

Preparing for emissions accounting for sugar cane production



Why should I be concerned about greenhouse gas emissions?

In the future, sugarcane production that is certified as sustainable—especially with a low carbon footprint—is likely to be preferred or even required by both domestic and international supply chains. Therefore, understanding and managing farm emissions will be crucial for maintaining competitiveness

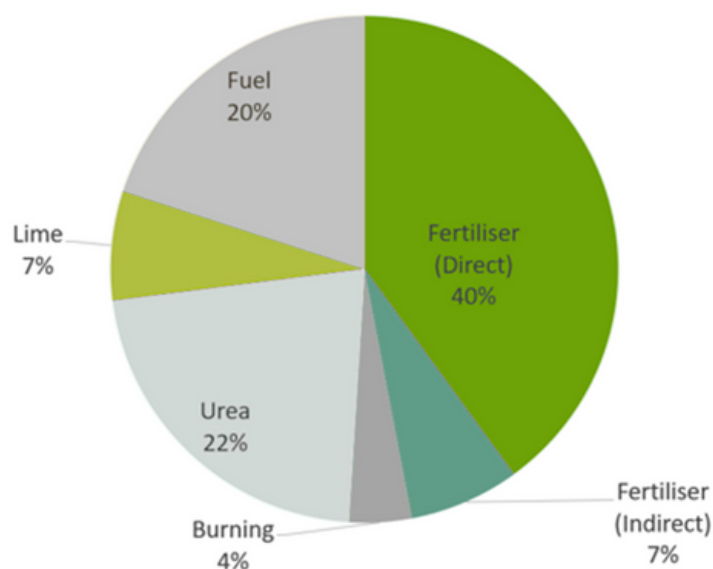
How can I reduce my emissions?

Fertiliser application is by far the largest contributor to on-farm emissions in sugarcane production. Therefore, improving nitrogen use efficiency is essential for reducing these emissions.

Using legume fallows, such as soybean, can decrease the amount of fertiliser needed for sugarcane and also lower emissions during the fallow period. However, incorporating legume residues into the soil can release nitrous oxide (N_2O), a potent greenhouse gas. These emissions can be minimized by adopting reduced tillage practices that keep legume residues on the soil surface for as long as possible, no-tillage planting of sugarcane directly into the legume residue, growing a nitrogen-catch crop between the soybean harvest and sugarcane planting, and/or applying nitrification inhibitors to soybean residues before tillage (Halpin et al 2015, Reeves et al 2018, Salter et al 2015, Wang et al 2015).

Enhanced efficiency fertilisers with nitrification inhibitors can also reduce emissions however there is limited evidence of yield advantages that justify the extra cost.

Other significant on-farm emissions in sugarcane production come from non-renewable energy sources. These include the production of farm inputs, especially urea, fuel consumption by farm machinery, and electricity used for irrigation.



Typical emissions profile of an Australian sugarcane enterprise

Want to know more?

DPI extension officers are available to answer your cropping related greenhouse gas or carbon accounting questions. You can contact Barbara George-Jaeggli barbara.george-jaeggli@dpi.qld.gov.au or Mandy Christopher mandy.christopher@dpi.qld.gov.au

How can I reduce my emissions? (continued)

In cases where water application rates or pumping head pressures are high, improved irrigation efficiency can be a significant source of emissions savings (Renouf et al 2024). Modest reductions can also be achieved from the adoption of wider row spacings, reduced tillage, and controlled traffic, reducing fuel use (Halpin et al 2008).

Many farm practices that reduce emissions such as optimising nitrogen rates, planting legume fallow crops, or more efficient irrigation practices, also result in increased production and reduce impacts on water quality. Several carbon calculators are available for growers to estimate their farm's carbon emissions, for example the S_GAF Sugar GHG Accounting Framework (<https://piccc.org.au/resources/Tools.html>). Growers can have the impact of their practices on greenhouse gas emissions recognized and quantified through the Smartcane Best Management Practice program. (<https://smartcane.com.au/>).



What data do I need to do an emissions baseline?

- Area sown to cane and other crops
- Sugar, bagasse and total cane yield
- Fertilisers applied per hectare and concentration of urea, lime, N, P, K and S
- Percentage of crop burnt
- Annual use of diesel, petrol and LPG
- Annual electricity consumption from the grid
- Herbicide & pesticide active ingredient use

What other information might come into play in the future?

- Know where your fertilizer was produced, as the emissions associated with fertilizer production can vary significantly between countries.
- Know your soil type(s)
- Area, species and age of new tree plantings on your farm

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