

# Composting and GHG emissions

This fact sheet is part of the Profitable Dairying series - *Good business management reduces greenhouse gas emissions.*

The Australian dairy industry has committed to reducing greenhouse gas emissions intensity (emissions per L milk produced) by 30% by 2020.

There are some farming practices where the greenhouse gas implications are well known and understood. Unfortunately, the total emissions from farm composting practices are not yet well understood.

Claims that composting reduces the carbon footprint of dairy farms are not currently backed by research evidence.

## Compost pros and cons

Composting can be a good way to manage some farm wastes e.g. bedding straw, calving woodchips, spoilt hay and mortalities.

However, if you are bringing compost onto the farm, it is unlikely that you are reducing the carbon footprint of your farm if the full life cycle emissions associated with the composting process are accounted for. This is principally because the composting process produces two greenhouse gases with high global warming potential.

Nitrous oxide has a global warming potential of 298 ie it is 298 times more potent than carbon dioxide as a greenhouse gas. Methane has a global warming potential of 25.

Compost manufacturers often claim compost will reduce the carbon footprint of your farm if you use it as a fertiliser. However, typically farm compost has a low nutrient content (dry weight) of 1-2% nitrogen, 0.2-1% phosphorus, 0.5-1% potassium and 30% carbon.

Well-made, mature compost can have 3-5% of its total nitrogen content in readily available forms with an additional 5-10% becoming available over the year. The carbon footprint of the equivalent nutrients from conventional fertiliser is less than compost.

The carbon footprint of some composts is significantly increased with poor composting practices e.g. excessively low C: N ratio, poor aeration, inappropriate particle size and pH.

Direct application of low carbon-high nitrogen (low C/N) wastes such as manure is usually an effective and cheaper option than composting the material first. To reduce nitrogen losses they need to be applied to actively growing plants or physically incorporated into the soil soon after application. High carbon/low nitrogen (high C/N) wastes such as spoilt hay or bedding are likely to be more effectively utilised and cause less problems if composted.

If you are doing your own composting, it is important to get the C:N ratio correct. For composting on dairy farms, there is usually no need to purchase additional N (such as chicken manure). Composts with high N content will produce more nitrous oxide and won't produce a better quality compost.



## Will compost increase soil carbon levels?

A much publicised benefit of applying purchased compost to farms is that it can act as a soil conditioner to increase soil carbon and organic matter levels. Compost contains large amount of organic matter in various forms - some of which is broken down (“mineralised”) relatively quickly releasing nutrients, through to stable forms that will last in the soil for many years. For soils with a low carbon content (e.g. those with a long cropping history), heavy and regular compost applications (e.g. 5-10 t/ha/year) for a number of years will increase soil carbon. Large increases in the soil carbon content of such low carbon content soils can improve soil physical, chemical and biological health, for example, better soil structure, water and nutrient holding capacities. Soils under long-term perennial pasture in higher rainfall areas already have high carbon levels. It is increasingly difficult to further lift the long-term carbon content of such soils, even with heavy applications of compost.

## A smart fit for composting in the farm system

The Scott family farm at Boyanup in West Australia. Three years ago they invested in shaded feedpads and loafing areas. Concentrating shade, water and feed in one area during the hotter months was a good strategy for managing heat stress. However, initially they had problems with increased mastitis and cell counts, from the cows lying on manured straw. Their solution was to replace the straw daily, but this meant dealing with large volumes of bedding straw regularly. Composting has become a good fit for their farm to deal with the large volumes of straw. Mature compost is typically incorporated into new paddocks in the cropping rotation.



## Further resources:

[Composting on dairy farms - is it for my farm? \(Dairy SA fact sheet\)](#)

[Making compost on dairy farms](#)

[Understanding purchased compost products](#)

[On farm composting of dairy cows](#)

[Training manual for on farm mortality composting](#)

[Minimising gaseous nitrogen losses](#)

Published by Dairy Australia Limited with support from the Australian Government.

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