



Kilkenneth Croft



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.

Kilkenneth Croft

Kilkenneth Croft run by Morven and Archie MacArthur, is located on the western coast of Tiree, producing beef cows and sheep. The croft ranges over 96 ha and has a significant proportion of machair, a vital habitat for biodiversity on the west coast of Scotland. Due to the harsh climate, there is minimal tree and hedge growth on the island, none were present on Kilkenneth.

Carbon storage

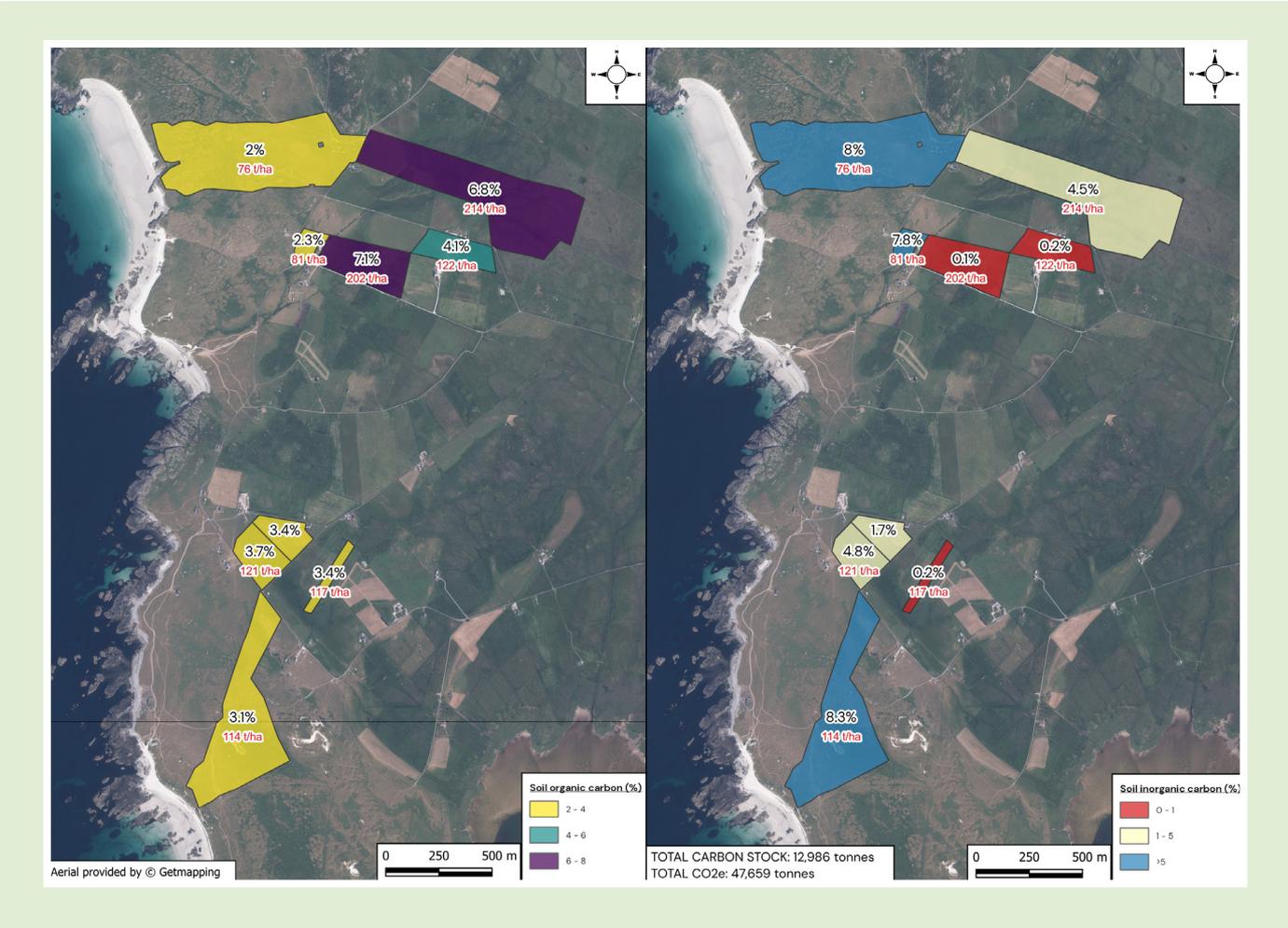
At Kilkenneth, the project looked at quantifying the carbon stored within the topsoil and above-ground biomass in trees and hedges on the croft. These numbers are estimates, based on a snapshot of the carbon that was stored at the time of surveying.

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 croft's soils, trees, and hedges.

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



Breakdown of % soil organic and inorganic carbon (carbon per hectare in red)



Trees and hedges

There were no trees or hedges present on Kilkenneth croft however, there was extensive Marram Grass on the machair. The calculation of carbon stored in Marram Grass was not possible using the current model.

Soils

The soils at Kilkenneth Croft varied considerably from the machair on the coast to the more intensively managed fields further inland. The soil on the machair was sandy with little organic matter whereas some of the fields further inland were considerably peaty. This resulted in significant variation between soil organic carbon and soil inorganic carbon.

Results taken from the machair soil contained considerable amounts of inorganic carbon. Unlike organic carbon, inorganic carbon is extremely stable and cannot be lost as easily when exposed to the atmosphere through intrusive farming practices such as ploughing. While it is easier to increase soil organic carbon, it is extremely difficult to improve soil inorganic carbon stocks. Although soil carbon in the machair was predominantly inorganic carbon, organic carbon storage was not insignificant.

The total carbon stored in the soils at the time of sampling was estimated to be 12,986 tonnes (tC).

Total Tree Carbon Stock



0

Carbon stock tonnes (tC)

Total Hedgerow Carbon Stock



0

Carbon stock tonnes (tC)

Total Soil Carbon Stock



12,985.9

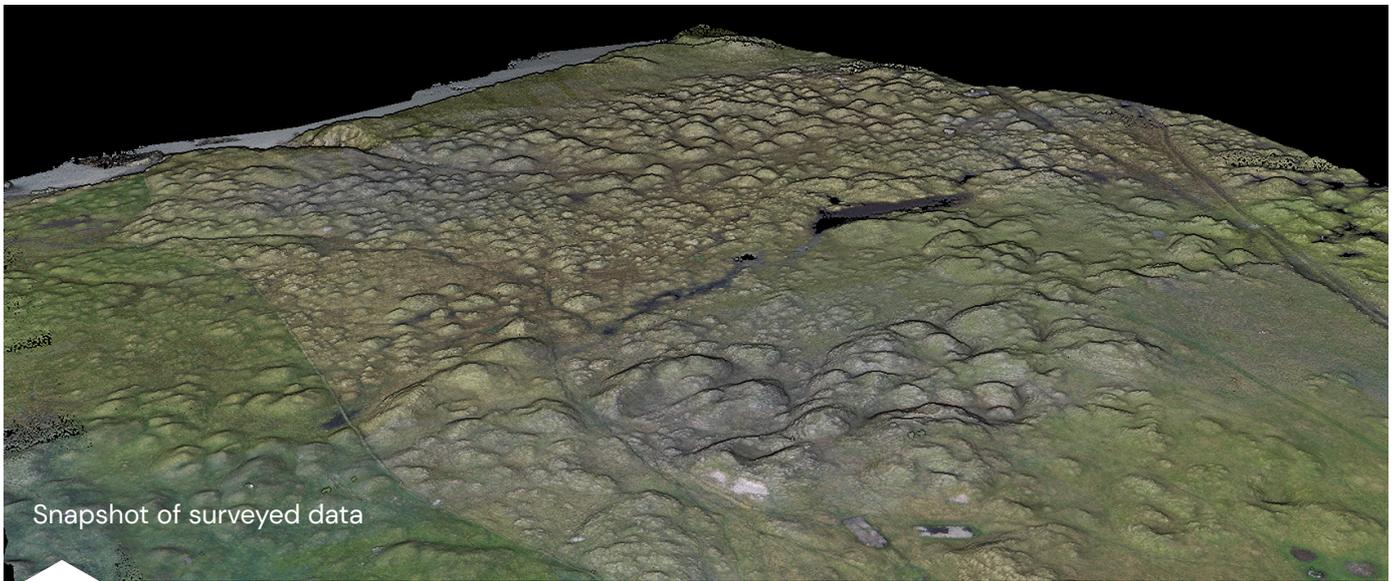
Carbon stock tonnes (tC)

Total Farm Carbon Stock



12,985.9

Carbon stock tonnes (tC)



Recommendations



Soils

To improve soil carbon the following options could be implemented:

Protection of soil: The machair habitat is renowned for its biodiversity and the benefits it brings in the form of overwintering habitat for livestock. The continued management of this habitat in this manner will help to protect the soil carbon stored within the machair. There is also potential to increase soil organic carbon through utilisation of technology such as virtual fencing.

Rotational grazing: Rotational grazing could bring about multiple benefits to Kilkenneth Croft and is actively being pursued as a management practice to take forward. This approach could help to deliver improved grass productivity while in turn stimulating root growth to the benefit of soil organic carbon.

Multi species sward: Much of the grass at Kilkenneth is natural and already multispecies, however rejuvenating the sward with a diverse mix could help to improve productivity and increase soil organic carbon. This would also have the added benefit of improving the biodiversity of the sward overall.