



**Farm
Carbon
Toolkit**

Case study: West End Farm

Prepared by The Farm Carbon Toolkit

This report details the carbon footprinting work completed in September 2021 depicting the carbon footprint of West End Farm. The report shows the overall carbon balance of the farm, highlighting the emission areas and opportunities for increasing carbon sequestration. The report has been designed to illustrate the importance of whole farm footprinting ensuring that all carbon assets within the farming system are accounted for.

Introduction

To respond to climate change and help build resilience for future generations, all sectors of society are tasked to reduce greenhouse gas emissions. Understanding your footprint is a vital first step to gain a perspective on your environmental impacts and identify opportunities. This can help the resilience and profitability of the business because high carbon emissions tend to be linked to high use of resources and wastage.

This footprint was calculated using the [Farm Carbon Calculator](#), a tool that takes account of all of the activities which occur across a farm business. Useful resources to learn more:

- FCT's free toolkit for farmers: bit.ly/fct-toolkit
- Farm Carbon Calculator: bit.ly/fct-calc

The overall aim of this work has been to help calculate, understand and communicate the carbon footprint of its farming operation. This encompasses an understanding of the current emission profile of the farm and the carbon that is held within its natural assets. As well as the carbon report, detailed soil sampling has been undertaken to allow for an understanding of the current levels of carbon storage within the farm and the potential for additional carbon sequestration to offset the carbon emissions.

About West End Farm

West End Farm is a mixed farm with a 200 cow dairy unit, and beef and sheep enterprises. The farm occupies 420 acres, which encompasses upland areas, typified by rough grazing, land designated by a SSSI, and some lower land which has been improved as grassland. There are also some arable crops which have been grown on the farm over the last few years to feed the stock including oats, wholecrop wheat and triticale. The farm is supporting a diverse range of species alongside the farmed stock, with a particular emphasis on bird populations, notably supporting a large number of curlew nests and breeding sites. It is the mix of farming and habitat preservation that was the focus of this carbon case study. The farm's dairy enterprise is regularly footprinting as part of the milk contract, however it was important to understand the carbon impact of the whole farm; supporting multiple enterprises and

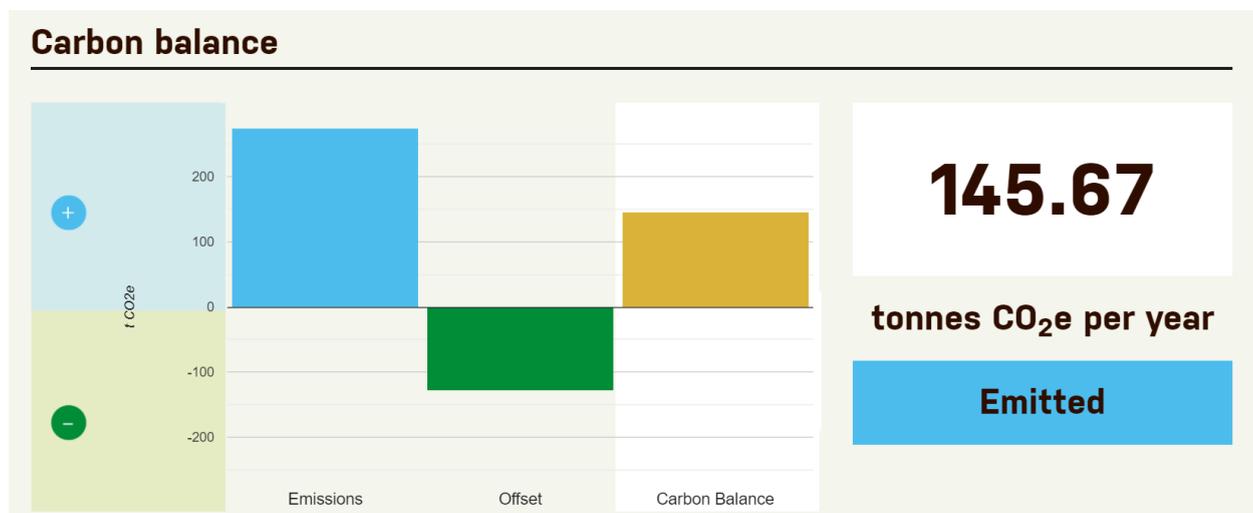
habitats. Supply chain carbon footprinting excludes these assets which are of critical value for carbon but also biodiversity.

Carbon Footprint

This report is broken down into sub sections that explain the current carbon position of the farm and the potential opportunities to reduce emissions and increase carbon sequestration. The report starts with the current carbon balance of the farm and then works through the main categories of emissions and then the opportunities with sequestration.

The carbon balance is calculated by totalling all sources of emissions and then deducting all sequestration and offsets from renewable energy and recycling. The carbon balance is the first key step to be able to understand what the current position of the farm is and the ‘size of the challenge’ to reach net zero. It is also the first opportunity to decide on the key management opportunities that can be used to reduce emissions and improve sequestration by evaluating the balance between the two.

For the modelling included within this case study, the dairy herd is excluded to highlight the importance of the blended approach.



Carbon balance	145.67 tonnes of CO ₂ e
Carbon balance per hectare	0.83 tonnes CO ₂ e per ha per year
Carbon balance per tonne	5.1 tonnes of CO ₂ e per tonne of product

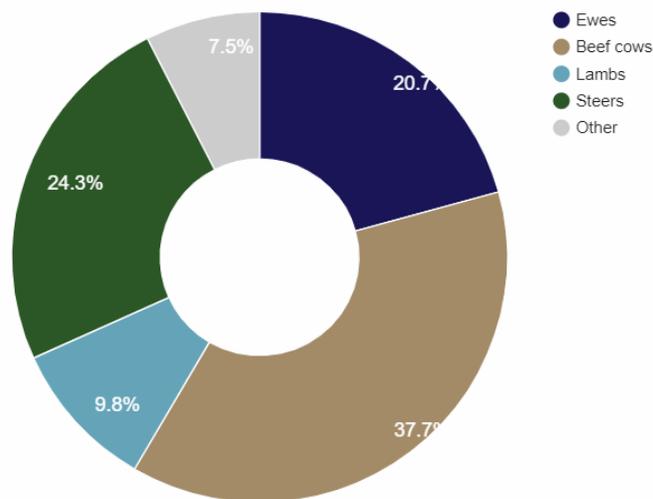
Current Carbon emissions and offsets at West End Farm broken down into broad categories

Emission	tonnes CO ₂ e	%	Sequestration	tonnes CO ₂ e	%
Fuels	30.41	11.09	Habitats	81.24	63.26
Materials	2.96	1.08	Hedgerows Woodlands	4.50 42.69	3.50 33.24
Crops	8.49	3.10	Total	128.43	100%
Inputs	18.30	6.68			
Livestock	213.94	78.05			
Total	274.10	100%			

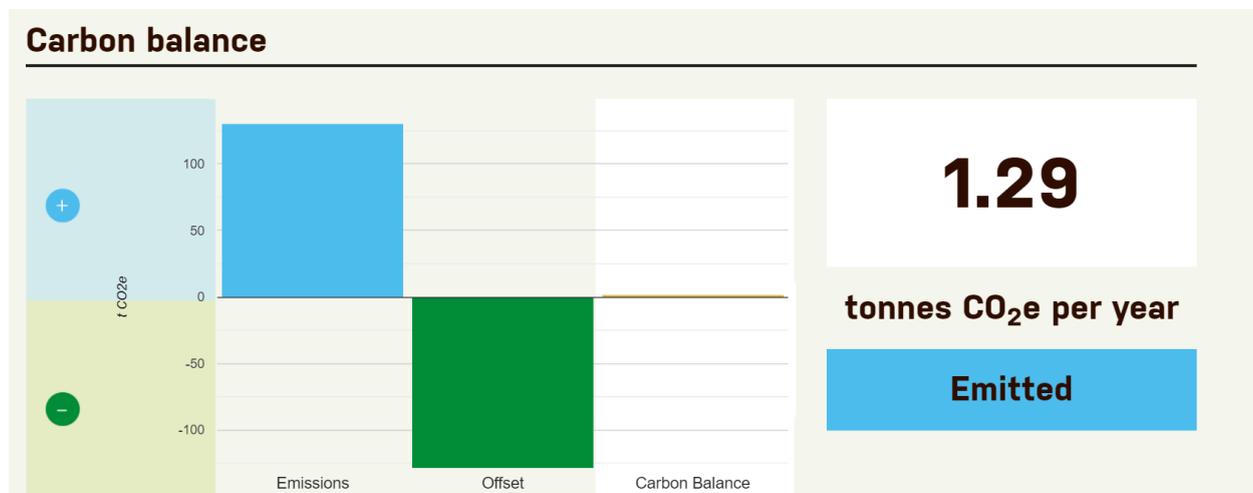
Emissions: Livestock

The livestock production contributes **213.94t CO₂e** each year which is **78.05%** of the total farm emissions, which includes 16t CO₂e produced from brought in feed.

Emissions from livestock originate from the stock themselves and then also the feed that they consume. Emissions have been calculated from the numbers and types of livestock which allow an understanding of the amount of methane that is produced, and the amount and type of manure.



Currently the calculator is using GWP100 to assess livestock emissions. The option to use the alternative metric of GWP* involves an assessment of the herd and flock numbers and whether these are growing in numbers, maintaining or decreasing. If the sizes of the sheep flock and beef herd are maintained at the current levels, then there is no additional methane being produced by the animals, as such, the new metric can be applied. Taking into account if the herd has been maintained a guide to the impact of this would be a reduction in the carbon footprint associated with the ruminants from a GWP100 result of 214 t CO₂e to **65 t CO₂e**. This is a reduction of **148t CO₂e**. This also transitions the farm from being a net emitter to very close to net zero.



Carbon Sequestration

Sequestration	tonnes CO ₂ e	%
Habitats	81.24	63.26
Hedgerows	4.50	3.50
Woodland	42.69	33.24
Total		100%

The main sequestration asset on the farm is currently the habitats. The habitats comprise areas of permanent pasture and areas that are managed to support bird populations, especially curlews. These habitats are also used for grazing, which is done sensitively to support biodiversity. However a key aspect of the farm management is to also provide these habitats within the improved ground. It can prove challenging from a management perspective, but the farm is seeing the benefits in terms of developing an integrated system.

As well as the habitats and moorland, the farm also has 20 acres of woodland and 1000m of hedgerows which are contributing to the sequestration total.

Soil Carbon Sequestration

The current footprint does not include soil carbon sequestration within it as there is no previous testing to accurately model the increase in organic matter for each of the fields tested.

However by understanding the management practices undertaken on the farm, it is possible to model a conservative improvement in soil carbon on the improved ground. Practices undertaken on the improved land include pasture rejuvenation, grazing management and diversifying the crop rotation as well as looking at fertiliser type and application rate to build soil health.

Across the 20 acres of improved ground on the farm, a 0.05% increase in soil organic matter would generate an additional 30t CO₂e through soil sequestration. When this is added to the existing habitats and woodland, it increases the sequestration taking place on the farm to **159t CO₂e**.

Emissions reductions

The improvement in grassland management and forage quality has also led to a reduction in the amount of bought in feed required for the stock. Traditionally the beef would have been supplemented with a larger amount of feed, however this has now reduced to a small amount of barley to finish. The reduction has generated a carbon saving of **14 t CO₂e** to finish the same number of cattle and also provides financial benefits. Within the sheep flock, concentrate feed was eliminated this year again providing carbon (on average **8t CO₂e**) and cost savings.

Future plans and next steps

It is important to understand the wider benefits that are taking place on farm alongside the main enterprise. The practices that are taking place at West End Farm are providing a sequestration benefit (through protection of habitats and safeguarding biodiversity) whilst at the same time supporting a diverse farming business. Through pasture improvement and diversifying rotations the farm has been able to improve resilience and build soil health alongside achieving economic savings through improved forage quality leading to a reduction in inputs. He is keen to showcase the opportunities that exist in integrating farming and environment together, *“rather than segregating out environmental land and intensive farmland, there is a middle ground where you can do both. It also provides multiple benefits, sustaining good soil health, economic production and biodiversity.”*

