

Cutting greenhouse gases from horticulture

In the general stress of growing crops and then selling them at a sufficient margin to keep on doing it for the next year, worrying about what is the carbon foot print of your business and how it will affect the climate in fifty years time for most farmers and growers doesn't seem immediately relevant.

Indeed one of the challenges for anyone concerned about the impact of climate change is not only that it seems a long way off from whatever it is that we're doing at the moment and but also that there's no tangible reward for possibly changing what we're doing and making our lives any more complicated or hard work than they are currently.

So why worry about your greenhouse gas (GHG) emissions?

Organic growers are probably well ahead of the curve compared to farmers generally on this, as they tend to be part of the activist margins of society and have much wider agendas for the work they do rather than focussing primarily on maximizing returns. However if you're not already factoring in your GHG emissions into your business development it's worth reflecting on why it's important and why maybe you should.

Climate change may seem a long way away but in fact it is already with us....and will continue to change at an increasing rate for the next 40 years¹. whatever we do today, and will have a major impact on the lives of our children, their global peers and the biosphere in general². It's also generally acknowledged that to have a reasonable chance to avoid the more extreme consequences of climate change we have a small window.

In the next 10 – 20 years² we have to act (at least possible cost) to bring down global emissions to reduce the probability of very significant changes to the climate, with huge impacts on societies across the world. And because of the 40 year time lag there is the challenge. It requires real long term thinking that isn't naturally part of our individual day to day decision making, nor sits very well with democratically elected governments whose lifetime is only as much as five years.

If as individuals, communities and nation states we fail to meet this urgent internal and external challenge I imagine that forty years hence that generation will look back with rage and incredulity at our wilfully perverse decision making.

Reasons for taking action

So if you're not already taking conscious action to engage with your GHG emissions

why should you, and how you can as efficiently as possible?

Other than the obvious reason that if you want to *'live for today but farm for tomorrow'* and leave the world in a better state than when you started, then engaging with your GHG emissions is a no brainer. But there are also at least three other sound business reasons for getting to grips with GHGs:

- . Energy costs, efficiency and resilience – GHG emissions can come from many sources on a farm, fossil fuel use being one. As energy costs rise the need to review your use and reliance and on bought in energy gets stronger by the week.
- . According to Defra, agriculture accounts for around 9% of UK GHG emissions⁶; Agriculture is not UK plc's largest GHG emitter (it's the second largest, way behind Energy, but greater than Industry) with government targets for reductions of 12% by 2012 and a challenging/scary 80% by 2050. It maybe some time away but at some point government will be involved in making you reduce your GHG emissions.

In the meantime, as interest in climate change comes and goes with media fashion, the challenges to the science will disappear and as the effects of climate change manifest themselves, general concern and awareness about GHG emissions will become mainstream. If you're supplying direct, then to be able to show your customers that you are committed to a GHG reduction strategy will be an almost essential requirement for many organic buyers.

- . If you're supplying the large retailers you will soon be asked to be part of their 'corporate carbon reduction commitments', Tesco is aiming to reduce its GHG emissions by 50% by 2020 and M&S carbon to be neutral by next year. It's almost inevitable that the other retailers will follow and as sure as eggs is eggs they'll be pushing their aspirations directly up the supply chain and it will be part of your supply contract. I can also imagine that in maybe five or ten year's time it will be a mandatory section that you will have to fill in for your organic certification.

Understanding emissions

Understanding where GHG emissions come from and measuring from which areas in your business is the first place to start. There are three main greenhouse gasses that are released as a result of (primarily conventional) farming and growing in the UK.

The most significant agricultural GHG is Nitrous Oxide (N₂O) which accounts for 55% of agriculture's GHG emissions. Virtually all N₂O emissions are from the soil and the biological processes dynamics of Nitrogen cycling through the soil. Almost half of these emissions are directly due to the application of fertilizers (from both synthetic

fertilizers and organic manures).

For organic growers, whilst not responsible for any of the GHG emissions associated with conventional fertilizers the fixing of Nitrogen out of the soil air by legumes will increase the build up of soil nitrogen and will be responsible for some additional N₂O emissions both during the growing cycle and the decomposing cycle¹⁰. Nitrous oxide is almost three hundred times more damaging as a GHG than carbon dioxide – the gas we most usually associate with climate change – because of its much longer retention time in the atmosphere, so it really is the **most** significant GHG for growers.

The next most significant GHG for agriculture is methane (CH₄). Around 36% of agriculture's GHG emissions are due to the production of methane, mainly as a result of ruminant livestock farming and the bacteria in the rumen converting some of the carbon in the food to methane, which is burped out, rather than sugars that can be absorbed into the bloodstream. Methane is twenty five times more damaging than carbon dioxide. It's not likely to be directly relevant to organic growers except in terms of indirect emissions from the importing of manures and composts.

For GHG emissions in UK agriculture overall less than 10% is due to the release of carbon dioxide (CO₂) through the actual combustion of fossil fuels for power and heating, though this of course masks a wide range for different types of growing.

So if that's where they're coming from at the macro level....where are they coming from in your business.... and what can you do to reduce **your** GHG emissions?

Your emissions and sequestration

The place to start is with a carbon calculator that will model your farm. The only carbon calculator that has been developed particularly with organic growers in mind is the CFF carbon calculator developed by Jonathan Smith (organic grower in Scilly Isles) and Mukti Mitchell (low carbon lifestyle expert) in 2009, it is free to use and is available on the website <http://www.cffcarboncalculator.org.uk/>.

It is a very comprehensive calculator and will take you more than 20 minutes to fill in – but it will give you a robust figure and is also the only calculator that takes fully into account any carbon sequestration that you may be carrying out on your land either deliberately or by default. There are other calculators; the original agricultural carbon calculator and current industry 'standard' is CALM <http://calm.cla.org.uk/>. It was developed several years ago and has been recently updated with support from Natural England.

The agricultural processors and retailers standard carbon calculator is the Cool Farm Tool that was developed with Pete Smith at the University of Aberdeen (but is not as comprehensive in its sequestration section as the CFF carbon calculator). It is also intended to be used internationally as it is designed to be an industry standard for

multinational operations and possible lacks some detail at the expense of its breath. It is not yet available for free on the Unilever website <http://www.unilever.com/aboutus/supplier/sustainablesourcing/tools/>

From then on your actions will depend on what is specific for your farm.

It could show that what you are doing is already well above average or it might point you towards looking at possible changes to how you manage nitrogen or how much your logistics and packaging arrangements contribute to your audit – as Riverford identified when they carried out their whole business carbon audit⁸.

Further information

There are various sources of information on what you might want to do next or where to find more specific expertise. The Soil Association has recently launched its Low Carbon Framing program <http://www.soilassociation.org/lowcarbon>, they are part of the South West Agricultural Resource Management (SWARM) hub <http://www.swarmhub.co.uk/index.php> or if you're in Scotland the Scottish Agricultural College has a well developed research and outreach program <http://www.sac.ac.uk/climatechange/farmingforabetterclimate/>.

Another source of support and free information is the Farm Carbon Cutting Toolkit (FCCT) <http://www.farmcarbontoolkit.org.uk/>. This is a farmer to farmer, not for profit organisation set up and run (on a bootlace) by farmers. We are developing an online toolkit for farmers and growers who want to reduce their GHG emissions which will be live on our website by the end of the December. We hope to get the forum space up and running soon to allow a flow of questions, experience and comment, akin the excellent information sharing on the OGA forum.

Also important is energy resilience – how dependant are you on non renewable sources of energy, how dependant are you on them remaining cheap and readily available, and how important is it to you to do anything to change that? What you might do to improve the energy resilience for your farm and your business will be very specific to your location, the different enterprises, capital available and your passion.

The range of possible actions and confusion over the potential benefits or drawbacks of selecting any one course over another can lead to not doing anything..... **the most significant action** is always just taking the first step... which is to commit to doing something. Once that is taken, with sufficient determination and clarity about why you're doing it , the 'something' will inevitably fall into place.

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OGA and the Farm Carbon Cutting Toolkit will be running a series of articles in The

Organic Grower, sharing experiences of growers actively taking steps to reduce their GHG emissions and building energy resilience.

References

1. Nature – January 2004 ‘Feeling the heat: Climate change and biodiversity loss’
2. Stern Review on the Economics of Climate Change 2006
3. <http://www.skepticalscience.com/climate-change-the-40-year-delay-between-cause-and-effect.html>
4. <http://www.riverfordenvironment.co.uk/Rivercarbfoot.aspx>
6. <http://www.defra.gov.uk/publications/files/pb13622-ghg-emission-projections.pdf>
7. http://www.terrestrialco2.com/uploads/Nitrogen_Fertilizer_Article.pdf
10. http://cleanmetrics.typepad.com/green_metrics_clean_metri/2010/09/modeling-soil-nitrous-oxide-emissions-for-legumes.html

Source: <http://www.farmcarbontoolkit.org/resources/articles/cutting-greenhouse-gases-from-horticulture>