-making to improve profitability;
- obtain the support to try new approaches to refine on-farm practices; and
- share research findings to support your farming.

What is the cost?

The initiative is free to join. FarmLink will collect GPS-located soil samples in up to five wheat paddocks across your farm. After harvest, FarmLink will contact you to gather the inputs for each crop, including paddock histories.

You do not need to remain in the initiative if you find it offers no value.

How are emissions calculated?

Emissions are calculated on a commodity basis, considering the energy and related emissions connected to each input.

Participating growers can demonstrate the emission footprint of wheat based on carbon dioxide equivalents per tonne and per hectare (CO_2 e/t and CO_2 e/ha). This accounts for the emissions related to the manufacture and use of all inputs (fertiliser, crop protection and weed control), diesel use and soil disturbance.

In favourable seasons, the emission footprint per tonne is low because there are more tonnes of grain spread across the emissions used. Accordingly, better seasons generally result in lower CO_2 e/t. Considering CO_2 e/ha, the emissions footprint reflects changes to inputs and practices over time.

Nitrogen is of interest because:

- urea manufacturing is energy intensive resulting in high greenhouse gas emissions;
- applying urea leads to nitrous oxide and carbon dioxide losses from soil; and
- urea is generally the largest input, significantly contributing to emissions.

Soil carbon, soil pH and cation exchange capacity values are also collected. These all play a role in 'offsetting' emissions.

Land use changes – such as growing pasture or pulses in rotation with annual grain crops, producing cover crops and switching to reduced tillage – are also considered in calculating emission offsets.

Emission results

For the 30 FarmLink paddocks analysed so far for the 2021 results, 278 kilograms of CO_2 e/t of wheat was produced on average. More paddocks will be added to this dataset, and a revised report will be produced later this year.

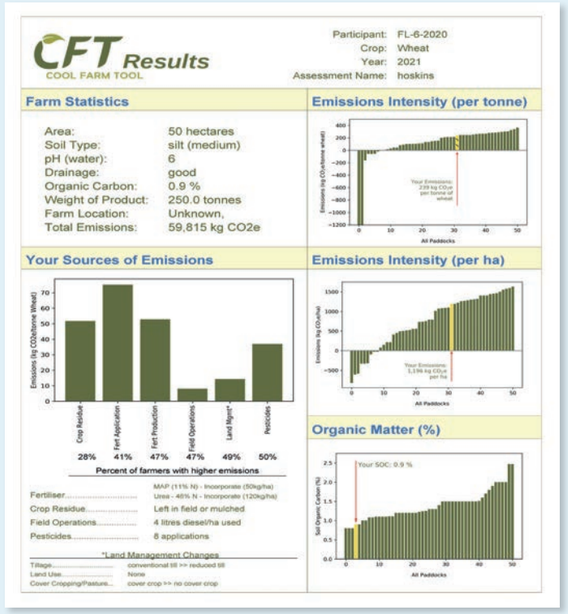
Interestingly, for 40 CWFS paddocks, 230kg of CO_2 e/t of wheat was produced on average. For 128 Riverine Plains paddocks, the value was 322kg CO_2 e/t of wheat.

These results reflect the different levels of production inputs used to grow wheat in the medium, low and high-rainfall zones, respectively.

Emissions per hectare during 2020 and 2021 were lower than emissions in 2017 and 2018.

Crop inputs were lowest among CWFS members and highest among Riverine Plains members.

While urea use is a significant factor behind these results, the range in intensity is also driven by the degree of offsets.


CFT Results
COOL FARM TOOL

Participant: FL-6-2020
Crop: Wheat
Year: 2021
Assessment Name: hoskins

Farm Statistics

Area:	50 hectares
Soil Type:	silt (medium)
pH (water):	6
Drainage:	good
Organic Carbon:	0.9 %
Weight of Product:	250.0 tonnes
Farm Location:	Unknown,
Total Emissions:	59,815 kg CO2e

Emissions Intensity (per tonne)

Your Sources of Emissions

Emissions Intensity (per ha)

Organic Matter (%)

28% 41% 47% 47% 49% 50%

Percent of farmers with higher emissions

Fertiliser	MAP (11% N) - Incorporate (50kg/ha) Urea - 46% N - Incorporate (120kg/ha)
Crop Residue	Left in field or mulched
Field Operations	4 litres diesel/ha used
Pesticides	8 applications

*Land Management Changes

Tillage	conventional till >> reduced till
Land Use	None
Cover Cropping/Pasture	cover crop >> no cover crop

Dr Cassandra Schefe discusses the Australian Cool Soil Initiative at a soil pit/workshop in Coolamon last month.

Offsets impacts

High soil organic carbon (SOC) levels provide emission offsets. However, more importantly, they benchmark farming system resilience. High SOC values mean higher amounts of soil organic matter, which increases nutrient cycling, improves water-holding capacity and increases the diversity of microbes in the soil.

SOC values vary significantly within and between regions.

FarmLink: 12 paddocks had SOC levels of more than two per cent. Of these, nine had a history of lucerne or clover-based pasture or pulses. Only one paddock had a pH value of less than 4.8.

CWFS: 20 paddocks had SOC levels of more than 1.5 per cent. Of these, 15 had a history of lucerne or clover-based pasture. Only one had a pH of less than 4.8.

Riverine Plains: 35 paddocks had SOC levels of more than two per cent. Of these, 26 had a history of a pulse or pasture.

When farmers grew a legume in 2019 in both the CWFS and Riverine Plains groups, their 2020 wheat yield was consistently high with a tighter range of yields – compared to a broad spread of yields when they did not. This trend was not clear in 2021.

If soil pH (calcium chloride) is less than 4.8, phosphorus is not readily available to plants, legumes cannot fix nitrogen into the soil, low nitrogen mineralisation impedes the cycling of organic matter, and applied urea is not used efficiently. Accordingly, grain yield is reduced, and emissions are likely higher.

Effective incorporation of lime is needed to ensure it reacts with the soil and increases pH. If lime is broadcast without disturbance, it will not move and ameliorate the soil.

We want you!

FarmLink has 10 extra places for interested growers to join the Cool Soil Initiative. To register your interest, contact James Holding:

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