

Farm Carbon Footprinting Factsheet

A key component of managing greenhouse gas emissions on-farm is being able to measure them.

What is a carbon footprint?

Identifying the carbon footprint of a farm business is the first vital step in being able to quantify the contribution that the farm is making to climate change. A carbon footprint calculation identifies the quantity and source of carbon dioxide, methane and nitrous oxide emitted from the farm (as well as carbon sequestered in soils and woodland) highlighting areas where improvements or changes can be made to reduce greenhouse gas emissions.

The end result from a carbon calculator provides you a carbon balance that is usually expressed in kg or tonnes of **carbon dioxide equivalent** (or CO₂e). This is because agriculture is a sector where we emit multiple gases; as such the non-CO₂ gases need to be converted into their carbon dioxide equivalent to provide a uniform metric. A lot of farm-based calculators will also indicate the amount of the different gases that the farm is emitting so that you can appreciate the proportion of the footprint which is from each gas.

What is the benefit of completing a carbon footprint for my farm?

Reducing carbon emissions in a farming business makes sense on many levels. High carbon emissions tend to be linked to high use of resources, and/or wastage, so reducing emissions also tends to reduce costs. This makes the farm more efficient and should improve profitability.

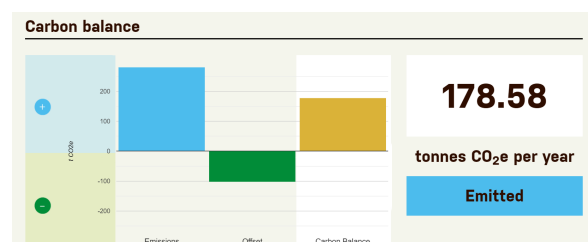
Before being able to reduce emissions, you need to know where they're coming from. Are the largest emissions coming from livestock, soils, fuels, fertilisers? It is vital to get a picture of your business, and this is what happens when we do carbon footprinting.

Also with the Net Zero ambitions from the UK Government as well as pressure from retailers, consumers, industry stakeholders and supply chains, understanding the farm's current position and proximity to Net Zero is vitally important. Carbon footprinting also provides an opportunity to assess the farm's current carbon assets – including how much carbon is held in trees, environmental features and soils and provide an understanding of the potential to help deliver climate solutions.

How many carbon calculators are out there and which one should I use?

Carbon footprinting tools for farmers have been in existence for the last decade or so. There are some calculation tools which come as part of a supply chain or retailer (for example through milk processors), and these tend to be bespoke to the end user requirements.

For farmers who are keen to understand what their baseline position is and assess areas to target emissions reductions, there are three main options. These include the Farm Carbon Calculator, AgreCalc and the Cool Farm Tool.



The important aspect in carbon footprinting is consistency. Choose a calculator that works best for you and stick with it to ensure changes in the farm's carbon balance are as a result of management changes rather than the use of a different accounting system.

There is a PAS standard (PAS 2050) for Carbon footprinting as well as different standardised metrics including methods from the IPCC and the Greenhouse Gas Protocol, however none of them are ideally suited for all farming situations. [PAS 2050](#) is widely used to calculate the GHG emissions from various products and services. Its methodology is used in many calculators, however its scope falls short of what is required for a complete farm carbon footprint, in that it doesn't include some key parameters for farms such as carbon sequestration and some indirect emissions (such as embedded carbon found within capital assets).

The important thing for farmers using these calculators is consistency and understanding the background to the one that is being used. Currently Defra are evaluating the available tools to develop a harmonised approach that is based on new research and understanding and better meets the needs of farmers.

Data collection

This can seem like the most daunting part! The first step is to gather all the input data, including details such as fuel use, livestock numbers, fertiliser inputs, use of materials, waste produced, etc. In order to be accurate you need to be comprehensive in your assessment. The list can look huge at first, but if your record keeping is reasonable then this process should be achievable in a few hours. Once you've done it once, the next time will be much quicker and once the data is entered into the carbon calculator, it is

then possible to copy the data to start a new report for the subsequent year.

How often do I need to do my carbon footprint?

When carbon footprinting, doing it once is great as it gives you a snapshot of where you are at that time as well as an indication as to your proximity to net zero. But to really understand whether your emissions are increasing or decreasing it's important to repeat the process at regular intervals – ideally on an annual basis. When you do this you can start to see what direction the farm is moving in and whether the actions you're taking are working.

Approaches to carbon footprinting

When looking at the results and choosing a carbon calculator to use, it is important to ask a few key questions which will help to assess the right tool to use.

Whole farm or product footprint?

Where you choose to draw the boundary around what is included within your carbon footprint will have a big impact on the results. At the Farm Carbon Toolkit, we advocate that the starting point for a carbon footprint is the whole farm, as you are able to assess all of the sources of GHG emissions and sequestration opportunities in one footprint.

This can then be apportioned out if you are running multiple enterprises on-farm. Per product footprints are often used by companies and retailers as carbon per kg beef / wheat or per litre of milk is a metric that is commonly now required. This can be useful in terms of highlighting where improved efficiency can also drive carbon reductions but sometimes just focussing on a per product footprint can mean that opportunities are overlooked.

What is being included?

When using a carbon calculator it is important to know what is included and what isn't; for example are the emissions associated with fertiliser manufacture, or transport of feed to my farm included? The table below shows the different scopes for carbon footprint and what is included. In order to take a full account of your footprint we would always advocate including scope 3 emissions wherever possible.

Scope 1	Also known as direct emissions , these are emissions that are owned or controlled by the company such as tractors, farm machinery, gas for heating and from change of land use. Additional emissions arise from N ₂ O released as a consequence of manure storage and application.
Scope 2	These are associated with emissions resulting from the generation of purchased electricity or gas used on the farm.
Scope 3	Also known as indirect emissions , associated with the production, processing and distribution of inputs into the farming system. For example, fertilisers and the emissions that occurred in the manufacture of machinery, building materials and other farm infrastructure.

Table 1: The different Scopes of a carbon footprint

Data accuracy and relevance to UK farms

Carbon footprints are calculated using a combination of farm level data and emissions factors. An emissions factor is a value which accounts for the amount of GHG that is produced for each input used on the farm. These factors are produced periodically by the UK Government and form the basis of all carbon calculators. Some studies use global data (which is termed Tier 1 data) and some use more detailed factors that represent variations in climate, practice and landscape (usually Tiers 2 and 3). It is important to make sure that the calculator that you use is relevant for your farming system and not using global average data.

Sequestration – in or out?

A key part of carbon footprinting is to ensure that a complete assessment is carried out. This means ensuring that carbon that is being stored on the farm is also included. A key question to ask of any calculator provider is how sequestration is being accounted for. Carbon is stored on-farm within woody biomass (trees and hedgerows), in areas that are managed for environmental benefits (pastures, parklands, scrub, arable reversion etc) and then also in farm soils. It is important that this is accounted for within the calculation, through either a model or measurement-based approach.

Interpreting results and next steps

Although it can seem complicated, carbon footprinting provides a fresh perspective on how your business is operating, where efficiencies and cost savings can be made and how you are able to manage your carbon assets to provide a climate solution. Once you have been through the process and calculated your current footprint, the important next step is to then understand it and develop a strategy for your farm which drives resilience, profit and environmental protection. The team at FCT are here to help provide advice and guidance, but we also have numerous online resources which include the Toolkit, case studies and how to guides which will support you in implementing emissions reductions on your farm.