



## Auchinbay Farm



Part of Scotland's  
Rural College (SRUC)

# Farm Carbon Storage Network

Through the establishment of a Farm Carbon Storage Network, this project seeks to raise awareness of the value of carbon stored on farms. Funded by the Scottish Government's Knowledge Transfer and Innovation Fund (KTIF), five farms were selected to participate in the first phase of the project.

### Why do the project?

Farmers are increasingly aware of their need to help tackle the climate crisis, through a combination of reducing greenhouse gas (GHG) emissions and increasing sequestration of carbon dioxide on farms. A farm's soils, trees and hedges act as a carbon sink, which can be difficult to quantify, however, technology can help us improve the accuracy of these estimated carbon stocks.

This project quantifies the value of these natural assets in terms of their carbon storage, establishing a baseline for future monitoring. The carbon stock on each representative farm was estimated by combining soil testing and LiDAR (Light Detection and Ranging) aerial surveys.

The network data delivers a better understanding of the impact and importance of certain farm habitats, identifying management strategies that could be employed to enhance them.

### Auchinbay Farm

Auchinbay Farm, managed by Davie and Gillian Morton, was the dairy farm selected for the farm carbon storage network project. Located in east Ayrshire, the farm produces premium milk under the brand 'Morton's Milk'.

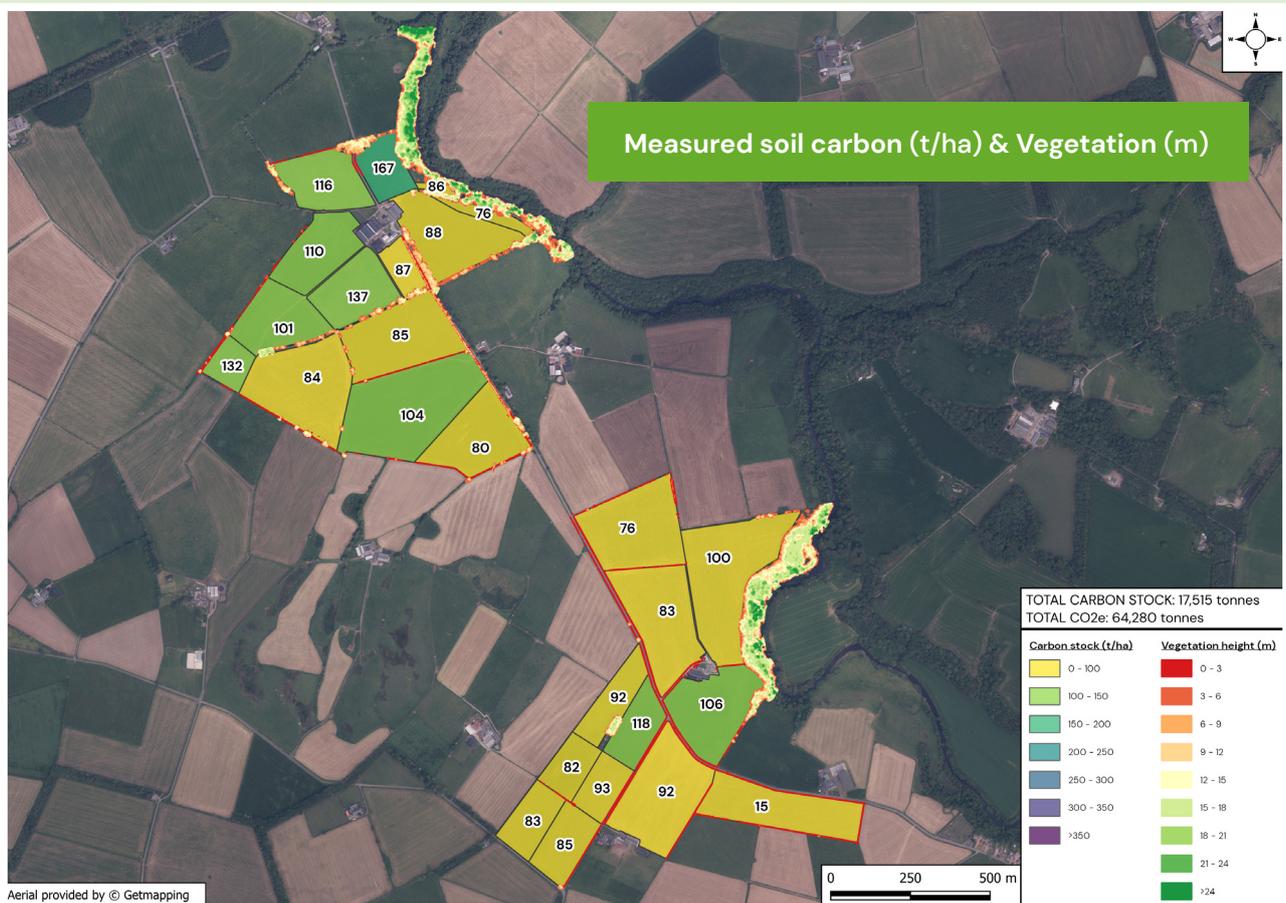
Located in one of Scotland's prime dairy regions, the farm consists of improved grassland with a mixture of grazing and silage fields. The farm boasts extensive hedgerows and mature riparian woodland habitats.

## Carbon storage

At Auchinbay, the project looked at quantifying the carbon stored within the topsoil and above-ground biomass in trees and hedges on the farm. These numbers are estimates, based on a snapshot of the carbon that was stored on the farm at the time of surveying.

It is important to note that there is a difference between carbon stored and carbon sequestration. **Carbon stored** is the carbon that is locked away in the soils, trees, and hedges at the moment of sampling, whereas **carbon sequestration** is the carbon that is actively being taken out of the atmosphere and stored in the farm's soils, trees, and hedges.

Carbon stored on site does not influence the estimated GHG emissions from the carbon footprint of the farm businesses. However, continuous monitoring can help to identify accurate sequestration across farms when action is taken to increase carbon stocks.



### Trees and hedges

The majority of trees on site are located in two riparian zones along the edges of the farm and consist of predominantly mature native woodland. There are additional rows of trees spread across field boundaries consisting of broadleaves, along with the occasional Conifer. There is no active management of the woodlands on the farm.

There is an extensive hedge network across the farm of varying ages and condition, ranging from 40+ years to 27-year-old hedge planting. The hedges vary in quality from monoculture broken beech hedges to diverse natural hedges including mature trees.

The total carbon that is stored in the above ground biomass was estimated to be 6,281 tonnes (tC).

### Soils

The soils on farm are managed to produce productive grassland for grazing and silage. Swards are reseeded on a regular basis and rotational grazing has been introduced in some fields since 2017.

Soil sample results highlighted an interesting variation in the soil carbon stored in the fields that have been recently reseeded versus the longer-term grass leys, suggesting that the longer leys stored more carbon.

The total carbon stored in the soils at the time of sampling was estimated to be 11,235 tonnes (tC).

#### Total Tree Carbon Stock



6,184.3

Carbon stock tonnes (tC)

#### Total Hedgerow Carbon Stock



96.2

Carbon stock tonnes (tC)

#### Total Soil Carbon Stock



11,234.5

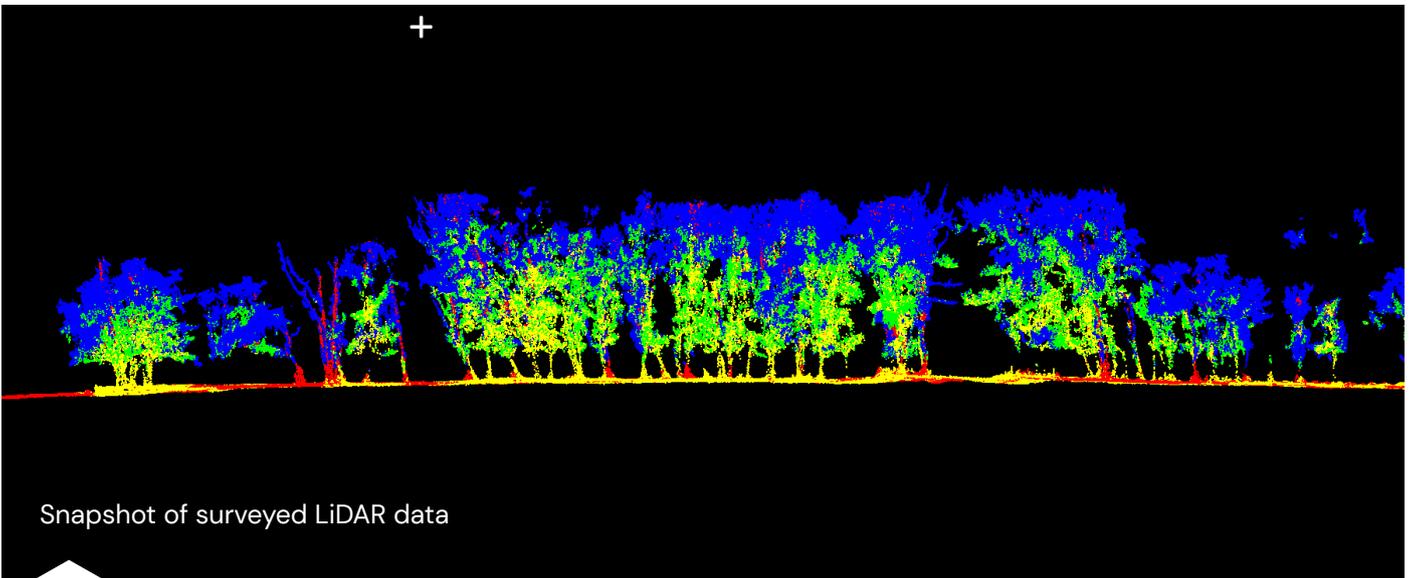
Carbon stock tonnes (tC)

#### Total Farm Carbon Stock



17,515.0

Carbon stock tonnes (tC)



Snapshot of surveyed LiDAR data

## Recommendations

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### Trees and hedges

*To enhance and increase the above ground biomass of the trees on the farm there are a few different options:*

**Rejuvenate/expand hedges:** Some of the hedges at Auchinbay farm are of an old age and would benefit from rejuvenation or gap filling. This would help to ensure the hedges provide a sufficient field boundary and support shelter and shade for livestock. Filling hedge gaps with a diverse planting selection alongside extending the hedge network could help to create habitat bridges linking the mature riparian woodlands with the rest of the farm.

**Incorporate trees within fields:** There is potential to expand on tree planting within fields by including trees in rejuvenated hedge networks or by creating shelter belts on more exposed parts of the farm. This would provide shelter and shade for livestock while having minimal impact on grassland productivity and delivering health benefits to cattle.

**New tree planting or Agroforestry system:** There are small sections of Auchinbay farm that are quite unproductive for agriculture. These areas could be used for new woodland creation or agroforestry. New planting of native hardwoods for production of firewood and agroforestry could provide a small additional source of income in the future while protecting the grazing potential of the area.



### Soils

*To improve soil carbon the following options could be implemented:*

**Rotational grazing:** The cattle at Auchinbay farm are already rotationally grazed on some of the fields however there is room to expand on this management practice. Rotational grazing can help to stimulate root growth which in turn can help to improve soil quality and soil organic carbon. Rotationally grazing can also increase the efficiency of grass growth across the farm and so reducing the need for bought in feed.

**Multi species sward:** Soil sample results at Auchinbay farm suggest a link between reseeding and lower soil organic carbon. This is likely due to the release of carbon dioxide when the field is ploughed. This reduction will likely be temporary and as the sward grows the soil carbon stocks will recover. Incorporating a multi species sward would likely increase the potential soil organic carbon that could be stored in the soil while also improving grass growth and resilience to climate change.