



Farm
Carbon
Toolkit

Annual review 2022

Foreword

The Farm Carbon Toolkit (FCT) was created by farmers for farmers and remains so today. In 2011, farmers Adam Twine and Jonathan Smith could see that farmers would need a way to be able to measure the carbon footprint of their farms to enable them to understand where to concentrate to reduce emissions of greenhouse gases (GHGs). To do this they created one of the first farm carbon calculators in the world. Today over a decade later we are proud of our calculator, a leader in its field in the UK and beyond, which we provide free for farmers.

We understood that farmers and growers would need to be able to develop a new vocabulary and learn new skills in the world which we are moving into, where reducing emissions and maximising carbon removal will be key alongside reversing the decline in nature. To respond to this, we have an advisory team who work alongside farmers and growers to inspire change at grass roots.

Since 2018, the global imperative to take action to limit the most extreme impacts of climate change has come to the fore and with it the interest in being able to measure and reduce agriculture's impact on climate change. This has seen the work of FCT expand rapidly with a major upgrade of our calculator that will enable farmers to bring data into the calculator from other data sources when it is launched in the near future. Our advisory team has also expanded and is working with farmers, processors, researchers and new technology providers to support the transition to a net zero biodiverse agrifood future.

This review celebrates the work and the impact we have had in 2022, I hope you enjoy reading it.



David Gardner
chair



Introduction



This is my first annual review as CEO of FCT and I could not be more delighted to be leading the organisation's strategy for growth and financial resilience as we continue to establish ourselves as the 'go-to' independent, trusted experts on farm and soil carbon.

We are investigating the addition of advisory and verification services; this will entail the broadening of our provision to agrifood businesses to assist them in reducing emissions and increasing carbon storage/removals within a nature friendly environment. This will include advisory and verification services to respond to the growing need for evidence of the veracity of data entered into the Farm Carbon Calculator and to enable greater carbon literacy across the sector.

Over the past year we have grown and brought in two new soil and carbon advisors alongside a data analyst and a new member of the Farm Carbon Calculator team as well as increasing our organisation's ability to share our activity more widely. Demand for our services has never been greater with ever increasing interest in farm carbon footprinting from across the sector as well as demand for on farm advice where our team truly have their 'boots on the ground'.

We are a Community Interest Company and are very proud to provide the Farm Carbon Calculator for free to farmers wishing to calculate their footprint. We also run two industry competitions; Soil Farmer of the Year (now in its eighth year) and the newly launched Carbon Farmer of the Year. These showcase those businesses going above and beyond to improve soil health, reduce emissions and remove carbon from the atmosphere.

As a leading organisation supporting a just, fair and nature based decarbonisation of our food system, we provide the Farm Carbon Calculator to other advisors to help them in their consultancy work with farmers as well as providing bespoke 'white label' calculators to businesses wishing to be able to manage the data from their suppliers/members/clients. Over the next 12 months we are working with industry partners to make it easier for the necessary data to be loaded onto the calculator to reduce the time commitment for data entry. We are involved in developing a number of new partnerships to ensure that the impact of our work is maximised.

Thank you for taking the time to read our review and please do get in touch if you want to find out more.

Liz Bowles
chief executive

Farm Carbon Toolkit

Our vision

A farming sector which is minimising GHG emissions and improving sequestration and natural capital through implementing practices that enhance soil health, safeguard resource use, support nature, improve energy resilience and produce nutrient dense food. Farmers feel empowered to share knowledge (with and outside the industry) on the positive changes that have been achieved and are involved in setting the agenda for research, technology and innovation which will allow them to evolve and thrive.

Our mission

FCT is a trusted advisor to the farming industry and beyond for carbon farming and nature friendly farming. Our Farm Carbon Calculator is recognised as a leading industry calculator trusted and used by actors across the UK Supply Chain and beyond. We provide the industry with clear and practical advice on emissions reductions and carbon removal strategies whilst empowering a thriving food and farming industry.

Our approach

Purpose

- To support on-farm resource efficiency and thriving farm businesses
- To provide independent thought leadership
- To link science and farming
- To create collaboration along supply chains

Principles

- For farmers, by farmers
- Committed to reducing agriculture's footprint
- Impact led
- Not for profit

How we work

- We empower farmers
- We build resilient communities
- We measure change
- We provide practical help and resources for farmers

It all starts with the soil

Soil underpins the entire farm system. Healthy, well-managed soils support productive and healthy crops and pasture, which in turn supports a profitable and resilient farming system. A soil that accumulates organic matter will be sequestering carbon, improving fertility and water holding capacity and providing for increased productivity.

Carrying out soil sampling and analysis is a vital way to understand soil health and identify areas that may require action.

As an organisation we pioneered the development of soil sampling and analysis to underpin soil carbon baselining with our groundbreaking soil carbon project which enabled us to track the change in soil health and carbon storage over five years on 120 farms alongside tracking farming practices. We now have one of the largest datasets on soil health linked to farming practice in the UK and are starting to interrogate the data to understand the impact of farming practice on soil carbon storage at different depths in soil, something on which relatively little is currently known.



We work with farmers, estates, supply chains, national parks, local authorities, AONBs and others to baseline soil carbon and soil health. This helps farmers to understand the challenges and opportunities they face in transitioning to a nature based decarbonisation. We work with key partners to support the implementation of estate wide net zero plans, assisting farmers and growers to adopt those climate and nature friendly farming practices which are of most relevance for them.

FCT is truly unique. Their vision to explore farm GHG emissions at the time they did demonstrated amazing perception of the spotlight that food and farming would come under. Their team truly understands the link between farm emissions and the opportunities to abate these emissions at farm-level.

Gerard Hayes,
technical director,
Yeo Valley Farms Ltd

Highlights 2022

January

Work with Portsmouth Water looking at soil mineral nitrogen testing and its impact on carbon footprint



February

Spring calculator updates included: 150 emissions factors; new farm nitrogen balance tool; breakdown of emissions by Scope and GHG



March

Awarded project (with Foundation for Common Land) to develop a calculator that works on uplands and across common lands

April

7,000th user of the Farm Carbon Calculator registered



May

Farm Net Zero release videos demonstrating the great strides being made towards net zero in Cornwall



June

Soil Farmer of the Year winners announced: Billy Lewis, David Miller and Andrew Rees



July

Awarded an Innovate UK Smart grant (with Carbon Connect consortium) and Tesco/WWF Innovation Connections funding to develop Farm Carbon Calculator version 2.0



August

Soil Farmer of the Year walks showcase their excellent soil management practices



September

Farm Net Zero conference embraces community empowerment



October

Autumn roadshows for First Milk members in Scotland and the north of England supporting a nature based transition



November

Development of curriculum for agricultural colleges on farm carbon footprinting and emissions reduction strategies

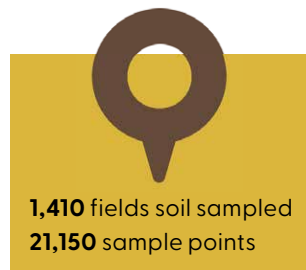


December

Awarded 'Nitrogen efficient plants for climate smart arable cropping systems' funding from Innovate UK in consortium led by PGRO



Outreach 2022



Every week we run online training courses



100,000+ visitors to our websites



Every month we deliver at least 6 farmer/farm advisor training sessions



Nurturing: new training modules on carbon for undergraduates

Over 3,700 people directly trained by FCT



Farmer training

Farming with climate change in mind requires a new approach, so we explain the fundamentals of on-farm carbon management in a way which is practical, robust and informative. There are so many opportunities for farmers to build resilience, deliver meaningful change and improve performance and carbon simply provides a different lens to evaluate business efficiency.

Courses are farmer focused and shaped to deliver learning outcomes. We understand the subject can be complex so spend time listening to questions and concerns that farmers have. We also frame the topic in a practical way and focus on solutions rather than issues.

Courses range from overviews of managing whole farm carbon to technical sessions on measuring soil carbon or planning agroforestry design. We are delighted to work with a range of organisations to deliver training that meets farmer's needs and suggests locally relevant solutions.

The Farm Carbon Calculator

2022 was a year of big changes, making the calculator even better for supporting farmers and growers in the transition to low carbon farming. In May, improvements in visual design, updated emissions factors, methodologies, and a new nitrogen tool were delivered. Another upgrade of emissions factors will be released in spring 2023.

We received major investment through Innovate UK and Tesco/WWF Innovation funding, supporting an upgrade which will be launched in late summer 2023. A major new feature will be an API enabling reduced data inputting for users through integration with other data sources.

The number of users grows constantly, registering many thousands now, and the calculator is consistently rated as user friendly, comprehensive and accessible. As calculating carbon footprints becomes ever more important in the food and farming sector, we are well placed to help farmers and growers measure and understand carbon in their businesses.

The agrifood sector

We work with supply chain businesses that process and supply food into retail and food services. We report on emissions as the raw materials enter further processing. Increasingly this will involve integration with end users own data platforms, allowing for emissions calculations to be measured in real time.

Our work with Mercian Ltd (the UK's largest supplier of crisping potatoes to the UK industry) started in 2021, when we developed a 'white label' calculator which enables them to provide GHG emissions for every load of potatoes delivered for crisping. In 2022 we worked with Mercian on interoperability, reducing the need for time consuming data entry for growers and enabling real time information on emissions to be sent to their customers.

Supporting grass roots transition

The foundation of our work is built on engagement with farmers and growers as we know that this achieves the greatest impact! Through working with our partners and the fantastic farmers who are truly leading the way across the UK and beyond, we are both educating and being educated – we then disseminate our findings to succeed in maximum farmer uptake.

We are working to normalise the dialogue around reducing emissions on farms and in food supply chains, by turning it into something that is understandable, practical and of significant relevance. When we do this we see effective changes on farm whilst at the same time supporting farming businesses to remain profitable and resilient.

Farmers and growers increasingly look to us for information and solutions regarding their carbon footprint, so our partnership with FCT, where we're certain of the integrity of the information, is crucial. FCT's independence, support and training aligns very much with our own principles.

Nick Shorter,
managing director,
Velcourt

Becky from FCT was fantastic, her enthusiasm was infectious, she was an amazing trainer – engaging, passionate, exceptionally understandable – probably one of the best trainers I have ever seen!

Attendee at an
FCT training event



Farm Net Zero



FCT is a member of a consortium alongside Duchy College, Westcountry Rivers Trust, Innovation for Agriculture, and Innovative Farmers, delivering Farm Net Zero (FNZ) in Cornwall. It is the first Community Action Fund project funded by the National Lottery working within the farming community.



43 Cornish farmers are at the heart of the FNZ project with partners working with them to reduce greenhouse gas emissions and improve soil health. FNZ is led by these farmers. The consortium deliver events, workshops, training and trials focused on specific areas highlighted by the community to increase business resilience through reducing emissions and enhancing business sustainability. We have delivered events spanning paddock grazing to dung beetles and to engaging with local gardeners to share learnings on how to improve soil health.



The FNZ project team have sampled over 200 fields and completed more than 50 farm carbon footprints. This work will be repeated in 2023 to understand the impact of the community network on soil health, soil carbon and reducing greenhouse gas emissions on farm.

Lamb Weston

Lamb Weston is one of the world's largest processors of potato products, operationally based in Holland, the business' plant located in Lincolnshire has contracted suppliers throughout the UK. A project between Lamb Weston, Farm Carbon Toolkit and one of their UK suppliers, EC Drummond in Herefordshire was developed to review the sustainability of potato production strategies, utilising carbon as a metric; designed to carbon footprint individual fields under differing management strategies for cultivation, pesticide and fertiliser use to determine the emissions dynamics and consequent impact on crop performance.

For potato production the carbon balance per field is likely the least useful statistic as field sizes are variable and may contain multiple varieties. Consequently, carbon balance per hectare and per tonne provide much more useful metrics to provide a current baseline position and develop future benchmarking; providing a comparable metric that can be tracked over time and compared to other growers as key measures of sustainability and resource efficiency.

The project utilised three fields already within the contracted supply chain and as such were subject to multiple variables such as variety choice in addition to management strategy.

When the fields were carbon footprinted, yield made a significant impact on the resulting emission metrics – the highest yielding field (Rock Hill) had the highest emissions on a land use area (per hectare) basis but a comparable footprint on a production basis (emission per tonne) to that of the regeneratively managed field (Orchard Field) with reduced pesticide, irrigation and fuel use.

This project focused on the emissions associated with the production of potatoes rather than a 'whole-farm' approach where potential natural capital and sequestration would be accounted for. This was determined so as to be reflective of the wider national system where land is often rented by growers and there would be no available offsetting opportunities or influence on prior soil management as to build inherent resilience to aid growing conditions. Consequently, emission reduction and optimising growing conditions within the cropping system will be key to ensuring the future sustainability of ongoing potato production.

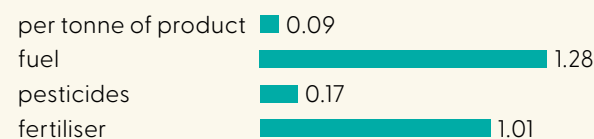
Understanding the intricacies of potato production from a carbon perspective is novel, over time processes will be further refined and the metrics better understood. The project provided a baseline and thus vital insight into the dynamics of emissions arising from different management practices upon the carbon footprint of both the individual field and the product produced.

The three fields

The control

Rock Hill potato variety **maris piper**

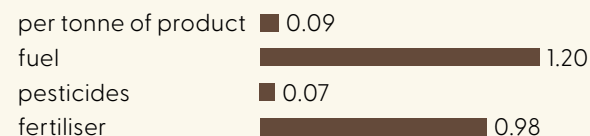
Total tonnes of CO₂ emissions per hectare/year = **4.83**



Reduced pesticide application

Orchard Field potato variety **maris piper**

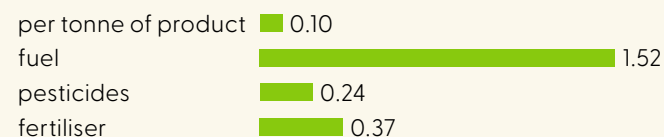
Total tonnes of CO₂ emissions per hectare/year = **4.32**



Reduced fertiliser application

Court Field potato variety **innovator**

Total tonnes of CO₂ emissions per hectare/year = **4.10**



Soil Farmer of the Year winners

Since 2015, our Soil Farmer of the Year competition has helped to find, promote and champion UK farmers who are passionate about safeguarding their soils and building resilient businesses. 2022 was no different, with the largest ever field of entries and over 200 farm businesses attending the farm walks on the winners' farms.

Our 2022 winners were Billy Lewis (right) from Boycefield Farm in Herefordshire in the mixed farm category; David Miller from W heatsheaf Farming, Folly Farm in Hampshire in the arable category; and Andrew Rees, a dairy farmer from Moor Farm in Haverford West, our competition runner up. What these three have in common is that they are all excited by trying out new ideas on their farms with a focus on introducing diversity in everything they do.

Billy Lewis, Herefordshire

Over the past five years, soil management at Billy Lewis's mixed farm has changed radically to a direct drilling regime with living mulches and catch/ cover cropping alongside integrating livestock into the arable system. The grazing platform has developed from a field-by-field rotational grazing system to a high-impact, long recovery mob grazing approach; transitioning from monoculture grass leys into diverse leys. Maximising diversity is the key to success with the practice changes reducing the requirement for artificial inputs and improving the bottom line.



David Miller, Hampshire

David Miller (left) also places managing diversity at the heart of his farming practice, with a simple but profitable regenerative arable farming system with no livestock. Farming this way for the past seven years has certainly paid off with fuel usage down by over 40%, through a focus on four of the pillars of regenerative farming – keeping soil covered, diversifying the rotation, maintaining living roots and minimising soil movement.

Andrew Rees, Haverfordwest

Andrew Rees (below left, leading a farm walk), a grass based dairy farmer has soil health at the centre of his system. Over the past five years he has transformed his business from high input- high output to a holistic model incorporating a rotational grazing system with diverse species-rich swards to provide year-round nutrient dense, high-quality forage for his herd. The transformation of his grazing and conservation platform has seen fertiliser usage down across the farm by some 140 kg/ha alongside improved herd health.



Soil Farmer of the Year is run by FCT in association with Innovation for Agriculture with sponsorship in 2022 and 2023 from Cotswold Seeds and Hutchinsons. We are excited to see the next round of inspiring entries! Thank you to all who help us to make this competition a success.

Duchy of Cornwall

FCT has been working with the Duchy of Cornwall over the past two years to help support their tenants to baseline, understand and reduce greenhouse gas emissions and improve soil health across the estate.

What did we do?

Engaged with tenants to discuss any worries or concerns they might have and ensure that the project started effectively. For many farmers carbon can be seen as something which is far removed from day-to-day farming practices and may impact negatively on their business, causing understandable concern. Our advisors are skilful at myth busting and framing conversations to engage and empower farmers to make a positive difference on their farms.

Baselined existing position: Soil samples were taken to assess soil health and carbon stocks across the farm as well as baseline carbon footprints. The baseline was fundamental to engage tenants on how carbon impacts on their farm are critical. Emissions and sequestration data was collected to input into our Farm Carbon Calculator. For each farm, a footprint report was produced that demonstrated the overall carbon balance of the farm, calculating the source of GHG emissions and sequestration.



Explanation of the results and a net zero plan provided: Our advisors visited every farm to discuss the footprint allowing farmers the space and opportunity to discuss and understand the baseline position of their business and decide on the key management opportunities to reduce emissions and improve sequestration. Our advisors' extensive carbon and farming knowledge was critical to building trust with the tenants and to enable realistic assessment of the practicality of change implementation for the tenant.

As a result of the project, tenants reported an uplift in their knowledge through discussion with the FCT advisors and are now looking at the potential next steps highlighted to reduce emissions/ boost carbon removals. In some cases, they have adopted new farming practices which will reduce their emissions and increase carbon removals into soils and non-crop biomass, helping the estate as a whole to meet its decarbonisation targets.

What next?

Linking across the industry

FCT has always worked directly with the farming community, but now we are linking up with other agricultural professionals including vets, agronomist and nutritionists, helping them to understand how changes to their advice may impact farm carbon footprints.

Talking to the next generation

In partnership with Duchy College and Reaseheath College we have developed modules and bespoke lectures on carbon literacy and regenerative farming practices to feed into traditional training material. It is wonderful to be able to share with future farmers the huge role that agriculture has as a key part of the solution to the climate crisis.

New partnerships

FCT and Wilder Carbon have teamed up to launch a service for farmers which will enable them to develop optimum integration of Nature Based Solutions (NBS) and agriculture to achieve multiple benefits for their businesses and the public good. We have also been selected as the Prince's Countryside Fund's Carbon Clarity project advisor, this new project provides a holistic approach to carbon management on farms

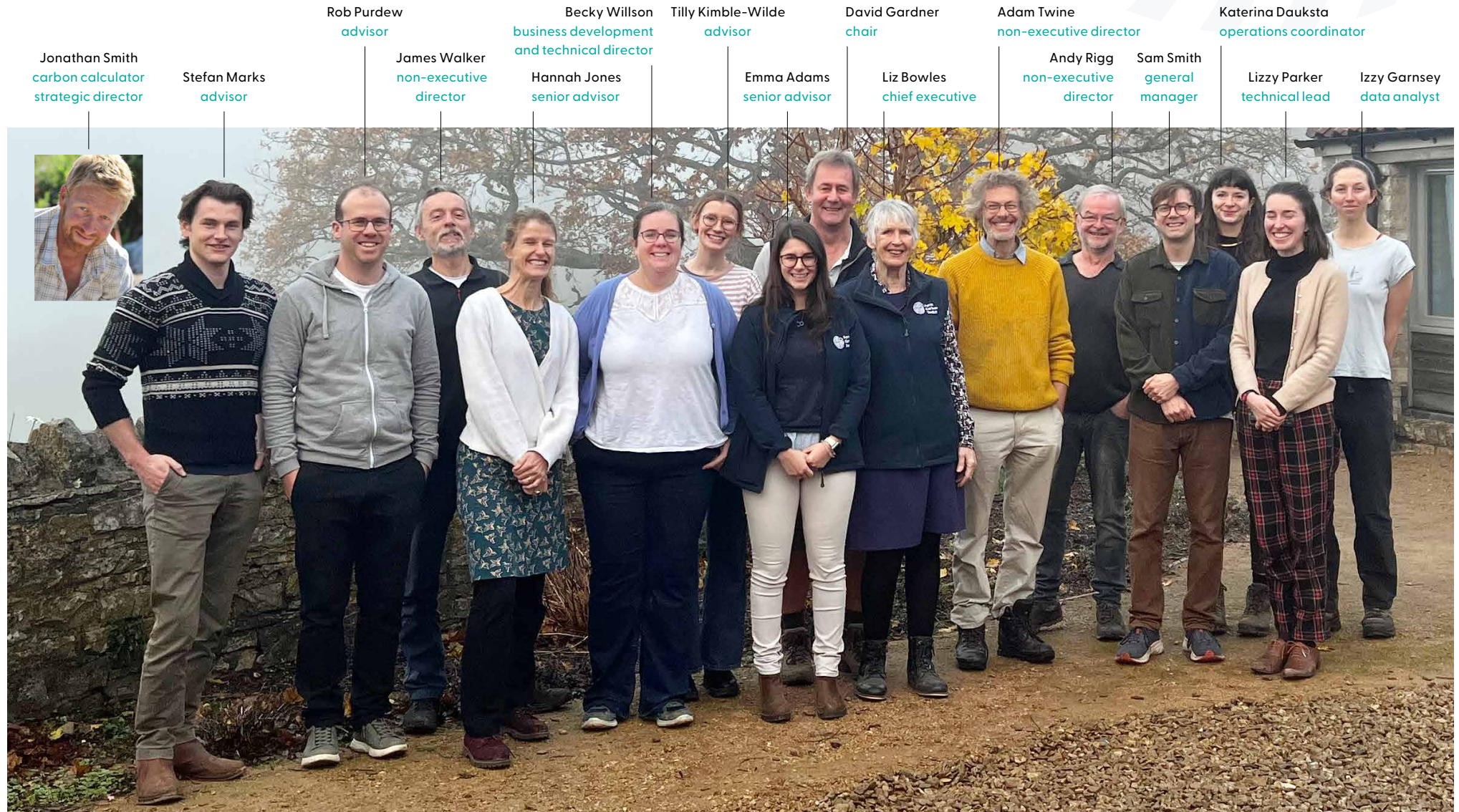
Carbon Farmer of the Year

In 2023, FCT will be launching Carbon Farmer of the Year. The competition is built to recognise and champion farmers, sector organisations and businesses who are leading the way in adopting farming practices and developing new technologies that are helping to reduce farm emissions while optimising output. Judging will take place over the summer with winners announced at the first FCT conference in September.

The Prince's Countryside Fund has been delighted to work with FCT over the past year to deliver our new programme, Carbon Clarity, in partnership with Morrisons. A new area of work for The Prince's Countryside Fund, we were very conscious of delivering the right information, in the right way, for our farmers, and FCT's Becky Willson has been instrumental in its success. Over 8 in 10 attendees said they were likely or very likely to recommend Carbon Clarity to other farmers – with many participants feeding back how engaging and informative the session was. It's been a joy to work with Becky on the programme, and we are so excited to see what the future holds.

Rebecca Hadaway,
corporate partnerships
manager, Prince's
Countryside Fund

Who we are

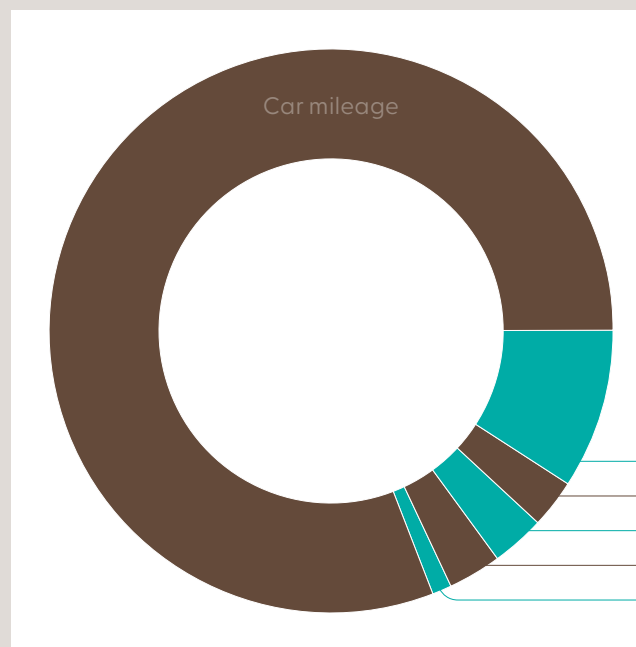


Our carbon footprint

Backed by a clear scientific consensus, businesses and citizens everywhere are tasked to rapidly decarbonise. Those that are able to move faster and go further should do so – and at FCT, we want to lead by example. As such, we are working on how we can get to being carbon neutral (2030) and then negative by 2035. Furthermore, we want to achieve this without resorting to purchasing carbon offsets.

As a remote-working organisation our opportunities to decarbonise are relatively straightforward. Our 2021/22 GHG inventory showed that the largest part of our footprint is associated with car mileage (81%). Reducing the number of journeys would help but in many of our projects, the farm visits are considered invaluable to helping farmers with their carbon reduction journey. Hence, from 2023/24, we intend to start a journey to invest in the leasing of electric vehicles, powered on renewable tariffs, for staff.

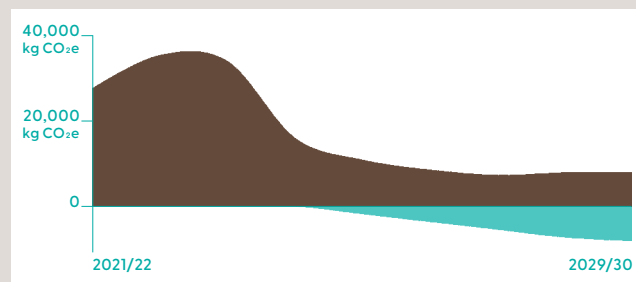
Eliminating indirect, Scope 3 emissions is the greatest challenge for most businesses. We have assumed that up to 2030, there will still be a portion of Scope 3 emissions we cannot eliminate and hence we will have to invest in some form of carbon removals to become net carbon negative. This investment is still to be identified and we will be investigating options from 2023. It is ongoing work to improve the accuracy of our footprint and assess our options to decarbonise.



GHG emissions 2021/22

This footprint covers the period 1 April 2021–31 March 2022. Full details about our methodology and a detailed breakdown is available in a separate GHG inventory report, published on our website. Excluded from scope in 2021/22 due to limited data included: Google Workspace services, catering at events, packaging, external soil lab analysis and use of courier services. Effort is being made to include these emissions from 2022/23.

	kg CO ₂ e	%	Scope*
Car mileage	21,872	81	1
Home working	2,567	9	3
Accommodation and subsistence	848	3	3
Capital items	783	3	3
Public transport	699	3	3
Digital (website, hosting, zoom)	357	1	3
Total	27,125		



FCT's pathway to carbon negative

*Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the purchase of energy. Scope 3 includes all other indirect emissions as a result of an organisation's activities.

Thank you

We are incredibly grateful to all our project partners, clients and all who support our work through funding. These are just some of the organisations we work with.



farmcarbontoolkit.org.uk
calculator.farmcarbontoolkit.org.uk

info@farmcarbontoolkit.org.uk
calculator@farmcarbontoolkit.org.uk

07541 453413

FarmCO2Toolkit

farm-carbon-toolkit

farm-carbon-toolkit

© Farm Carbon Toolkit 2023

