



Carbon farming and the Tasmanian fruit industry

Andrew Winkler, January 2014

Horticulture contributes only 1% to total Australian greenhouse gas (GHG) emissions, but has greater emissions intensity per hectare of land than other enterprises. Although that's a small contribution to total emissions, fruit growers need to be prepared for the future including carbon farming and new policies as they unfold.

Fruit growers can reduce their total emissions and/or emission intensity – it's all about productivity - for example growers can increase overall productivity including yields; reduce fuel and energy use (and costs); increase fertiliser use efficiency; and maintain or increase soil carbon and soil health. So, there are some management techniques that not only improve productivity and your 'bottom line', but also reduce emissions at the same time.

Growers should keep informed about new policies and the Carbon Farming Initiative (CFI) approved methodologies as they are developed. Help is available through your local CFI Extension Officer (see contact details below) to estimate your GHG emissions or incorporate carbon farming in your farm/property plan.

Horticulture's contribution to climate change

Tasmanian agricultural emissions in 2011 were 2,017 kt tonnes CO₂ equivalent, or 26% of the States total GHG emissions (Australian Greenhouse Emissions Inventory system). Methane (CH₄) emissions from livestock are the largest contributor to agricultural emissions. So, what is horticulture's contribution? Nationally, horticulture contributes about 1% to total Australian GHG emissions (Horticulture Australia Limited). That's a small contribution, but it's from a relatively small area of land, and horticulture has a greater impact per hectare. That is due to intensity of the production system, infrastructure e.g. cool rooms, irrigation and relatively high nitrogen fertiliser use per hectare.

What are the main emissions from horticulture?

The main GHG emissions from horticulture are:

- Fuel and electricity use (70%) especially for irrigation
- Nitrogen fertilisers and animal manure (20%)
- Waste and refrigerant loss to the atmosphere (10%)

Reducing these emissions not only reduces total GHG emissions but also has the additional advantage of reducing costs.



Australian Government



"Reducing land sector emissions and effecting the Carbon Farming Initiative in Tasmania" is supported by funding from the Australian Government.

What does this mean for fruit growers?

While these topics may not seem relevant to you initially or applicable to your orchard setting now, the basic principles of addressing climate change through carbon sequestration and emissions reduction, is sound. For example, at the very least, building soil carbon (thereby improving soil health) and reducing your emissions is good for your land, good for productivity and ultimately, good for your 'bottom line'. You may also be able to take advantage of schemes such as the CFI and the Emission Reduction Fund and generate income from reducing emissions.

The following table shows emissions and activities relevant to fruit growers and potential management techniques.

GREENHOUSE GAS	NATURAL PROCESSES THAT PRODUCE THE GAS	ACTIVITIES THAT PRODUCE THE GAS (ACTIVITIES OF RELEVANCE TO FRUIT GROWERS IN BOLD)	MANAGEMENT TECHNIQUES FOR FRUIT GROWERS
Carbon dioxide (CO ₂)	<ul style="list-style-type: none"> Respiration by living organisms Forest fires Evaporation from seawater 	<ul style="list-style-type: none"> Combustion of fossil fuels (coal, oil and gas) such as electricity generation and transport Land clearing Loss of soil carbon 	<ul style="list-style-type: none"> Improve fuel and energy efficiency Grow native vegetation
Methane (CH ₄)	<ul style="list-style-type: none"> Decomposition of organic matter Methane-producing bacteria 	<ul style="list-style-type: none"> Livestock farming (livestock emissions and decomposition of animal wastes) Extraction of fossil fuels Wet rice cultivation Burning of crop residues and savannah Landfill Domestic sewage Coal mining 	
Nitrous oxide (N ₂ O)	<ul style="list-style-type: none"> Microbial action 	<ul style="list-style-type: none"> Application of fertiliser and animal waste to agricultural soil Burning of crop residues and biomass Manure management Transport 	<ul style="list-style-type: none"> Improve fertiliser management and nitrogen use efficiency Incorporate organic matter into soil Improve fuel efficiency
Hydrofluorocarbon (HFC)	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Cooling 	<ul style="list-style-type: none"> Improve energy efficiency

Adapted from Vegetable Industry Development Program. Climate Change: Managing Variability and Carbon (Horticulture Australia Limited)

Aren't we already storing carbon in our orchards?

During the day, plants absorb carbon dioxide (CO₂, yes the greenhouse gas) and convert it to organic carbon (via photosynthesis). During the night some carbon is released as CO₂ (respiration). Some carbon is retained within the plant during this process for tree growth (sequestration). Fruit trees are therefore a temporary store of carbon; this is released back into the atmosphere at a later date, when trees are pulled and decompose or get burned.

What about the Carbon Farming Initiative (CFI)?

To participate in the CFI, carbon must be stored for at least 50 or 100 years, depending on the type of planting, and the activity must be additional and not 'business as usual'. Therefore, fruit trees in a traditional commercial orchard context don't meet the current requirements of the CFI. The only current methodologies that are applicable for fruit growers are those involving carbon sequestration in trees e.g. new environmental plantings or re-growth, on land not used for food production. Interested growers should keep informed about new CFI methodologies (rules about what kind of carbon sequestration is included in the CFI) and the possibility of options under the CFI for N₂O reductions associated with fertiliser use.

What are the current opportunities for fruit growers?

So, if you can't utilise your existing carbon stored in orchard trees, windbreaks and soil under the CFI, it pays to take a closer look at other alternatives open to you; reducing emissions or sequestering carbon by other means and for the benefit of your business.

- **Energy use:** Energy use is a large cost to fruit growers and packers. A new Apple and Pear Australia Limited (APAL) project will be undertaking 30 energy audits in 2014 and come up with methods of reducing energy use in fruit production, cooling and storage.
- **Soil carbon:** Soil carbon is essential for healthy soils and productivity. Maintaining or improving good Soil Organic Carbon (SOC) levels will benefit your land while contributing to a lower industry carbon footprint. Soil Organic Matter (SOM, mainly carbon plus nitrogen) allows the soil a greater ability to store water and nutrients as well as increasing balanced soil microbial activity. By understanding the SOM profile of an orchard, growers may be able to tailor management practices to help the environment, maximise productivity and minimise costs. Means by which carbon can be sequestered and soil health improved include adding organic matter to your soils, (mulching, compost etc.), growing vegetation under trees over winter and reducing compaction.
- **Fertiliser efficiency:** Taking a look at and fine-tuning, fertiliser management, nitrogen use, irrigation and other inputs will have a direct impact on emissions and therefore your efficiency and your running costs.
- **It's all about productivity:** increasing marketable yields or reducing waste can reduce your emission intensity e.g. emissions per tonne of produce, and can also improve profits.

In an increasingly competitive market place, processors and retailers are looking to, and for, food suppliers to be sound environmental managers. Just as corporate Australia now requires resellers to be a part of Agsafe and for producers to support programs such as drumMUSTER before they are awarded major contracts, it may well be the case that providing evidence of good environmental stewardship including carbon offsets or sequestration may be looked upon favourably in the near future by both industry bodies and consumers.

Why not get on the front foot and take a closer look at an incentive that may help your land and your bottom line?

If you'd like to estimate your current GHG emissions, or look at how 'carbon farming' fits in with your farm/property plans, or if you'd like to identify what opportunities / options are available to you, contact your local CFI Extension Officer.

Key messages:

- Horticulture contributes only 1% to total Australian GHG emissions, but has greater emissions intensity per hectare of land than other enterprises.
- It's all about productivity - fruit growers can reduce their total emissions and/or emission intensity, through, for example: increasing productivity/yields; reducing fuel and energy use (and costs); increasing fertiliser use efficiency; and maintaining or increasing soil carbon.
- Growers should keep informed about new policies and CFI approved methodologies as they are developed.
- Help is available through your local CFI Extension Officer (see contact details below) to estimate your GHG emissions or incorporate 'carbon farming' in your farm/property plan.

For more details contact:

- Cradle Coast - Ashley Hobbins (RMCG), 0447 776 909, ashleyh@rmcg.com.au
- North - Adrian James (NRM North), 0448 318 873, ajames@nrmnorth.org.au
- South - Tim Ackroyd (NRM South), 0400 047 665, tackroyd@huonvalley.tas.gov.au
- Andrew Winkler (NRM South), 0428 259 156, awinkler@nrmsouth.org.au