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Unravelling the science of agricultural emissions

Urgency and excitement are not feelings I have come to associate with conferences, but the SFT's *Farming and Climate Change: Towards Net Zero Emissions* at Fir Farm this July fairly fizzed and popped with the stuff.

Perhaps its spark was ignited by the leadership of SFT CEO Patrick Holden and NFU Director Minette Batters, bringing the two organisations together in pursuit of a common goal, or it may have been the brilliance and diversity of the speakers from farming, academia and politics. Perhaps it was the flash of anarchy lobbed in by Dr Gail Bradbrook of Extinction Rebellion. Maybe it is simply indicative of the times we live in, when most intelligent beings concur with the view of the [UN Intergovernmental Panel on Climate Change \(IPCC\)](#) that we have less than two decades to limit the effect of climate change in order to avoid irreversible changes to ecosystems and stay within planetary boundaries.

As a livestock farmer and long-time believer in the beneficial role of grazing ruminants for healthy people and planet, I went to Fir Farm in search of answers to questions which have baffled, bothered and bewildered me for too long:

How have we allowed the public debate to conflate 100% plant-based diets with saving the planet?

And in so doing, how on earth has the humble cow come to have taken 90% of the flak for global warming?

The first two questions from the floor were from farmers grappling with this same issue. How, they asked, do we communicate our good news story about how ruminants maintain ecosystems whilst providing nutrient dense, local food? Why are we failing to engage with and inspire the public, especially millennials and Generation Z? These are good questions. Why do these well-educated, well-informed, well-intentioned young citizens appear so deeply sceptical of farmers' claims that livestock farming can be part of the solution, whilst paradoxically appearing to trust without condition, Big Food's eco-credential claims for its highly-processed, resource intensive, globally sourced, plant-based foods?

A significant chunk of the answer to these questions was provided by [Professor Michael Lee](#) at Rothamsted Research, Professor [Myles Allen](#) at Oxford University, and Professor [Dieter Helm](#), Chair of the Natural Capital Committee.

Although my little brain nearly combusted trying to keep up with the able professors, some universal themes emerged. Both Michael Lee's presentation on how we determine what a sustainable food system is, and Myles Allen's presentation on the potential of farming to reduce global warming, might be summarised thus: "It's complicated. Single metrics are dangerous. Currently we are measuring the wrong thing. Farming is part of the solution."

According to both eminent speakers, the “wrong thing” we are using as a measure is CO₂e (carbon dioxide *equivalent*). CO₂e was sensibly conceived by the scientific research community as a working tool to provide a common unit of measure for all Greenhouse Gases (GHGs), with the main ones relevant to agriculture being carbon dioxide, methane and nitrous oxide. But when CO₂e wriggled out of academia into the high octane ether of social media, it quickly grew into a fully formed, grown-up, single measure for the most important existential challenge facing humanity – only it wasn’t and it isn’t.

Misuse of CO₂e accounts for many of the perverse and bizarre 'facts' shaping the public discourse today, such as the assertion that grain-fed beef intensively reared in feedlot systems is better for the planet (never mind the human or the animal) than grass-fed beef naturally reared on pasture that cannot be used for any other productive purpose. Leaving aside the question of how or why CO₂e was allowed to escape from its research domain, the important point made at the conference is that, by working together, scientists and farmers now have an opportunity to cut through the mistruths and give people much needed facts and solutions.

As Michael Lee said, “The NHS is our illness service. Farming is our national health industry. It is farming’s job to keep people well.” He went on to say that the principle purpose of food is to deliver nutrition, but that CO₂e tells us nothing about which farming systems are most effective at producing nutritious food, sustainably. “Chasing a single metric is dangerous. CO₂e was never intended to be used as a way to measure sustainability.” Lee is leading work at Rothamsted to develop a more holistic measure of sustainability focused on nutrient delivery per 100kg of food produced. Interestingly, beef and lamb reared on pasture score worst for sustainability when measured by CO₂e, but are among the best for sustainability when measured by Rothamsted’s Nutrient Index.

Myles Allen gave similar criticisms of CO₂e as a measure of global warming. “The conventional way of measuring global warming using CO₂e is wrong. Government is using a flawed accounting system.” Allen went on to suggest that 'climate neutral agriculture' would be a hugely positive brand winner for UK farming and easily within our grasp. Although methane is a highly potent GHG, its effect is short-lived as it persists in the atmosphere for around 12 years. By contrast carbon dioxide stays in the atmosphere for hundreds of years, and its cumulative effect is much greater. As Allen put it, for a power station to stop contributing to global warming it would have to completely shut down because its CO₂ emissions would have to reduce to zero to stop contributing to global warming; by contrast, for UK livestock farming to achieve the same, it needs to reduce methane emissions by around 20%; and by making modest and achievable reductions in its methane emissions, farming can have an active role in maintaining the climate within safe limits, *and* continue to produce nutritious food, maintain landscapes and ecosystems, support tourism, cultural traditions, vibrant rural communities and employment.

But the reality to date is that CO₂e has lent credence to an argument that livestock farming is the big problem when it comes to the health of people and planet. Methane is a potent GHG, livestock farming is one of the biggest emitters of methane – *ergo*, stop farming livestock and you’ve cracked global warming. If just a 20% reduction stops further warming, 100% reduction

would save the planet! Bingo, job done. No need to address over-consumption, lifestyles, use of fossil fuels, the carbon footprint of global food supply chains or account for all those pesky externalities that might up-end all Big Food's sustainability and eco-credentials. Just pin it on cows.

As Dieter Helm said, "There is no net zero without farming. And there is no farming without tariff control on trade deals." He pointed to the recent EU/South America trade deal to see what a threat zero tariffs would be to UK farming. "The only honest way to reduce CO₂ is to look to our total CO₂ consumption to include imports." He pointed out that much of what government has claimed in CO₂ reduction is, in fact, a result of the de-industrialisation of the UK economy. What we once made, we now import and that CO₂ is not currently accounted for. But, he noted, to properly account for CO₂ requires the 'Polluter Pays' principle to be enacted. Fertiliser is globally one of the five biggest polluters. UK farming should rightly expect the same standards, regulations and taxes to be applied to imports as UK produce, but this will also mean that farming needs to pay for the true cost of its own externalities. There is no such thing as a free lunch, and that goes for all of us.

The public discourse around food and farming is part of a bigger piece about living within our planetary boundaries. The logic has been distorted and skewed, sometimes by accident, other times by design. By whatever cause, it has not served the quality of debate. The debate, however, is far from over. By stepping outside of our silos and comfort zones, we can turn the conversation around. To give real credibility to our voice, farmers of all stripes will need to prove that we are much more than defenders of the status quo, but that we too are citizens of one planet, willing and able to stop the most harmful and unsustainable farming practices in order to focus on farming which delivers the most good for the least harm. Eating beef and lamb produced from pastures which cannot be used to grow a crop, seems like an obvious 'most good' case to me.

Transforming our food and farming system is not just a parochial matter for farming. How we measure and account for things really matters. Dieter Helm's 'natural capital' thinking requires a fundamental change to how we account for everything within our economy, and that will require real political courage and commitment, as will resisting the temptation to sacrifice the de-carbonising of our economy for short-term popularity at the ballot box. Achieving net zero carbon emissions is a challenge for humanity, and the exciting truth of the matter, so emphatically driven home by the conference speakers, is that farmers are not the problem – they are part of the solution.