FARMING FOR CARBON & NATURE (FCN)

Progress report, March 2023

Esmée Fairbairn FOUNDATION

food and farming

STUDENTS ORGANISING FOR SUSTAINABILITY UNITED KINGDOM

NATURAL ENVIRONMENT INVESTMENT READINESS FUND

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Introduction

- Why the FCN pilot project started
- What FCN is and who it is for
- How FCN is funded
- What we're hoping to achieve

University net zero targets, universities owning a significant amount of farmland, and UK biodiversity loss, all led to SOS-UK developing FCN

UK universities passing progressive net-zero carbon reduction targets, often in response to student-led climate emergency campaigns, but having to address unavoidable Scope 3 emissions e.g. international student travel, international research, and some lab gasses.

+

Many UK colleges and universities having large agricultural landholdings, >35,000 hectares in the UK. Some of this land is being managed for research, but most is used for commercial purposes including being let out to tenant farmers.
Potential for farm soil carbon sequestration.

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The UK is one of the most nature depleted countries in the world and the biggest impact on UK biodiversity over the last 50 years has been the intensification of agriculture.

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Farming for Carbon & Nature (FCN) pilot project

FCN is an SOS-UK pilot project aiming to develop a unique financial model that can benefit farmers, the climate, and nature, whilst also helping universities reach their net zero targets and give students the opportunity to connect with nature by visiting farms.

For farms on university and college owned land

We offer regular facilitated knowledge sharing sessions between farmers.

We organise guest speakers to share insights with farmers for example about the importance of hedgerows for nature and carbon, reducing nitrogen fertiliser use, understanding the new government Environmental Land Management (ELMs) payment schemes, and achieving soil health.

We are collecting data on farm biodiversity and soil carbon levels that we hope, in the long term, will help the farmers be able to assess the effectiveness of changes in their farming practices.

We plan to launch a post pilot programme that will include farms receiving payments to help them transition more easily to nature friendly farming practices.

For universities and colleges

We organise excellent student engagement opportunities that measure and recognise skill development.

We are working with farm managers to help them reduce farm emissions which will also help institutions meet net zero targets. For universities and colleges that mange their own farms this will reduce Scope 1, 2 and 3 emissions, for universities with tenant farms, we are looking into how insetting could help universities reduce Scope 3 emissions.

We offer research opportunities related to farm soil carbon and biodiversity.

For students

We deliver online farm soil sampling training as well as biodiversity monitoring training.

We offer opportunities to spend a day on a farm taking soil samples or doing biodiversity monitoring.

We cover expenses to make spending a day on a farm more accessible for students.

We give students a digital badge to highlight skills learnt if they join a training session, do soil sampling or biodiversity monitoring, and complete our baseline and follow up surveys.

FCN is funded by two grants with complementary objectives

Esmée Fairbairn FOUNDATION

- **March 2021 – March 2024**
- £198,240 for initial support to create a sustainable fiscal model enabling farmers on university and college owned land to transition to carbon and nature-friendly regenerative farming practices through university offset payments from unavoidable Scope 3 emissions.
- **Objectives:**
  - Soil health on university and college owned farmland is improved and soil carbon levels increased.
  - Wildlife and biodiversity are improved on university and college owned farmland.
  - Increased access to, and engagement with, the natural world by students.

NATURAL ENVIRONMENT INVESTMENT READINESS FUND

- **September 2022 – November 2023**
- £86,500 for in depth exploration of whether university offset payments are a viable/credible option and if there is a better financial model for FCN.
- **Objectives:**
  - Develop an investment model for FCN.
  - Establish suitable and credible verification for FCN.
  - Create a viable business model with 15 sellers and 10 buyers.

We’re hoping to develop FCN into an accredited or certified programme that will:

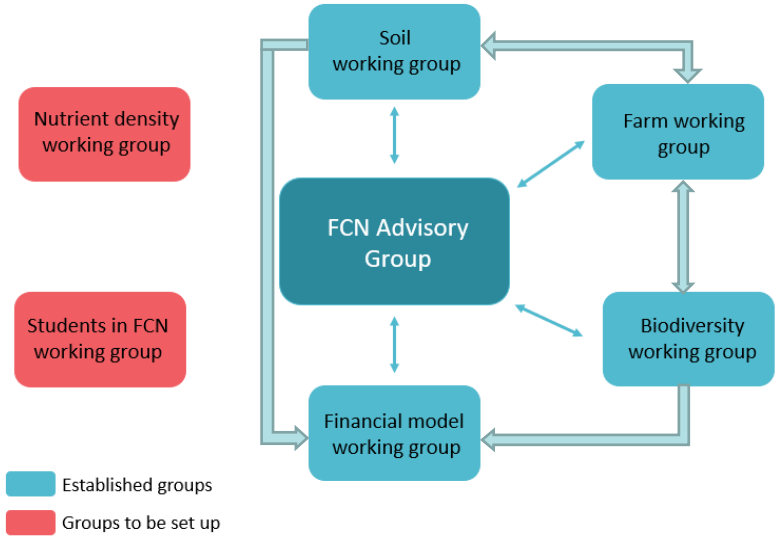
- Pay farms enabling them to transition to more nature friendly farming
- Help universities reach their carbon and biodiversity targets
- Provide opportunities for students to increase their knowledge of, and access to, farmland owned by their university or college
- Enable SOS-UK to continue to expand FCN’s impact with more universities/colleges, farms and students involved
- Expand research and impact opportunities such as looking into the nutrient-density of the food produced on farms and helping reduce procurement barriers for farms supplying to institutions

Who is shaping FCN?

A key factor in the success of FCN to date is the large group of committed and influential people helping us to explore the science, ethics and viability of farm soil carbon, carbon markets, payments for ecosystem services, and how to measure biodiversity increases. This expertise will enable us to establish a credible, innovative and impactful programme post-pilot.

We have an incredible network of people who regularly meet to help us shape FCN

FCN project structure



Please note: This list of people does not include all the Farm Managers involved in FCN, all the Biodiversity Leads (mostly lecturers) who are leading the biodiversity monitoring on the farms during the field trips, the excellent guest speakers we've had for the Farm Working Group, or the numerous interesting and helpful people we have had occasional meetings with to help us develop FCN.

Farming expertise

- UK Chair, Nature Friendly Farming Network
- Head of Sustainable Farming Campaign, Sustain
- AGRI & PR Manager at the National Federation of Young Farmers' Clubs
- Executive Director, FAI Farms
- Business Development & Technical Director, Farm Carbon Toolkit

Soil expertise

- Professor of Environmental Sustainability, University of Manchester
- Lecturer in Geography and Environmental Science, Loughborough University
- Senior Farm Carbon and Soil Advisor, Farm Carbon Toolkit
- Associate Professor in Soil Science, Lincoln Institute for Agri-Food Technology, University of Lincoln

Biodiversity expertise

- Vice Chancellor's Senior Fellow, Northumbria University
- Senior Lecturer, Geography and Environmental Sciences, Northumbria University
- Engagement and Training Manager, Field Studies Council
- Founder, Biological Recording Company

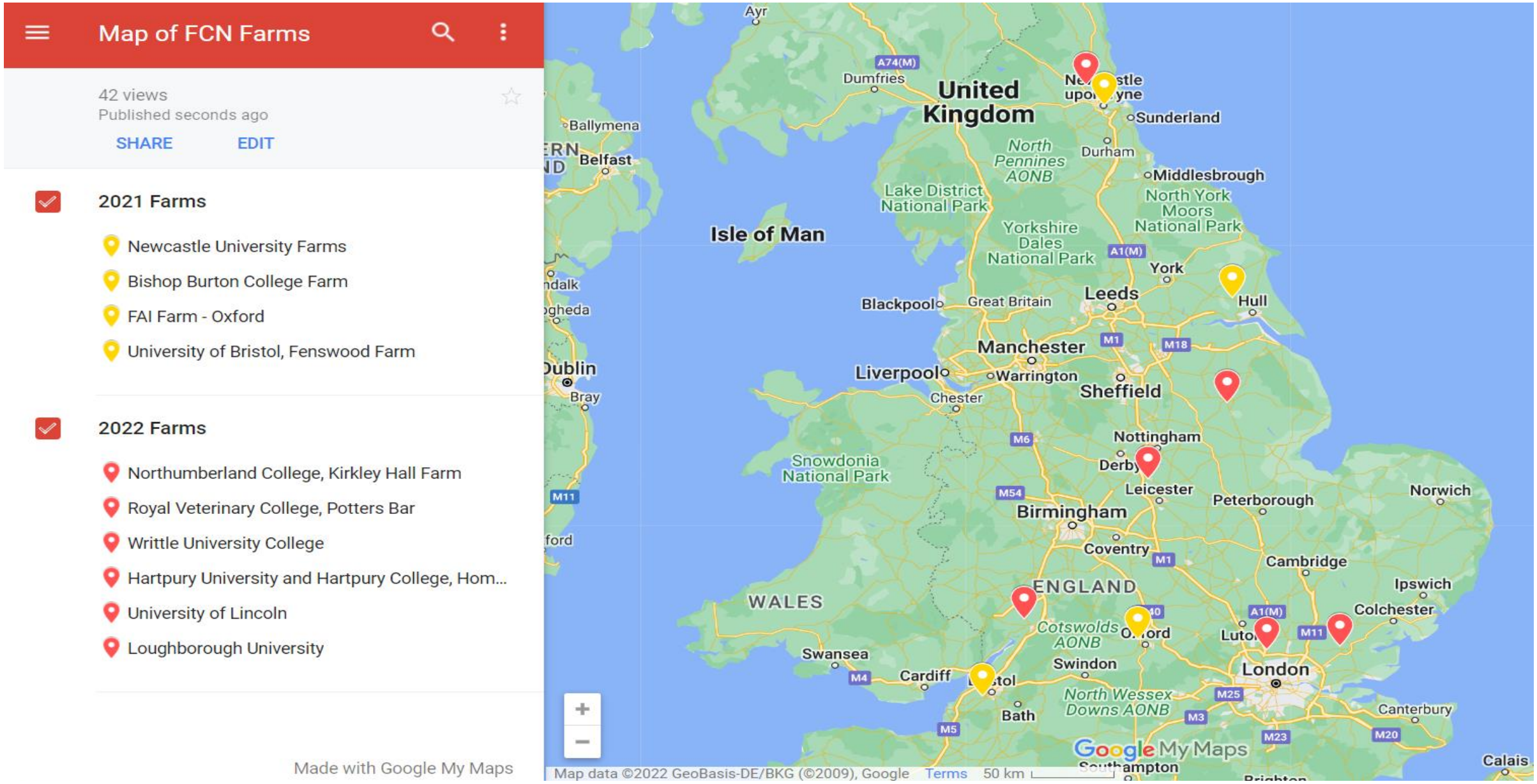
University and college - sustainability and sector expertise

- Head of Space Strategy, Planning & Sustainability, University of Lincoln
- CEO (Interim), EAUC – The Alliance for Sustainability Leadership in Education
- Sustainability Manager, University of Lincoln
- External Estates Manager, University of Bristol
- Curriculum Manager, Northumberland College
- Environmental Sustainability Manager, Royal Veterinary College
- Lecturer in Agriculture, Writtle University College

Carbon and finance expertise

- Energy Manager, UWE Bristol (University of the West of England)
- Chief Technical Officer, Gold Standard
- Senior Analytical Consultant, Accelar Ltd
- Managing Director, Accelar Ltd
- Head of Member Services, The Energy Consortium (TEC)
- Non-Executive Director and General Manager, Farm Carbon Toolkit
- Carbon Project Officer, EAUC – The Alliance for Sustainability Leadership in Education

Ten farms across England are helping to shape our FCN pilot project



There are many reasons why farmers want to be part of FCN

- Aligns with our other activities/ interests, such as being zero carbon
- Engagement with our landlord (university)
- Learning from other farmers
- Hoping to contribute to the university's reduction of carbon and to be recognised for this
- Good opportunity to get involved as a university farm
- Showcases the farm in a positive light
- Being able to measure the benefits of the changes in our farming practice to evidence to students
- Credibility
- More data on biodiversity
- Financial help
- I hope it will justify our approach and we'll be able to point to various metrics which will say this is why regenerative agriculture is so important
- Getting to know other farmers that liaise with their university
- Related to discussions about farming, carbon and nature we're having with industry partners
- Adds value to the farm by being involved with a big project
- Sharing knowledge and ideas, learning from one another's mistakes so as not to repeat them

Progress towards achieving project goals

1. Improving farm soil health & increasing soil carbon
2. Improving farm wildlife & biodiversity
3. Increasing student access to the natural world
4. Creating a credible and viable financial model

1) Improving soil health and increasing soil carbon

Key outcome: Soil health on university and college owned farmland is improved and soil carbon levels increased.

Progress indicator: 900 hectares of university and college owned farmland have increased soil organic matter leading to 24,000 tonnes of carbon sequestered. A model for continuing the programme after the end of the grant is demonstrated.

Progress made towards achieving this outcome

- We are working with 1206.25 hectares of university/college owned farmland so far.
- We have a very knowledgeable and productive Soil Working Group that meets regularly and comprises senior academics, senior carbon & soils advisors from Farm Carbon Toolkit, and a farmer who's also chair of the Nature Friendly Farming Network.
- Scientifically robust and realistic soil sampling and soil carbon testing protocols have been agreed.
- All soil sampling and testing equipment has been ordered, and almost all has arrived.
- 100 students have completed an expression of interest form for doing farm soil sampling.
- Loughborough University have agreed to do all the soil testing during the pilot in their labs and to create a Standard Operating Procedure that can be used by other university labs post pilot.

Challenges and the changes we have needed to make

Getting baseline soil samples has been an enormous challenge. The pandemic slowed us down initially, it took longer than expected to agree scientifically robust yet realistic protocols for the soil sampling/ testing, and we had to work within both farming and academic calendars. Finally, due to the lengthy procurement processes of universities, it has taken months to get the necessary equipment ordered and delivered.

⇨ As a result, we have changed our focus from taking annual samples during the pilot to piloting the soil sampling and testing protocols, establishing a lab Standard Operating Procedure, and assessing the effectiveness of our student recruitment techniques and student training session.

⇨Recommendations will be made to ensure annual sampling and testing are carried out to the highest standards for the most valuable impact post pilot.

What we have learned and the impacts post pilot

- We will be more strategic when recruiting the next five farms and only select farms that fill data gaps we have in relation to geographical location, soil type and/or farm management practices. This will provide more comprehensive end of pilot data.
- There are times of the year that are more optimal than others for doing soil sampling. We will recommend an adjustment to timings for annual soil sampling post pilot to reflect this.
- The academic staff in our Soil Working Group intend to publish several papers based on the data collected through the FCN pilot project. Because of the lack of robust farm soil carbon data that is publicly available, and our growing knowledge of soil carbon, we would be interested in collaborating to create a research project following this pilot.

We will take farm soil samples, do infiltration testing onsite and then test and analyse the soil samples in a university lab

Taking farm soil samples

- 2 fields on each farm sampled
- 10 sample areas per 10-hectare field
- Each sample = 1 deep core (50cm) + 5 ‘normal’ cores (0-30cm)

Infiltration test onsite

Testing in the lab at Loughborough University

- Loss on Ignition = heat 550C for 4 hours and compare before and after weights
  - Before-after = mass lost
  - Different size aggregates indicates how stable the stored carbon is

Analysis & Results

- Soil carbon levels vs.
  - Aggregate size – Where is carbon stored in the soil?
  - Farming methods - What correlates with the amount of soil carbon?
  - Soil type - How does soil carbon vary by soil type?

2) Improving wildlife and biodiversity

Key outcome: Wildlife and biodiversity are improved on university and college owned farmland.

Progress indicator: Baseline and follow up surveys show biodiversity increases on 15 university and college owned farms.

Progress made towards achieving this outcome

- We have recruited ten farms and started conversations with a further two. The plan to recruit five farms during each of the three years of the pilot project is on track.
- We have an excellent Biodiversity Working Group that meets regularly and is comprised of senior academics as well as Field Studies Council staff who have 80 years experience of environmental education and biodiversity monitoring.
- Biodiversity monitoring methods have been developed and agreed (see following 2 pages); they are meaningful and feed into national data sets but are also accessible to students without prior experience.
- Our biodiversity monitoring training session for students is in development.
- Dates have been booked in for the first biodiversity field trips and training sessions.

Challenges and the changes we have needed to make

- Getting baseline biodiversity monitoring data has been a challenge for similar reasons to the baseline soil sampling and testing data.
  ⇨We have changed our focus from doing baseline and follow up biodiversity monitoring field trips during the pilot to piloting our agreed methodologies, assessing the process of recruiting biodiversity leads at each institution to lead on the field trips, and evaluating our student training session.
- Inexperienced students would be unable to carry out the monitoring methods that would provide the most robust biodiversity data.
  ⇨We have compromised by selecting meaningful but widely accessible methods.
- Biodiversity monitoring will be in March/April and May/June 2023 but not all 15 farms will have been recruited by then.
  ⇨We will do some additional monitoring in Autumn 2023 with a subset of the surveys.

What we have learned and the impacts post pilot

- It would not be possible, or make financial sense, for SOS-UK staff to travel to every farm in both early and late spring every year to do the biodiversity monitoring.
- We hope that recruiting biodiversity leads at each institution will prove to be beneficial to them and their students as all those recruited are lecturers in subjects related to ecology/biodiversity.
- Although we were initially disappointed not to have time to do follow up monitoring within the pilot timeframe, we now believe having the opportunity to pilot our methods and then evaluate, analyse and refine them prior to launching our post-pilot programme will prove more beneficial going forward.
- We will only have baseline data for 10 farms although we plan to have recruited 15 farms by the end of the pilot.

Contributing to important datasets about nature in the UK

March/April	May/June
Earthworms Earthworm counts using an FCN Biodiversity Working Group developed method	**Hedgerows** People's Trust for Endangered Species: Great British Hedgerow Survey
Farmland birds Game and Wildlife Conservation Trust annual survey: Big Farmland Bird Count	**Flying insects** UK Pollinator Monitoring Scheme: Flower Insect Timed Counts
Optional: small mammals Mammal Society: Mammal Mapper	**Arable wild plants** Plantlife International: Arable plants survey Rapid Assessment

3) Increasing student access to the natural world

Key outcome: Increased access to, and engagement with, the natural world by students.

Progress indicator: At least 60 students have access to university and college owned farmland through completing biodiversity monitoring, with opportunities being made accessible to students from diverse backgrounds.

Progress made towards achieving this outcome

- We are planning three visits to each of the 10 farms between March and June 2023 (one soil sampling and two biodiversity monitoring visits) with 10 students at each.
  ⇨In total, there will be 300 student opportunities to access university/college owned farmland in spring 2023 with more opportunities likely in the autumn when our additional 5 farms are on board.
- Comms and student engagement is in line with SOS-UK's policies, and students are paid expenses, to help ensure accessibility for students from diverse backgrounds.
- We have a baseline and follow up survey to assess how FCN impacts students.
- All students will get training prior to the field trips. After completing the training, a farm visit, and the surveys, students will be awarded with a digital badge to recognise their skill development.

Challenges and the changes we have needed to make

- It is time intensive to collect enough samples to make the soil data scientifically robust.
  ⇨Originally we only planned to involve students in farm visits for biodiversity monitoring but they will now be doing soil sampling as well so we can collect more samples and obtain better data.
- Student recruitment: not all farms have links with lecturers/students (particularly with tenant farms) so cannot help with student recruitment.
  ⇨SOS-UK has existing relationships with most students' unions and sustainability staff in universities. For some farms, particularly colleges, groups of agricultural/ecology students will be doing the field trips. For others, particularly universities, there will be a mix of students from many different courses.

What we have learned and the impacts post pilot

- FCN offers students valuable practical experience and, particularly with the biodiversity monitoring, links the formal and informal curriculums.
- Insurance and risk assessments vary between farms. To ensure consistency and the highest student safety we have written a Risk Assessment and made changes to SOS-UK's insurance so all activities are fully covered.
- We thought taking soil samples may not be an attractive opportunity for students but over 100 filled in our form expressing their interest before dates were even confirmed.
- We would like to develop a Student Working Group to explore other potential opportunities we've identified for students.
- Farms aren't technically part of the 'natural' world, so we have amended our language to be access to the 'countryside' instead.

Students have given many reasons for wanting to get involved with FCN

I feel like soil is the single most important thing we need to take care of to combat climate change

I write for my student newsletter, and this research could be great to form the basis for a future article!

Really interested in the agriculture industry and how it can be made more sustainable

I am an avid environmentalist, I love food and I have a great interest in food production

I grew up in Sub-Saharan Africa where I had first-hand experience with the challenges of food and clean water…corrective measures cannot be effectively implemented without intensive research on the soil

This is a great opportunity to meet new people who share a similar interest

I have a profound passion for nature and have learnt lots about wildflower, tree and (some) bird identification, however, know little about soil

I am interested in any way in which we can store carbon as I believe this is key in our fight against climate change

I am interested in going into conservation/ Sustainability

I am interested in a career in agriculture

This is a really great opportunity to learn more about how we can improve our agricultural systems and food production!

I'm studying Environment [and] feel powerless against climate change…contributing even in a small way is something I can do

I feel an intimate understanding of soil ecosystems is crucial to further understanding agriculture

I love to be outside and if I can do that while gaining practical skills, even better!

I hope to learn more about what impact the soil can have on the carbon in our environment, as I had never considered it a key role in greener farming practices before

The impact farm soil can have is particularly interesting to me primarily due to the fact that 71% of land in the UK is agricultural

I am interested in a career relating to food security and agriculture

I have a strong interest in soil chemistry, biology and ecology, and hope to work in a role related to Agroecology as a career further down the line

I am keen to gain an insight into how soil health can be altered as carbon emissions increase and would love to be part of this incredible opportunity

I would love to learn more about the soil I walk on every day!

4) Creating a credible/viable financial model for FCN

Initial support to create sustainable financial model enabling farmers on university/college owned land to transition to climate and nature positive farming practices through university offset payments from unavoidable Scope 3 emissions.

In depth exploration of whether university offset payments are a viable/credible option and if there is a better financial model for **FCN.**

Progress made towards achieving this outcome

- The NEIRF funding began in September 2022, providing technical advice on UK natural capital finance and investment from Accelar Ltd. We have specifically examined the status of the UK soil carbon market.
- The NEIRF community of practice has connected us to key players in the UK soil carbon market e.g. the UK Farm Soil Carbon Code Consortium and the Sustainable Soils Alliance. This has allowed us to anticipate the future development of the UK soil carbon market and respond appropriately.
- We now have an outline business model and are in a position to develop a detailed business plan (with costings) over the remaining months of the NEIRF funding and the FCN pilot. This will include all aspects of student engagement and biodiversity monitoring from the pilot.

Challenges and the changes we have needed to make

- The UK soil carbon market is emerging and developing, which provides significant challenges for developing our financial and business model. Key uncertainties:
  - Lack of robust scientific evidence on the quantity and permanence of soil carbon sequestered in real life farming practices;
  - Requirement in the new UKFSCC minimum standards (for high integrity) to provide 'evidence' to support proposed soil carbon credit generation for offsetting.
- Making farm payments during the pilot was deemed inappropriate/impossible because of the above uncertainties and delays in developing our robust soil testing protocol. Benefits to farms in the pilot is non-financial, from educational seminars and peer learning in the Farm Working Group.

What we have learned and the impacts post pilot

- The UK market for farm soil carbon offsets is not sufficiently mature to be a basis for FCN.
- We have developed a sustainable business model, based on GHG reductions and insetting for universities/colleges and their farms. It is flexible and can include GHG removals (carbon sequestration) once they are evidenced.
- FCN will help sustainability managers with farm-related emissions in their institutional GHG reporting and support in-house or tenant farmers (via training, advice and financial incentive) to reduce their GHG emissions and work towards overall net zero (or better) on the farm.
- FCN will continue soil carbon testing to contribute evidence on soil carbon sequestration from changes in farming practice.

Budget

Spending is currently within budget for both Esmée Fairbairn Foundation and NEIRF

We are currently delivering on our FCN outcomes within the budget of our two funders.

- £198,240 funding from Esmée Fairbairn Foundation over 3 years, from March 2021 to March 2024.
- £86,500 funding from the Environment Agency's Natural Environment Investment Readiness Fund (NEIRF) over 15 months, from September 2022 to November 2023.

Unexpected impacts on the budget

- The pandemic meant we spent less on travel than anticipated.
- The cost-of-living crisis affected salary budgets more than we had anticipated.

We have been able to capitalise our efforts, and amplify the impact of this pilot project, through linking with other work we are doing on Food & Farming at SOS-UK.

- Our 'Sustainable Food & Growing: Support Network' helps universities, colleges and students' unions embed more sustainable food and food growing on campuses.
- Our 'How Farming Can Cool The Planet' project provides student opportunities to visit farms and discuss the links between food, farming, and the climate and nature crises. This is in partnership with the National Federation of Young Farmer's Clubs and FLAME, the youth branch of the Landworkers' Alliance.

Next steps for FCN

We have several key goals for the final year of the FCN pilot

Recruit another 5 farms to the pilot

Calculate costings and develop a business plan for our post-pilot FCN programme

Approach universities about signing up to our post pilot programme

Facilitate further knowledge sharing between the farms to help them transition to more nature friendly farming

Evaluate, analyse and refine our soil sampling/testing, biodiversity monitoring and student recruitment processes

Create comms to share all that we learn during the FCN pilot project

If you have any questions about this report, or Farming for Carbon & Nature, please email us at foodandfarming@sos-uk.org

www.sos-uk.org