



Understanding carbon

Understanding carbon management is essential for enhancing soil health, boosting farm productivity, and addressing climate change. Effective carbon management supports environmental sustainability and strengthens farm resilience. The following information explores the global and national context, and what it means for the Hills and Fleurieu. Topics explored include

- [The global and national background \(#the-global-and-national-background\)](#)
- [The Paris Agreement \(#the-paris-agreement\)](#)
- [Climate change in the Hills and Fleurieu \(#climate-change-in-the-hills-and-fleurieu\)](#)
- [Greenhouse gases in agriculture \(#greenhouse-gases-in-agriculture\)](#)
- [Global Warming Potential \(GWP\) \(#global-warming-potential-gwp\)](#)
- [The carbon cycle \(#the-carbon-cycle\)](#)

The global and national background

In 2015, Australia along with 195 other Parties adopted the Paris Agreement, a legally binding international treaty on climate change. This was a major step in international efforts to address climate change.

In 2022, Australia introduced the Climate Change Bill which legislates the nation's commitment to reduce greenhouse gas emissions. Australia's commitment is to reduce greenhouse gas emissions 43% below 2005 levels by 2030, and net zero by 2050.

All sectors, including agriculture, need to reduce emissions in order to achieve global and national agreements and emissions targets.

Agricultural industry bodies have developed or are developing sustainability plans to reduce emissions including:

- [Meat and Livestock Australia \(https://www.mla.com.au/research-and-development/Environment-sustainability/carbon-neutral-2030-rd/\)](https://www.mla.com.au/research-and-development/Environment-sustainability/carbon-neutral-2030-rd/)
- [Dairy Australia \(https://www.dairy.com.au/sustainability/reducing-environmental-impact/reducing-emissions#:~:text=Through%20the%20Australian%20Dairy%20Industry,helping%20to%20drive%20](https://www.dairy.com.au/sustainability/reducing-environmental-impact/reducing-emissions#:~:text=Through%20the%20Australian%20Dairy%20Industry,helping%20to%20drive%20)
- [Wine Australia \(https://www.wineaustralia.com/sustainability/emissions-reduction-roadmap#:~:text=The%20pathway%20to%202030,further%20reduce%20emissions%20from%20tod](https://www.wineaustralia.com/sustainability/emissions-reduction-roadmap#:~:text=The%20pathway%20to%202030,further%20reduce%20emissions%20from%20tod)

Governments and large corporations, including banks and insurers, have also made carbon reduction commitments for 2030 to show they are moving in the right direction.

Carbon accounting, and actively managing carbon, is likely to be a part of doing business in the future.

The Paris Agreement

The [Paris Agreement \(https://unfccc.int/process-and-meetings/the-paris-agreement\)](https://unfccc.int/process-and-meetings/the-paris-agreement) aims to strengthen the global response to the threat of climate change by:

- holding the increase in the global average temperature to well below 2°C above pre-industrial levels; and
- pursuing efforts to limit temperature increase to 1.5°C.

The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015. It entered into force on 4 November 2016.

Climate change in the Hills and Fleurieu

Our climate has changed in the last century, well beyond natural cycles because of our human activities. As our human activities are releasing more greenhouse gases into the atmosphere, our planet is warming, shifting temperatures and weather patterns.

All sectors, including agriculture, need to mitigate greenhouse gas emissions. The agriculture sector in particular needs to plan to adapt practices to suit the new and changing climate.

The potential impacts of climate change in the Hills and Fleurieu which we may need to adapt to are:

- Warmer weather with more hot days and warm spells
- Changes to the timing and quantity of rainfall
- Ocean impacts with sea level rise and water temperature and pH changes

Further climate data for the Hills and Fleurieu is available through the [South Australian climate projections viewer \(https://www.environment.sa.gov.au/topics/climate-change/climate-science-knowledge-resources/latest-climate-projections-for-sa\)](https://www.environment.sa.gov.au/topics/climate-change/climate-science-knowledge-resources/latest-climate-projections-for-sa).

Useful tools and information

[My Climate View \(https://myclimateview.com.au/\)](https://myclimateview.com.au/) enables you to explore climate information relevant to your location and commodity.

ABARES latest modelling, (<https://www.agriculture.gov.au/abares/products/insights/climate-change-impacts-and-adaptation#recent-changes-in-seasonal-conditions-have-affected-the-profitability-of-australian-farms>) examining the effects of recent and possible future changes in climate on the profitability of Australian farms.

CliMate App (<https://climateapp.net.au/>) for past and forecast seasonal information

Greenhouse gases in agriculture

Greenhouse gases, are gases in the Earth's atmosphere that let sunlight past, but also trap heat from leaving the atmosphere. They help to keep the surface of the earth at a habitable temperature. Greenhouse gases occur naturally, and can also be induced by human activity such as burning of fossil fuels, deforestation and agriculture. The more greenhouse gases there are, the more heat is trapped, causing global warming.

Agricultural production including livestock and crops contribute around 17% of Australia's total greenhouse gas emissions.

The main greenhouse gases influenced by agricultural practices include:

- Methane CH₄ (enteric methane (belching) from livestock (ruminants))
- Nitrous oxide N₂O (from soil microbial activity, fertiliser application and livestock manure and urine); and
- Carbon dioxide CO₂ (burning of fossil fuels, plant decay, microbial activity in soils)

In a livestock production system methane accounts for the majority of the emissions on farm, followed by carbon dioxide and nitrous oxide.

Global Warming Potential (GWP)

Each greenhouse gas has a different Global Warming Potential. Carbon dioxide is used as the benchmark to compare how different greenhouse gases trap heat in the atmosphere.

The heat-trapping ability of a gas measured against carbon dioxide is the Global Warming Potential. These GWP's are standardised and are outlined in the National Greenhouse and Energy Reporting Act 2007.

Averaged over 100 years, Methane has a GWP of 28, or is 28 times more potent than carbon dioxide. Therefore emitting one tonne of methane is equivalent to emitting 28 tonnes of carbon dioxide. For nitrous oxide the GWP is 265.

The carbon cycle

Carbon cycles through our environment, and can be found as a gas, solid or liquid. The total amount of carbon on earth is fixed, we cannot create more and we are unable to remove it from the earth's system. We can however influence where the carbon is stored.

In an agricultural system, carbon cycles through the atmosphere, through plants and animals and through the soil. Agricultural practices can impact how much carbon is stored on farm. By increasing carbon stored in our soil for example, not only is carbon dioxide removed from the atmosphere, but soil health improves which leads to productivity gains.

Unfortunately, grazing livestock farming systems convert some carbon into methane as part of their digestive cycle, with methane released through belching as a by-product. For the period of time the carbon is in its methane form, it warms the atmosphere at a faster rate, with the global warming potential of methane at 28 times that of carbon dioxide. As a result, even though the carbon in livestock systems are cycling, it still increases global warming.

