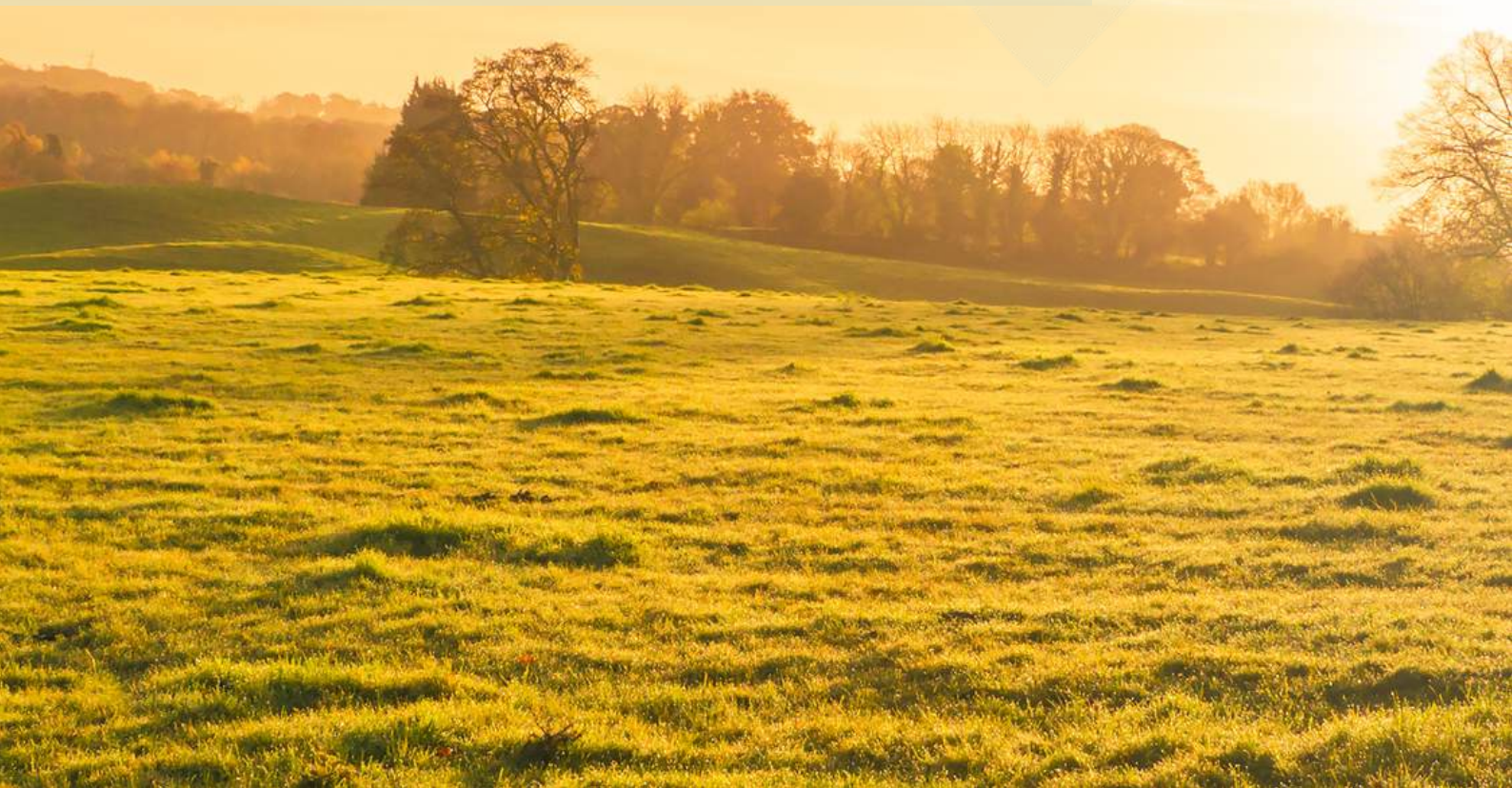




From Data to Decisions

Insights from the first
cohort of farms measured
by Soil Association Exchange.

Published September 2024



Introduction

Founded in 2021, Soil Association Exchange emerged from a simple yet important idea: **the agricultural industry lacked comprehensive data on the environmental impact of farming practices at a national level.** This gap was a significant barrier to achieving the systemic change needed for climate-friendly farming.

Now, three years later, we have collaborated with farms from **Land's End to Orkney.** Whilst some farms have decided to baseline with Exchange directly, most farms have been supported to access Exchange at no cost through one of our business partners. These include lead partners Lloyds Bank, the Agricultural Mortgage Corporation and Bank of Scotland, along with partners Arla, Compass Group, M&S Food, Riverford Organic Farmers, Nando's, ABP, Nestle, Co-Op and Cibus.

This report summarises the data collected from the first 685 farms measured between summer 2022 to August 2024. While not exhaustive, it **highlights the power of this dataset** and the potential of Soil Association Exchange as an ongoing tool to measure change in UK farming.

Within this initial cohort, there are exemplary cases of **trailblazing farms where nature and food production thrive together**, as well as instances where land and nature are struggling. The farmers we engage with share a deep commitment to producing high-quality food in harmony with nature. However, **the industry has only recently begun receiving the support needed** to balance food production with environmental protection.

Change is on the horizon. Both government and industry are starting to provide financial incentives for sustainable farming. The speed of this change is crucial, and comprehensive, holistic farm-level data is essential across the industry to facilitate rapid transformation. **With Soil Association Exchange, the sector now has access to a valuable resource for measuring the impact of nature-friendly practices on farms.**

The first cohort of farms have provided us with critical insights into the challenges we face. We can now begin to understand the concrete impacts of various interventions and unlock new funding from both private and public sectors.

Environmental data from

685

UK farms included
in this report

238,494

hectares of land surveyed



For simplicity, we do not detail our data collection methodology in this report. This information can be found in the Exchange Measurement Protocol at www.soilassociationexchange.com/science

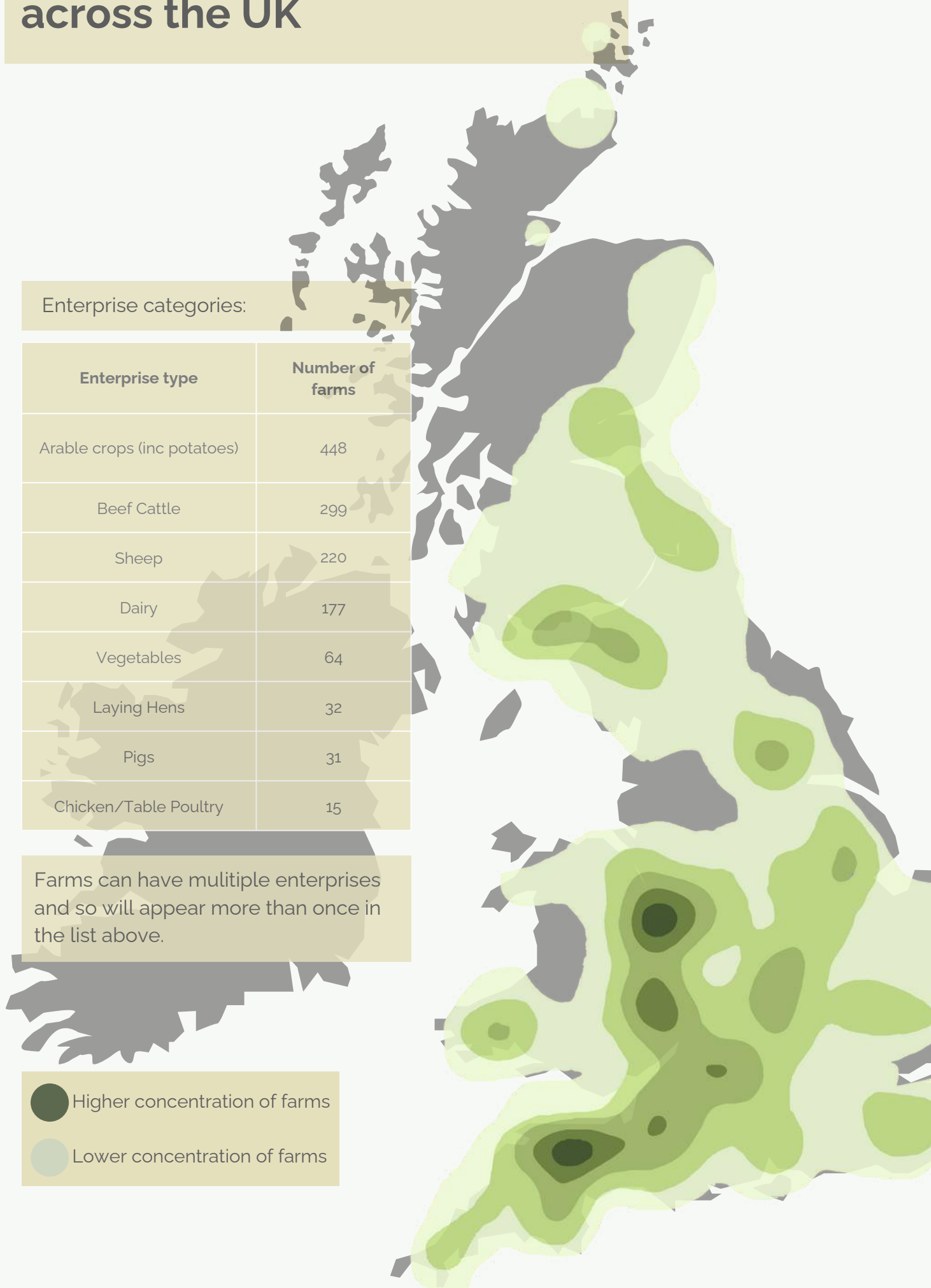
Exchange farm distribution across the UK

Enterprise categories:

Enterprise type	Number of farms
Arable crops (inc potatoes)	448
Beef Cattle	299
Sheep	220
Dairy	177
Vegetables	64
Laying Hens	32
Pigs	31
Chicken/Table Poultry	15

Farms can have multiple enterprises and so will appear more than once in the list above.

-  Higher concentration of farms
-  Lower concentration of farms



Executive summary

We measure outcomes across six impact areas: soil health, carbon, biodiversity, animal welfare, water, and people & society. In this report, we focus on four of these, and our topline findings are below:



Soil health is individual to every farm and impacted by a multitude of factors, including geography, rainfall, soil type and input level. The soil health data from the first 685 farms has provided us with evidence revealing the crucial role livestock play in enhancing soil health, notably in terms of organic matter and soil carbon levels.



Carbon scores differ greatly among various enterprises, and it will come as no surprise that dairy and beef farms typically have higher emissions. Livestock emissions are important, but the role of fuels and inputs should not be underestimated. Fuel and inputs offer farmers potential to swiftly reduce overall emissions.



Biodiversity of plant and bird life varies greatly from farm to farm. Despite regular sightings of both amber and red listed birds reported on most farms, only 28% of farms are meeting RSPB targets to have 10% of land managed as space for nature by 2030¹. Hedgerow coppicing and laying is rare, offering huge potential to farmers for recovering biodiversity and accessing funding.



Animal welfare metrics perform well across all farms, with dairy farms demonstrating particularly strong performance on mortality, lameness and mastitis. Performance on Antibiotic use was good across species, demonstrating farms were either aligning or out performing average industry data across species.

Overall Exchange benchmarking

Exchange farmers always receive the raw data for all the metrics we measure. However we use 'scoring' as a way to help interpret that data. Scoring is out of 100 (100 is best) and the bands within the scoring are based on how that farm compares to other 'similar' farms within the Exchange cohort. 'Scoring' is only ever a tool to help farmers understand how they might make changes to their farm. We emphasise the need to interpret the score to a farm's individual situation. Farmers are also able to view their score vs an industry standard where that is available.

Average Impact Area score by most common enterprise combinations

The table below details the median Exchange scores by enterprise type and the areas we measure. Enterprise types are self-nominated by Exchange users upon registration, and the below are the 7 most common enterprise combinations.

At this high level, we observe relatively consistent scores across different enterprises combinations. However, these overall average scores mask nuances in the data and a great deal of variance both between farms, and within metric performance for individual farms.

	Distinct No. of Farms	Animal Welfare	Biodiversity	Carbon	Soils
Enterprises	No.	Median	Median	Median	Median
Arable only (incl potatoes)	153	N/A	52	57.7	51.05
Dairy Only	89	51.15	50	48.1	60
Arable plus Beef & Sheep	70	54.55	62.15	57.15	57.25
Arable plus Beef	68	68.2	57.25	61.05	56.95
Beef and Sheep	47	57.3	59.3	54.4	65.8
Arable plus Sheep	29	50.7	57.4	63.2	54.5
Arable plus Dairy	25	45.8	54.4	49.4	59.9

Table - Data is cut by the top Enterprise combinations which covers a subset of the total number of farms. Scores are out of 100.

These differences highlight the natural strengths within different sectors. They also reveal the areas where improvement is more challenging and understandably slower, such as reducing the carbon footprint of livestock.



Soils

There is an increased interest and knowledge of the importance of soil health and the impact it has on crop health, water retention, pest resistance, and nutrition.

We see very broad variation in the health of soil across different geography and enterprise types. This will be no surprise to farmers, who often see great variation across a farm.

Our data has revealed a general trend of improved soil health for farms with a more mixed enterprise system that includes livestock. There's also **clear evidence that including livestock into an arable mix increases the carbon stored in a soil.**

Across all of the farms surveyed, soils had an average of **5.74% soil organic matter and 3.34% soil organic carbon.**

Further detail on Soil Organic Carbon and Bulk Density can be seen in the appendix.

3.34%

Average Soil Organic Carbon

Average Soil Organic Carbon by enterprise

2.54%

Arable cropping enterprises, incl potatoes



3.47%

Mixed arable cropping enterprises, plus Beef cattle and Sheep



4.92%

Beef Cattle and Sheep only



5.09

average earthworm count/pit - Grassland

4.12

average earthworm count/pit - Arable

UK Regional variation -soil organic matter %

6.88%

North incl Scotland

5.33%

West

4.99%

East



David White - Hawkmill Farm

"As a farmer I notice both the big changes like worm activity and bird numbers, as well as the smaller ones like water percolation and trafficability in a wet season. What we all know is that these improvements, whilst real, are subjective and so what we need is to have them accurately recorded so that we can demonstrate the real trend. The Exchange platform has been perfect for this and alongside the brilliant help and guidance given by the team we now have a set of "measurables" that I wish I could have had eight years ago."

*Soil Organic Carbon (SOC) refers to the carbon content of a soils organic matter. SOC improves a soils biological, chemical, and physical properties, its water-holding capacity and its structural stability.

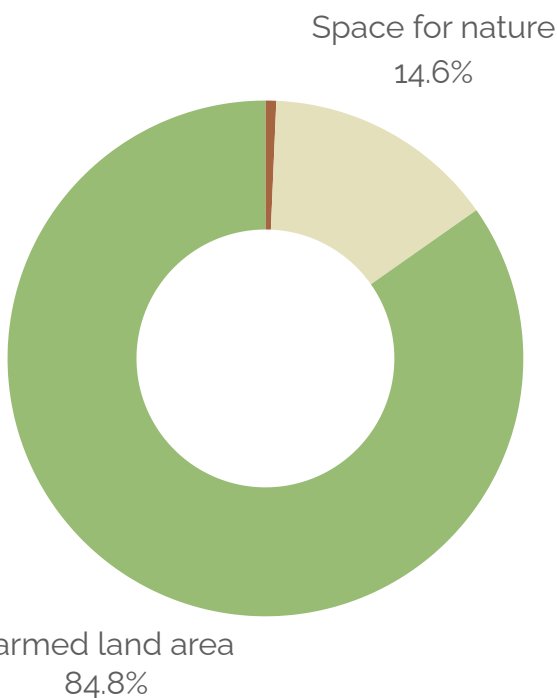
Biodiversity

We have looked at 4 key areas of our biodiversity measurement for this report - plant life, hedgerows, birds, and space for nature. All farms were measured on a single day by Exchange technicians.

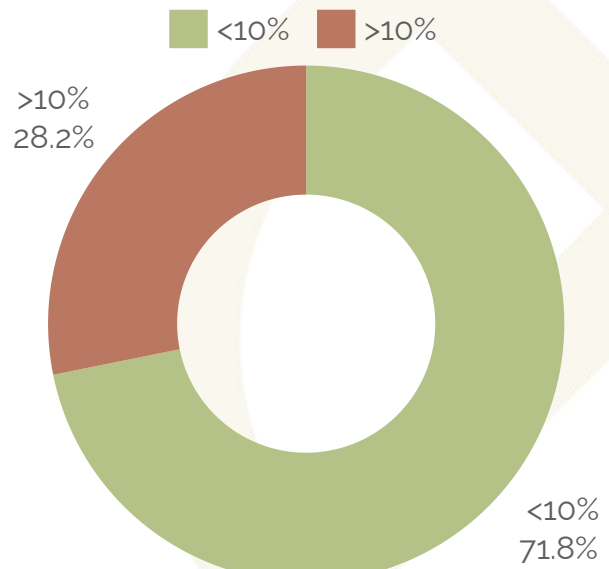
We know that farmers know their land and biodiversity best, and that indicators change through the seasons. In 2024, we are adding more capability for farmers to input their own data, to provide a richer understanding of biodiversity on-farm.

Farmed and space for nature split

- Buildings and infrastructure
- Space for nature
- Farmed land area



Percentage of farms with at least 10% space for nature



Hedgerows

Our advisors are seeing an increased focus on active hedgerow management due to new government payments, and greater awareness of the importance of hedgerows to both nature and their secondary roles in farm resilience (herd health, water retention etc). The results below demonstrate the work to be done in this area, and opportunity to improve.

1240km

Hedgerows surveyed across the UK

64%

Dense & Well Managed

12%

Over Trimmed

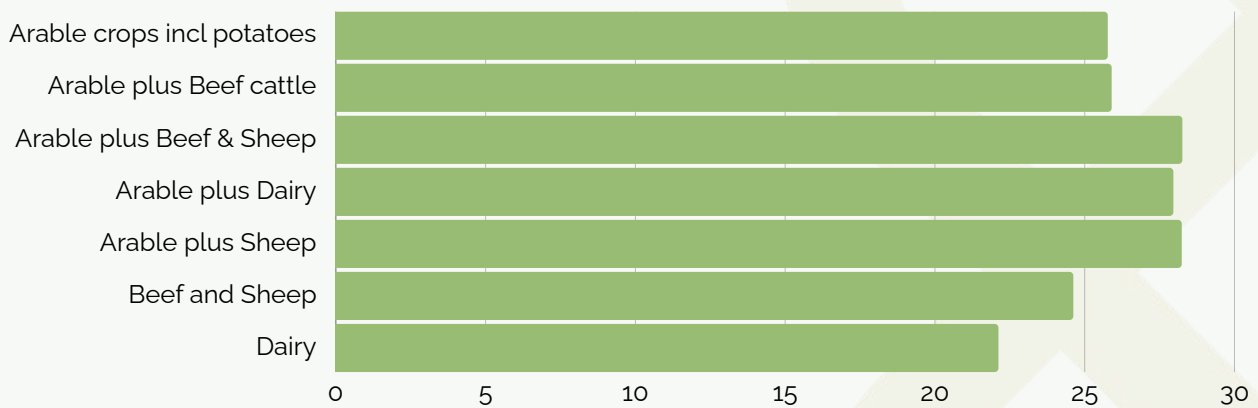
3%

Recently Re-juvenated

Biodiversity continued

Plant Diversity

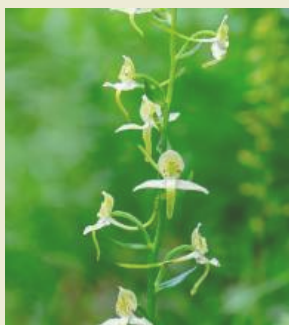
Mixed enterprise farms that include livestock together with arable tend to have more plant diversity than enterprises that don't. There is of course a wide range of performance within each enterprise category, but it does demonstrate the importance of diversity within a farming system to support wildlife.



Average count of grassland/arable species by top 7 enterprise mixes

Butterfly Orchid

Rarest plant



1 sighting

Perennial Ryegrass

Most common plant



1465 sightings

7.22

average Arable species diversity/field parcel

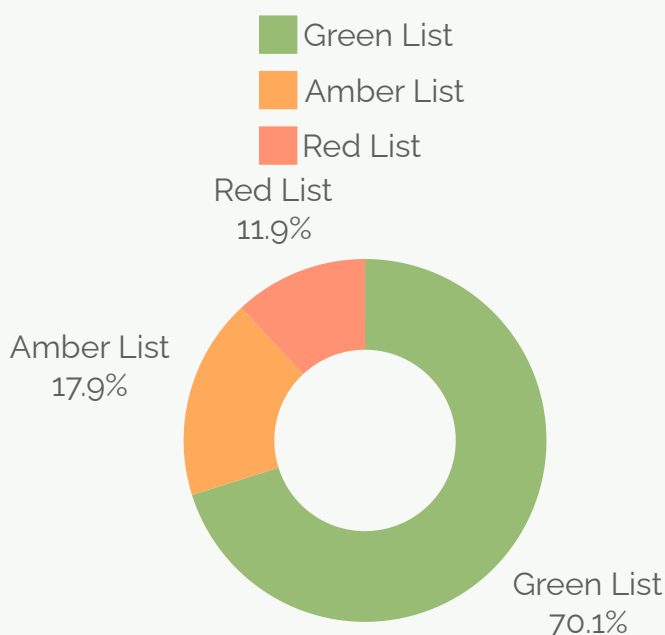
7.98

average Grassland species diversity/field parcel

Biodiversity continued

Birds

Birdlife is a key indicator of the broader biodiversity on farm. Knowing what birdlife a farm has, and what might be missing is key to helping a farmer focus on what they can do to improve the environmental health of a farm. Birds perform a variety of services, from pollination to insect control. The 2023 State of Nature¹ report showed that **43% of UK birds are at risk of disappearing**. The report highlighted the need for the protection and creation of bird-friendly habitats throughout our agricultural landscapes.



Exchange farms had an average of **15.9 bird species per farm**. **18% of birds sighted were amber list** for conservation concern. **12% of sightings were red list**. This demonstrates the importance of agricultural landscapes for threatened bird species.



Peter Cheek - Godminster Farm

"Until you've got a baseline and an existing measurement, you don't know what you've got. You get a rough idea and you can guess, but Exchange provides recorded data that highlights the areas where you are weak. Exchange has shown us areas where we can do better and lets us know where we are at a specific moment in time. Now when people talk about 10% or 20% of land being put down to biodiversity, we know where we are, and we are very close to that figure."

Skylark

Most common red bird list recorded



701

sightings

Wood pigeon

Most common amber bird list recorded



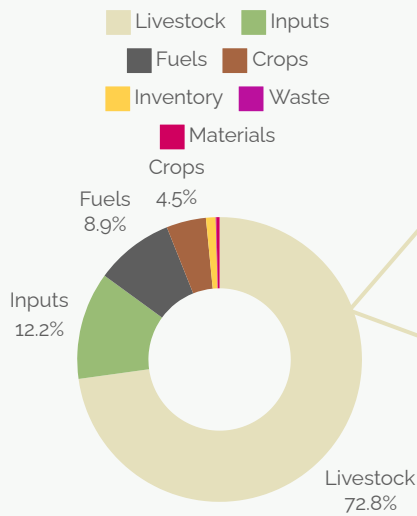
1. Burns, F. et al, 2023. State of Nature 2023, the State of Nature partnership.

Carbon

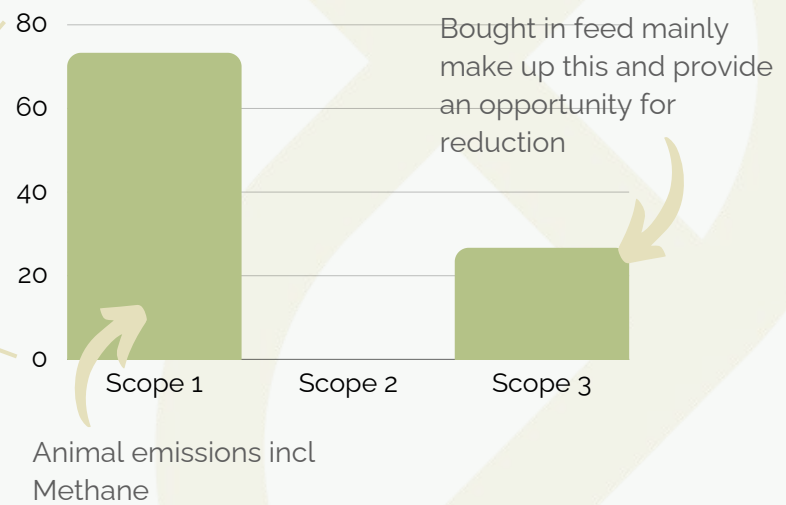
Farming contributes **11% of our UK Greenhouse Gas (GHG) emissions**, and the National Farmers Union (NFU) have a 2040 industry goal to become net zero. It is still rare to find a farm that has achieved a net zero status, and there are no doubt some have large hurdles to overcome. Livestock in particular play a large role in our emissions, but are also pivotal to not only our soil health but to overall biodiversity and the rural community.

CO₂ Equivalent Emissions

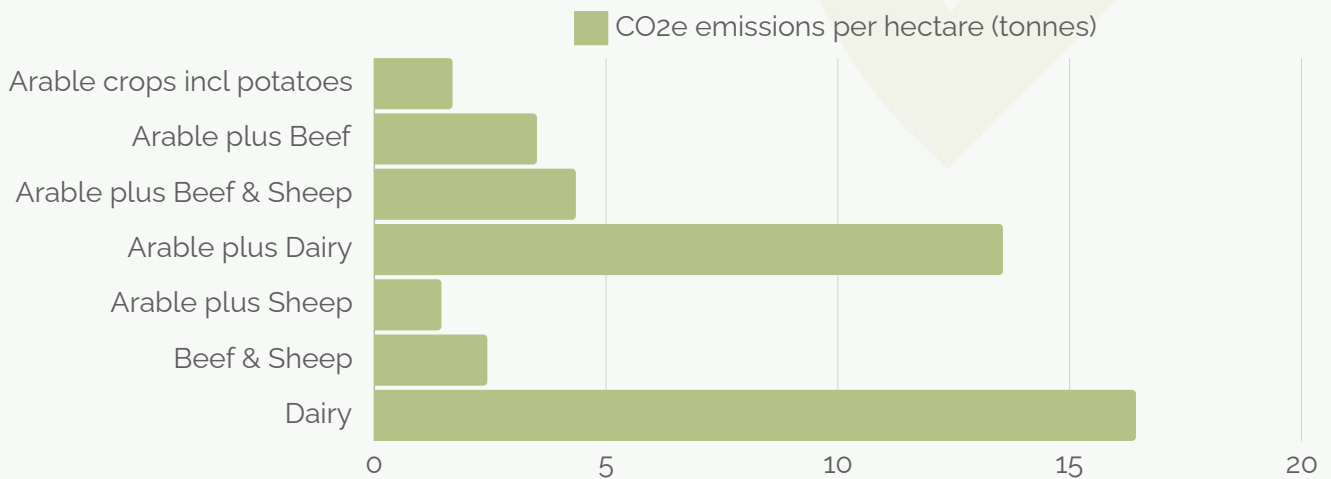
Top sources of CO₂(e) emissions (%)



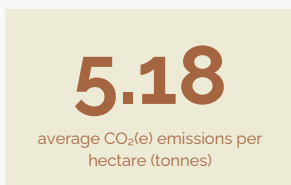
CO₂(e) emissions by scope from livestock (%)



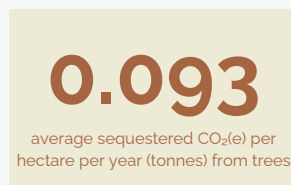
Average CO₂(e) emissions by per hectare (tons) by enterprise type



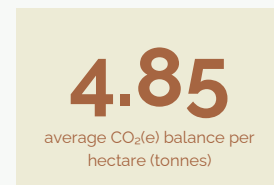
Emissions



Sequestration



Carbon Balance

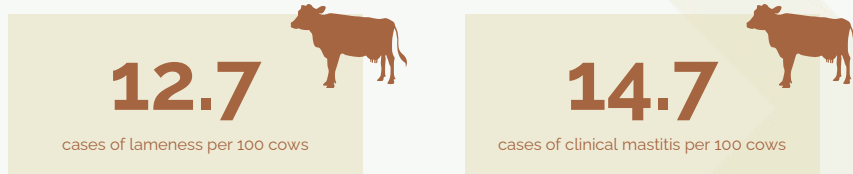


Animal Welfare

High animal welfare standards are crucial in not only ensuring farmers provide the best possible quality of life to the animals they look after, but also **84% of shoppers** rank animal welfare as important in their decision making¹. The health and welfare metrics below demonstrate a good performance, in particular from the dairy sector. As further strides are made in our journey to net zero, it is vital that we avoid unintended consequences for welfare as the industry looks to address the GHG emissions in particular from livestock.

Dairy

On average, Exchange farms have:



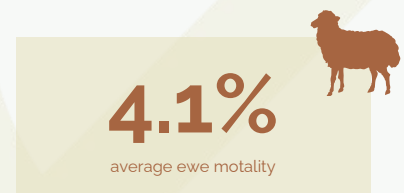
All dairy calf and heifer mortality figures are in the top scoring bracket.

Beef

The calves weaned average for Exchange farms was 94%. This is moving into the 'Performing Well' range in the AHDB beef sector KPI's.

Sheep

Exchange farms were performing in line with average industry performance for ewe mortality, with an average of 4.1%. This falls in the midpoint score of AHDB lamb sector KPI's. The average lamb losses from scanned to rear at just over 9% was a very good performance.



Antibiotics

Performance on Antibiotic use was good across species, demonstrating farms were either aligning or out-performing average industry KPIs.

Enterprises	Antibiotic use level
Beef Cattle	3.61 (mg/kg)
Dairy	13.29 (mg/kg)
Layers (Laying Hens)	0.23 (% bird days)
Pigs	23.62 (mg/kg)
Broilers	6.34 (mg/kg)
Sheep	3.51 (mg/kg)

1 IGD. Health, nutrition and ethics monthly shopper update – January 2024



Recommendations & Actions

Exchange provides actions and recommendations to farmers in order to help them take action to **improve the sustainability, profitability, and future resilience of their farms**. We record the type of actions being taken based on the advice our advisors give. This allows us to understand the **tangible measures being taken by farmers** after receiving their Exchange report.

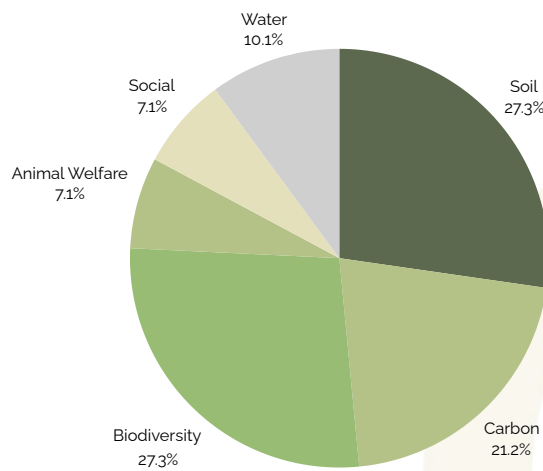
8551

Recommendations made by
Advisors

1267

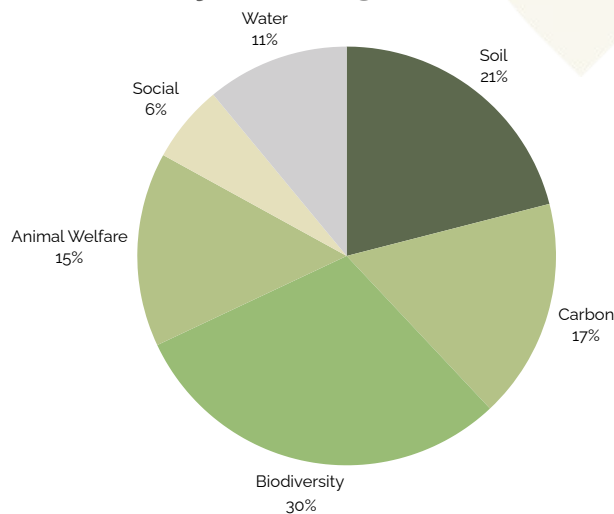
Actions taken

Top recommendation area from Exchange advisors



The advice we give to farmers is bespoke and grounded in the ambitions of the farm. Our most common conversations focus on soil health, hedgerow management and the use of cover crops and herbal leys.

Top action area committed to by Exchange farmers



Actions being taken by farmers upon receipt of their Exchange report and advice include hedgerow management, cover cropping, and crop rotation. Applying for an SFI is the third most common action being taken, revealing the potential of the Exchange platform to help farmers understand and unlock funding. Animal Welfare actions are particularly strong and show the passion for welfare as an industry as well as the financial support for a health and welfare review.

Closing note



In Soil Association Exchange, the sector now has access to a resource for measuring the impact of sustainable practices across farms.

85%

of farmers have changed to nature-friendly practices

77%

feel more profitable

96%

report that Exchange met or exceeded expectations

With the first 685 farms participating in the Exchange program, our mission to help UK farmers become more profitable and sustainable is well underway. The results speak for themselves: feedback shows that over 85% of farmers who have completed the Exchange program have adopted more nature-friendly practices. Additionally, 77% of farmers report feeling more profitable as a result of the Exchange, and 96% say that Exchange met or exceeded their expectations.

We believe that the future of our industry lies in the balance between productivity and sustainability. By embracing innovative practices that enhance soil health and biodiversity, farmers can build resilient businesses that thrive over the long term. At Soil Association Exchange, we are dedicated to guiding farmers on this transformative journey. Our vision is to create a future where farming not only meets the demands of food production but also enriches the environment. Together, we can cultivate a landscape where profitability and sustainability go hand in hand, ensuring a prosperous and nature-friendly agricultural industry for generations to come.

Joseph Gridley - Soil Association Exchange CEO

Appendix

This report is just a snapshot of some of the insights we've gathered from UK farms. We capture environmental outcome data on all the following metrics.

Metric	
Soil Organic Matter	Habitat Management
Soil Organic Carbon Stocks	Biodiversity Connectivity Features
Soil Structure: Bulk Density	Space for Nature
Soil Structure: VESS	Bird Species Abundance
Total Nitrogen and C:N Balance	Arable, Hedgerow, Field Margins and Grassland Flora
Earthworms	Hedgerow Structure
Soil Cover %	Contextual Biodiversity Information
pH	Carbon Balance
Contextual Soil Information	GHG Emissions
Water Storage	Carbon Stored in Woodland and Forest: Stocks
Nitrogen Balance	Carbon Stored in Woodland and Forest: Sequestration
Phosphate Balance	Carbon Stored in Hedgerows: Stocks
Potash Balance	Carbon Stored in Hedgerows: Sequestration
Water Resource Availability	Carbon Stored in Soils: Stocks
Groundwater Status	Carbon Stored in Soils: Sequestration
Water Usage Actions	Antibiotic Usage
Contextual Water Information	Welfare Outcomes
Crop and Livestock Diversity	Food Production
Land Access	Community Engagement

The power of Dynamic Benchmarking for farms

The 100 point Dynamic Benchmarking system was introduced in summer 2024, and is a new way for farmers to understand their performance against similar enterprises. Farmers can easily see whether they are in the top 10%, somewhere in the middle, or if there is room for improvement.

It provides real time insights - meaning as more data is added to an individual farm, or the group, the benchmark will shift, providing farms with the most up to date performance data.

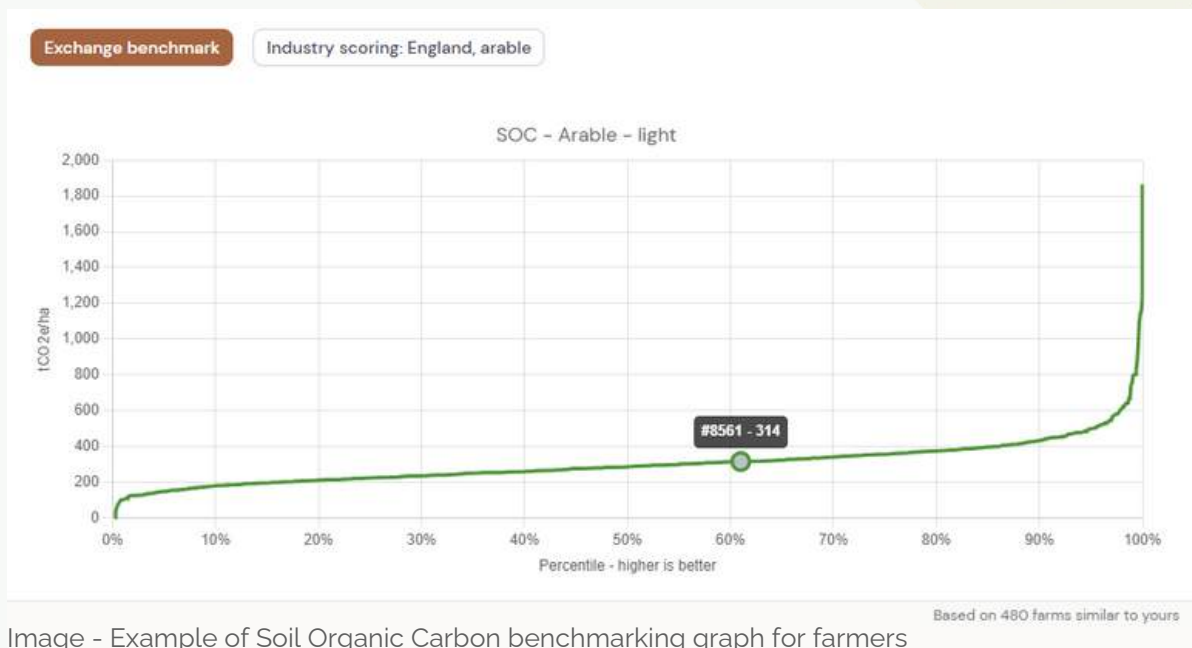


Image - Example of Soil Organic Carbon benchmarking graph for farmers



Soils Additional data

This table details different soil types sampled by Exchange, and average Soil Organic Carbon and Bulk Density. For an individual farmer, context is crucial and this example of variation between soil textures and between crop and grassland demonstrates how farmers need to have data that is contextualised to their situation to make informed decisions about what is possible. Tools like **Dynamic Benchmarking** enable farmers to see the full potential of different land parcels by **showing the upper and lower limits**, with filters that are relevant to their situation.

Soil Texture	Soil Texture Description	landcover type Crop or Grassland	SOC%.avg	BDkg/ltr.avg	% of total samples
Sands	Sand	c	1.89	1.12	4.5%
Sands	Sand	g	4.56	0.98	5.4%
Light	Chalky, silty loam	c	2.56	1.07	2.6%
Light	Chalky, silty loam	g	4.61	0.96	1.5%
Light	Loam	c	2.68	0.99	1.8%
Light	Loam	g	3.97	0.91	2.8%
Light	Loam to sandy loam	c	2.49	1.06	4.1%
Light	Loam to sandy loam	g	3.82	0.96	7.7%
Light	Loam to silty	c	2.27	1.11	2.3%
Light	Loam to silty	g	4.04	0.91	1.0%
Light	Peat	c	6.84	0.97	0.5%
Light	Peat	g	11.74	0.77	1.4%
Light	Sand to silt	c	2.95	1.06	1.8%
Light	Sand to silt	g	3.43	0.99	1.9%
Light	Silt to silty loam	c	2.34	1.03	0.7%
Light	Silt to silty loam	g	4.02	0.95	0.7%
Light	Silty loam to sandy loam	c	3.05	1.01	0.9%
Light	Silty loam to sandy loam	g	5.22	0.86	1.1%
Clays	Chalky clay to chalky loam	c	2.56	1.06	1.3%
Clays	Chalky clay to chalky loam	g	4.69	0.95	1.3%
Medium	Clay to clayey loam	c	2.4	1.09	17.6%
Medium	Clay to clayey loam	g	3.7	0.98	14.9%
Medium	Clay to sandy loam	c	2.45	1.08	5.3%
Medium	Clay to sandy loam	g	4.18	0.95	5.7%
Medium	Clayey loam to sandy loam	c	2.54	1.06	4.3%
Medium	Clayey loam to sandy loam	g	3.95	0.95	6.8%



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