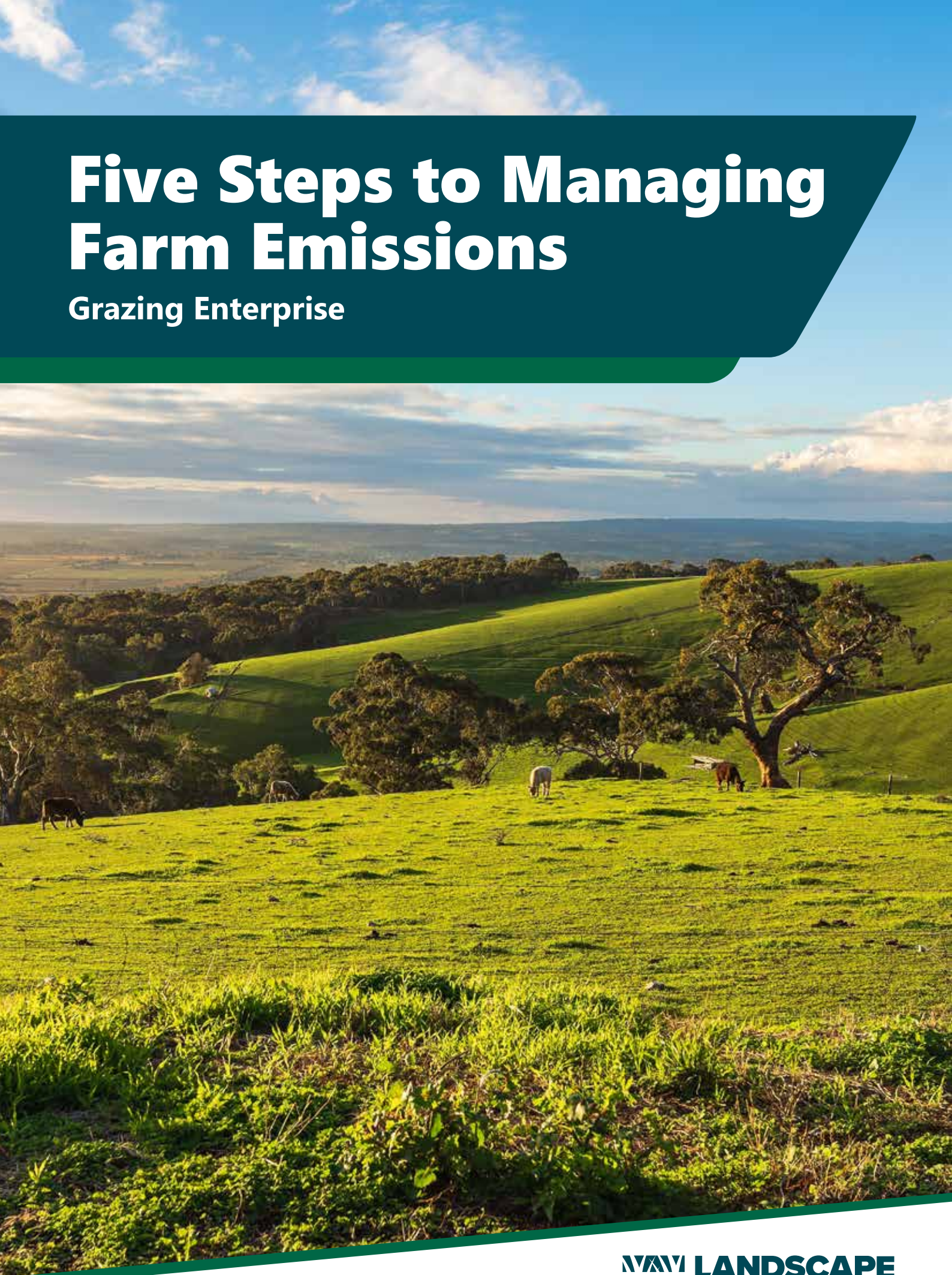
Five Steps to Managing Farm Emissions

Grazing Enterprise



LANDSCAPE SOUTH AUSTRALIA HILLS AND FLEURIEU

Welcome

You're here because:

- You're ready to actively manage emissions on your farm (grazing enterprise).
- You want practical steps to measure and, reduce emissions and store carbon.
- You're interested in improving productivity.
- You're thinking about future-proofing your business in a changing market.

This guide walks you through five clear steps to manage emissions on your grazing enterprise - whether you're just starting out or refining your current practices.



Managing emissions isn't just about environmental responsibility. It's about building a more resilient, efficient and future-ready farm. As market expectations shift and climate risks grow, farms that actively manage emissions are better placed to meet supply chain demands, maintain profitability, and protect their social licence.

By acting now, you're contributing to a more productive farm, a stronger agricultural sector, and a healthier planet.

About this guide

This guide is part of a series designed to support smart, well-timed land management actions across your property. Other topics include:

- Soil
- Native vegetation
- Watercourses
- Weed control
- Revegetation
- Dam enhancement

Use the guides that suit your needs to build a complete stewardship plan. The content draws on the experience of our climate-ready agriculture team, local landholders, and partners across the Hills and Fleurieu region.

We wish you every success.



Acknowledgement of Country

The Hills and Fleurieu Landscape Board acknowledges First Nations as the first people of the lands and waters where we live and work. We respect the Peramangk, Kaurna, and Ngarrindjeri peoples, past and present, who have cared for Yerta/Ruwe for generations, nurturing its life, stories, and landscapes. We recognise their deep knowledge, spiritual belonging, and enduring connection to Country.

We are committed to walking alongside First Nations, listening, learning, and working together to protect and restore these lands and waters.

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STEP 1

Collect data about your farm's emissions

Before you can manage emissions, you need to measure and understand them. This step helps you gather the right data - from livestock numbers to fuel use - so you can build a clear picture of your farm's emissions profile. It sets the stage for meaningful action and ensures that your efforts are targeted and measurable.

Collecting data is the foundation of effective emissions management - it helps identify where emissions are coming from, how much is being produced, and where the greatest opportunities for reduction lie. Without accurate data, it's impossible to make informed decisions or track progress over time.

On most farms, the most common sources of emissions include methane (CH_4), nitrous oxide (N_2O) and carbon dioxide (CO_2).

By gathering data across these areas, you'll build a clear picture of your farm's emissions profile (what greenhouse gases are on your farm and where they come from) and be better equipped to take strategic steps toward emissions reduction and carbon storage.

CH_4

Methane

is the main emission source for a livestock enterprise - a by-product of ruminant (hoofed livestock including cattle and sheep) digestion.

N_2O

Nitrous oxide

is emitted from nutrient rich soils and influenced by animal urine and dung, fertiliser applications and soil disturbance.

CO_2

Carbon dioxide

is emitted from petrol and diesel use on farm, lime applications, and electricity use.



Required data

To measure or calculate emissions on farm, the following data will be needed (where applicable). You may already have this information, however, best to check the list and fill any data gaps before reaching for an emissions calculator.

The main data requirements for a livestock enterprise are:

Farm inputs:

- Fertilisers (tonnes)
- Purchased animal feed (tonnes)
- Diesel (litres)
- Petrol (litres)
- Electricity (kWh) purchased
- Herbicides (kg active ingredient)
- Pesticides (kg active ingredient)

Livestock inventory for each stock class (monthly or by seasons):

- Livestock numbers
- Live weight
- Live weight gain

Purchase and sale of inventory across each stock class for the year:

- Number of animals purchased and sold
- Average purchase/sale weight of each animal

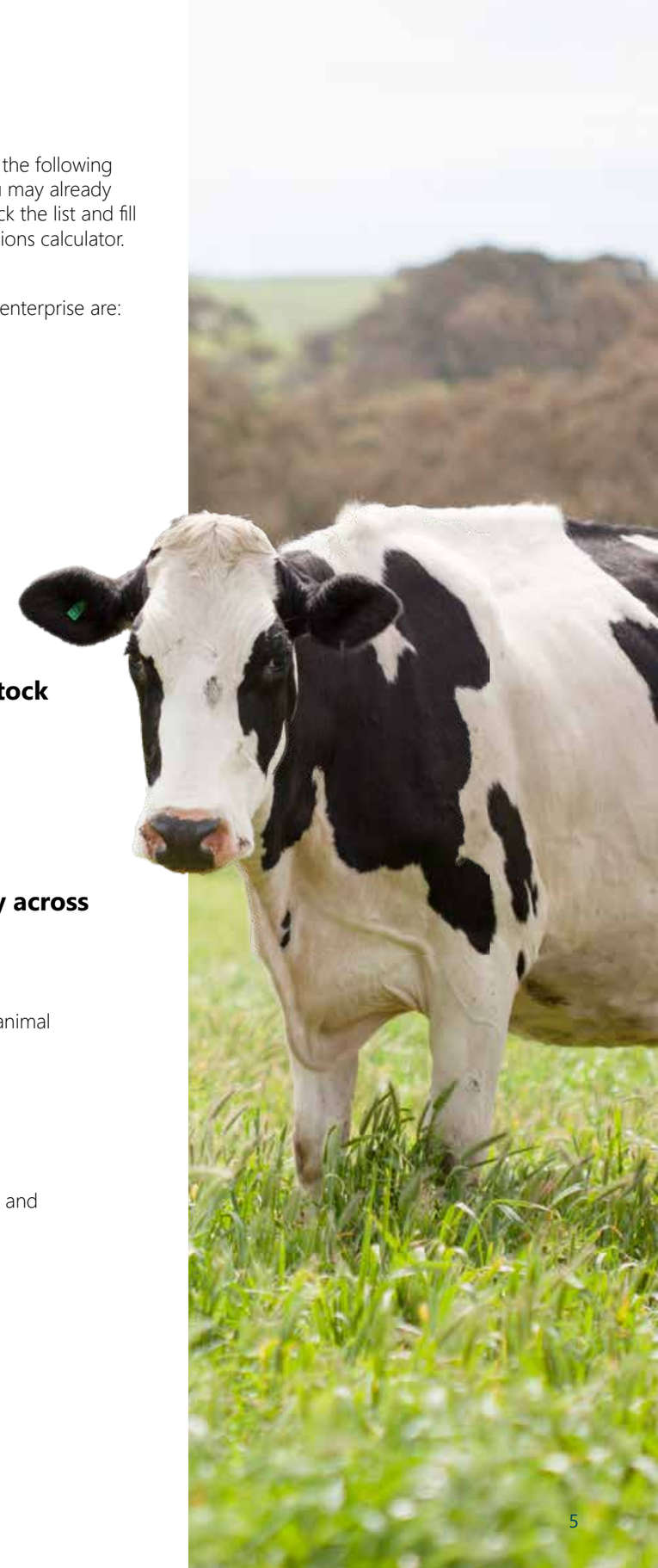
Other

- Mineral supplementation
- Wool cut data for sheep enterprises
- Percentage cows calving, ewes lambing and seasonal lambing rate

Electricity (kWh) generated

For sequestration by trees:

- Area (hectares)
- Species of trees
- Age of trees



STEP 2

Calculate emissions on your farm

Once you've collected your data, it's time to calculate your emissions. This step introduces free online tools and services that can help you work out your total emissions and your emissions intensity - a measure of how efficient your production is.

There are several free calculators available. Alternatively, there are service providers who can prepare an emissions profile for your farm for a fee. Contact Landscapes Hills and Fleurieu for more information about current consultants who can prepare your emissions profile.

The calculators will provide an overall emissions number for your enterprise along with an emissions intensity number for your product/s. The emissions intensity number can be considered a measure of production efficiency.

Visit landscape.sa.gov.au/hf/carbonsmartfarming for a complete list of free online emissions calculators.

Once you have your emissions intensity number you can assess against an industry benchmark.

Some industry benchmarks for the emissions intensity of product/s are listed below. If your number is low on the scale, there may be market advantages, if high on the scale there may be opportunities to reduce emissions and improve production efficiency.

Product	Unit of measure	Emissions Intensity (low)	Emissions intensity (high)
Chicken meat	CO_2e/kg LWT (liveweight)	**3**	**5**
Pigs	CO_2e/kg LWT (liveweight)	**4**	**7**
Beef	CO_2e/kg LWT (liveweight)	**11**	**18**
Sheep meat	CO_2e/kg LWT (liveweight)	**6**	**8**
Sheep wool	CO_2e/kg greasy wool	**21**	**28**
Dairy	CO_2e/tonne milk solids	**8**	**21**

Every farm enterprise is structured differently, and a breeding enterprise will have a different emissions intensity number to a trading enterprise. The best benchmark to assess yourself against, is your own; aim to improve your emissions intensity number each year.



STEP 3

Assess management options

Now that you know your emissions profile, you can explore practical ways to reduce emissions and store carbon. This step outlines actions for methane, nitrous oxide and carbon dioxide, tailored to beef, dairy and sheep enterprises.

The agricultural sector provides options to both reduce emissions and sequester carbon, influencing both sides of the equation in calculating net emissions.

Emissions - **Sequestration** = **Net Greenhouse Gas Emissions**

There are landscape scale benefits when emissions are actively managed on farm including enhanced biodiversity, improved soil health, improved water quality and greater resilience to climate change.

It is important to consider ways to both reduce emissions, and to sequester carbon to influence your net greenhouse gas emissions on farm.



Breaking through the jargon

Carbon farming

involves land management practices that reduce farm emissions and capture and store carbon in vegetation and soil to help mitigate climate change.

Emissions reduction

is taking action to decrease the amount of emissions produced, typically through energy efficiency, production efficiency, or reduced consumption.

Carbon sequestration

is the process of capturing and storing carbon from the atmosphere.

3a Options to reduce emissions

Options to reduce emissions are listed below for a livestock enterprise.

How to use these tables

The following tables list practical management actions that can be incorporated into your enterprise to reduce emissions from livestock. Actions are grouped by the type of greenhouse gas they target; methane, nitrous oxide, or carbon dioxide - and show how relevant each action is for beef, dairy, and sheep systems.

Each row includes:

- The management action
- The estimated impact by type of enterprise (where known)

Use these tables to identify actions that align with your farm goals. You can record your choices in the Managing Farm Emissions Action Plan template.

CH_4 Management Actions for Methane Reduction

Management Action	Beef	Dairy	Sheep
Improved productivity	5–15% reduction. Improve weight gain, weaning rates (85–95%), moderate cow weight, reduce mortality.	5–15% reduction. Boost calving rate, reduce mortality, improve feed-to-milk conversion.	5–15% reduction. Increase lambing rate, reduce mortality, improve nutrition.
Genetics	~0.2% annual reduction. Select for better feed conversion and moderate cow weight.	~0.2% annual reduction. Use Sustainability Index for low methane cows.	~0.2% annual reduction. Breed for better feed conversion and Residual Feed Intake.
Feeding strategies	Rotational grazing and mulching to improve forage quality.	Match feed to age and lactation stage. Include legumes.	Rotational grazing and legumes to improve intake.
Bovaer (3-NOP)	30–55% reduction. Works best in feedlots with mixed rations.	15–30% reduction. Effective in mixed ration systems.	15–20% reduction. Limited data.
Agolin (essential oils)	5–10% reduction. Organic option, broader use.	5–10% reduction. Organic option, broader use.	5–10% reduction. Organic option, broader use.; trials needed.
Asparagopsis (seaweed)	30–80% reduction. Effective in feedlots.	Not applicable.	Not applicable.
High concentrate feed	Grain improves efficiency and reduces methane.	Not applicable.	Not applicable.
Fats and oils	~4% reduction per 1% increase in dietary fat.	Higher energy diets reduce emissions.	~4% reduction per 1% increase in dietary fat.
Wheat feeding	Not applicable.	~10% reduction. Grain feeding lowers methane.	Not applicable.
Brassicas	Not applicable.	~10% reduction. Brassicas reduce rumen retention time.	15–25% reduction. Brassicas like forage rapeseed show strong results.

(from Guideline for Emissions Reduction Options Report (2025); Integrity Ag)

CH_4 Management Actions for Methane Reduction

There are other prospective feed additives that are in research or trial, including:

- Mootral for beef and dairy systems
- Essential oils
- Polyphenols (eg Polygain)
- Tannins
- Probiotics
- Biochar

More research is being undertaken for low methane pastures, in addition to brassicas, such as chicory, fodder beat, and plantain.

As more research occurs, new emissions reduction and production efficiency options may become available, so it is important to keep up to date with the latest findings.

N_2O Management Actions for Nitrous Oxide Reduction

Management Action	Beef	Dairy	Sheep
Optimised fertiliser use	Reduction: ~3.5%.	Reduction: ~7.5%.	Reduction: ~3.5%.
	Apply 4Rs for nutrient efficiency: Right source, Right rate, Right time, Right place.		
Inhibitor-coated fertiliser	Reduction: ~25%. Effectiveness depends on soil conditions.		

(from Guideline for Emissions Reduction Options Report (2025); Integrity Ag)

Other prospective management actions for nitrous oxide reduction in a livestock enterprise include:

- Use of organic fertilisers – For example compost, chicken manure
- Use of carbon neutral fertilisers
- Use of biochar products

CO_2 Management Actions for Carbon Dioxide

Management Action	Beef	Dairy	Sheep
Renewable energy	Reduction: ~30% of electricity emissions. Solar Return On Investment 3–5 years.		

(from Guideline for Emissions Reduction Options Report (2025); Integrity Ag)

Other prospective management actions for carbon dioxide reduction in a livestock enterprise include:

- Electric machinery, for example electric tractors, will be beneficial for enterprises that have significant diesel emissions.
- Examining emissions from farm inputs - for example supplementary feed, lime, fertiliser, herbicides, pesticides.
- Use of organic fertilisers – for example compost, chicken manure.
- Use of carbon neutral fertilisers.

3b Options to store carbon in soil and vegetation

Agricultural land can be used to store carbon by sequestering carbon into soil and vegetation. This carbon can then be used to either inset to reduce your farm emissions or offset to reduce emissions of some other enterprise (i.e. sold on the carbon market).



CO_2 Breaking through the jargon

Carbon insetting and offsetting are both strategies to address carbon emissions.

Carbon insetting

Involves reducing emissions or storing carbon within your own business/supply chain.

Carbon offsetting

Involves selling/purchasing carbon credit to an external company.

The online Landscape Options and Opportunities for Carbon Abatement Calculator (LOOC-C) can be used to assess the viability of a registered sequestration carbon project on your farm. Department for Environment and Water also have some valuable resources that explain organic carbon stocks in SA soils. Visit landscape.sa.gov.au/hf/carbonsmartfarming for a complete list of free online tools.

No matter the results, there are production benefits in storing carbon in soil and vegetation outside of a registered carbon project.

Soil carbon sequestration

Increasing soil carbon stocks (total tonnes of carbon stored in the soil profile per hectare) on farm provides productivity as well as emissions reduction benefits.

Important considerations include:

- Carbon can only be increased to a maximum stable level as determined by site characteristics (eg soil type) and climate (eg rainfall).
- Continual active management is required to maintain carbon stocks.
- Carbon can be lost to the atmosphere with climate and management changes (eg maintaining stocking rates in drought) and once lost takes time to rebuild.

Given property sizes, soil types, and historic land use practices in the Hills and Fleurieu region, there are limited viable areas for registered soil carbon projects, but there will always remain a productive benefit to actively manage soil carbon sequestration.

Maintaining groundcover and managing grazing rotations can contribute to building and maintaining soil carbon stocks for productivity.

Increasing soil carbon will:

- Improve soil structure
- Increase water infiltration, holding capacity and retention for better drought tolerance
- Support beneficial microbial activity, helpful to supress disease and/or severity of disease
- Enhance nutrient cycling and availability, and
- Improve root structure to reduce soil erosion risk.

See **Managing Farm Emissions Action Plan template** for some quick ways to assess soil carbon potential.

Vegetation carbon sequestration

Planting vegetation on farms offers a valuable opportunity to sequester carbon while also boosting productivity. By designing plantings to provide shade and shelter for livestock and crops, farmers can enhance growing conditions and animal welfare. These improvements not only support carbon capture but also increase the productivity of livestock and crops - which, in turn, helps reduce overall emissions.

Did you know?

- Lamb and shorn sheep survival improves when sheltered from the chill experienced through cold winds
- Dry matter intake, live-weight gain and reproductive success of livestock increases when they have access to shelter in hotter conditions
- Pasture productivity is also likely to increase in a well-planned paddock and shelterbelt
- Well-placed trees can improve grazing access by reducing salinity and/or water logging
- Tree planting helps to retain water loss and improve water quality
- Tree planting provides groundcover and protects soils from erosion
- Tree plantings assist in maintaining and increasing biodiversity on farm provision of habitat increases biodiversity on farm and in the wider landscape, this can benefit farming systems through increased pollinators.

For agricultural enterprises, carbon sequestered in vegetation is calculated within current standard emissions calculators. This can be a useful way of determining the sequestration potential of a revegetation project and its impact on your farm's emissions.

3c Understanding the Australian Carbon Credit Unit (ACCU) market

Managing emissions on your farm can bring productivity benefits, whether or not you choose to participate in the carbon market. The carbon market is voluntary, meaning you can decide whether to register a carbon project or simply manage emissions independently.

If you reduce emissions or store carbon on your farm, you can:

- Inset those reductions against your own products (e.g. beef, wool, milk)
- Or offset them by selling carbon credits through the ACCU Scheme

This section explains what a carbon project is, how the ACCU Scheme works, and what to consider before registering. In **Step 4,** you'll find decision trees and tools to help assess whether a carbon market project is right for your farm.

What is a Carbon Project?

An ACCU carbon project is an initiative that reduces emissions or stores carbon and is registered under the Australian Carbon Credit Unit (ACCU) Scheme, managed by the Clean Energy Regulator (CER). To be eligible for carbon credits, a project must:

- Be new and not already legally required
- Demonstrate additionality (i.e. it wouldn't happen without the incentive)
- Be registered before it begins
- Commit to a permanence period of either 25 or 100 years

Carbon projects can be complex. They involve:

- Benchmarking and validation
- Ongoing monitoring and reporting
- Independent auditing

Many landholders work with carbon service providers to manage these requirements. Services and costs vary, so it's worth comparing options.

What is a Methodology (Method)?

Each carbon project must follow a methodology determination, or "method". This is a set of rules that outlines:

- What activities are eligible
- How carbon abatement is measured
- What monitoring and reporting is required

Methods are specific to project types - for example, soil carbon, vegetation, or livestock emissions - and may evolve over time. For the latest information, visit the Clean Energy Regulator website.

Methods under the ACCU Scheme

If you're considering registering a carbon project, it's important to understand the methodologies available. These are the approved approaches for measuring and verifying carbon abatement under the ACCU Scheme.

The tables below outline current methods relevant to agriculture and vegetation in the Hills and Fleurieu region. Each method includes:

- A brief description
- The types of activities that are eligible
- Links to further information (see Clean Energy Regulator website)





Agriculture methods: reduce farming and land emissions.

The current methods under the ACCU Scheme, as relevant to the Hills and Fleurieu region include:

Method	Description	Eligible Activities
Estimating soil organic carbon sequestration using measurement and models method	Demonstrate an increase in soil carbon above the baseline level by testing and sampling soil	Activities under this method include: • applying nutrients to the land through fertiliser • applying lime to remediate acid soils • applying gypsum to remediate sodic or magnesic soils • undertaking new irrigation re-establishing or rejuvenating a pasture by seeding or pasture cropping establishing, and permanently maintaining, a pasture where there's previously no or limited pasture • altering the stocking rate, duration or intensity of grazing • retaining stubble after a crop is harvested • converting from intensive tillage practices to reduced or no tillage practices • modifying landscape or landform features to remediate land • using mechanical methods to add or redistribute soil • using legume species in a cropping or pasture system • using a cover crop to promote soil vegetation cover or improve soil health or both.
Animal effluent management method	Recycle and reuse animal waste through an eligible animal waste treatment facility	Project activities include any of the following: • emissions destruction • emissions avoidance • biogas generated for biomethane production
Integrated Farm Management Method	Currently under development and aims to integrate various farm management practices to reduce emissions	

Vegetation methods: remove carbon dioxide from the atmosphere and store it as carbon in plants.

The current methods under the ACCU Scheme include:

Method	Description	Eligible Activities
Reforestation by environmental or mallee plantings FullCAM method 2024	Plant trees to store carbon and earn Australian Carbon Credit Units Note: There may be opportunities to design a planting project that meets requirements under both the ACCU Scheme and the Nature Repair Market scheme. Make sure you understand ACCU Scheme and Nature Repair Market scheme eligibility requirements before starting your planting activities to ensure you can participate in both schemes.	Project activities are for planting trees: • as seeds or tubestock • in areas that are linear belts or blocks • with the potential to reach heights of at least 2m and provide cover over a minimum of 20% of the land • at a density that allows them to achieve forest cover - belt plantings must have a minimum density of 800 stems per hectare - block plantings must have a minimum density of 200 stems per hectare. Please also refer to Fact Sheet: "Carbon Plantings in the Hills and Fleurieu: What Land Managers Need to Know" to assess eligibility of carbon plantings on your farm.
Plantation forestry method	Establish, convert or transition to forestry plantations	You can run a project by: • establishing a new forestry plantation • converting a short rotation plantation to a long rotation plantation • continuing to plant forestry where it would otherwise be converted to non-forested land • transitioning to a permanent planting in circumstances where it would otherwise be converted to non-forested land. Please also refer to Fact Sheet: "Carbon Plantings in the Hills and Fleurieu: What Land Managers Need to Know" to assess eligibility of carbon plantings on your farm.

Not all carbon planting projects are the same. For example, there is the opportunity to value add to a carbon planting by adding biodiversity benefits. This may result in a higher ACCU price in the open market. There may also be opportunities to stack carbon projects with Nature Repair Market projects, and obtain both ACCU's and Biodiversity Certificate/s. The desired outcome/s must be planned before projects commence and are registered.

STEP 4

Take action

Now that you understand your emissions profile and the management options available, it's time to decide what actions you'll take on your farm.

This step is about turning ideas into action - choosing the strategies that best suit your enterprise, setting priorities, and recording your decisions in the Action Plan template.

Whether you're aiming to reduce emissions, store carbon, or explore the carbon market, the actions you take will often improve productivity and resilience at the same time.

Choosing Actions That Fit Your Farm

Start by reviewing the tables in Step 3. Ask yourself:

- Which actions are most relevant to your enterprise (beef, dairy, sheep)?
- Which ones offer quick wins or align with existing practices?
- Are there actions that support long-term goals, like soil health or energy efficiency?

You don't need to do everything at once. Focus on a few key actions that are practical and achievable and build from there.

Use the **Managing Farm Emissions Action Plan** template to record:

- What you plan to do
- Why you've chosen those actions
- How you'll monitor progress

Considering the Carbon Market

If you're thinking about registering a carbon project, this is the time to explore your options. You can:

- **Inset** emissions reductions within your own business, or
- **Offset** by selling carbon credits through the ACCU Scheme

Ask yourself:

- Are you looking to reduce the emissions intensity of your product?
- Are you interested in earning additional income through carbon credits?

Use the decision tools listed below to help assess whether a carbon market project is right for your farm:

- Carbon Opportunity Decision Support Tool (CODST)
- Landholder guidance checklist – Carbon Market Institute

Next Steps

Once you've chosen your actions:

- **Record them in your Action Plan template**
- **Set a timeline for implementation**
- **Decide how you'll monitor success (see Step 5)**

Taking action is the most important step - even small changes can make a big difference over time.

STEP 5

Monitor and review

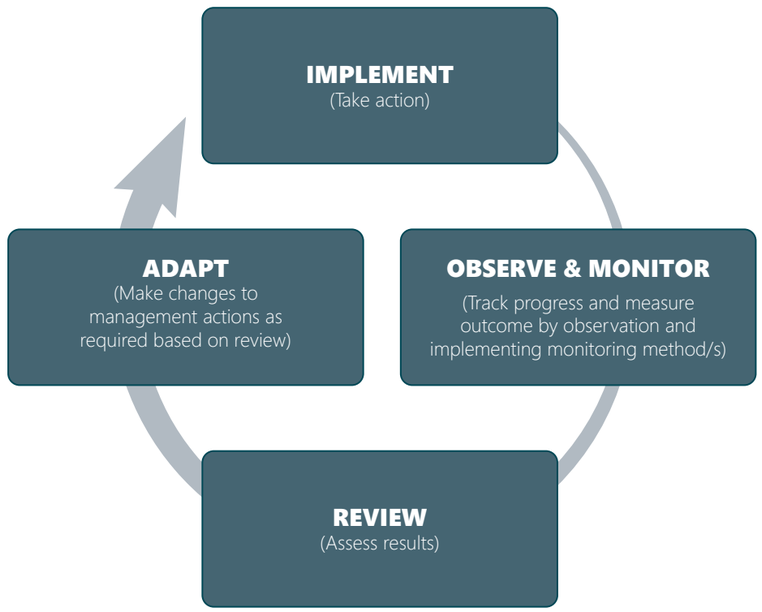
Monitoring helps you track progress and adjust your actions over time. This step shows how to set a baseline, observe changes, and review results so you can keep improving.

Setting a baseline

Before implementing any management actions, it's beneficial to collect baseline data to understand the status of emissions on your farm. Regular monitoring will help to see if your actions are succeeding. What success means will depend on your farm goals.

Monitoring on your farm

Monitoring will help you respond to emerging issues and identify successes and whether actions need to be adapted or changed; it is an ongoing process of learning and improvement. If the monitoring data indicates that the management actions are not achieving the desired outcomes, adjust the management actions accordingly.



What to monitor to manage emissions?

There are many things that can be monitored and measured - however, it is important that what you measure provides answers to the original desired outcome. Refer to your goal in managing emissions on your farm.

To regularly monitor emissions on farm, emissions intensity of product/s and to regularly assess against benchmarks, see **Step 1** for list of calculator tools available.



Would you like to learn more?

Managing emissions is one of the most practical ways to improve your farm's productivity, resilience and sustainability. By measuring your emissions, taking action to reduce them, and storing carbon in soils and vegetation, you're helping to future-proof your business and contribute to a healthier landscape.

For a full suite of links and additional information, tools and references aligned to the topics in this guide, please visit the carbon farming pages on our Landscapes Hills and Fleurieu website at landscape.sa.gov.au/hf/carbonsmartfarming. This is also where you will find your Managing Farm Emissions Action Plan template.

Every step you take, big or small, makes a difference. Use the Action Plan to record your goals, track your progress, and keep improving over time.

Together, we can build a stronger, climate-ready agricultural sector.

Download your **Managing Farm Emissions Action Plan template** from our website and get started today!



LANDSCAPE SOUTH AUSTRALIA HILLS AND FLEURIEU

Connect with us
Web: landscape.sa.gov.au/hf
Email: hf.landscapeboard@sa.gov.au
Phone: 08 8391 7500
Unit 8/22 Mann Street
Upper Level, Corner Mann & Walker Street
Mount Barker - Peramangk Country SA 5251