

Reducing your Carbon Footprint:

Integrated approaches to reduce emissions and increase carbon sequestration



Farmers hold a unique position to be an innovative part of the solution to climate change, with farming having the potential to act as both a source and a sink for greenhouse gas (GHG) emissions. **Climate positive farming** is a key guiding principle of LEAF's 2021-2031 strategy through the adoption of the **agroecological and regenerative** benefits of the whole farm, site specific focus of Integrated Farm Management (IFM). Developing and advancing relevant, site specific and whole farm approaches underpin LEAF's capability to deliver climate positive action.

Agriculture, Forestry, and other Land Use is responsible for around a quarter of global greenhouse gas (GHG) emissions as a result of **human activity**¹. Agricultural emissions from livestock, soil, nutrient management, and deforestation are an important contributor to this. **GHGs are gases in the atmosphere that affect the earth's energy balance by trapping heat and warming the planet.** Although there are 7 main GHGs, there are 3 key GHGs within the agriculture sector: carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

Carbon Footprints

Carbon footprints are the **total amount of GHGs released into the atmosphere due to our actions.** They measure the total amount of carbon dioxide equivalent (CO₂e) emissions that are directly and indirectly caused by an activity (or is accumulated over the life stages of a product). Results are reported as units of **CO₂ equivalent (CO₂e)**, to represent all GHGs, including methane (CH₄) and nitrous oxide (N₂O) and not just CO₂.

There are over 65 GHG calculators available in the UK²; some are **enterprise specific**, some for the **whole farm** and others **specific to market requirements**. Choosing the one that is most appropriate to your business as a starting point is key. We recommend that you do some research around what data they require, and then assess how easy it is for you to access that data, especially using information that is already available. Ideally, **once you have picked a tool that works for you, stick with it.** This helps **map your progress.**

The key part to a carbon footprint assessment is **generating a baseline** and then working with the same tool to find out where you can **make improvements, reduce emissions, and assess your progress**, year on year. Using a carbon footprint assessment can provide a focus on how to assess your efficiency, where you can save money, and reduce your GHG emissions. It evidences the improvements made and what steps and support are required to make further improvements. The UK farming industry is committed to deliver a **net carbon zero goal by 2040**³, which will require a strong baseline to build on.

¹ IPCC, [Special Report: Special Report on Climate Change and Land](#), 2019

² Sykes *et al*, A comparison of farm-level greenhouse gas calculators in their application on beef production systems, 2017

³ NFU, [Achieving Net Zero – Farming's 2040 goal](#), September 2019

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LEAF and Integrated Farm Management

For some 30 years LEAF has been developing and promoting [Integrated Farm Management \(IFM\)](#), driving efficiencies and attention to detail. As we look to reduce emissions and increase carbon sequestration such an approach could not be more critical.

IFM is a site specific, whole farm approach, made up of nine sections, attention to detail and incremental improvements to each area which work together to address environmental, economic, and social sustainability across the entire farm business. An understanding of the [importance of each section and the interactions between them](#) is essential in reducing the carbon footprint of the farm and increasing carbon sequestration.

Driving circular agriculture through Integrated Farm Management



Through focusing on soil, water, energy, air and nature, the implementation of IFM offers a perfect opportunity to optimise the farms inputs and activities, in turn reducing emissions and environmental impact whilst also making productivity gains. Reference to the [LEAF Sustainable Farming Review](#) management tool and Control Points in the [LEAF Marque Standard v.15.0](#) help LEAF farmers to reduce their carbon footprint as outlined below.

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Organisation and Planning



Many decisions and actions will influence the farms carbon footprint and the level of carbon sequestration. LEAF Farmers:

- Complete the **Integrated Farm Management Policy** which includes a commitment to improving efficiency and justified resources (including energy) use, and minimising pollution.
- Consider **resource use and waste management** in the purchasing and/or design of buildings and/or new equipment.
- Consider incorporating **renewable energy generation** during the purchase and/or design of buildings and/or new equipment.

Soil Management



Protecting soil and enhancing its ability to store carbon is key to helping reduce emissions and improving levels of carbon sequestration. IFM advocates a range of soil management strategies such as crop rotations, maintaining cover, and appropriate cultivations to protect and enhance soil quality. LEAF Farmers:

- Complete the **Soil Management Plan** which includes identification of soils prone to erosion, targets to improve soil health, and control strategies to reduce possible risks to soil health.
- Take measures to **conserve and build up soil organic matter**.
- Test soils in all fields for **soil organic matter and soil organic carbon**.
- **Assess the risk of soil degradation** prior to operations being carried out to ensure that field operations and/or grazing have minimum environmental impact.
- Use **cover crops** on areas prone to erosion.
- Use **minimum tillage and zero tillage** at some point in the rotation.
- Implement a **Nutrient Management Plan** that places emphasis on reducing use (i.e., inorganic inputs and using other substitutes).

Crop Health and Protection



Within an IFM system, IPM takes a holistic approach to crop protection, with various practices promoting soil carbon sequestration and reducing emissions. LEAF Farmers:

- Include **cover crops** in their cropping.
- Aim to cover land with **year-round vegetation**.
- Are aware of the loss in **product quantity and quality** which occurs during harvested product storage.
- **Improve transport efficiency** by considering the distance between silage storage sites and operational sites.

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Pollution Control and By-Product Management

IFM supports farmers in adopting a 'reduce, reuse, recycle' approach to managing and minimising waste and on-farm pollution. LEAF Farmers:



- Complete a **Pollution Risk Assessment** that identifies pollution risks and records steps to reduce/avoid the impact of all pollutant risks to the environment (including the air).
- **Reduce, reuse and recycle** where possible, participating in local recycling schemes.
- **Reuse their by-products** effectively, including collecting and storing dirty water and silage effluent safely, selling or swapping surplus manure or slurry, and using home produced compost and digestate.
- Actively consider ways to help **reduce GHG emissions** (carbon dioxide, methane, and nitrous oxide).
- Consider ways of **carbon sequestration**.
- Actively **source inorganic fertiliser** from low carbon manufacturing systems.
- **Improve their nitrogen use efficiency** to reduce nitrous oxide emissions.
- Consider ways of **minimising carbon dioxide emissions** from fuel use.

Animal Husbandry

Although farming systems that integrate livestock bring increased emissions, they also bring opportunity to upcycle carbon more effectively adding organic matter and improving soil condition. IFM additionally promotes consideration of the wider GHG emissions of bought in feed. LEAF Farmers:



- Implement an **Action Plan based on the Animal Feed Audit** including opportunities to reduce GHG emissions.
- Consider ways of **minimising methane emissions** from their livestock.
- Actively manage GHG emissions through **livestock feed rations and cropping options**.
- Consider reducing GHG emissions in **grazing management decisions**.
- Calculate **stocking rate** with regard for environmental requirements.
- Breed replacement stock from the **most optimal animals**.
- Plan housing and slurry stores to **minimise emissions and the distance** for slurry to travel.
- Manage **stocking densities** appropriately.
- Use **rotational/paddock grazing, managed intensive rotational grazing, and/or mob grazing** to optimise livestock and pasture performance.

Energy Efficiency

Being aware of the energy we use and how it influences emissions is essential to reducing our impact on the planet. LEAF Farmers:



- Complete an annual **Energy Audit** that records all source(s) of energy used and references both renewable and non-renewable energy.
- **Monitor their energy use** by recording energy consumption at least quarterly.
- **Record CO₂ emissions** based on either energy consumption records or the completion of a carbon foot-printing tool.
- Implement an **Energy Action Plan** that makes reference to and sets targets for reducing GHG emissions.

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Landscape and Nature Conservation

IFM supports a wide range of ecosystem services, all of which contribute to a healthy landscape and society. Our natural landscape offers simple and easy wins when it comes to carbon sequestration. LEAF Farmers:



- Complete a **Landscape and Nature Conservation Audit** including reference to semi-natural habitats (e.g., moorlands, wetlands, lowland heath, carbon sinks etc.) and linear features (e.g., hedgerows, fence lines, verges, field margins, ditches).
- Seek to **preserve and enhance carbon sinks**, maintain forests and areas of vegetation which naturally absorb CO₂.
- Seek to preserve the ability of the soil to **store carbon**.
- **Retain all in-field trees**.

Climate Positive Farming

Over the next 10 years, LEAF will continue to strengthen its Network of Demonstration Farms and Innovation Centres, creating a platform that supports **Beacons of Excellence** in farming, including Circular Agriculture farms, **Net Zero Carbon Farms** and Zero Plastic Waste Farms. Through **focusing on soil, water, air, and nature** we will look to understand better the levers for change and support farmers in addressing Net Zero Carbon, environmental enhancement, and the reduction of Greenhouse Gases and waste, including plastic. Creating a strong platform to drive cutting edge adoption of technology, innovation and management practices, **LEAF delivers Climate Positive Farming**.

LEAF Farmers are well positioned to be part of the solution to drive Climate Positive action through activities, events, and on-line engagement. We invite you to join us on our journey towards Climate Positive Farming. Our full ten-year (2021-2031) strategy can be accessed [here](#). For more information on the different focus areas of IFM, please see our **IFM Guide**, or the Simply Sustainable Series covering **Soil, Water, Biosecurity, Biodiversity, and Integrated Pest Management**.