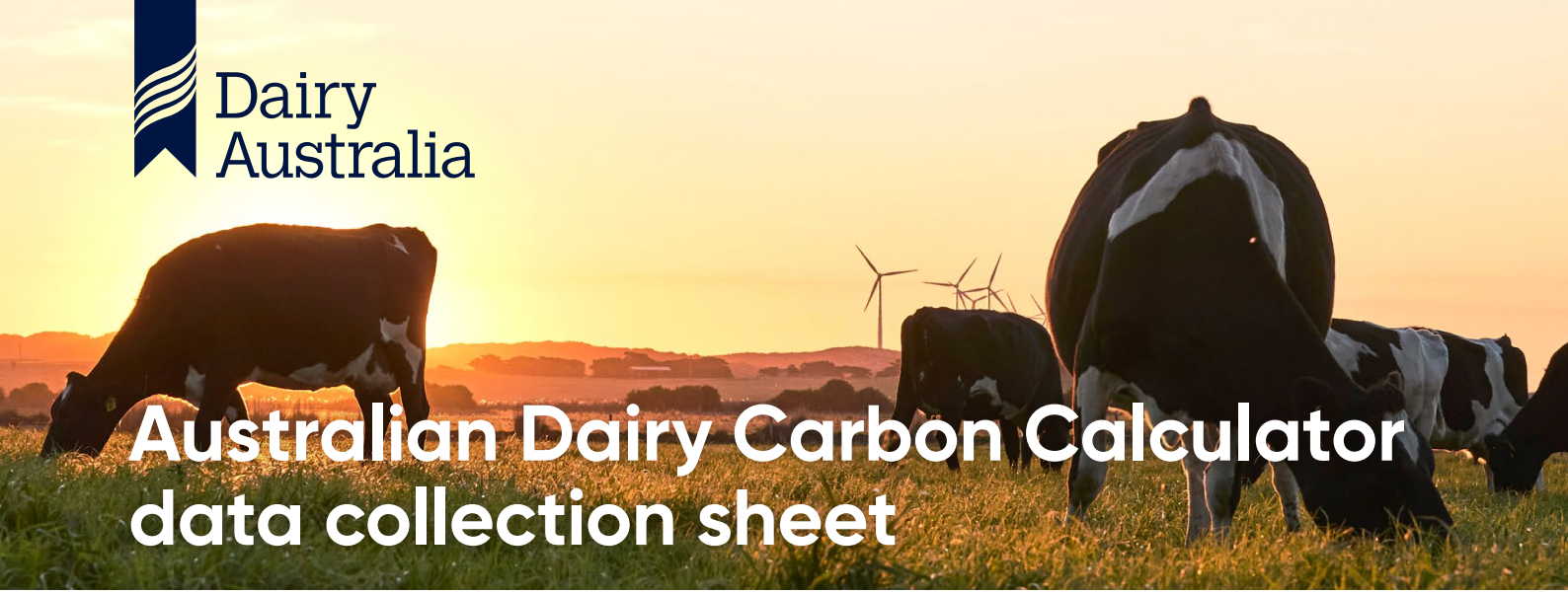

Australian Dairy Carbon Calculator data collection sheet

This datasheet outlines the information you need to complete the Australian Dairy Carbon Calculator (ADCC) and will help you gather it all in one place before you begin.

1. Financial year for data collected	
2. Owner or shareholder name/property name	
3. State and region	

4. Livestock data

Note that milking cows is the number of cows milked for a minimum of two months over the assessment period, which may be greater than your average milking herd size. If you retain some or all of your non-replacement calves (heifers and bulls/steers) beyond post-weaning, these need to be recorded in the 'other stock' column. If you sell separate groups of stock (within the same class) at different times throughout the year, record separately in table on page 7.
The last two columns are for calves that are sold soon after birth or sold post weaning at around 100kg live weight.

Typical live weight gain is between 0.6 and 0.75 kg per day depending on the breed, with Jerseys at the lower end and large-framed Holstein Friesians (>600 kg) at the upper range.

	Milking cows	**Replacement heifers** >1 yr age (13+ moths old)	**Replacement heifers** <1 yr age (1-12 months old)	**Mature bulls**	**Other stock** 1–12 mths **(young bulls, steers or non-replacements)**	**Other stock** >1 yr age **(bulls, steers non-replacements 13+ mths old)**	**Calves sold soon after birth** 1–2 weeks	**Calves sold post-weaning** ~100kg
Number of animals								
Average liveweight kg (at start of year)								
Average liveweight kg (at END of year)								
Daily liveweight gain kg/day								
Number sold								
Average liveweight when sold kg								

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5. Milk production data

Total herd milk production	**Units for milk production** Tick	**Average annual fat** %	**Average annual protein** %	**Average lactation length** days
	☐ Litres per annum ☐ kg milk solids per annum			

6. Milker average diet intake and quality

This data is used to estimate the milking cows average dry matter digestibility and crude protein % based on the intakes of all feeds and their corresponding DMD and CP%.

The calculator will determine average daily intake, and thus methane production, using average diet DMD%, liveweight, milk production etc.

Note: if you don't know the DMD and CP % for your feeds, a list of commonly fed forage and non-forage supplements and their corresponding dry matter digestibility (DMD) and crude protein (CP) percentage is available in the ADCC as an appendix. To convert ME to DMD, DMD = (ME+ 1.037)/0.1604

	Intake DM/day ☐ or total kg/day ☐	**DMD** %	**CP** %
Pastures			
Grain 1			
Grain 2			
Concentrates			
Silage			
Hay			
By-products			
Other feeds (please specify)			

Fertilisers

7. Please provide the tonnes of fertiliser per annum applied. Do not include any fertiliser that has been purchased but not spread - this will be accounted for in the year of its application.

We require the rate of element applied to calculate emissions. If you have a copy of the % of each element within your blends (from your supplier), please provide. Otherwise , a list of common fertiliser types and the percentage of elements in each blend can be sourced in the ADCC appendix.

Fert blend name	Tonnes applied	**% Nitrogen** (N)	**% Phosphorus** (P)	**% Potassium** (K)	**% Sulphur** (S)
Tonnes of Urea					
How many tonnes of lime/dolomite did you spread?					
If yes, how often do you apply lime/dolomite (e.g. annually or every 5 years)?					

8. Energy consumption

Where possible, do not include any houses/accommodation not related to the dairy.

Electricity consumption kWh/annum	**Where does your electricity come from?** Select from list below	**Diesel/unleaded fuel consumption (litre/annum)**
	☐ State grid ☐ 100% renewable	

For estimating all fuel consumed, we must also consider any contractor activities that occur on farm where fuel use was not reported above. Please list hectares of any major activities that were completed by a contractor on farm and tick the corresponding box:

Hay No. of ha:	**Silage** No. of ha:	**Grains/maize** No. of ha:	**Pasture renovation** No. of ha:	**Other** No. of ha:
☐ Mowed	☐ Mowed	☐ Ploughing/tillage	☐ Harrow ☐ Discing	
☐ Raked	☐ Tethered	☐ Sowing	☐ Fertilising	
☐ Baled	☐ Raked	☐ Spraying	☐ Spraying	
	☐ Baled	☐ Harvesting	☐ Direct drill/sowing	
	☐ Wrapped			

9. Purchased supplements

Provide detail on purchased feed/supplements. Please report consistently across the whole feed table and either enter quantities on dry matter or as-is basis.

☐ Reporting as tonnes of dry matters or
☐ Total tonnes

Supplements	**Tonnes**	**% fed to milkers**
Pasture, cereal, lucerne or legume hay		
Grain and concentrates		
Pasture, cereal or maize silage		
By-products		

Carbon sequestered in trees

10. Please enter any planted trees (e.g. pine, blue gum or native mixed species) between the ages of 1-25 years old.

If you have a carbon sequestration project and have measured using recognised methodology, please list here:

Region	**Tree species**	**Soil type**	**Area of trees** ha	**Average age of trees** whole number of years

Manure management

For most farms where the milkers spend 2–4 hours per day off paddock (i.e. to/from the dairy, at the dairy, on a feedpad etc.), the state-based factors will generally reflect how your farm's manure is managed. If this is the case, tick 'default state-based factors' below and disregard the rest of the questions.

However, if the milking herd spends a larger proportion of time away from the paddocks grazing, such as for partial/total mixed ration farms, you should consider entering farm-specific data to determine GHG emissions from urine and dung deposition. If this is the case, please fill in the following questions.

If all 'other stock' classes also spend a proportion of time off-paddock (i.e. mostly only relevant for fully-housed TMR farms, not because you have them yarded occasionally for treatment, weighing, pre-testing etc.), you will also need to answer questions about how the manure from these animals is handled. However, if these animals are outdoors year-round, leave the questions for these blank so the default 100% of manure deposited onto paddocks remains activated.

Milking herd

Please use default state-based fractions ☐ (if this is ticked, do not complete questions 11-20)

11. **Average number of hours per day and days per annum cows spent at the dairy and yards where manure is hosed/flushed**
12. **Percentage of waste that is flushed and drains directly to a paddock without any solids separation**
13. **Percentage of waste that is flushed and spread daily from a sump/dispersal system**

ADCC assumes that the remaining percentage is flushed and enters a pond/lagoon system. So, if the answer to the last two questions is 0% (i.e. neither directly drains to paddock or sump/ dispersal system and spread daily), ADCC assumes 100% is flushed to a pond/lagoon system.

14. **Do you pre-treat the waste prior to being spread daily/enters a pond/lagoon?** ☐ Yes ☐ No
    i.e. a solids trap, weeping wall, mechanical separation
15. **Number of hours per day and days per annum a milker spends on a feedpad/loafing area/is housed.**
16. **Select how the milking herd's feedpad waste is mostly handled**
    Only one option can be selected

    ☐ Flushed and drains directly to a paddock
    ☐ Flushed and spread daily from a sump/dispersal system
    ☐ Flushed to a pond/lagoon system
    ☐ Scraped and stockpiled before spread onto paddocks at a later date

Manure management for all other stock

This includes rising heifers that may spend significant time off paddock. Only complete this if all other stock spend a significant amount of time off paddock i.e. TMR farm.

17. **Number of hours per day and days per annum the heifers spend in yards or are housed where the waste is deposited.**
18. **Select how this other stock waste is mostly handled**
    Only one option can be selected although it can be different to the milking herd's feedpad waste

    ☐ Flushed and drains directly to a paddock
    ☐ Flushed and spread daily from a sump/dispersal system
    ☐ Flushed to a pond/lagoon system
    ☐ Scraped and stockpiled before spread onto paddocks at a later date

Appendices

Commonly fed non-forage and forage supplements

If you only know the fresh (wet) weight of a feed, multiply this by the average dry matter to convert to dry weight (DM).

	Dry matter %			Dry matter digestibility %			Crude protein %		
	Average		Range	Average		Range	Average		Range
Non-forage supplements									
Barley grain	88.7	81.2	97.0	79.5	55.6	87.3	10.8	6.3	19.0
Brewer's grain	28.2	13.9	60.6	69.8	53.7	90.5	21.6	9.8	28.8
Canola meal	90.5	87.4	93.5	78.2	63.4	99.0	37.5	27.4	42.1
Carrot pulp	10.0	8.0	15.5	82.1	56.9	91.8	9.8	6.5	15.3
Citrus pulp	14.3	10.6	17.3	83.4	62.1	93.7	8.6	6.0	11.9
Cottonseed meal	89.8	87.5	95.3	71.8	62.1	82.1	43.5	39.5	48.0
Grape marc	55.1	19.6	93.9	40.7	14.9	78.2	12.1	5.4	17.2
Lupin seed	91.6	86.1	95.5	81.5	72.4	96.3	32.0	21.3	43.2
Maize grain	84.2	60.3	96.4	89.2	79.5	96.3	10.0	7.3	21.9
Molasses				66.6			4.0	3.0	5.0
Oats	91.1	80.0	93.3	66.6	38.1	91.8	9.0	4.0	15.4
Rice bran	90.4	89.9	90.8	89.9	60.1	97.6	15.5	12.9	19.6
Sorghum grain	89.6	86.2	94.4	86.0	80.8	93.1	10.6	9.6	13.2
Soyabean meal	85.4	11.9	93.7	96.3	86.0	99.0	43.5	29.3	53.7
Sunflower meal	90.8	86.4	92.0	64.0	54.3	90.5	34.1	20.4	39.1
Tomato pulp	27.3	16.6	30.2	49.8	26.5	60.1	19.4	5.0	22.6
Triticale grain	89.4	80.3	96.9	84.0	75.0	87.3	11.4	6.6	18.8
Turnip tops	29.1	8.5	87.7	86.6	69.2	93.7	15.9	7.2	29.6
Turnip bulbs	23.7	4.7	87.4	89.9	75.6	95.7	14.8	4.6	26.7
Wheat grain	89.4	80.2	92.9	84.7	67.9	91.2	12.9	7.4	22.7
Wheat bran	34.0	15.1	89.6	77.6	70.5	85.3	17.9	8.4	29.8
Whey	7.5	2.1	27.4	87.9	79.5	91.2	30.1	18.6	40.3
Forage supplements									
Barley silage	39.0	20.9	64.3	58.8	35.6	74.3	10.7	5.5	22.9
Barley hay	87.0	66.1	93.7	56.9	27.2	72.4	8.2	1.2	14.6
Barley straw	89.3	73.4	93.6	42.0	14.2	55.0	2.8	0.2	28.8
Clover silage generic	41.9	20.9	79.5	62.1	52.4	68.5	19.3	12.4	27.2
Clover hay generic	86.6	61.3	93.2	57.5	40.1	72.4	17.6	6.3	26.1
Grass silage	43.2	17.1	89.3	60.1	31.0	77.6	13.2	5.1	26.6
Grass hay	86.3	51.9	94.0	51.7	31.7	67.9	8.0	0.7	17.7
Legume/grass silage (legume dominant)	42.1	13.7	68.3	60.8	38.1	73.7	16.0	7.3	28.6
Legume/grass silage (grass dominant)	86.4	45.2	95.9	56.9	33.6	73.7	14.5	4.1	25.4
Lucerne silage	49.5	15.8	87.7	60.8	31.0	70.5	20.0	5.3	32.1
Lucerne hay	87.8	36.0	96.1	60.1	34.3	73.1	18.9	5.7	29.7
Lucerne straw	86.1	68.2	93.4	36.9	27.8	44.0	8.9	5.9	14.1
Maize silage	30.9	9.2	84.5	68.5	32.3	84.0	7.7	3.4	17.1

	Dry matter %			Dry matter digestibility %			Crude protein %		
	Average	Range		Average	Range		Average	Range	
Forage supplements continued									
Oaten silage	40.9	18.1	82.2	56.2	38.1	72.4	9.8	3.8	19.4
Oaten hay	88.9	40.2	96.4	54.3	29.1	73.1	6.9	1.1	16.3
Oaten straw	89.4	80.2	93.8	40.1	27.8	64.7	2.8	0.1	11.9
Pasture silage	43.1	10.9	87.6	60.8	14.2	76.3	14.1	3.2	27.3
Pasture hay	86.2	48.6	95.5	54.3	34.3	72.4	10.8	1.7	30.0
Rice straw	85.2	52.2	93.5	43.3	34.3	57.5	4.0	1.9	5.0
Subclover silage	37.1	20.6	59.9	61.4	33.6	67.9	18.8	12.6	26.9
Subclover hay	86.8	71.7	93.9	56.9	42.0	68.5	17.2	7.7	25.7
Triticale silage	42.9	20.1	71.0	58.8	45.9	72.4	10.8	4.0	24.0
Triticale hay	86.6	54.3	93.9	55.6	31.0	69.2	7.3	1.3	16.2
Triticale straw	89.8	62.7	95.7	40.1	26.5	58.2	2.8	0.7	6.7
Wheat silage	44.9	27.5	69.1	56.9	29.7	69.2	10.0	6.5	16.0
Wheat hay	87.9	46.8	95.1	56.2	31.7	71.1	8.2	0.1	17.4

Common fertilisers and their composition

Primary element(s)	Brand	Composition (%)			
		N	P	K	S
N	Urea	46.0	0.0	0.0	0.0
N & P	Di-ammonium phosphate	18.0	20.0	0.0	1.6
	Mono-ammonium phosphate	10.0	21.4	0.0	1.5
P	Single Superphosphate	0.0	9.0	0.0	11.0
	Double Superphosphate	0.0	16.2	0.0	4.1
	Triple Superphosphate	0.0	20.0	0.0	0.8
	Pastursul	0.0	18.0	0.0	9.7
	Pasture Builder	0.0	14.0	0.0	0.0
	Hi-Fert 0:20:0	0.0	20.0	0.0	1.5
K	Potassium chloride	0.0	0.0	50.0	0.0
	Muriate of Potash	0.0	0.0	50.0	0.0
P & K	Pasture Gold 3:1	0.0	8.9	17.5	11.0
	Pasture Gold 4:1	0.0	9.8	14.5	12.2
P & S	Pasture Gold	0.0	14.3	0.0	17.1
	Gold Phos 10	0.0	18.0	0.0	10.0
	Gold Phos 20	0.0	16.0	0.0	20.0
	Pasture Phos	0.0	13.0	0.0	7.0
K & S	Super Potash 1 & 1	0.0	4.4	25.0	5.5
	Super Potash 2 & 1	0.0	5.9	16.6	7.3
	Super Potash 3 & 1	0.0	6.6	12.7	8.2
	Super Potash 4 & 1	0.0	7.0	10.0	8.8
	Super Potash 5 & 1	0.0	7.3	8.3	9.2
Blends of all elements	Dynamic Lifter	3.5	2.4	1.6	1.0
	Pasture Booster	24.0	4.0	13.0	5.0
	Poultry litter*	2.6	1.8	1.0	0.6

*Poultry litter can vary widely depending on many factors. If your farm is applying poultry litter, we suggest you ask the supplier if they have any records of what the percentage of elements were.

Fuel consumption with contractors

When estimating the amount of fuel (diesel) consumed, you also need to consider any activities that contractors undertake on the farm, especially where they supply the fuel. Approximate consumption figures for some common activities are:

- Fertilising/chemical spraying/rolling/hay raking/tethering/light harrows – 3 litres per ha
- Direct drilling/sowing/mowing/silage wrapping/power harrows – 9 litres per ha
- Discing – 12 litres per ha
- Baling silage and hay/harvesting (e.g. maize silage) – 16 litres per ha
- Ploughing/tillage – 18 to 22 litres per ha (dependent on soil conditions)

For example

You are using a contractor for harvesting silage. The steps in this process were mowing, tethering, raking, baling and wrapping. This process would require approximately 40 litres per hectare (i.e. 9 litres/ha for mowing, 3 litres/ha each for tethering and raking, 16 litres/ha for baling and 9 litres/ha for wrapping). This needs to be included in the fuel consumption figures in ADCC as it is a component of the farm's management and fuel consumption.

Carbon in trees

Note that for the majority of regions, there is no difference in carbon sequestration between the two soil types. Similarly, the drop-down list in ADCC will occasionally have two options for Radiata Pines (low or high input), although the carbon sequestration potential is frequently the same. If the species on your farm is not listed, select the next most relevant. Environmental plantings are native species endemic to your region so select this if no options match what you have on farm. Alternatively, use other tools such as FullCAM to access data for your region.
If you access carbon sequestration data from other sources, make sure you are recording t CO_2e/ha. You can convert C to CO_2e by multiplying by 3.67, e.g. 4 t C/ha = 14.68 t CO_2e/ha.

Other livestock help

Relative weight advantage of steers vs heifers at same age (if known)

Other stock aged 1–12 mths (young bulls, steers or non-replacements)

	Heifers		Steers	
	Numbers	Age when sold (months)	Numbers	Age when sold (months)
Mob 1				
Mob 2				
Mob 3				
Mob 4				
Retained stock				

Other stock over 12 months old

	Heifers		Steers	
	Numbers	Age when sold (months)	Numbers	Age when sold (months)
Mob 1				
Mob 2				
Mob 3				
Mob 4				
Retained stock				

FURTHER INFORMATION

Dairy Australia supports dairy farmers looking to better manage their carbon footprint by understanding on-farm emissions and then working out which options offer practical and profitable ways to reduce emissions.

To access the Australian Dairy Carbon Calculator, visit **dairyaustralia.com.au/climateandenvironment**

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