Carbon Footprinting on the Beef Farm

Practical Guide

Carbon footprinting helps you to quantify the farms greenhouse gas emissions.

Acting on this information not only helps minimise emissions but can also provide significant efficiency and economic benefits at farm level.

Improving on-farm efficiencies through better use of inputs strongly correlates with **reduced production costs per kg of beef** sold meaning improved profitability for the farm business.

Rather than a burden, lowering greenhouse gas emissions represents a challenge with clear opportunities.

This Practical Guide concentrates on some of the opportunities that could come from carrying out a carbon footprint on the beef farm.

Where do the key agricultural emissions come from?

Emissions from livestock farming include carbon dioxide (CO_2) produced by burning fossil fuels, methane (CH_4) as a natural by-product of animal digestion and nitrous oxide (N_2O) from soils, manure and nutrient management. Changes in land use and vegetation can also have an impact on greenhouse gas emissions from the farm.

How is a carbon footprint calculated?

To establish a starting point baseline information on available land area and type, livestock numbers, and weight of livestock sold is recorded along with feed, fertiliser and fuel use. The carbon footprint is expressed on a '*per net unit of food product leaving the farm'* basis. For a beef unit, this would be in kg of greenhouse gas (normally a measure of all greenhouse gases but expressed as a ***carbon dioxide equivalent*** **CO_2e**) per kg cold carcase weight of beef sold.

What's the point of a carbon footprint for my business?

The carbon footprint shows how much greenhouse gas is being produced through routine activities on your farm. It highlights areas of the business where greenhouse gas emissions seem high and allows you to compare your farm performance against other similar enterprise types (benchmarking like for like). High farm emissions reflect poor utilisation of costly inputs, highlighting scope to implement efficiency savings - benefiting both the farm business and the wider environment. Some supermarkets already ask suppliers to provide this information.

Farming for a Better Climate

There are five sets of Practical Guides covering :

Use energy and fuels efficiently

Develop renewable energy

Lock carbon into soils and vegetation

Optimise the application of fertilisers and manures

Optimise livestock management and the storage of manure and slurry

Find further information, including links to other Practical Guides and Case Studies, at

www.farmingforabetterclimate.org

Funded by the Scottish Government as part of their Climate Change Advisory Activity

Websites

www.farmingforabetterclimate.org
www.farmingfutures.org.uk
www.ipcc.ch
www.agrecalc.com
www2.cplan.org.uk
www.calm.cla.org.uk
www.planet4farmers.co.uk
www.fertbench.com
www.soilassociation.org.uk
www.renewableenergyonfarms.co.uk

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How do you improve efficiency on a beef farm?

The key measures of a farms performance with regard to greenhouse gas minimisation are broadly similar to already familiar performance indicators used by the industry today (see box). **Improvement in productive efficiency** is the most important factor that farmers have within their control to reduce emissions and positively **steer profit.** The following three example measures are based on actual farm data and indicative of what could be expected in specific scenarios. It also broadly illustrates that greenhouse gas emission reductions are achievable, even on already technically efficient farms, **and** compatible with maximising farm profits.

Key 'Performance Indicators'

Number of calves born to females bred

- ✓ Age at first calving
- ✓ Replacement rate
- ✓ Calf mortality
- ✓ Weaning percentage
- ✓ Disease level/challenge
- ✓ Feed conversion efficiency
- ✓ Days from birth to weaning weight
- ✓ Liveweight gain to 400 days (or similar)
- ✓ Forage quality
- ✓ Stocking rate/forage yield per hectare
- ✓ Fertiliser requirements
- ✓ Red diesel use

Example efficiency measure 1 — Increase calf sales

Ensuring suckler cow fertility is not unduly compromised is an essential aspect of maximising live calf numbers. This includes good husbandry practices such as selecting replacements from fertile stock, use of EBV's, bull fertility checks, condition scoring cows, good grassland management, biosecurity measures, health planning and many other small but cumulatively significant practices.

Using SAC farm data it was shown that achieving 5% greater calf numbers (reducing barren cows and calf mortality by 5 in 100 cows bred) could improve finisher cattle sales by **over 3t liveweight per 100 cows** and reduce greenhouse gas emissions by 10% per kg carcase weight.

Example efficiency measure 2 — Improve nutrient use

Targeting and applying manure and fertiliser to crop requirements is an effective method of reducing purchased fertiliser cost and increasing nutrient utilisation (minimising nutrients lost to the environment) without compromising crop yield. A 10% reduction in fertiliser purchase could reduce the carbon footprint by 2% per kg carcase weight.

Example efficiency measure 3 — Improve forage quality

Unimpaired field drainage, modern grass varieties and timely field operations presents an opportunity to increase forage quality without necessarily compromising yield. Improved forage quality will encourage intakes, promoting young stock growth-rates or off-set purchased feed use.

Improving grass silage energy content by 1MJ/kg DM over six-month feeding period is equivalent to around **90kg barley or an additional 35kg live weight in a growing beef ration**. In this scenario, selling 2.5% additional carcase weight reduced emissions by around 6% per kg carcase weight.

Next steps?

Undertaking a farm carbon footprint will help establish a starting point and an action plan to improve business resource efficiencies and assess year on year change; it could also compare your performance with like businesses. Regular assessment can help quantify progress and positively direct efforts to make the most of inputs whilst reducing farm greenhouse gas losses. An action plan based on technical performance targets should aim to take one step at a time towards a more efficient, lower cost system with a reduced carbon footprint.