SUSTAINABLE SOILS ALLIANCE

May 2023

The Sustainable Farming Incentive (SFI) Soil Standards
Observations and Recommendations

1. Summary

The inclusion of soils in the Sustainable Farming Incentive (SFI) through the two Soils Standards was a welcome recognition of their role and importance. Although the Standards have only been in place for a year and information about their take-up rates/user feedback is limited, it is timely to consider their design and scope in the context of external developments as follows:

- The emerging private marketplace for farm soil carbon.
- Understanding in the food supply chain of soil's role in scope 3 greenhouse gas (GHG) removals (international GHG protocols).
- Change in costs (overheads, labour) that impact the overall funding model.
- Greater clarity around agriculture's place in Net Zero, and soil's role in carbon removals.
- The emergence of new tools and technologies for soil measurement and assessment.
- Novel approaches taken to national soil measurement in other UK nations.

Analysis of the Standards in the context of these developments call in to question whether they provide the best mechanism for using public money to achieve soil outcomes - either to reward farmers or provide a gateway to the private marketplace. To that end, we would make the following observations and recommendations:

- When underlying time and overheads are factored in, the payment rates offered by the SFI Soil Standards do not provide an adequate financial incentive for farmers to get involved in the scheme.
- The payment rates do not seem to reflect the economic model (income forgone plus costs) that DEFRA claims underpins the scheme. The underlying calculations have never been published.
- There is no clear, universal guidance about how farmers should measure or understand their soils – or what data will be collected by DEFRA and how – a missed opportunity to establish a common, universal approach through the industry and beyond.
- As currently designed, the SFI risks disqualifying participating farmers from participating in the growing private market for farm soil carbon.
- The soil organic matter tests the scheme currently pays for are adequate to assess a farmer's soil health but not rigorous enough to account for soil carbon for any GHG inventory requirements (nationwide, inset, offset). They will not capitalise on the growing private sector interest in soil health, or create the framework by which public and private money can align to deliver economic and environmental outcomes.

We call on the government to review the SFI Soil Standards as follows:

- **To ensure the underlying payment rates reflect all relevant costs and overheads as well as the invisible risks that come with any transition (impact on crop, disease, pest management etc). Overall expenditure on soils should reflect the societal cost of soil degradation (£1.2bn[1]) and the value of the ecosystem benefits generated.**
- **To engage with private market players to better understand the legal and economic differences between public and private schemes and develop an effective workaround enabling SFI and investor income to work in harmony.**

[1] https://www.sciencedirect.com/science/article/abs/pii/S0921800915003171

- **To promote the AHDB soil health scorecard as the universal approach to on-farm soil measurement and interpretation.**
- **To disaggregate payments for soil organic carbon measurement from those for interventions.**
- **To phase out financial support for low-integrity soil carbon measurement in favour of high integrity measurement that will enable soil carbon to be included in GHG inventories (nationwide, inset, offset).**
- **To take advantage of emerging low-cost, high integrity soil carbon measurement technologies already being used across the UK.**
- **To explore new financial mechanisms for rewarding farm soil carbon storage.**

Further detail to support these recommendations is as follows:

1. Ensure payment rates reflect the underlying costs

The SFI Soil Standards (Arable and Grassland) require farmers to carry out 4 actions:

- Complete a soil assessment and produce a soil management plan
- Test soil organic matter
- Add organic matter
- Winter cover

All of these actions incur a cost in terms of overheads and time. The scale/nature of these costs will be dependent on farm size and type, as well as other factors (availability of organic matter etc), however two in particular are fixed, external overheads – cover crop seeds and soil organic matter measurement.

The following is an indicative overview of these costs per ha for the two levels (introductory and Intermediate) for the Arable Standard:

	Introductory	Intermediate (20% multi-species)
Cover crop*	£30-50	£50-80
SOM measurement (needed every 5 years)	£17-30	£17-30

**The 2020 AHDB maxi cover crop project[2] (Project report PR620) identified a cover crop cost ranging from about £30/ha for a simple straight oil radish to £80/ha for a 5 species mix.*

This does not factor in other associated costs – e.g. (herbicide/equipment) of removing the cover crop before sowing. Neither does it reflect the numerous (invisible) risks inherent in transitioning to a more sustainable, regenerative farming system – impact on crop, disease, and pest management etc.

When factoring the time and the costs involved, the payment rates scarcely represent a financial break-even for farmers. The current rates will make participation attractive for farmers who are already on a journey to sustainable farming, but not enough to incentivise those who need to make the fundamental shift and change their farming system, something the Government has already acknowledged: "*evidence from farmers already in the scheme that the current payments don't fully account for the costs of entering and implementing an agreement*."[3]

It is unclear how the calculations represent the income foregone + costs model. Since the figures underpinning this calculation have never been published, it is hard to assess what farm size/type they reflect which aspects have been under-calculated.

[2] https://ahdb.org.uk/maximising-the-benefits-from-cover-crops-through-species-selection-and-crop-management-maxi-cover-crop

[3] https://defrafarming.blog.gov.uk/2023/01/05/introducing-sfi-management-payments-and-changes-to-countryside-stewardship-rates/

We urge the government to review the SFI Standards payment rates to ensure they reflect a) all relevant costs and overheads (soil measurement, cover crop seed mixes etc) b) the cost of soil degradation (£1.2bn) and c) the value of the benefits generated. This would enable a clear understanding of whether the Standards offer value for money for scheme participants and the taxpayer.

We also call for greater transparency behind the calculations which underpin the Soil Standards, including the cost-benefit analysis/calculations carried out before the scheme was announced in 2020.

1. Take advantage of existing measurement tools

Whilst the Standards require farmers to carry out a soil assessment, the scheme is not prescriptive of how – despite calls from farmers for more clarity and guidance in this respect. The NFU's July 2022 Foundation of Food[4] report called for a simple set of soil metrics to be established, while the University of Plymouth social science research highlighted how farmers want clear, unambiguous protocols for measuring their soil.

Since the publication of the Standards, the AHDB has published in full its Soil Health Scorecard[5] (October 2022) - a set of practical physical, chemical, and biological soil health indicators for the routine measurement and monitoring of soil health, alongside benchmark values for these indicators (for crops and grassland).

The indicators and benchmarks provide a robust, simple, and visual framework that can help farmers to understand – and optimise their soil. They also have the potential to provide a gateway to a universal understanding of soils as well as the uniform collection of data by the government. When the Soil Standards first appeared, clarity about what data would be collected and how was promised under the Soil Health Action Plan for England – a Plan whose publication was subsequently abandoned.

We urge the government to actively signpost the AHDB Soil Health Scorecard and benchmarks as the preferred, universal mechanism for soil assessment and understanding. The scorecard should not be presented as a one-size fits all approach but a framework for interpreting soil health capable of aligning public incentives with assurance schemes and other sustainable farming schemes.

We also urge DEFRA to revisit its plans to clarify what soils data it plans to collect from farmers, in what format and timeframe, and how it plans to address any data ownership and sharing issues that will result.

2. Pay for measurement not interventions

A challenge with the SFI Soil Standards is how they sit alongside the emerging private marketplace for soil carbon.

Defra have indicated that they do not want Environmental Land Management (ELM) schemes to 'crowd out' private funding and investment, however many voluntary carbon market projects have 'additionality' clauses that essentially preclude participation in both public and private schemes if certain conditions are not met. Concerns that SFI participation might disqualify farmers from private markets are already disincentivising them from signing up to the scheme.

By way of example, because the SFI Soil Standards pay farmers to adopt carbon-positive farming practices (cover crops), participating farmers would be excluded from the private market because any project would fail the 'additionality' test - the principle that buyers/investors will only pay for carbon-sequestering activities that would not happen without carbon funding.

[4] https://www.nfuonline.com/media/mibfsfsm/nfu-the-foundation-of-food.pdf
[5] https://ahdb.org.uk/knowledge-library/the-soil-health-scorecard

We urge Defra to engage with private market players to better understand the legal and economic implications and develop an effective workaround enabling SFI and these schemes to work in harmony.

The SFI should address the 'additionality' challenge by disaggregating payments for soil organic carbon measurement from those for interventions. Separate Standards will enable farmers to take advantage of public money for measurement without disqualifying them from the private market. Interventions/practices that increase soil organic matter can then be paid for by the investors, in particular the food industry which shares with farmers a vested interest in long-term resilient supply (see below).

Farm soil carbon Standards for soil improving practices should be available to farmers who do not wish to enter the private marketplace, or whose farm system is not eligible.

3. Phase out low-integrity soil organic carbon measurement

Soil organic carbon testing is a welcome inclusion in the SFI Soil Standards as it is a critical soil health indicator. As it stands, less than 20% of farmers undertake monitoring of other soil health indicators such as Soil Organic Matter[6].

However, the long-term inclusion of soil organic carbon measurement is problematic for two reasons:

- DEFRA is paying for soil organic matter measurement while other soil health metrics (pH, MPK) are required by regulation (the Farming Rules for Water[7]). This sends a mixed message to farmers about their responsibility for understanding the overall health of their soils. It is also confusing from a practical standpoint since most laboratories offer a bundled soil-testing experience covering soil health (chemistry) and carbon.
- SFI guidance is not prescriptive about what soil organic matter tests the scheme will pay for but refers to 'Loss on Ignition' (LOI) as an option. LOI is a 'low integrity' measurement, adequate for testing a farmer's soil health for productivity/ecosystem service delivery purposes but not accurate or intense enough to detect measurable change in carbon stock over a period of time for carbon inventory purposes. This might be for national GHG accounting (e.g. to establish how the SFI has contributed to national Net Zero targets), for Voluntary Carbon Markets (Offsetting) or increasingly supply chain scope 3/GHG protocol measurement.

Critical differences between high and low-integrity measurements (as specified by the IPCC) are as follows:

	Low integrity (e.g. Sustainable Farming Incentive)	**High integrity (e.g. farm soil carbon marketplace)**
Technique	LOI/Elemental analysis	Elemental analysis
Bulk density	Estimated	Measured for every sample
Sampling	Can be famer led	Must be collected by specialist
Depth	One depth (0-30cm)	Two depths (0-30 & 30-60 cm)
No. samples /ha	1 per field (average c.7-8 ha)	0.5-2.5 per ha (to reflect farm size/soil variability
Compositing	Acceptable	Not acceptable

Whilst it is acceptable for the government to pay for low-integrity soil carbon measurement as an interim (e.g. 5-year) solution to engage farmers with the importance of soil organic carbon, in the long run this should be an expectation that farmers understand the state of their soils (including carbon) consistent with the 'polluter pays' principle. This interim period will also enable farmers to better understand the regulatory framework (the Farming Rules for Water) and identify other sources of income for their soils from private and supply chain sources.

[6] https://www.sheffield.ac.uk/sustainable-food/research/translational-transformative/ achieving-sustainable-soil-management-uk#Research%20findings

[7] https://www.gov.uk/government/publications/farming-rules-for-water-in-england

We urge the government to set a timeframe to gradually move away from paying for existing low-integrity soil carbon measurement, which instead should become (over time) a regulatory requirement, as part of the Farming Rules for Water.

4. Invest in high-integrity soil organic carbon (SOC) measurement

Instead of low integrity data, Defra should be paying for high-integrity soil measurement. This will generate accurate, robust data about soil's carbon removal potential, and provide genuine return on investment for the taxpayer by opening the door to private investment – specifically the £3.75 bn of private money needed for sustainable soil management identified by the Green Finance Initiative in its 2021 Finance Gap for Nature report[8].

As it stands, we see two likely barriers to the government investing in high-integrity measurement:

- **Concerns about the principles and practicalities of the offsets market**, partly due to prevailing, exaggerated claims about soil carbon's sequestration potential and perceptions of greenwashing. Whilst these concerns are valid, they should not be an obstacle to government investment because:
    a) High-integrity data will in fact make the market more robust and help counter inaccurate claims about carbon sequestration potential. Furthermore, investment in robust data will improve the accuracy of the models used to estimate sequestration potential in different landscapes - bringing down costs for farms of all sizes looking to participate in carbon positive projects.
    b) The growth in interest in robust soil carbon measurements is not from offsets, but from food and drink businesses looking to incorporate removals (insets) into their Scope 3 reporting – which increasingly requires high-integrity measurements (see GHG and SBTi Protocols), rather than modelling/emissions factor calculations. These businesses are farmers' customers and see carbon sequestration and permanent storage as crucial for long-term resilient food production, not just carbon accounting. In other words, high integrity data will underpin mutually supportive long term, sustainable farming relationships.
- **The costs associated with high-integrity measurement**: In fact, the emergence of new technologies means that the cost of sampling is closer to that of the low-intensity sampling the government is already subsidising. We would draw attention to Annex I which provides a cost comparison between different methodologies. Comparing columns C and D highlights how the government could be paying for high integrity data when they are already paying for low-integrity data.

Whether insets or offsets are at stake, Government investment in high-integrity measurement will send an important, leadership message and help kick-start the nationwide universal, robust measurements. This is already being done in Scotland, Australia and in particular Northern Ireland where the Soil Nutrient Health Scheme is carrying out soil sampling and carbon analysis to estimate of the amount of carbon stored in their soils, hedgerows, and trees across the country.

We urge the government to create a separate, new standard for high-integrity soil carbon measurement available to farmers that want to enter farm soil carbon markets for offset, inset or ecosystem service purposes.

[8] https://www.greenfinanceinstitute.co.uk/news-and-insights/finance-gap-for-uk-nature-report/

5. Invest in carbon storage

Carbon storage represents another significant challenge in the private marketplace for ecosystem services that the government should look to address.

- As it stands, farmers who have historically managed their soils well and so maintain high levels of soil organic carbon stock will be particularly disadvantaged by the new farming regime. Like their peers they will lose their basic payments, but unlike their peers they will be unable to participate in the emerging carbon market since their soils will be at or close to SOC saturation levels – meaning they cannot sequester more carbon. The private sector is interested only in 'additional' carbon sequestration and is unable to pay for carbon maintenance.

  As a result of this market imbalance, some farmers are feeling pressure to plough up and deliberately release carbon to make their land eligible.

- Another challenge from the private marketplace is farmer concerns about 'long permanence period' conditions. There is a significant gap between what farmers and carbon buyers consider reasonable in terms of the contract period for carbon certification, credits, and revenues. Buyers can look for permanence periods of up to 100 years, while farmers are generally unwilling to commit to anything longer than 10 years.

To address these challenges, the government needs to recognise the public good of long-term soil carbon storage – one that cannot be achieved by market forces. SOC is a key component in soil health, and maintaining high levels of SOC, which requires often decades of dedication, learning, experimentation, labour and capital investment – should be considered a public good to society, similar to maintaining e.g. species rich hay meadows to support biodiversity.

Such recognition would also be consistent with the growing appreciation within the UK political system of a resilient, domestic food system, shorter supply chains, and food security - maintaining the availability of food in face of increasingly common extreme weather events and trade disruptions is key to avoiding empty shelves on supermarkets.

There is precedent here. The EU in its proposal for Certification of carbon removals[9] calls for future schemes *to positively recognise the action of first movers who have already engaged in carbon removal activities*. For further in-depth information on payment for soil carbon storage please see Annex II.

We call for the government to explore new mechanisms for rewarding farm soil carbon storage. This might include establishing three tiered 'options' into the new Countryside Stewardship scheme, inspired by the GS8/GS7/GS6 options for species rich hay meadows, specifically:

CF3: Creation of high carbon arable soils
CF2: Regeneration of high carbon arable soils
CF1: Maintenance of high carbon arable soils

The Sustainable Soils Alliance, with input from Professor Guy Ziv (University of Leeds), Professor Mark Reed (SRUC) and Annie Leeson (Agricarbon). An earlier draft of this briefing note was presented to the DEFRA SFI, Green Finance and Soils teams at a workshop in May 2023.

[9] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13172-Certification-of-carbon-removals-EU-rules_en

Annex I: Cost comparison

The following table provides an overview of the likely costs for annual farm soil measurement per field according to 4 'scenarios':

- Soil health only, conventional methods
- Soil health + Basic Soil Carbon assessment, conventional methods
- Soil health + Full Soil Carbon Stock Baseline (MRV protocol compliant), Agricarbon
- Soil health + Full Soil Carbon Stock Baseline (MRV protocol compliant), conventional methods

	Soil Health + SOM% Testing, conventional	Soil Health + Basic SOC% Testing, conventional	Soil Health + Full SOC% Testing, Agricarbon	Soil Health + Full SOC% Testing, Conventional
	A	B	C	D
Sample collection - SOC (£4/sample)	£60.00 (0-30cm)	£60.00 (0-30cm)	*Included in figure below* (0-30 & 30-60cm)	£240.00 (0-30 & 30-60cm)
LOI Analysis x 1 (15 samples composited)	£10.00	n/a	n/a	n/a
SOC Analysis x 3 (dumas x £12 each)	n/a	£36.00 (3 locations, composited)	*Included in figure below*	£360.00 (15 locations, not composited)
Basic Nutrients (N,P,K, ph etc) One result per field	£27.50	£27.50	£45.00	£27.50
Bulk Density (£20 per sample, x 3)	*n/a*	£60.00	*Included in figure below*	£600.00
SOC+BD end to end (Agricarbon only)	n/a	n/a	£225.00 (15 cores)	n/a
Handling (compositing, posting etc)	£20.00	£40.00	*Included in figure above*	£150.00
Expenses + margin ???	£30.00	£40.00	*Included in figure above*	£250.00
Total Costs per field	**£147.50**	**£263.50**	**£270.00**	**£1,627.50**
Cost per ha, assuming 8.5 ha	*£17.35*	*£31.00*	*£31.76*	*£191.47*

The calculations are based on the following assumptions:

- Calculations are based on an average-size farm scenario of 85ha and 10 fields (8.5ha average field size)
- For all samples, collection and laboratory analysis are outsourced
- Costs do not distinguish between farm types (e.g. arable vs grassland)
- Source: various providers, including Scottish national soil testing scheme
- 2 x sampling depths: 0-30cm, 30-60cm reflect IPCC guidelines

A: Soil health only, conventional methods = £1,475 per farm

- Outsourced sample collection + laboratory analysis
- Price per field: £147.50 per field (source: various providers, including Scottish national soil
- 1 x location per field after compositing samples
- 1 x sampling depth (e.g. topsoil)
- Basic nutrients + **Loss on Ignition for SOM** (no bulk density)

B: Soil health + **Basic Soil Carbon assessment**, **conventional methods = £2,635 per farm**

- Outsourced sample collection + laboratory analysis
- Price per field: £263.50 (source: various providers, including Scottish national soil testing scheme)
- Price per ha = £31.00
- 3 x locations per field for SOC and BD (lab estimate only) and single basic nutrients test, compositing of samples.
- 1 x sampling depth
- Basic nutrients + **SOC% (Dumas) + Bulk Density**
- Not a baseline to deliver change

C: Soil health + **Full Soil Carbon Stock Baseline (MRV protocol compliant)**, **Agricarbon methods = £2,700 per farm**

- Agricarbon sample strategy design, collection, logistics, preparation, and analysis (full end-to-end service)
- Price per field: £270.00 per field (assuming April 2023 price increase due to inflation)
- Price per ha = £191.47
- 15 x locations per field (no compositing) for SOC & BD, and single basic nutrients test
- **2 x sampling depths (e.g. IPCC guidelines; 0-30cm, 30-60cm)**
- **SOC% (Dumas) + Bulk Density for every sample + Basic nutrients**

D: Soil health + **Full Soil Carbon Stock Baseline (MRV protocol compliant)**, **conventional methods = £16,275 per farm**

- Outsourced sample collection + laboratory analysis
- Price per field: £1,627.50 per field (source: various providers, including Scottish national soil testing scheme)
- Price per ha = £31.76
- 15 x locations per field (no compositing) for SOC & BD, and single basic nutrients test
- **2 x sampling depths (e.g. IPCC guidelines; 0-30cm, 30-60cm)**
- **SOC% (Dumas) + Bulk Density for every sample + Basic nutrients**