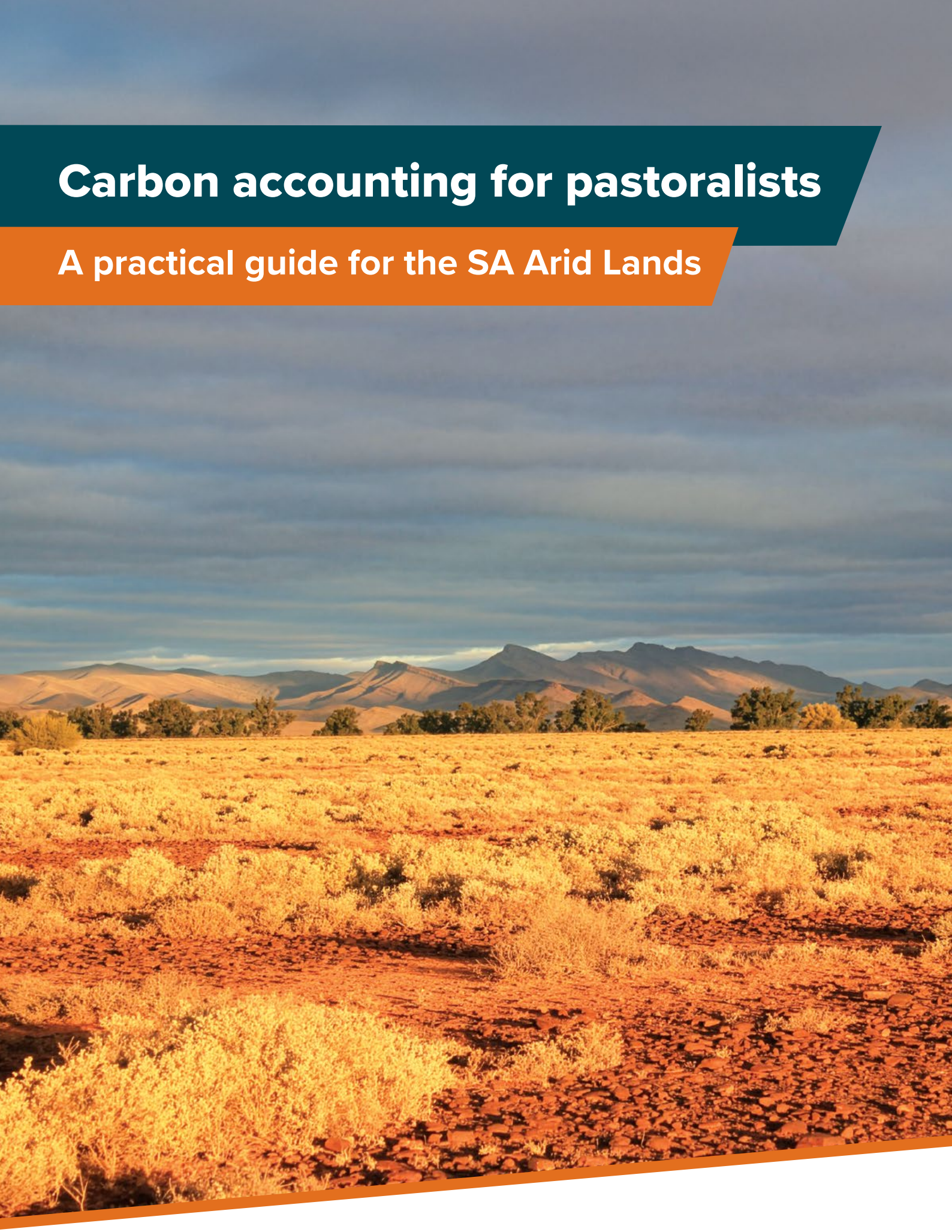
Carbon accounting for pastoralists

A practical guide for the SA Arid Lands



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LANDSCAPE SOUTH AUSTRALIA SA ARID LANDS

What does a carbon account look like?

A carbon account tallies an enterprise's greenhouse gas emissions over a year, then divides them by what is produced. The result, *emissions intensity* (EI), is the figure buyers, lenders, and supply-chain partners are increasingly asking for.

Rangeland sheep

What data is needed for a sheep enterprise?

1. **Flock/herd structure by class and season**
   Numbers in each class – rams, ewes, lambs (sheep) – averaged across each season. *Drives total methane output.*

   RECORDS: paddock count records · monthly diary · stock summaries

2. **Production rates and liveweights**
   Marking, weaning, mortality, liveweight by class & season, liveweight gain, fleece per head. *Determines how many kg of product the emissions are spread across.*

   RECORDS: scanning records · weaning tallies · scale weights · shearing tally

3. **Outputs sold**
   Total kg liveweight sold and total kg greasy wool produced for the year. *Include cull and surplus stock — not just trade animals.*

   RECORDS: NLIS · saleyard dockets · wool brokers' statement

4. **Energy and inputs**
   Diesel / petrol / LPG litres, electricity kWh, supplements tonnes, herbicides kg active ingredient. *Usually a small slice in rangelands, but it's still counted.*

   RECORDS: fuel invoices · power bills · supplement purchases · chemical records

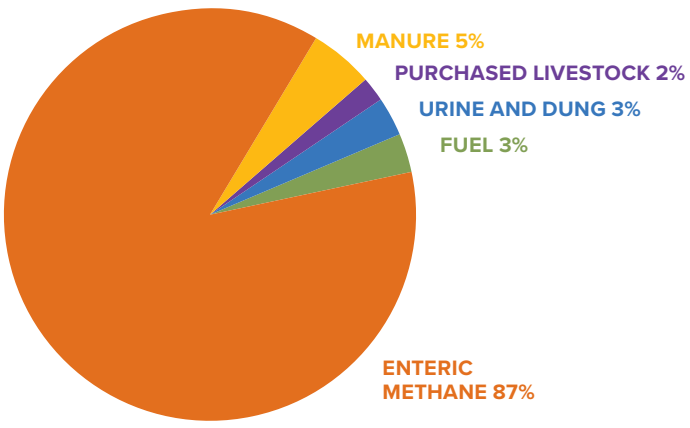
5. **Land and vegetation**
   Total area run, chenopod and shrub cover, any change in woody vegetation. *Used to estimate on-property sequestration that offsets emissions.*

   RECORDS: lease / title area · ground cover monitoring

SHEEP EXAMPLE[1]

WHAT NUMBERS ARE INPUT? Far Plains Station*, a self-replacing 5,000-head Merino flock in the Northern Flinders district, averaging around 250 mm annual rainfall, completed their carbon account for FY25–26 using the SB-GAF tool. The figures below are what came out.
FLOCK & PRODUCTION Self-replacing ewe flock: 5000 breeding ewes, 1000 maiden breeding ewes, 100 rams, 1750 ewe lambs, 1150 wether lambs Marking / weaning: 85% / 78% Ewe mortality: 6%
OUTPUTS Average sale weight (LWT): 45kg Greasy fleece / head: 5kg
RESULTING EMISSIONS INTENSITY (EI) Per kg liveweight (meat): 5.6kg CO2-e Per kg greasy wool: 19.8kg CO2-e

HOTSPOT ANALYSIS: FAR PLAINS STATION



Rangeland cattle

What inputs are different for cattle?

1. The breeder herd dominates

A significant share of emissions per kilogram of liveweight (LWt) is attributed to maintaining the breeding herd. **More successful weaners** spreads emissions across more kilograms of product.

2. One product, no allocation

Just kg liveweight to divide by – no meat/wool split. The intensity number is simpler to read but tends to sit higher than sheep.

3. Longer time on property

Steers in arid country typically reach turn-off at **24-30 months**. Every extra month of feed intake adds methane before the animal is sold.

4. Southern Rangelands sits high

Typical EI here is **~18 kg CO_2e/kg LWt** – the upper end of the industry range – reflecting slower growth, longer cycles, and energy to run water across very large leases.

CATTLE EXAMPLE[1]

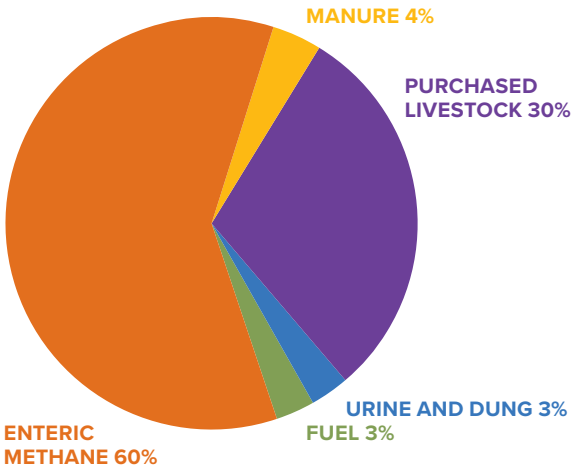
WHAT NUMBERS COME FROM YOUR INPUTS?
Wirra Downs* is a 200,000 ha cattle lease located in the Marree-Innamincka district and runs a 1,200 self-replacing breeders on chenopod country. The managers completed their carbon account for FY25–26 using the SB-GAF tool. The figures below are what came out.

LAND AND HERD STRUCTURE
Total lease area: 200,000 ha
Breeder herd: 1,200 head
Country / cover: Chenopod shrubland

PRODUCTION
Branding / weaning rate: 65% / 58%
Breeder / calf mortality: 4% / 10%
Steer turn-off weight / age: 380 kg @ 30 mo

RESULTING EMISSIONS INTENSITY (EI)
Per kg liveweight (excl. sequestration): ~16kg CO2-e
Within the rangelands cattle range:11 – 18 CO2-e

HOTSPOT ANALYSIS: WIRRA DOWNS



* *Far Plains Station and Wirra Downs are fictional properties created for the purpose of illustrating a carbon account. The figures are not based on real properties.*

1. *Whichever enterprise you run, a carbon account is the same first step — pick a calculator (AIA EAP, MLA, or PICCC SB-GAF), pull your stock and input data, and run it. Talk to the SAAL Sustainable Agriculture and Carbon Outreach Officer for help getting started.*
Please note, these numbers are indicative — your own account will reflect your country, season and management

What an account tells you

Enteric methane from rumen digestion is the dominant emission (typically 80–90% of the total), joined by manure, fuel, electricity, and embedded inputs. Totals are allocated between meat and wool on sheep accounts.

Figures indicative — use a farm-specific calculator (e.g. SB-GAF) to produce a reportable account.

How to complete a carbon account

WHY BOTHER?

A carbon account helps determine net GHG position and identify where to reduce emissions and build on-farm carbon storage.

Set a benchmark to track progress, and produce the emissions intensity figure processors and markets increasingly require for ongoing and emerging access.

PICK A CALCULATOR (all free):

- **PICCC SB-GAF (Excel)** – the underlying framework the others build on.
  piccc.org.au/resources/Tools.html

- **AIA Environmental Accounting Platform (AIA EAP)** – free, standardised tool covering beef, sheep, goat and grain at enterprise or whole-of-business level; well suited to mixed pastoral operations.
  www.aiaeap.com

- **MLA Carbon Calculator** – online, web-based; the easiest entry point for a single beef or sheep enterprise. A carbon accounting technical manual is also available on this link.
  carbon-calculator.mla.com.au

INFORMATION NEEDED

A full year of data – the items listed on page two under 'What goes in', entered as opening and closing figures.
A financial year is easiest.

STEPS – TYPICAL WORKFLOW

- Set up your property profile (region, area, rainfall zone).
- Enter livestock inventory – opening and closing numbers by class.
- Enter productivity – marking/weaning %, mortality, turn-off weight.
- Enter inputs – fuel, electricity, purchased feed, fertiliser.
- Enter on-property sequestration (vegetation and soil, only if measured/eligible).
- Review outputs: total net farm emissions (t CO_2-e/yr) and emissions intensity per kg liveweight, plus per kg greasy wool for sheep.
- Save the report and data file as your baseline; then rerun annually.

LOWERING EMISSIONS INTENSITY

Once you are comfortable entering the data, you can look at options to lower your intensity. In rangelands enterprises almost every reduction lever works the same way: produce more kilograms of meat (or wool) from the same methane-producing animals. You're not eliminating the methane – you're spreading it across more product.

Cut the small things that add up. Switching diesel bores to solar removes Scope 1 fuel emissions; better water-point distribution opens underused pasture and cuts walking distance; renewable power at the homestead trims Scope 2.

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