COMMERCIALFARMERSGROUP

CFG Briefing: Engaging farmers and driving reductions in climate warming through a parallel, solutions-based approach

Summary

While the current standard accounting method for greenhouse gas (GHG) emissions (GWP100) measures emissions by warming potential, it is limited to a particular time horizon (100 years) and cannot accurately reflect the contribution that different GHGs, which degrade at different rates, have on warming over different time horizons. An alternative model (GWP) better accounts for these effects and so more accurately reflects the true warming impact of short-lived GHGs such as methane. The use of GWP100 has polarised opinions around the sustainability of ruminant agriculture in the UK, which is now hampering efforts to tackle warming. Adopting dual-accounting (both GWP100 and GWP*) in the UK – a simple exercise – has the potential to: i) allow UK farmers to better understand the true impact of their activities thereby increasing engagement on opportunities to mitigate warming ii) shift from inaction and blame, to 'unblocking' the pathway towards new solutions iii) create new opportunities for 'carbon' trading/offsetting iv) offer UK Government a post-Brexit opportunity to demonstrate (domestically and internationally) innovative fresh thinking. This solutions-based approach has delivered ground-breaking leadership in antibiotic reductions; it can do the same for climate warming.*

Background

Climate change is generally acknowledged as the greatest societal challenge we face. As such all nations, industries and individuals must play their part in reducing Anthropogenic Global Warming (AGW).

Carbon dioxide (CO_2), derived from the burning of fossil fuels, is by some margin the greatest contributor to AGW and is therefore the reference gas against which other GHGs are measured. This is why the term 'carbon footprint' has been widely adopted as a proxy for the impact of human activities on AGW, and CO_2e or 'carbon dioxide equivalent' as its principal metric. However other gases, specifically methane (CH_4) and nitrous oxide (N_2O), are also significant contributors. They are also both far more potent GHGs than CO_2 but they have very different lifespans in our atmosphere.

Agriculture is unique among the major industrial emitters of GHGs in so far as its contribution in terms of actual CO_2 is relatively small. Due to the key biological processes that underpin both the agricultural carbon and nitrogen cycles (i.e. enteric fermentation in the rumen, the decomposition of manures and organic matter, and the soil-nutrient interactions that lead to the release of nitrous oxide from organic and inorganic fertiliser sources), methane and nitrous oxide account for the lion's share of agriculture's 'carbon footprint' expressed as CO_2e. In this

regard talk of the 'carbon footprint' of ruminant agriculture is misleading misnomer; 'methane footprint' might be more appropriate.

Using the widely accepted Intergovernmental Panel on Climate Change (IPCC) methodology for GHG emissions, which measures estimated Global Warming Potential (GWP) over a 100-year time horizon (known as GWP100), methane alone accounts for over 56% of UK agriculture's GHG inventory, nitrous oxide 31%, while true CO_2 makes up just 13%. This compares to a breakdown of 7%, 2% and 92% respectively for emissions from all other industrial sources in the UK according to the National Atmospheric Emissions Inventory.

This heavy weighting applied to methane emissions has contributed to the widespread belief that ruminants, and in particular cattle, are a major driver of AGW globally. This in turn has led to many media, government agencies and NGOs around the world questioning the future role of meat and dairy in a sustainable diet. These challenges have arisen despite the clearly established nutritional value of animal-derived foods and the fact that two thirds of the world's agricultural land is grassland or prairie which cannot be used for growing crops. This means that these areas require ruminants to convert their outputs into human-edible form.

Alternative accounting methods

Research led by Prof Myles Allen at the Oxford Martin School, University of Oxford, challenges the appropriateness of GWP100 as the key method of quantifying the impact of GHG emissions. While GWP100 measures amounts of warming gases emitted, it does not accurately represent the warming effect (and therefore actual contribution to warming) over time periods different to 100 years or the rate at which GHG gases degrade.

The research focuses particularly on methane, which is known to be a short-lived climate pollutant. Unlike CO_2, which persists in the atmosphere and contributes to global warming for millennia, and nitrous oxide, which has a lifespan measured in centuries, methane has a half-life estimated at eight to nine years. This means that within three decades the vast majority of methane emitted today will have been completely broken down into the far less potent, CO_2 and water. Importantly for livestock, no greater quantity of CO_2 eventually results from the decomposition of methane than was originally removed from the atmosphere by the photosynthesis of the plants eaten by the ruminant.

Therefore, in a static or declining methane emissions scenario, as has been the case in the UK for the last 40 years due to gradually reducing UK cattle and sheep numbers, the rate at which 'new' methane is being added to the atmosphere is lower than the rate at which 'old' or existing methane is being removed. Hence, according to the Oxford Martin research, a static population of ruminants does not cause any global warming and a gradual decline in UK ruminant populations actually produces a global 'cooling' effect. This tells a very different story from the prevailing GWP100 method.

Some commentators, concerned over the implications of the 100-year time horizon embedded in GWP100, have proposed GWP20 (warming measured over 20 years) as an alternative which would drive more urgent action. However, GWP20s still fails to acknowledge the rate at which methane degrades thus risks skewing the debate further away from long-lived GHGs.

Interestingly, where methane emissions are rising, GWP20 and GWP* calculations produce a very similar result, so there should be no concern that GWP* lets ruminants 'off the hook'.

The opportunities

Industry-wide, the effect of measuring warming emissions by their actual impact is significant. The model Oxford Martin has developed based on this research – GWP* – can be used to re-calculate the UK's 2016 agricultural GHG inventory, reducing it from 45.6MT CO_2e per annum to 25.5MT, nearly 40% lower than the officially published figure. In the event that the UK ruminant population continues to decline in line with recent trends, then a resulting cooling effect can be further subtracted. Indeed, Prof Allen has calculated that taking the 40-year view, the decline in UK ruminant populations has more than offset the entire GHG contribution of UK agriculture over the same period (including non-ruminant UK agriculture).

This is a potential game changer for agriculture in terms of how it identifies, prioritises and tackles its own contributions to global warming as well as offers solutions to others. For example, if the warming contribution of static/declining methane is accurately measured, practices that emit CO_2 or nitrous oxide gain relative impact, as do those that increase methane emissions. Activities that seek to increase carbon sequestration on agricultural land (such as tree planting) could be part of a much broader list of potential interventions including methane emission capture and diet formulations designed to reduce methane production. All of these have a cooling effect and may therefore be used to offset fossil fuel-derived GHG emissions in the wider economy, within an appropriately designed emissions trading system. These also have the potential to generate much-needed additional revenue for farming in the process.

Thus formal recognition for GWP* or its adoption as part of a dual-accounting protocol in the UK alongside GWP100 would provide tremendous opportunities. Such recognition would not let ruminant sectors 'rest easy' (because, for example, increasing cattle numbers without methane mitigations would be recognised as causing significant warming). It simply gives more accurate feedback on interventions with the greatest impact. GWP* should be detached from current GWP100-aligned Net Zero ambitions as these would cease to provide the ambitious stretch needed; new targets would be required. CFG would also propose that a voluntary UK-level cap on total ruminant numbers is explored as the logical consequence of the adoption of GWP*. Such a cap would relate to the national herd and flock rather than individual herd sizes, in line with Government's stated wish to avoid further reductions in the size of the national herd, but would offer plenty of scope for individual businesses to pursue greater scale and productivity beneath a UK-level cap.

The challenges

While the science behind GWP* is proven and widely accepted, the political obstacles to its adoption should not be underestimated. The current GWP100 methodology does to some extent 'take the heat off' other sectors unencumbered by a significant methane emissions, yet more dependent on fossil fuels, and potentially better-resourced to lobby for a continuation of the status quo, as well as for individual citizens reluctant to make certain lifestyle choices. Countries which have stated expansion of ruminant agriculture as a core strategy for economic growth are also likely to favour using solely GWP100, as GWP* reveals the true climate cost of

their decisions. The status quo also acts as a diversion within agriculture, focusing attention away from areas that should be addressed and creating a stand-off situation between farming, NGOs, the media and other sectors, culminating in entrenched ideological views and inertia on both sides.

GWP100 is currently used for GHG accounting purposes by the UK Government. If governments are to focus on reducing warming then GWP* is a more appropriate metric. However, some targets have been set to reference GWP100 and this has become an end in itself. Changing established protocols is not easy, but there are no domestic or international legal barriers to adopting dual accounting. It would simply be down to the will and vision of the UK Government to accept an expansion of focus to include GWP*.

Lastly, UK agriculture as a lone voice on this issue risks accusations of single-issue lobbying and vested interests, especially if it is seen as merely a means of shifting responsibility and reaching Net Zero targets more easily. It is therefore essential that the farming industry views this as a critical re-set prior to full engagement, and starts to deliver tangible results quickly. It is also critical that a robust and evidence-based coalition of support is assembled, both domestically and from key stakeholders in other countries for whom this is a significant issue, to position the proposal carefully and credibly. Several international farming unions have already voiced their support for GWP*.

Next steps

This year the UK hosts both the G7 summit in Cornwall in June and the COP26 international climate change conference in Glasgow in November. Both present unique opportunities to take a lead on GWP* by adding it to the agenda, and for UK agriculture to demonstrate genuine leadership to both domestic consumers and international trading partners on this globally important and highly emotive issue. It also allows the UK, freshly 'Brexited', to spearhead a genuinely innovative and solutions-focused approach to a perplexing challenge. It has taken a unique leadership position on farm antibiotic use; it can do the same here.

Conclusions

Including GWP* alongside GWP100 in calculating the UK's GHG inventory offers all UK stakeholders a chance to suspend ideological differences and engage in solutions-based interventions from which we can all benefit. Through GWP*, UK agriculture can demonstrate a commitment to the consumer and to wider society to shoulder its share of responsibility and engage meaningfully in this issue. There are many opportunities available to the UK ruminant sector to increase productivity through wider adoption of best practice and exploitation of technological innovations which, under GWP* actually cause cooling (similar to tree planting) and could be rewarded through market mechanisms. Wider adoption of these would support sustainable output and value growth to the extent that the adoption of a nationwide cap on ruminant numbers would be no impediment to the success of individual farm businesses.
Although not a silver bullet, GWP* provides the catalyst for much needed change.

References

For further information on GWP* the following resources provide more detail on how the methodology was developed and should be implemented and interpreted.

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7 May, 2021