

VIEWPOINT

CARBON FOOTPRINTING – OPPORTUNITY OR THREAT?¹

Sam Evans

The question of whether or not you believe in climate change is now largely irrelevant in farm business decision-making, as Governments have decided to act. Indeed, the UK has now passed legislation which introduces the world's first legally binding framework to tackle the dangers of climate change. The Climate Change Bill was introduced into Parliament on 14 November 2007 and became law on 26 November 2008. Two key aims of the act are:

1. to improve carbon management, helping the transition towards a low-carbon economy in the UK;
2. to demonstrate UK leadership internationally, signalling that we are committed to taking our share of responsibility for reducing global emissions in the context of developing negotiations on a post-2012 global agreement at Copenhagen in December 2009.

Two key provisions of the act are:

1. A legally binding target of at least an 80 percent cut in greenhouse gas emissions by 2050, to be achieved through action in the UK and abroad. Also a reduction in emissions of at least 34 percent by 2020. Both these targets are against a 1990 baseline.
2. A carbon budgeting system which caps emissions over five-year periods, with three budgets set at a time, to help us stay on track for our 2050 target. The first three carbon budgets will run from 2008-12, 2013-17 and 2018-22, and had to be set by 1 June 2009. The Government must report to Parliament its policies and proposals to meet the budgets as soon as possible.

Therefore, the legislation is already in place to enforce reduction of carbon emissions, and it is now in the industry's hands to ensure that this happens.

You will no doubt have seen in the media reports of how livestock 'passing gas' are contributing to global warming. There have now been plenty of headlines saying, 'Kill a cow. Keep a car', with the corresponding article basically stating that livestock farming creates more of a greenhouse gas problem than transport. Many of the lobbyists responsible for these statements have their own agendas, of course, often linked to vegetarian and vegan causes. Nevertheless, the headlines cannot be ignored.

1. A version of this paper was presented at the UK National Farm Management Conference, Oxford, November 2009, and is printed by kind permission of the Conference organisers

The science shows that ruminants do produce the potent greenhouse gas methane in high quantities, although the gas is mainly produced from eructation from cudging and not from the other end. And, as well as the methane, there's also the production from land and fertilisers of nitrous oxide — another potent greenhouse gas — to be considered, plus all the other direct carbon inputs from electricity, fuel, and other energy sources.

Better farming, smaller footprint

Kite Consulting became involved in carbon assessments when we were approached by ASDA/Walmart in 2007 and commissioned to determine the carbon footprint of milk in conjunction with the processor Arla Foods. Since then, we have been engaged to help farmers reduce their carbon loading through better management practices. As a result of this work, the E-CO₂ project was formed as a joint venture between Kite Consulting, Advance Sourcing and CMS UK Services to allow a nationwide approach and delivery helping the industry to target energy and carbon reduction.

The key messages we found are:

- The sources of a carbon footprint for milk typically are 45 percent from methane, 30 percent from direct CO₂, and 25 percent from N₂O emissions.
- Lower carbon footprints come from better farming practices, and the more efficient, more profitable farms are likely to have a lower carbon footprint than less efficient ones.
- UK dairy farms have cut their greenhouse gas emissions by up to 10 percent since 1990 and will hit the Kyoto targets by 2020. The main reason is that we have produced a similar amount of milk from a smaller dairy herd because of higher yields, and will continue to do so as management improves and yields rise.

A positive story

These messages actually are very positive, and few other industries can match these improvements. They should be used to present a positive image of the dairy sector.

The results of on-farm assessments clearly indicate a close correlation between carbon and financial efficiency. The more efficient operators had a significantly lower cost of production, as well as a lower carbon footprint. The correlation is not as strong between a higher cost of production and a higher carbon footprint, but the trend is evident. The figures also show that the range in carbon footprints between the top 25 percent and bottom 25 percent of farms is more than 40 percent. The potential to make even more progress is clearly there!

What affects farm carbon footprints?

Lower carbon footprints are closely correlated to high standards of husbandry which produce higher yields per cow and lower culling and

replacement rates. This is because of the “fixed cost” of maintaining the rumen generating the methane.

A lower-yielding cow carries a higher maintenance cost per litre of milk in terms of methane, whereas the higher-yielding cow spreads its methane maintenance cost over more litres of milk. In addition, making efficient use of slurries and manures also lowers the carbon footprint, as well as reducing fertiliser costs and N₂O emissions. Management skills, husbandry level, farm output (yield per cow) and fertiliser use account for most of the differences we see on farms.

Findings in the pilot studies subsequently have moved onto the entire ASDA/Walmart dedicated supply group of 550 farmers. Participating farmers are sharing their ideas on best practices, are looking at practical ways to improve yields through better husbandry and lower costs, and are working to make better use of manures and slurries. We believe that there is the potential to reduce carbon emissions significantly within the pool within three years. And, because reducing carbon emissions is linked to better profitability, we also should be improving profits.

In addition, free energy assessments are being linked now with the carbon calculator. These help to save even more costs, especially around the milking plant, and encourage farmers to look positively at reducing their carbon footprints. This is the ‘carrot’ approach and one which is being encouraged throughout the UK dairy sector at present. Behind the scenes lie plans to audit farms and the supply chain with business-to-business contracts - the ‘stick’ approach. We believe that demonstrating to government and special interest groups that the industry is acting in a positive and responsible way will only serve well for us in the future and help to avoid a legislative approach.

Calculating carbon footprints

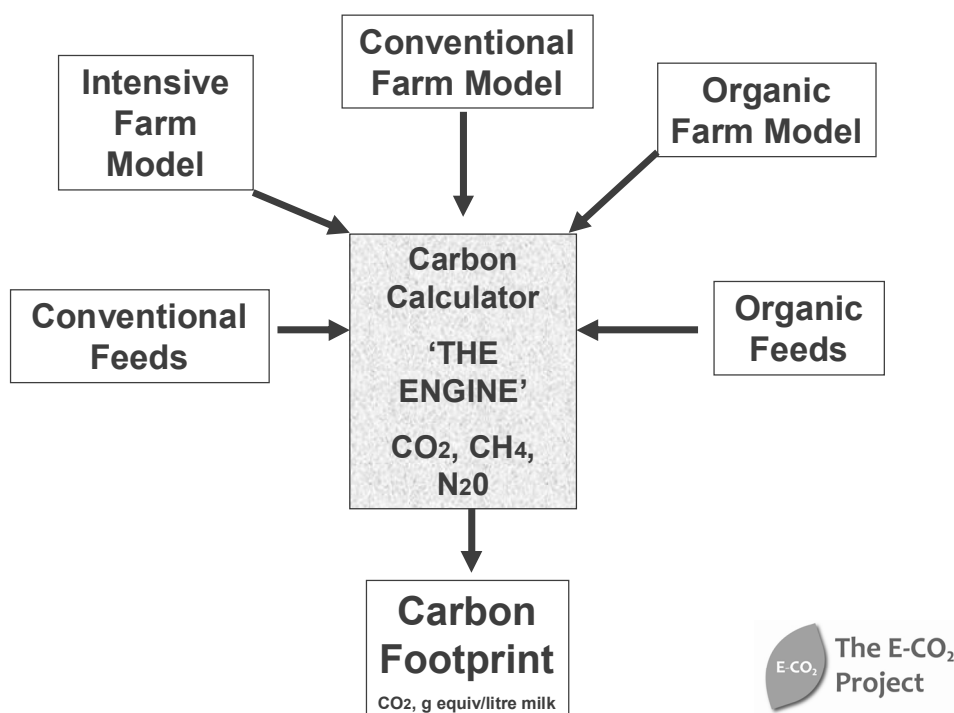
PAS 2050 uses Life Cycle Analysis (LCA) to calculate the carbon footprint of the product produced, for instance milk. Life cycle analysis goes ‘from cradle to grave’, taking into account all inputs and outputs, traced back to primary source, e.g.:

Milk production: Oil → Fertiliser → Chemicals → Machinery → Crops → Fodder → Housing → Feeds → Cattle → Milk cooling; or

Milk processing: Transport → processing → separation → pasteurisation → packing → retailer → consumer.

The reason agriculture is an easy target for lobbyists is the generation of emissions from stock and land etc, such as methane and nitrous oxide, which have a much higher global warming potential than carbon dioxide (see table overleaf); these two factors alone mean that agriculture has a huge role to play in reducing emission levels.

	Source	Importance
Carbon dioxide, CO₂	Burning fossil fuel Respiration Deforestation	Absorbs infrared radiation, Affects Stratospheric ozone
Methane, CH₄	Rumen fermentation Land fill, rice paddies	25 x more potent than CO ₂
Nitrous Oxide, N₂O	Burning biomass (protein), fuel, fertiliser	298 x more potent than CO ₂



To calculate a business' carbon footprint correctly, models then need to take into account all of the inputs on a farming business to allow true calculation of carbon output:

Following PAS2050 methodology and using life cycle analysis allows the product of the farm (meat, milk, eggs etc) to have a enterprise-specific carbon footprint, which then gives the starting point for business analysis as to how the individual footprint of the enterprise can be reduced. Adopting PAS2050 allows various models to be used in the industry as they are all working to the same 'rules' and therefore the industry is comparing like-for-like as opposed to various models that track some and not all emissions which may give the farming business an artificially high or low carbon footprint.

Opportunity or threat?

The opportunity or threat argument becomes one of a point of principle. Currently the issue is being driven by lobbyists or bureaucrats all who have a vested interest in their approach. This leads to the possibility of the industry going down one of two paths:

Path one – Path of deintensification

This would result in the process being a whole-farm assessment process which inevitably means that the answer to reducing carbon footprints will be to lower stocking levels, resulting in a lowering of emissions due to fewer stock being held on the holding. This could then mean that in the future the holding receives carbon credits (which could be tradable) for additional sequestration. However, this route would also result in us exporting our livestock industries in effect, resulting in increased imports of meat/product, although theoretically allowing us to export our carbon problem elsewhere. This also assumes that world food requirements stay static, whereas we all know that population growth and in turn the requirement for additional food stocks will only continue to rise year on year going forward. We found in experience that it is impossible to complete accurate whole-farm assessments given the complex nature of the systems involved. Due to this, a whole-farm approach cannot meet the requirements of PAS2050 or Carbon Trust certification.

Path two – Path of the realist

I believe that the way forward is to follow the embedded carbon of the individual product. We have to assume that consumers will continue to consume, and given the financial wealth in the western world, there seems no reason as to why this will not continue. This then focuses on individual enterprise carbon footprinting, allowing the discussion to be held as to how to reduce the product's footprint and meet government targets. This moves the emphasis from potentially being paid not to farm, towards increasing technical efficiency, which in turn will increase system profitability.

Through increasing system efficiency, there could still be a role for carbon trading, and sustainable systems will still have a role in sequestration.

The opportunities are, however, much greater than the threats, as long as we start the journey and be proactive NOW. The dairy industry has already beaten the Kyoto targets, and there is no reason as to why this trend will not continue as system efficiencies continue to be made as well as science continuing to help move the industry forward. However, representation on behalf of the industry needs to continue, and this is where, in my view, the role of the AHDB (EBLEX & Dairy Co) moving forward will become key. The dairy industry is already leading well with a co-ordinated approach between Dairy Co, Dairy UK, NFU and other organisations involved with on farm footprinting. The red meat sector is not there yet and has some catching up to do; however they have already started the process with the red meat roadmap.

Finally, in all of these debates it is important to remember that approximately 73% of the agricultural area of the UK is unsuitable for growing crops for human consumption. This land resource cannot be used to produce anything else but grass and rough grazing. Humans cannot eat grass, and therefore these areas can only be efficiently utilised by ruminants. This allows those animals to convert a 'waste' into edible product as well as preserve the landscape; provide areas for tourism (the view isn't there without livestock creating it!); maintain levels of bio-diversity; and keep jobs and population in rural communities. The UK livestock Industry also consumes huge levels of co-product from the food industry which results in fewer co-products being sent to landfill where it would have produced methane. To stop this way of farming would in my view be foolish and catastrophic as it would leave us short of food and turn the countryside into 'wasteland'. Livestock production can and will also help the UK with carbon mitigation by locking up carbon in grassland (sequestration) whilst also bringing food security to the UK.

What you can say

The next time you are quizzed about polluting cows, or see negative headlines in the press, you now have several positive responses:

- Cows and other ruminants have been on this planet long before man and are not the cause of climate change that is man's activity. However, we can make our contribution to helping the planet.
- Cows produce a wonderful food and help create fantastic landscapes. Imagine a land devoid of livestock and covered solely with trees and crops or scrub!
- We have reduced our carbon emissions. Those of us in the UK will hit our contribution to the Kyoto targets.
- Reducing carbon emissions goes hand in hand with better farming practices such as greater welfare and cow care, which in turn create additional income streams.
- We have taken the lead in the UK, and we need to share our best

practice around the world. Doubling India's average cow yields to 2,454 litres per cow could save the world 36 million cows with methane emissions equivalent to twice that of the number of cows in the U.S.!

None of the above needs to cost us. Doing what we have been doing for generations as farmers, and becoming more efficient as a result, will reduce emissions. We can be 'part of the solution, not the problem'. Let's make it happen!

About the author

Winner of the 2008 BIAC/Lloyds TSB Young Consultant of the Year award, and an Associate Partner with Kite Consulting, Sam Evans (sam.evans@kiteconsulting.com) works with livestock & dairy businesses who want to improve technical performance and profit levels. His approach allows businesses to understand their current level of competitiveness in the industry and then provide innovative and practical down to earth solutions for increasing income streams further to ensure long term stability and profitability in a volatile agricultural market. With carbon footprinting moving up the political agenda, and with agriculture being a major source of greenhouse gases, Sam is also part of the project team working on 'The EC02 Project' which has created Carbon Trust accredited carbon calculators for beef and dairy farming operations. These models are being used in farm carbon calculations to allow the industry to better understand the role of farming operations in global warming and further looking at ways of reducing agricultures carbon footprint.

