

Viticulture and greenhouse gas emissions

Grapegrowers across Australia are already feeling the impact of a changing climate with earlier budburst, shorter winters, compressed vintages and more frequent extreme weather events such as frosts, heat waves and bushfires.

Questions and answers about greenhouse gases and climate change as they relate to viticulture are outlined below.

What are greenhouse gases?

Greenhouse gases (GHG) include carbon dioxide, methane and nitrous oxide.

When these gases are produced, released or retained in the atmosphere they cause increases in the earth's surface temperature, and changes to the earth's climate.

Significant world-wide efforts are underway to reduce GHG emissions, with the goal of keeping the increase in global surface temperature below 2C.

Around 21 per cent of Australia's greenhouse gas (GHG) emissions are generated from the agriculture and forestry sectors, including viticulture.

While the biggest contribution to these emissions comes from livestock production, the winegrape sector still plays a part.

What are the main sources of emissions for vineyard businesses?

The biggest proportion (about 98 per cent) of emissions from vineyard businesses relates to the use of electricity and fuel (diesel and/or petrol) which generate CO₂ emissions, plus a small component of nitrous oxide (N₂O) related to fertiliser and soil management.

Nitrous oxide is relevant to viticulture because it is naturally released from the soil as a 'by-product' of the nitrogen cycle however, the volume released is affected by the amount and timing of nitrogen fertiliser applied.

Because the global warming potential of nitrous oxide is approximately 300 times that of carbon dioxide its contribution to global warming is significant, even though its volume is small.

How can I calculate the emissions of my business?

A wine industry-specific carbon calculator has been developed for grapegrowers and winemakers to estimate their own emissions.

The calculator is available online at:

www.wfa.org.au/entwineaustralia/resources/carbon-calculator/

How can vineyards reduce emissions?

In the vineyard, the amount of electricity and fuel used is largely influenced by the type of energy used for pumping irrigation water.

If, for example, a diesel pump is used the total fuel usage will be greater than for electricity. Regardless of the energy type,

consumption is generally related to the volume of irrigation applied.

The total volume of fuel used by a vineyard is also determined by use in tractors and other vineyard vehicles.

One of the best ways to reduce fuel consumption is to reduce the number of tractor passes through the vineyard each year.

Many growers have saved one or two tractor passes per year by grazing sheep in the vineyard during winter.

In large vineyards, fuel savings can also be achieved using multi-row spray equipment.

Another option for reducing emissions is environmental tree plantings which sequester carbon. Depending on government policy, such plantings may be eligible for carbon credits or equivalent.

Recent work conducted at the AWRI (currently unpublished) investigating GHG abatement options for vineyards has demonstrated the production of N₂O from vineyards is low compared to other horticultural crops.

It is likely the low production of N₂O is related to the relatively conservative use of nitrogen fertilisers in viticulture.

In terms of mitigating N₂O losses from the vineyard, nitrogen fertilisers should be used efficiently, that is nitrogen should only be applied to the vineyard during periods of uptake at around flowering and during the post-harvest period when active root growth is occurring.

Application of nitrogen fertilisers should be avoided when soils are waterlogged or compacted, as these conditions will increase N₂O emissions.

Government policy seems to be very uncertain at the moment, what should I do?

While it is true the climate policies of the Australian Government are currently under review, this should not concern grapegrowers unduly.

In nearly all cases, actions taken to reduce emissions and improve efficiency (such as reducing fuel or electricity usage, and optimising use of nitrogen fertilisers) will come with a financial benefit as well as an environmental one.

It makes sense for viticultural businesses to take steps to reduce emissions, regardless of where the climate policy ends up.

How can I find out more information?

The AWRI recently launched a new extension program, funded by the Australian Government, to collate and deliver tailored practical resources to the grape and wine industry on climate change, greenhouse gas emissions and carbon storage.

The program will also include more than 30 workshops across Australia's wine regions.

To find out more about the program, please contact **Mardi Longbottom** on 08 8313 6600 or viticulture@awri.com.au.



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