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Environment, Food and Rural Affairs Committee

Soil health

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Summary

Soil is a natural resource that is integral to various ecosystem services, such as food production and flooding mitigation. Healthy soils are necessary for meeting our climate and biodiversity goals and protecting the health of our population. Despite its importance, evidence suggests that human activity is putting the health of our soils at serious risk. It is critically important to course-correct over the coming years to secure our food supply, bolster our natural environment and preserve life on earth.

Immediate action is hampered by a lack of agreed soil health indicators as well as limited data on soil management and soil health. The Government has initiated programmes that will go some way to resolve this issue, culminating in a soil health map by 2028. We encourage the Government to establish its promised soil health indicators by 2024 so that all stakeholders can start working towards common goals. This would also allow the Government—as well as its arm’s-length bodies—to monitor progress and the impact of policies, particularly the Government’s Environmental Land Management schemes (ELMs). However, we believe that more could be done to provide earlier insights into soil health and gain a granular picture of what is happening both within and on the ground: for example, the Government’s ELM schemes could encourage the collection of standardised field-level data. It is also critical that funding for the monitoring programme is secured for the long-term.

Collecting this information and determining these indicators will be vital for the next important step: setting clear and measurable targets for improving soil health in England. To provide leadership, these targets should be a fundamental part of future iterations of the Environmental Improvement Plan—due by 2028—and be underpinned by a statutory requirement to make progress on improving soils to bring it in line with already existing targets for other important natural resources such as air and water. We also hope that the Government provides some clear leadership through the promised Land Use Framework, which should provide advice on the best uses of land as well as the trade-offs that may need to be considered, as land use is one of the most important factors that affect soil health and wider environmental outcomes.

The ELM schemes are the main vehicle through which the Government aims to improve soil management in the agricultural sector, which makes up around 70% of land use in England. Consequently, these voluntary schemes must be more widely accessible and more attractive to farmers than they are at present. We believe that the budget for ELM schemes should be increased to reflect the environmental benefits they bring and allow for an uplift in payment rates to drive take-up. By 2040, the Government should aim for nearly all agricultural land to be within an ELM scheme, underpinned by clear and agreed definition(s) of “sustainable soil management.” This will have to be a flexible, reasonable but stretching definition, agreed with other important stakeholders.

ELM schemes, however, cannot be the whole story. These do not address the other supply chain issues that drive unsustainable farming, such as the lack of profitability in the sector, unsustainable retailer and consumer demands and a need to boost the supply of a diverse range of organic inputs. A strategy is needed to address these problems.

It is also important not to rely solely on voluntary initiatives. To ensure the polluter pays and instil minimum standards, the Government must look towards a future regulatory framework for soils, informed by the agreed definition of sustainable soil management. This framework should initially come into effect after the agricultural transition—we recommend by 2035—so that the Government can focus on an incentive-based approach to improve its relationship with the farming community as well as collect the data needed to develop the framework. As ELMs and regulations are reviewed over time, these should be designed in lockstep with each other to strike a balance between rules and incentives: in the end, the former should focus on soil protection whereas the latter concentrates on soil restoration. This framework should contain adequate protections against soil contamination through organic inputs although we think that more needs to be done upstream, through policies such as Extended Producer Responsibility, to prevent contamination at source. A regulatory framework should also provide protections for soils across multiple land uses, not just in agriculture. For instance, the Government should consider whether the voluntary codes of practice for managing soil waste on construction sites should become mandatory to prevent soils going to landfill.

Any regulatory framework—as well as ELMs—will need effective compliance monitoring. The Environment Agency and Rural Payments Agency must be adequately resourced to ensure that these rules are followed: inspections need to become more routine, not just to catch the bad actors, but also so that land managers can benefit from the advice and support that the Government wants these organisations to provide. This work could also be enhanced by taking steps to improve the guidance, skills and education available so that land managers and their advisors have the tools they need to properly factor soil health into their decision-making. To achieve this, there should be a review of soil health skills and more investment into farmer-led research of sustainable agricultural systems as well as peer-to-peer knowledge exchange initiatives which have proved to be highly effective at sharing best practices.

1 Background and scope of inquiry

1. Soil is a vital resource that facilitates natural processes, a circular economy and food production. As well as helping to regulate the water we drink and the air we breathe,¹ soil is one of the world's most complex ecosystems, providing a habitat for the millions of microbes, invertebrates and other biodiversity that are often behind the benefits that soils provide.² Soil health is therefore fundamental to life on earth,³ and worsening soil health can have significant environmental, economic and societal consequences.

2. For example, soil degradation is associated with increased carbon emissions: it is estimated that UK soils currently hold around 9.8 billion tonnes of carbon, only around half of soil's carbon-storing potential.⁴ The Environment Agency's (EA) 2019 *State of the Environment* report also estimated that, in England and Wales, soil degradation⁵ was putting 4 million hectares of soil at risk of compaction as well as over 2 million hectares of soil at risk of erosion (which could take hundreds, or thousands of years to form again⁶). The EA concluded that soil degradation is therefore leading to increasing flooding risks and is threatening biodiversity, water resources and soil fertility, costing the economy £1.2 billion per year (based on 2010 figures).⁷

3. Soil degradation is a future risk area for food production,⁸ particularly since soil health is thought to improve agricultural climate change resilience.⁹ Other links to human health are not fully understood, but some evidence points to potential impacts of poor soil health on food quality, rising antimicrobial resistance, and food contamination.¹⁰ Poorer quality food may also be linked to worse gut microbiomes and chronic diseases,¹¹ which incur serious costs to healthcare systems. It has also been estimated that “75% of antibacterial agents and 60% of new cancer drugs approved between 1983 and 1994 had their origins in the soils,”¹² so the loss of biodiversity in soils could inhibit future drug development.

Why is UK soil health at risk?

4. Human activity often upsets natural land-water-air systems, leading to soil degradation.¹³ This occurs in a variety of contexts—including urban environments

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- 1 Cheng Kun et al. [The role of soils in regulation of freshwater and coastal water quality](#), Philosophical Transactions of the Royal Society B, 4 August 2021; Donna Giltrap et al. [The role of soils in the regulation of air quality](#), Philosophical Transactions of the Royal Society B, 4 August 2021
 - 2 Food and Agriculture organisation of the United Nations, [The State of Knowledge of Soil Biodiversity](#), 2020
 - 3 Natural Capital Committee, [End of Term Report](#), November 2020, p.29
 - 4 House of Lords Science and technology Select Committee, [Nature-based solutions: rhetoric or reality? - The potential contribution of nature-based solutions to net zero in the UK](#), 2nd Report of Session 2021–22, 27 January 2022, para 57
 - 5 In this report, this term refers to when soil health or quality diminishes
 - 6 House of Lords Library, [Soil Erosion: A Global Challenge](#), 21 January 2020
 - 7 Environment Agency, [The state of the environment: soil](#), June 2019
 - 8 Defra, [United Kingdom Food Security Report 2021](#), December 2021, Indicator 2.3.2
 - 9 Demos, [Sowing Resilience: unlocking the potential for regenerative farming](#), September 2023, pp16–7
 - 10 European Academies Science Advisory Council, [Opportunities for soil sustainability in Europe](#) September 2018, pp19–20; Food and Agriculture organisation of the United Nations, [State of Knowledge of Soil biodiversity](#), 2020, section 3.4.5; Brevik, E. C. & Burgess, L. C. (2014) [The Influence of Soils on Human Health](#), Nature Education Knowledge 5(12):1; [Qq165–166](#); Canterbury Christ Church University (SH0097)
 - 11 Croatan Institute, [The Regenerative Agriculture and Human Health nexus: insights from Field to Body](#), 2021
 - 12 HM Treasury, [The Economics of Biodiversity: The Dasgupta Review](#), February 2021, p63
 - 13 UN Convention to Combat Desertification, [Global Land Outlook](#), 2nd Edition, April 2022

through soil sealing,¹⁴ industrial activity, poor air quality and emissions¹⁵—but soil degradation is particularly associated with agriculture, due in part to the more intensive farming techniques that developed in the 20th century.¹⁶

5. There has evidently been a growing awareness of the wider aspects of soil health—beyond fertility—amongst farmers, who have a clear self-interest in ensuring that soils are healthy.¹⁷ To support this inquiry, we ran a survey of nearly 200 farmers to hear more about their experiences with soil health (see appendix A for more details): the vast majority of respondents had made changes to improve their soils in the past 10 years, motivated primarily by either a desire to reduce their reliance on inputs; a desire to improve productivity; or simply a general awareness of the importance of soil health.

Scope, definitions and structure of the report

6. Given its strong connection to soil, and the fact that it occupies around 70% of land in England, agriculture has been the primary, but not exclusive, focus of this inquiry. We include all types of agriculture, including arable, livestock, and the horticultural sector. We chose not to focus on certain types of soil although we acknowledge that there are specific factors at play in different soil varieties, such as peat.¹⁸

7. With over 700 types of soil,¹⁹ used in many ways to achieve different societal and environmental benefits, there are numerous definitions of “soil health”.²⁰ It is for Government, academia and industry to define soil health but, in this report, we acknowledge it is measured by many physical, chemical and biological factors including soil structures, microbiomes, nutrients and contaminants. We also do not attempt to define ‘sustainable’ soil management; many stakeholders support systems like ‘regenerative’ farming, ‘conservation’ agriculture and other ‘agroecological’ approaches but their relevance depends on the context, some farmers do not wish to be labelled as such,²¹ and some terms are poorly defined.²² We use the term ‘sustainable’ broadly in reference to those practices thought to be more environmentally friendly in specific contexts.

14 Covering the ground with an impermeable material, such as tarmac: Scotland’s Environment website (Scottish Environment Protection Agency (SEPA), [Indicator 13: Soil sealing](#), accessed 29 November 2023

15 Forest Research website, [Effects of air pollution on soil sustainability](#), accessed 29 November 2023; FAO and UNEP, Global assessment of soil pollution, [Chapter 8: Sources of soil pollution in Europe](#), 2021; [Q21](#)

16 This included more use of heavy machinery, more tilling, the removal of woodland and hedgerows and a significant increase in the use of artificial (inorganic) fertilisers and plant protection products

17 As noted during [Q74](#). We have also been in conversations with several networks of interested farmers through Linking Environment and Farming (LEAF) and the Nature Friendly Farming Network (NFFN).

18 Peat was not a focus of this inquiry because the Government already has an [England Peat Action Plan](#) and because the Lowland Agricultural Peat Taskforce did not report until much later into the inquiry.

19 Cranfield University website, [Mapping and understanding soil types across England and Wales](#), accessed 29 November 2023

20 For instance, in 2019, the EA was using the definition “the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans”: Environment Agency, [The state of the environment: soil](#), 2019; The Intergovernmental Technical Panel on Soils (part of the FAO) define it as “the ability of the soil to sustain the productivity, diversity, and environmental services of terrestrial ecosystems”: see FAO, [Towards a definition of soil health](#), September 2020

21 This has been mentioned in discussions with stakeholders, during visits to support this inquiry and has been noted by other organisations: for instance see Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023, p.27

22 For instance, several reports have talked about the varying definitions of ‘regenerative agriculture’: “[Will fmcg play fair with regenerative farming?](#)” The Grocer, 12 October 2023; Sustainable Food Trust, [The many meanings of ‘regenerative’ agriculture](#), 30 November 2022; [Regenerative farming: “The theory and the farmers doing it”](#) Farmers Weekly, 13 October 2021

8. After discussing the lack of soil health data in chapter 2, chapters 3 and 4 consider the Government's ambitions for change and policies being undertaken to incentivise or require better soil management in the future, particularly the Government's Environmental Land Management schemes. Chapter 5 looks at the regulatory landscape and considers whether we need better soils protections going forward. Finally, chapter 6 discusses the guidance, training and education available on soil health.

2 Soil data

A lack of data

9. While there are soil maps and agricultural land classifications that indicate the varieties of soil across the UK,²³ there has historically been a notable lack of soil *health* data. There have been calls for a national monitoring programme since at least 1996²⁴ and while the UK Centre for Ecology and Hydrology's (UK CEH) Countryside Survey previously provided an overall picture of soil health in Great Britain, it last reported in 2007, after which the project was no longer funded.²⁵ Academic institutions, farming assurance standard providers, laboratories and individuals working in land-based industries (such as farmers) do generate some data but it is difficult or expensive to access and compare these privately owned resources.²⁶ Most soil resources are also privately owned and there have been limited attempts at a national level to collect information on how soils are currently being managed. For instance, some national surveys provide limited information about the usage of agricultural inputs,²⁷ but regulators and Government do not routinely measure the potency and frequency of chemicals being applied to soils.²⁸

10. The Office for Environmental Protection (OEP) and environmental NGOs have argued that without a soil health baseline we cannot set or measure progress towards any targets for improvement.²⁹ We cannot quantify and prioritise threats without understanding the economic impact of soil degradation.³⁰ A poor understanding of effective soil management practices inhibits the ability of businesses and land managers—including farmers—to make more sustainable choices and investments.³¹ It also makes it difficult to assess soil health initiatives, including the Government's flagship Environmental Land Management (ELM) schemes.³²

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- 23 [Qq273–274](#). For more information about agricultural land classification, data on which are kept by Natural England, see the [Guide to assessing development proposals on agricultural land](#). The [UK Soil Observatory](#) (hosted by the British Geological Survey) has pulled together information to create one of the most comprehensive map of UK soils. Cranfield University owns the National Soil Map: although more detailed data must be paid for, some information is public via the [Soilscapes Viewer](#).
- 24 House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, paras 79–81.
- 25 UK Centre for Ecology & Hydrology, [Countryside Survey: Soil report from 2007](#), CS Technical Report No. 9/07, revised February 2010
- 26 Sustainable Soils Alliance ([SH0094](#)); Professor John Quinton (Professor of Soil Science at Lancaster University) ([SH0014](#)); LEAF (Linking Environment And Farming) ([SH0049](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); Soil Association ([SH0066](#))
- 27 Defra, [The British Survey of Fertiliser Practice](#), published 28 July 2022; Fera, [Pesticide Usage Surveys](#), accessed 29 November 2023
- 28 Friends of the Earth, [There's something wrong in the countryside: rising pesticide use in the UK](#), 5 June 2019; [Qq324–325](#)
- 29 Office for Environmental Protection, [Progress in improving the natural environment in England, 2021/2022](#), 19 January 2023, p.46; Compassion in World Farming ([SH0061](#)); The Wildlife Trusts ([SH0063](#)); Nature Friendly Farming Network ([SH0030](#))
- 30 British Geological Survey ([SH0033](#))
- 31 Arcadis ([SH0074](#)); [Q255](#); National Trust ([SH0028](#)); This was also a common theme in some of the comments to our farmer survey - see appendix A.
- 32 British Geological Survey ([SH0033](#)); [Q309](#)

The Government's soil monitoring programme

11. Two strands of government work aim to improve national soil data collection:

- a) The Government is developing an Outcome Indicator Framework to monitor progress with the 25 Year Environment Plan. Indicator E7 on “Healthy Soils” is still in development.³³ Written evidence submitted by the Department for the Environment, Food and Rural Affairs (Defra) in January 2023 suggested that this would be ready in 18 months.³⁴
- b) The Government has also started an England Ecosystem Survey (EES), part of the Natural Capital and Ecosystem Assessment Programme (NCEA).³⁵ The EES will include a soil monitoring programme for England. The Government intends to publish a “baseline map” of soil health by 2028.³⁶

12. Natural England and Defra told us that the soil monitoring programme is feeding into the development of soil health indicators. Data gathered will be made publicly available and put into a user-friendly format so that land managers can compare their own soil data to a baseline and use this information to guide their decision-making processes.³⁷

The funding and future of the soil monitoring programme

13. Funding for soil monitoring has historically been considerably less than that for water and air monitoring, representing only 0.41% of monitoring spend.³⁸ As Professor Gilliland, Special Adviser for the Agriculture and Horticulture Development Board (AHDB) told us, filling in knowledge gaps will require a serious, ringfenced financial commitment to soil monitoring: for instance, Northern Ireland's Department of Agriculture, Environment and Rural Affairs (DAERA) and the EU have budgeted £45 million and €350–450 million respectively over the next four to five years.³⁹ The NCEA's overall budget is £140 million, but that will also fund the analysis of other natural resources; Defra was unable to outline how much of this budget would be allocated to the new soil monitoring programme.⁴⁰

14. Previous soil monitoring programmes have been lost when funding streams have not been renewed⁴¹ and representatives from Natural England and the Environment Agency wanted to avoid soil monitoring becoming a “one-off exercise.”⁴² Rt Hon Mark Spencer

33 Defra, Outcome Indicator Framework for the 25 year Environment Plan, [E7 on “Healthy Soils”](#), last updated 2023. The Joint Nature Conservation Committee (a public body that advises the Government) has been working on this project and has published some exploratory work alongside Cranfield University: JNCC Report, [Towards Indicators of Soil Health](#), Report 737, June 2023. This refers to a “soil health indicator framework” underpinned by various measurements, rather than a single indicator.

34 Defra ([SH0080](#))

35 Defra, [Natural Capital and Ecosystem Assessment Programme](#), updated 5 October 2022

36 Hm Government, [Environmental Improvement Plan](#), 2023, p.180

37 [Q266](#); [Q362](#)

38 Sustainable Soils Alliance press release, [“Soil failure leaving public in dark over environment, scientists warn”](#), March 2020; Game & Wildlife Conservation Trust ([SH0076](#)); CPRE, the countryside charity ([SH0077](#))

39 [Q264](#), [Q269](#)

40 [Q363](#)

41 House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, para 80

42 [Q268](#)

MP, Minister for Food, Farming and Fisheries, was unable to confirm the long-term security of the programme but said that he would make a “robust and strong case to the Exchequer” to continue that support.⁴³

15. We are pleased that the Government is developing a set of soil health indicators and a soil health baseline. Data, and a common approach to measuring soil health, is essential for setting targets, tracking progress, evaluating the ELM schemes and understanding the merits of different interventions. The Government should develop these as soon as possible, particularly the soil health indicators which will underpin future policy development. Soil monitoring must also not be a “one-off exercise”: soils will always be a vital natural asset and changes to soil health can take place over many years.

16. *The Government must ringfence the funding for the soil health monitoring programme to ensure a long-term commitment to this precious national resource. This funding should be on the same scale as funding for the monitoring of other critical assets such as water and air quality. The Government should also finalise the soil health indicators by December 2024 at the latest.*

Calls for a more ambitious data collection system

Using pre-existing data

17. The Government states that its soil health map will not be ready until 2028, which will likely mean waiting until well after that date for an indication of soil health trends. To gain an earlier insight into trends and fill in this evidence gap, some argue that the new soil monitoring programme should adopt similar methodologies to previous national surveys or data already collected by landowners.⁴⁴ Others suggest that efforts could be made to collate and analyse data from archived samples and laboratories.⁴⁵ The Government has not formally announced a project to collate existing data, but Alan Lovell, Chair of the Environment Agency, announced a “Big Soil Stocktake” in November 2023 which calls for more data collaboration to support the NCEA.⁴⁶ The nature of this project is unclear, but it could go some way to addressing data deficiencies.

A need for more detailed and standardised data

18. The NCEA’s soil monitoring programme will provide a useful but “high level” perspective of national soil health.⁴⁷ More granular, field-level data would be valuable for stakeholders looking to understand highly reactive indicators like biodiversity; or for land managers wanting to compare their soil health data to similar contexts.⁴⁸ The AHDB, alongside other organisations,⁴⁹ also noted that the UK evidence base for effective farming interventions and systems is lacking or is too “deep and narrow.”⁵⁰ Farmers we have surveyed also wanted more support for detailed, long-term trials to better understand

43 [Q364](#)

44 NIAB ([SH0064](#)); National Farmers Union ([SH0082](#))

45 British Geological Survey ([SH0033](#)); Soil Benchmark ([SH0055](#))

46 Environment Agency, [The Big Soil Stocktake: closing the data gap](#), 2 November 2023

47 [Q271](#)

48 [Q272](#), [Q5](#), Cranfield University ([SH0088](#)); Nature Friendly Farming Network ([SH0030](#))

49 [Q27](#); [Q66](#); [Q99](#)

50 [Q335](#)

what works within localities.⁵¹ To fulfil this need for more localised and specific data, there have been calls to make better use of the data that farmers already collect on their fields⁵² and embrace a “citizen science” approach.⁵³ This could be captured via the Farm practices survey⁵⁴ or by collecting farming data held by laboratories and assurance standard bodies.⁵⁵

19. There is clear interest in developing a Government-funded and administered soil testing programme in a similar vein to Northern Ireland,⁵⁶ where DAERA’s Soil Nutrient Health Scheme—a requirement for accessing agri-environment schemes—is attempting to measure soil health in every field. The National Farmers Union (NFU) highlighted that such a scheme could accelerate the rollout of soil testing.⁵⁷

20. This project, however, took considerable time to develop⁵⁸ and was designed for a different context to that in England; Northern Ireland features predominantly grassland agriculture. A popular alternative approach that could deliver similar benefits is to adapt ELM schemes to pay for and feed field-level data into the national soil monitoring programme.⁵⁹ For instance, one of the ELM schemes, the Sustainable Farming Incentive (SFI—see chapter 4 for more details) will already pay for measuring soil organic matter; some have suggested that the SFI—or all ELM schemes⁶⁰—could pay for a wider range of soil testing than often undertaken by farmers, the costs of which can be off-putting.⁶¹ Many organisations also suggested that this would be a way to bring about data standardisation, a lack of which is a problem for those looking to benchmark progress.⁶² Currently, land managers and laboratories can choose from a variety of different soil assessments and testing techniques which yield results that are difficult to compare.⁶³

51 See appendix A for more details about this survey.

52 NIAB ([SH0064](#)); University of Leeds ([SH0087](#)); Soil Benchmark ([SH0055](#))

53 [Q142](#); Environment Agency ([SH0044](#)). Citizen science refers to when the wider public contributes to a scientific project, often through data collection.

54 Defra, [Farm practices survey](#), last updated 8 June 2023

55 NIAB ([SH0064](#)); [Q36](#); [Q227](#)

56 NSA ([SH0042](#)); Environment Agency ([SH0044](#))

57 National Farmers Union ([SH0082](#))

58 [Q259](#)

59 National Farmers Union ([SH0082](#)); [Qq35–36](#), [Q92](#); Cranfield University ([SH0088](#)); National Trust ([SH0028](#)); Soil Association ([SH0066](#)); CPRE, the countryside charity ([SH0077](#)); National Farmers Union ([SH0082](#)); The Nitrogen Collaboration ([SH0105](#))

60 Environment Agency ([SH0044](#)); University of Leeds ([SH0087](#))

61 CPRE, the countryside charity ([SH0077](#)); University of Leeds ([SH0087](#)); NRM, part of Cawood ([SH0035](#)); Nature Friendly Farming Network ([SH0030](#)); In our survey (see appendix A) only around a quarter of respondents rated the affordability of tests as “good” or “very good”. Around half were unsure about the affordability and another quarter rated them poorly.

62 University of Leeds ([SH0087](#)); Canterbury Christ Church University ([SH0097](#)); Bill Grayson (Organic Farmer at Morecambe Bay Conservation Grazing Co.) ([SH0098](#)); LEAF (Linking Environment And Farming) ([SH0102](#)); Compassion in World Farming ([SH0061](#)); Soil Association ([SH0066](#)); [Q256](#); Many of the farmers that responded to our survey noted that data collection techniques would need to be similar, if not the same, if they were to contribute to a national database.

63 Rothamsted Research ([SH0104](#)). For instance, as the AHDB explains, there are two main ways to test for soil organic matter - the Dumas and “loss on ignition” methods: see AHDB website, [Measuring soil nutrients, pH and organic matter](#) for more details. There have been efforts to establish best practices: ADHB’s GREATSoils project highlights best methods for soil assessments. This includes, as CPRE, the countryside charity ([SH0077](#)) highlights, useful tools such as the Soil Health Scorecard and the Visual Evaluation of Soil Structure.

21. Some have argued that data sharing could be encouraged in exchange for public funding of tests and assessments.⁶⁴ The collection of farm-level data into a national database could raise privacy concerns but evidence suggests that aggregation and anonymisation could address these issues.⁶⁵ Of those that responded to our survey question on this subject, half were comfortable to input their soil health data into a national database, with several comments acknowledging the potential benefits for benchmarking. 40% responded “maybe”, and only 10% said they would not, with many of those in the latter two categories chiefly concerned about costs, the administrative burden, data security and potential penalties.⁶⁶

22. Defra is focusing on helping farmers “inform themselves” and has no plans to incorporate farm-level data into the national monitoring programme, although Defra is engaging with the “citizen science community”.⁶⁷ When asked about the possibility of farmers feeding data into a national database, the Minister argued that, with a limited budget, it is more important to “get on the journey” for improving soils rather than “obsessing” with soil testing and comparisons, and questioned whether land managers would find data from different farms and soils useful.⁶⁸

23. Defra also believes the national indicators project will make data collection more consistent and talked about developing “a voluntary measuring and monitoring scheme for soil structure”.⁶⁹ Sion McGeever, Defra’s Deputy Director for Access, Landscapes, Peatland and Soil, told us that the UK Government would “provide the guidance and the standards to the farmers, so that they can do the measurements in line with the [Natural Capital and Ecosystem Assessment Programme].”⁷⁰

24. The soil health baseline will not be established until 2028 and determining trends from that data will potentially take longer still. Given the importance of soil health, we feel it is essential to take steps now to use existing soil data and identify priority areas of concern. Furthermore, unlike the Minister, we believe that comparing soil data is helpful at an individual farm level and that this data is vital for assessing the impact of ELMs. The Government’s Natural Capital and Ecosystem Assessment Programme should therefore be more ambitious and aim to collect more detailed, granular data to support land managers and inform future policy development. ELMs—as well as benefitting from more thorough data—could also be an effective mechanism for funding, standardising and collecting such field-level data. We are not convinced that guidance alone will be enough to sufficiently standardise soil tests and assessments around agreed metrics. However, this must be done in such a way to alleviate privacy concerns and avoid additional administrative burdens.

25. *By 2025, Defra should adapt the Environmental Land Management schemes to fund the testing and assessment of all key physical, chemical and biological soil attributes decided by the soil health indicators project. These schemes should only*

64 National Trust ([SH0028](#)) Soil Association ([SH0066](#)) National Farmers Union ([SH0082](#)) Bill Grayson (Organic Farmer at Morecambe Bay Conservation Grazing Co.) ([SH0098](#)). We also talked about this idea with researchers at Rothamsted Research ([SH0104](#)).

65 National Farmers Union ([SH0082](#)); [Qq151–153](#)

66 Our farmer survey: see appendix A.

67 [Qq370–372](#), Defra ([SH0080](#))

68 [Q373](#)

69 Defra ([SH0080](#))

70 [Q374](#)

support tests that are easy to use, cost-effective, and meet an approved standard, to collect more robust and comparable data. This must involve working with industry on suitable tests and assessments and collaborating with supply chain assurance standards to ensure farmers need only produce data for one common set of soil health tests. The ELM schemes should incorporate mechanisms to feed publicly funded data back into the soil health monitoring programme. This data and analysis should be anonymised, aggregated, secured and not be used to monitor progress on individual farms.

26. In order to gain an insight into recent trends, the Government should also, by 2026, commission and publish an analysis of existing soil health data held by third parties. This should be used to inform future policy development, including incoming iterations of ELM schemes.

3 Soils strategy and leadership

The Government's strategy for soils

27. Numerous stakeholders believe that the Government could demonstrate more national leadership for improving soil health. In 2021, the Government committed to publishing a Soil Health Action Plan for England (SHAPE) to clarify how it would work towards its goals for sustainable soil management, but the SHAPE was ultimately “incorporated” into the 2023 Environmental Improvement Plan (EIP),⁷¹ a key part of how the OEP scrutinises the Government’s progress.⁷² The EIP set out the Government’s plan to establish “comprehensive baseline data” for soils; a target for bringing 60% of soil under “sustainable management” through its ELM schemes; and plans to divert more soils away from landfill. The EIP also set out plans for restoring peatland.⁷³

28. The absence of a standalone strategy for soils is a disappointment to several environmental organisations,⁷⁴ many of whom argue that the specific needs of soils are lost due to a focus on air and water quality.⁷⁵ A lack of focus on soil is evident in the Environment Act 2021, which requires targets only for air quality, water, biodiversity and resource efficiency.⁷⁶

29. Many environmental organisations have called for the SHAPE to be revisited,⁷⁷ but a separate soil-specific document, in addition to the England Peat Action Plan and the EIP, could lead to competing and confused environmental, political and agro-economic goals.⁷⁸ The Government stated that delivering soil policy through the EIP means it could act “better and quicker”.⁷⁹ An alternative approach is to use a land use “framework” or “strategy”, as other nations of the UK are doing.⁸⁰ This could help stakeholders embrace the co-benefits from changing soil management practices, manage trade-offs between different

71 [HL Deb, 8 September 2022](#) col 363 [Lords Chamber]. The EIP was first published in January 2023: HM Government, [Environmental Improvement Plan 2023](#), updated 2 February 2023

72 As set out in the Environment Act 2021, section 28

73 This will be achieved primarily via ELM schemes but also through bans on its use in gardening and acting upon the recommendations of the Lowland Agricultural Peat Taskforce. The [Lowland Agricultural Peat Taskforce](#) was set up in January 2021. The findings and the Government response were published in June 2023, late in this inquiry. The Government agreed to or noted most of the recommendations, which included thinking more strategically about water management; using ELMs to support more peat on farms; and efforts to support partnerships and research to enable wetter farming. For more details see Defra, [Lowland Agricultural Peat Task Force Chair’s report: government response](#), published 29 June 2023

74 For instance, Game & Wildlife Conservation Trust ([SH0076](#)); Sustainable Soils Alliance ([SH0094](#))

75 [Q56](#); ClientEarth ([SH0086](#)); Soil Association, [Saving Our Soils](#), 2021, pp 40–42

76 Environment Act 2021, section 1. As noted by representatives from the British Society for Soil Science and the Society for the Environment [Qq38–39](#) and CPRE, the countryside charity ([SH0077](#)). While these aspects are part of soil health, there is no guarantee that they will improve soils: for instance, academics called for the Government to make it clear that the Government’s 30 by 30 target (protecting 30% of land and sea) includes biodiversity below the soil: Canterbury Christ Church University ([SH0097](#)). Martin Ballard (Society for the Environment) highlighted that policies such as Biodiversity Net Gain may not consider the “ecological value of the soil beneath”: [Q23](#)

77 [Q56](#); CPRE, the countryside charity ([SH0077](#)); LEAF (Linking Environment And Farming) ([SH0049](#)); Sustainable Soils Alliance ([SH0094](#)); Soil Association ([SH0066](#))

78 For instance, helping soils to recover by adding more organic matter and taking some out of food production may have implications for emissions as well as food security.

79 [Q345](#)

80 Scottish Government, [Land use - getting the best from our land: strategy 2021 to 2026](#), 24 March 2021; Welsh Government, [Future Wales: The National Plan 2040](#), 2021

desired outcomes⁸¹ and enable better matching of land use and soil capability.⁸² While most of the evidence we received was supportive of the “land use framework” approach, Professor Gilliland (AHDB) warned the Committee that such an approach risks being too “top down” and that policy should focus on “empowering” land managers.⁸³ Nonetheless, the Government has committed to publishing a land use framework in 2023,⁸⁴ stating that it will “bring greater alignment in policies affecting land”⁸⁵ and suggesting it will help guide local decision-making.⁸⁶ However, at the time of writing, this land use framework had not been published.

Targets and definitions

30. Another way that the Government could provide clear leadership for soil is through its targets. In the Government’s 25 Year Environment Plan, Defra said that it wanted all soils to be “managed sustainably” by 2030. Since then, this target has changed to having 70% of agricultural land in an agri-environment scheme by 2030.⁸⁷ This would be a significant increase from the current 34% estimated by the Government to be in such schemes,⁸⁸ although as the 2023 *State of Nature* report highlights, this does not mean that all this land could be classed as “nature friendly farming.”⁸⁹ As set out under the 2023 EIP, the Government expects this to mean that 40% of agricultural soil will be under “sustainable management” by 2028, increasing to 60% by 2030.

31. The Soil Association, the Sustainable Soils Alliance and a wide range of environmental and wildlife organisations have called the 2030 60% sustainable soils target a “downgrade” from the ambitions of the 25 Year Environment Plan and would like to see greater ambition⁹⁰ or even a restoration of the old target.⁹¹ Targeting 60% of the 70% of land used for agriculture in the UK will leave sizeable tracts unaffected by policy.⁹²

Defining targets

32. “Sustainable management” is not defined: this means the Government’s main soil target will be impossible to measure and open to interpretations that do not prioritise improved environmental outcomes.⁹³ There have been calls to set clear objectives

81 [Q94](#); [Qq23–24](#); [Qq59–60](#); Institution of Environmental Sciences ([SH0091](#))

82 [MK Soil Science Ltd](#) [[SH0046](#)]; [Q23](#); [Future biogas](#) [[SH0059](#)]; [Q59](#); Cornwall Council ([SH0021](#))

83 [Q263](#)

84 Defra, [Government food strategy](#), 13 June 2022; [Oral evidence taken on 24 January 2023](#), HC (2022–23) 622, [Q389](#) [Mark Spencer]

85 [HL Deb, 9 February 2023](#), cols 340–341

86 [Q421](#)

87 Defra, [Environmental land management schemes: outcomes](#), 6 January 2022

88 Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#), 21 June 2023. Other estimates from the environmental sector have suggested that it is only 21%: State of Nature Partnership, [State of Nature Report 2023](#), 2023, p.53

89 State of Nature Partnership, [State of Nature Report 2023](#), 2023, p.53

90 The Wildlife Trusts ([SH0063](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); Game & Wildlife Conservation Trust ([SH0076](#)); CPRE, the countryside charity ([SH0077](#)); Rothamsted Research ([SH0104](#))

91 [Q293](#)

92 [Q58](#)

93 [Nature Friendly Farming Network](#) [[SH0030](#)]; CPRE, the countryside charity ([SH0077](#)); Game & Wildlife Conservation Trust ([SH0076](#)); Office for Environmental Protection, [Progress in improving the natural environment in England, 2021/2022](#), 19 January 2023, p.47; [Q18](#); [Q22](#); [Q55](#); [Q287](#)

for ELMs⁹⁴ and for the Government to work with industry to define “sustainable management”.⁹⁵ Others—particularly academics—have recommended setting more specific and measurable targets, such as: increasing soil organic carbon; limiting erosion rates; reducing the use of pesticides and artificial nitrogen; increasing the amount of organically farmed land, or land subject to integrated pest management controls; and greater use of agroforestry.⁹⁶

33. In addition to defining more ambitious and clearer targets, the CPRE (the Countryside Charity) has called for any new soil targets to be better integrated into statutory targets,⁹⁷ the approach taken in Northern Ireland.⁹⁸ In England, the only related statutory targets under the Environment Act concern minimising nutrient pollution of water, nature recovery and biodiversity targets, but these are not specific to soil health.⁹⁹ Setting more specific targets without a soil health baseline would be a challenge, so the current targets may be necessary for the interim.¹⁰⁰ We note, however, that the OEP, to support its scrutiny of the 60% sustainable management target, has commissioned work to look into possible definitions of sustainable soil management “under different land use scenarios”.¹⁰¹ This work, due to be completed by March 2024, could be an important piece of this target-setting puzzle.

Targets for agricultural inputs

34. Much of the agricultural sector is hugely reliant on fertilisers and plant protection products (PPPs—often referred to as ‘pesticides’) to maintain production, despite their high costs to farmers. However, these artificial inputs consume finite resources and contribute to global emissions;¹⁰² can inhibit plant diversity;¹⁰³ and upset chemical balances, affecting the microbiomes that produce and maintain healthy soil.¹⁰⁴ This can lead to a “vicious cycle” in which degraded soils lead to poorer harvests and greater reliance on inputs to maintain yields.¹⁰⁵

94 National Trust (SH0028); Rothamsted Research (SH0104)

95 [Nature Friendly Farming Network](#) (SH0030); [Soil Association](#) (SH0066); CPRE, the countryside charity (SH0077)

96 Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) (SH0071); CL:AIRE (SH0072); The Soil Association (SH0103)

97 CPRE, the countryside charity (SH0077)

98 Northern Ireland’s Climate Change Act 2022, for instance, requires DAERA to produce 5-year climate actions plans that must include “soil quality” targets: Climate Change Act (Northern Ireland) 2022, [Section 32](#)

99 Defra, [Environmental targets consultation summary of responses and government response](#), 16 December 2022

100 Q288–9; AHDB (SH0031); Q94

101 HM Government, Contracts Finder: [Review of evidence: Sustainable Management of Agricultural Soils in England](#), 24 October 2023

102 Oil and electricity are needed to produce many fertilisers and some, such as phosphorus, have to be physically mined from rare deposits, meaning that the UK is reliant on particular foreign sources like Morocco. The UK Government has acknowledged that these dependences are a threat to food security in its [United Kingdom Food Security Report 2021](#), last updated 5 October 2023.

103 Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidora; PAN UK (SH0065)

104 The Nitrogen Collaboration (SH0105); Buglife - The Invertebrate Conservation Trust (SH0095); The Wildlife Trusts (SH0063)

105 The Wildlife Trusts (SH0063), Future Biogas (SH0059) (an anaerobic digestion business); Promessa Organic UK Ltd trading as Carbon Farm Hub (SH0016)

35. The use of inorganic inputs needs to be minimised and the Government aims, via its ELM schemes, to incentivise soil management techniques that can reduce their use, such as different cropping systems, better plant management methods and other Nutrient Management (NM) and Integrated Pest Management (IPM) actions. However, inputs will still be required, and another approach is to replace some artificial fertilisers with more organic alternatives like manures,¹⁰⁶ composts,¹⁰⁷ biosolids,¹⁰⁸ and digestate,¹⁰⁹ which provide a variety of benefits to soil health.¹¹⁰ Within ELMs, adding organic matter is no longer part of the SFI but organic farming is part of Countryside Stewardship (see chapter 4 for more details).

36. Many stakeholders welcome these incentives¹¹¹ but the voluntary nature of these actions is a cause for concern. The Nature Friendly Farming Network (NFFN) told us that “the IPM SFI standard provides a useful mechanism” but only if “higher ambition options are delivered at a wide scale.” The NFFN called on the Government to publish its new National Action Plan for the Sustainable Use of Pesticides,¹¹² alongside “specific time-bound reduction targets.”¹¹³ The Soil Association and the Lords Horticultural Sector Committee have similarly called for input reduction targets to drive progress.¹¹⁴ However, as Professor Spurgeon, Ecotoxicological Researcher at the UK Centre for Ecology and Hydrology, told us, identifying a reasonable but stretching target for reducing pesticides will be challenging and require the acceleration of new technologies and data gathering.¹¹⁵ We also recognise that targets for organic inputs will have to acknowledge the limited amount and variability of organic material available¹¹⁶ as well as the need to feed current population levels.¹¹⁷ As several academics told us, it is likely that a mixture of inorganic and organic inputs will be necessary in the future.¹¹⁸

106 Waste (excrement) created by animals that is reapplied to soils. When mixed with water for ease of spreading, it is known as “slurry”.

107 Generated during the composting process, where microbes break down matter in the presence of oxygen. This is an alternative method for tackling food waste but more often used for garden waste.

108 Treated sewage sludge, captured from wastewater.

109 Output from the industrial process of anaerobic digestion (AD), the preferred method for processing food waste, in which microbes break it down in the absence of oxygen. The process produces biofuels as by-product.

110 This includes adding carbon and organic matter as well as improving soil structures, microbiomes and micronutrients. [Q15](#); The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#)); TIPA (Compostable Coalition) ([SH0057](#)); [Q229](#); Future Biogas ([SH0059](#)); The Anaerobic Digestion and Bioresources Association (ADBA) ([SH0090](#)); [Qq185–186](#); [Q240](#)

111 For instance, Compassion in World Farming ([SH0061](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); Environment Agency ([SH0044](#))

112 The Government has consulted on a new [National Action Plan for the Sustainable Use of Pesticides](#) in 2020–21 which included plans to promote IPM through training and awareness raising; targets for “reducing the risks associated with pesticide use”; and improved indicators for usage and update of Integrated Pest Management uptake. A plan was due in 2022 but hasn’t been published.

113 Nature Friendly Farming Network ([SH0030](#)).

114 The Soil Association ([SH0103](#)); House of Lords Horticultural Sector Committee, [Sowing the seeds: A blooming English horticultural sector \(parliament.uk\)](#), report of session 2022–23, para 404

115 [Q181](#)

116 AHDB’s [Nutrient Management Guide](#) (updated 2021); [Future Biogas](#) [[SH0059](#)]. Some organic inputs, such as manure and compost, act more like a soil improver than a fertiliser. While in the long run, such inputs can significantly reduce the need for artificial inputs as they improve soil ecosystems, farmers might sometimes require more immediate results on crop growth. Organic inputs are also less predictable than artificial ones: their impact on soils and nutrient availability to crops varies greatly between different types of inputs and the feedstock that produced it.

117 [Q243](#)

118 [Qq188–189](#)

37. There is a lack of leadership and focus on soil health in Government policy. The awaited land use framework could certainly help but, given that the Environmental Improvement Plan (EIP) and the Environment Act targets are already the central focus of policy and scrutiny, we believe that it would be better to also focus these targets on soils, giving them equal status to air and water and therefore encouraging better integration of these interdependent elements of the environment. The next update of the EIP is due by 2028, a date by which a baseline map of soil health should be ready. This presents a perfect opportunity to update the EIP and the Environment Act targets to better incorporate soils; and for the Government to refine its target to get more soils under “sustainable management.”

38. *By May 2024, the Government must publish the new National Action Plan for Sustainable Use of Pesticides and its Land Use Framework. The Framework should provide clear guidance and leadership to stakeholders on the most effective uses for types of soils, and the trade-offs between different outcomes, such as increased biodiversity and improved food security. Once established, the Land Use Framework should be frequently updated to incorporate the latest data and also should be integrated into other government incentive schemes, such as ELMs, to reward sustainable decision-making.*

39. *Once a soil baseline and health indicators are in place, the Government must work with industry and academia to develop a set of binding and measurable targets for improving soil health in England, based primarily on the agreed soil health indicators, and giving a clear but realistic indication of how the use of agricultural inputs will be reduced over time. By the end of 2028, the Government should have amended the Environment Act 2021 section 1, subsection 3 to explicitly mention soil health, put soil on an equal, harmonised footing with water and air, and to bind future governments to these targets.*

40. *The 2028 Environmental Improvement Plan should incorporate and develop these new soil health targets and ensure that soil improvement features across all related sectors, particularly construction, planning and agriculture. Goals for biodiversity, waste, food security, land use and net zero should ensure that soil health plays a role in their delivery. The EIP should also aim for nearly all farmers and growers (90% or more) to be part of an ELM scheme by 2040, and work with the agricultural sector to develop clear, reasonable and measurable definitions of “sustainable soil management” within ELMs, which are adaptable to different contexts and that all participants should be strongly incentivised to adopt.*

4 Incentivising sustainable soil management

41. Supply chains often reward farmers more for productivity and meeting consumer demand rather than protecting the natural capital that healthy soils provide. Year-round consumer demands for produce and a “chronic” lack of profitability in farming¹¹⁹ have cemented the need for maximum production through intensive farming, a major cause of soil degradation,¹²⁰ and may encourage practices harmful to soil, such as harvesting in wet weather.¹²¹ Precarious farming incomes do not encourage a financially risky switch to sustainable land management practices that might reduce food production in the short term, require significant upfront investment, or that might need trial and error to get right due to England’s geodiverse landscape.¹²²

42. The Government, and organisations such as the NFU, hope that ELM schemes and private ecosystem service marketplaces¹²³ will make sustainable farming more profitable.¹²⁴ The Government aims to “raise at least £500 million per year of private finance for nature recovery by 2027 and more than £1 billion by 2030.”¹²⁵ To achieve this, it is developing private ecosystem service marketplaces for woodland, peat, biodiversity net gain and nutrient mitigation¹²⁶ and has commissioned the British Standards Institution to develop standards for nature investment markets.¹²⁷ As yet, however, many of these marketplaces are in their infancy, and have so far focused on sequestering carbon into soils.¹²⁸ This means that public finance, in the form of ELM schemes, will likely be the main driver of progress in the short to medium term.

Public finance: the Government’s ELM schemes

43. The Government’s Environmental Land Management schemes consist of the Sustainable Farming Incentive (SFI—a basic, accessible scheme to incentivise farmers to adopt more sustainable land management practices), Countryside Stewardship (CS—which will pay for more significant actions that deliver “local environmental priorities”,

119 Game & Wildlife Conservation Trust ([SH0076](#)); Sustain: the alliance for better food and farming ([SH0029](#)). As Sustain explain in their report, [Unpicking Food Prices](#) (Dec 2022), profit margins for some produce are very small for farmers: a loaf of bread, for instance, costs just over 9p to produce but the farmer receives negligible profit on a retail price of £1.14.

120 Future Biogas ([SH0059](#)); Compassion in World Farming ([SH0061](#)); The Wildlife Trusts ([SH0063](#)); Floodplain Meadow Partnership ([SH0083](#)); Sustain ([SH0100](#))

121 NIAB ([SH0064](#)); Game & Wildlife Conservation Trust ([SH0076](#))

122 National Farmers Union ([SH0082](#)); [National Sheep Association](#) [[SH0042](#)]; Sustainable Markets Initiative, Agribusiness Task Force, [Scaling regenerative farming: an action plan](#), 2022, pp19–20; Cornwall Council ([SH0021](#)); Agriculture and Horticulture Development Board (AHDB) ([SH0031](#)); Game & Wildlife Conservation Trust ([SH0076](#))

123 Agricultural ecosystem service markets are where businesses pay farmers for providing environmental outcomes, usually to lower the environmental impact of the buyer. Often this is orchestrated through a marketplace in which farmers make “credits” available for businesses to buy.

124 [Q313](#); National Farmers Union ([SH0082](#)); HM Government, [MISSION ZERO - Independent Review of Net Zero](#), January 2023, section 6.5; House of Lords Built Environment Committee, [The impact of environmental regulations on development](#), 2nd Report of Session 2022–23, paras 140–158

125 Defra, [Local nature recovery strategies](#), 30 June 2023

126 Natural England, [Nutrient Neutrality and Mitigation: A summary guide and frequently asked questions \(NE776\)](#), 23 June 2022; [UK Woodland Carbon Code website](#), accessed 29 November 2023; Defra, [Biodiversity net gain](#), last updated 29 November 2023; IUCN, [Peatland code](#) website, accessed 29 November 2023

127 British Standards Institution, [The Nature Investment Standards Programme](#), accessed 29 November 2023

128 [Q68](#); [Q70](#); House of Lords, Land Use in England Committee, [Making the most out of England’s land](#), Report of Session 2022–23, 13 December 2022, paras 79–101

such as habitat creation or natural flood management), and Landscape Recovery (LR—that will support large scale collaboration and long-term land use change). ELMs will pay land managers “public money for public goods” such as improved soil health. The transition from the legacy EU Basic Payments Scheme (BPS) to ELMs is expected to finish by 2028, although much of the SFI and renewed Countryside Stewardship “Plus” (an update of the previous scheme) will be in place by the end of 2024.¹²⁹ Defra published a list of expected actions in early 2023, giving an indication of what SFI and CS will look like.¹³⁰ Broadly, ELMs are welcomed as a good start for improving soils.¹³¹ The SFI scheme has garnered the most interest because it is designed to appeal to the widest range of farmers and contains “actions for soils” that target sustainable soil management.

Payment rate calculations

44. Payments under the SFI and CS are primarily based on payments for each of the land parcels entered.¹³² Defra states that payment calculations under ELMs are based on the “costs of achieving the outcome and/or the potential loss of income”. Despite stating that it would be “fully transparent” with these calculations¹³³ and publishing, in early 2023, payment rates for all expected actions under SFI and CS,¹³⁴ no information is available about the exact data and calculations behind these rates. This has been highlighted as a potential transparency issue.¹³⁵

45. Payments reward actions taken to farm more sustainably, not environmental outcomes such as increased soil carbon, although Defra has previously said it is exploring how ‘payments by results’ might be achievable for the higher ambition ELM schemes.¹³⁶ While an action-focused approach might neglect long-term environmental outcomes,¹³⁷ many environmental NGOs and farming organisations agree that payment by results would risk penalising farmers for events outside of their control,¹³⁸ fail to recognise the

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- 129 For more information on the schemes, see Defra press release, [Applications start for Sustainable Farming Incentive 2023](#), 18 September 2023; NAO, [The Environmental Land Management scheme](#), Session 2021–22, 15 September 2021 HC 664; Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#), updated 21 June 2023; Defra, [The Path to Sustainable Farming: An Agricultural Transition Plan 2021 to 2024](#), November 2020
- 130 Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#), updated 21 June 2023
- 131 Q57; Compassion in World Farming (SH0061); Q33; Professor John Quinton (Professor of Soil Science at Lancaster University) (SH0014); Sustain: the alliance for better food and farming (SH0029); Nature Friendly Farming Network (SH0030); Organic Research Centre (SH0047); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK (SH0065)
- 132 Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services: annex](#), updated 21 June 2023. Landscape Recovery is closer to a traditional, project-based government funding, in which applicants apply for lump, bespoke sums of money.
- 133 Defra, [Environmental land management schemes: payment principles](#), 30 June 2021
- 134 Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services: annex](#), updated 21 June 2023
- 135 Q114–115; Q57
- 136 Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#), updated 21 June 2023
- 137 Cornwall Council (SH0021); Arcadis (SH0074)
- 138 Q149

good work that many farmers have already done to grow food more sustainably¹³⁹ and be difficult to implement without a full understanding of the wider environmental impacts and co-benefits of soil restoration practices.¹⁴⁰

46. Concerns have been raised about the attractiveness of the ‘income forgone and costs’ model, which suggests that participating farmers would, at best, break even when joining a scheme. This provides little financial incentive to join, particularly for those less engaged with more sustainable soil management practices.¹⁴¹ Some, including this Committee,¹⁴² have highlighted that the payment rates do not cover the time spent doing an activity or the administrative costs that ELMs can incur¹⁴³ such as paying for business consultants and agronomists,¹⁴⁴ or paying companies to carry out soil tests and assessments.¹⁴⁵ Moreover, although some grants are available,¹⁴⁶ in general ELM schemes do not cover investment costs which are a significant barrier to introducing more sustainable soil management techniques.¹⁴⁷ Many stakeholders felt that these shortcomings were to blame for the slow uptake of the 2022–23 SFI Offer.¹⁴⁸

47. The Minister believed that SFI uptake had been “encouraging” and thought that more impressive take-up figures would be seen for the 2023–24 SFI offer. He stated that payments rates are “based on what we think we can pay to motivate people to do it”¹⁴⁹—not a set mechanism or algorithm—and he added that better soils would boost incomes through increased yields.¹⁵⁰ However, while it is true that better soil quality can, and often does, improve crop yields¹⁵¹ or reduce input costs,¹⁵² this is not a guaranteed outcome

139 [Q149](#); [Q282](#); [Q298](#)

140 Compassion in World Farming ([SH0061](#)); [Q149](#)

141 LEAF (Linking Environment And Farming) ([SH0102](#)); The Nitrogen Collaboration ([SH0105](#)); [Q85](#)

142 NAO, [The Environmental Land Management scheme](#), Session 2021–22, 15 September 2021, HC 664, para 79

143 [Q57](#); The Nitrogen Collaboration ([SH0105](#))

144 Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023, section 2.3; [Q138](#); It should be noted that a few of the SFI actions, such as the “Assess integrated pest management and produce a plan” action, does require advice from a BASIS trained agronomist and offer £989 for the assessment. However this is one of the few payments that aims to specifically pay for advisory services.

145 Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#)). Our soil health survey found that quite a few farmers contract an organisation to carry out soil testing.

146 ELM scheme participants can apply for a [Countryside Stewardship capital grant](#) or the [Farming Investment Fund](#) for some assistance with capital costs.

147 For example, farmers may want to purchase machinery that is less likely to compact soil, or better storage methods for organic inputs. These barriers are mentioned in or by: Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023, p.24; NSA ([SH0042](#)); National Farmers Union ([SH0082](#)); [Q240](#)

148 National Farmers Union ([SH0082](#)); Sustainable Soils Alliance ([SH0094](#)); McCain Foods GB ([SH0068](#)); The Wildlife Trusts ([SH0063](#)); Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#)); University of Leeds ([SH0087](#))

149 [Qq379–382](#)

150 [Q379](#)

151 British Sugar ([SH0056](#)); Professor Nick Voulvoulis (Professor of Environmental Technology and Deputy Head of Department at Centre for Environmental Policy, Imperial College London); Dr Bonnie Waring (Senior Lecturer at The Grantham Institute for Climate Change and the Environment and the Georgina Mace Centre for the Living Planet, Imperial College London) ([SH0019](#)); University of Leeds ([SH0087](#)); Canterbury Christ Church University ([SH0097](#)); [Q161](#); [Q210](#)

152 CPRE, [Back to the land: rethinking our approach to soil](#), 2019, p.24

for all farms, some of which may need to become less intensive to restore soils.¹⁵³ These benefits also may only be realised after a few years,¹⁵⁴ a financial loss that many farmers do not have the financial headroom to absorb.¹⁵⁵

ELMs and natural capital

48. Environmental organisations and academics have also highlighted that the payment rates do not reflect environmental benefits such as reductions in pollution and increased biodiversity, which is notable given that ELM schemes are designed to pay public money for public goods.¹⁵⁶ Echoing conversations we have had with farming representatives,¹⁵⁷ a study published by the RSPB, National Trust and Wildlife Trusts showed that to achieve nature recovery targets, the Government needs £4.4bn a year for sustainable farming rather than the £3.5bn on average that the Government spends on all agricultural subsidies (including, but not solely, the BPS and the ELM schemes).¹⁵⁸ When we put this criticism to the Farming Minister, he said he “hoped” that the payment rates reflected the environmental benefits and reemphasised that the payment rates are all about “pitching” the support at the right level to attract farmers.¹⁵⁹

49. **The Government’s Environmental Land Management (ELM) schemes are an important economic incentive to protect and restore natural assets, such as soils. Until private ecosystem marketplaces are fully regulated and established for a variety of soil health benefits, ELM schemes will be the main tool for encouraging the restoration of soil health. Most stakeholders believe that paying for sustainable practices is the right approach, although effective regulation and evaluation will be essential to ensure that they deliver the right outcomes. Attractive payment rates will also be crucial, rates many believe to be too low at present. Higher rates that reflect environmental benefits and additional costs could boost take-up, lead to further savings in the longer term, keep ELMs true to the ‘public money for public goods’ philosophy, and keep the Government on track to meet its targets. ELMs also do not, in general, address the capital investment barriers to more sustainable farming, although we recognise that some grant funding has been made available. The Government needs to keep a careful eye on this problem and come up with solutions if needed.**

153 Future Biogas ([SH0059](#)); Compassion in World Farming ([SH0061](#)); Soil Association ([SH0066](#)). This is not the same as calling for a decrease in overall domestic food production; it is often argued that to compensate for less land intensive farming, more livestock farms should be, at least in part, converted to arable land, which tends to be more efficient per calorie produced.

154 “‘No quick fix’ as regen ag leads to lower yields,” Farmers Weekly, 5 September 2023; Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023; Sustainable Markets Initiative, Agribusiness Task Force, [Scaling regenerative farming: an action plan](#), 2022,

155 Agriculture and Horticulture Development Board (AHDB) ([SH0031](#)); Game & Wildlife Conservation Trust ([SH0076](#)); National Farmers Union ([SH0082](#)), section 4.7; LEAF (Linking Environment And Farming) ([SH0102](#)). Around half the respondents to our soil health survey thought that the impact on yields was the biggest barrier to change.

156 For instance, [Q57](#); Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#))

157 [Qq120–126](#)

158 RSPB, the National Trust and The Wildlife Trusts, [Assessing the costs of Environmental land Management in the UK](#), 28 June 2023

159 [Q382](#)

50. *By 2025, the Government should commission and publish a review considering what financial barriers, including upfront investment costs, are preventing more sustainable farming systems. Based on these findings, the Government should develop, alongside the industry, measures to combat the problem. These could include enabling access to more upfront grants, more Government-funded advisory services, low-cost finance or encouraging the sharing and pooling of resources.*

51. *By 2026, payment rates for the Sustainable Farming Incentive and Countryside Stewardship schemes should be increased and calculated on the basis of income foregone, costs and an additional uplift for the public goods potentially provided. These payment rates should be developed using data collected under the Natural Capital and Ecosystem Assessment Programme and ELMs. Underlying methodologies used to calculate payment rates should be made publicly available.*

Access to ELM schemes

52. Some farmers may struggle to access ELM schemes, which could be a major barrier to improving soil health. This includes: farmers in non-arable farming such as moorland and grassland, which can also suffer, albeit often to a lesser degree, with soil health issues;¹⁶⁰ growers in the horticultural sector, which is becoming increasingly important as we move towards nature recovery and tree planting targets;¹⁶¹ and farmers with small holdings.¹⁶² Farmers with grazing rights on common land may also have problems accessing schemes.

53. There have long been concerns about how well tenant farmers—which farm around 64% of agricultural land in England (30% of the total land area)¹⁶³—can access ELM schemes.¹⁶⁴ Tenancy contracts can, and often do, prevent long-term, ambitious actions for soils, particularly those involving land use changes.¹⁶⁵ While the Government has taken positive steps to improve access to the SFI,¹⁶⁶ tenants will still need their landlord's permission for all CS agreements because they often involve land use change; the Government is hoping to support more joint agreements to make this happen.¹⁶⁷ The Rock Review of the tenant farming sector called for further action to enable access to ELM schemes, such as measures to require that landlord permission to any ELM schemes cannot be “unreasonably” withheld for tenant farmers wishing to engage with any ELM scheme or related business diversification. This would allow more land use change for environmental benefits.

160 National Trust ([SH0028](#)); [Q79](#); [Q190](#); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fida; PAN UK ([SH0065](#)); Agriculture and Horticulture Development Board (AHDB) ([SH0031](#))

161 Horticultural Trades Association ([SH0054](#)); [Q99](#)

162 Compassion in World Farming ([SH0061](#))

163 Oral evidence taken on 27 June 2023, HC (2022–23) 1307, [Q1 \[Baroness Rock\]](#); National Farmers Union ([SH0082](#))

164 Defra, [Rock review: Working together for a thriving agricultural tenanted sector](#), October 2022

165 [Q62](#); National Farmers Union ([SH0082](#)) section 1.1; [Q340](#); House of Lords Science and technology Select Committee, [Nature-based solutions: rhetoric or reality?](#) 2nd Report of Session 2021–22, HL Paper 147, paras 125–128

166 Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#), updated 21 June 2023; Agriculture and Horticulture Development Board (AHDB) ([SH0031](#))

167 Defra, [Government response to the Rock Review: by recommendation](#), 25 May 2023; [Qq395–398](#)

54. We are also concerned that significant numbers of farmers may struggle to access ELMs and so be unable to improve their soils. We are concerned about access for non-arable farmers, small-scale farmers, the horticultural sector, those with common land grazing rights and, in particular, tenant farmers. *While we welcome the progress made for tenant farmer access to the SFI, we encourage the Government to continue the monitoring of uptake amongst different types of farmers and take steps to remove barriers to all ELM schemes when identified.*

Environmental ambitions

55. Organisations that contributed to this inquiry were pleased to see a range of measures in the SFI that will be beneficial to soils, including actions for soils, hedgerows, integrated pest management and nutrient management. Many environmental and farming organisations are, however, concerned that ELM schemes as a whole—particularly the SFI, which is designed to appeal to the widest range of farmers—are not ambitious enough, and focus on a narrow set of actions that do not go beyond already well-established best practices.¹⁶⁸ Gaps identified in the SFI include:

- limited support for greater crop diversity and crop rotations¹⁶⁹
- no support for organic farming¹⁷⁰
- no measures to tackle often neglected¹⁷¹ soil structure problems such as soil compaction¹⁷² and over disturbance of soil through repeated tilling.¹⁷³

The Government is “exploring” how no-till and direct drilling, and other precision farming techniques, can be incentivised, as these can be a challenge for particular soils and crops such as field vegetables.¹⁷⁴

56. Some elements of the missing actions identified above are covered by Countryside Stewardship (for instance, organic farming) and yet more may be included in the “CS Plus” when it arrives in 2024. CS and LR schemes are larger in scale and are seen by some as having great potential for improving soil health.¹⁷⁵ The Government believes that these will help create “superhighways” of nature recovery through greater collaboration.¹⁷⁶ It is, however, unclear how much land is expected to be entered into the SFI, CS and LR

168 Sustain: the alliance for better food and farming ([SH0029](#)); Compassion in World Farming ([SH0061](#)); CPRE, the countryside charity ([SH0077](#)); [Q33](#); [Q57](#); [Nature Friendly Farming Network](#) [[SH0030](#)] and [Wildlife and Countryside Link](#) [[SH0065](#)]; [Q85](#)

169 CPRE, the countryside charity ([SH0077](#))

170 Soil Association ([SH0066](#)); Organic Research Centre ([SH0047](#)); Sustain: the alliance for better food and farming ([SH0029](#))

171 Rothamsted Research ([SH0104](#))

172 The Wildlife Trusts ([SH0063](#))

173 Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#)); CPRE, the countryside charity ([SH0077](#)); Professor John Quinton (Professor of Soil Science at Lancaster University) ([SH0014](#)); Game & Wildlife Conservation Trust ([SH0076](#)); Sustain: the alliance for better food and farming ([SH0029](#))

174 Defra blog, [Use min-till or no-till farming](#), accessed 29 November 2023; Defra, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#), updated 21 June 2023

175 [Environment Agency](#) [[SH0044](#)]; The Greenhouse Gas Removal Hub (CO2RE) and the GGR-D Programme, ([SH0048](#)); University of Leeds ([SH0087](#)); The Wildlife Trusts ([SH0063](#))

176 [Oral evidence taken on 24 October 2023, HC \(2023–24\) 705, Q254](#) [Dr Therese Coffey]

schemes. In January 2022, the Government stated that “at least 70% of farmland” would be expected to join the SFI by 2028,¹⁷⁷ but the 2023 Environmental Improvement Plan talks about 70% of farmers joining one or more ELM schemes by 2028.¹⁷⁸ The University of Leeds and the EA also highlighted that the CS scheme is more focused on biodiversity rather than soil health as a whole.¹⁷⁹ The Minister disagreed with this assertion, pointing to several measures in CS that help soils.¹⁸⁰ The most popular actions in CS have, however, so far focused on less ambitious actions related to field edges, which may be less likely to lead to significant soil restoration.¹⁸¹

57. Perhaps the most strident criticism from the environmental sector has been aimed at Defra’s new “pick and mix”¹⁸² approach for SFI and CS, in which farmers can choose any combination of actions and have no minimum size land parcels to adhere to. This is a new approach in the 2023 offer, following feedback from the farming community that found a previous “standards” structure difficult to work with.¹⁸³ Environmental organisations and academics have suggested that this might lead to a “sprinkling [of] pro-environment measures around the edges,”¹⁸⁴ limited to the small pieces of land that farmers choose to include,¹⁸⁵ and could ultimately produce a “piecemeal” approach.¹⁸⁶ Analysis from Natural England has also highlighted how similar free choice in earlier schemes led to “unacceptably high policy deadweight”¹⁸⁷ and even Defra has admitted that the “pick and mix” approach has proved incompatible with important soil health actions such as “adding organic matter,” “single species winter cover” and “minimise bare ground”, which have now been removed from the SFI.¹⁸⁸

58. Greater flexibility was welcomed by farming organisations, such as the NFU, who pointed out that inflexible standards can be a barrier to take-up if certain actions within a standard are impossible to deliver in certain contexts; they believe that farmers are best placed to make decisions about soil management.¹⁸⁹ Despite this, the NFU expressed a desire to work on a definition of “sustainable soil management” that is tied in to Government targets but that also takes local conditions into account.¹⁹⁰ Environmental NGOs and the EA took this argument further, suggesting that ELMs should incentivise, potentially through top up payments,¹⁹¹ a move towards “whole-farm minimum standards” (similar to the original SFI design)¹⁹² or, at the very least, combinations of reinforcing

177 Defra, [Environmental land management schemes: outcomes](#), 6 January 2022

178 Hm Government, [Environmental Improvement Plan 2023](#), 2023

179 [Q104](#); Environment Agency ([SH0044](#))

180 [Q389](#)

181 [Q104](#); Environment Agency ([SH0044](#))

182 Defra, [Find out what’s available in SFI](#), 23 June 2023

183 Defra, [Applications start for Sustainable Farming Incentive 2023](#), 18 September 2023; Defra blog, [Expanded offer of the Sustainable Farming Incentive to roll out from August](#), 23 June 2023

184 Elise Wach, [Environment plan for England asks farmers to restore nature – but changes are likely to be superficial](#), *The Conversation*, 3 February 2023

185 Compassion in World Farming ([SH0061](#)); CPRE, the countryside charity ([SH0077](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); Game & Wildlife Conservation Trust ([SH0076](#))

186 Organic Research Centre ([SH0047](#)); Nature Friendly Farming Network ([SH0030](#))

187 Natural England ([SH0081](#))

188 Defra, [SFI Handbook for the SFI 2023 offer](#), updated 21 September 2023

189 [Qq106–107](#); National Farmers Union ([SH0082](#))

190 National Farmers Union ([SH0082](#))

191 [Q105](#); [Q110](#); [Q113](#)

192 [Q66](#); Natural England ([SH0081](#)); McCain Foods GB ([SH0068](#))

actions across the SFI and CS that are more likely to deliver on soil health outcomes.¹⁹³ Some would like to see conversions to particular farming systems such as organic¹⁹⁴ or regenerative¹⁹⁵ farming—although as noted previously, these are often poorly defined. In addition, several environmental organisations, as well as the EA, called on ELMs either to increase in ambition over time¹⁹⁶ or encourage farmers to put greater portions of land into schemes.¹⁹⁷

59. We are pleased to see soils being targeted specifically as part of the new Environmental Land Management (ELM) schemes. While these measures are a good start, the measures in the Sustainable Farming Incentive (SFI) are basic and lack essential actions that are known to protect and enhance soils. The role of the Countryside Stewardship (CS) and Landscape Recovery (LR) schemes in improving soil health also needs to be clearer. Low initial ambition is understandable while the Government is focusing on increasing farmer engagement with ELMs, improving its evidence base and establishing soil health baselines. In the long run, as ‘sustainable soil management’ is defined, the Government needs to strike a better balance between giving farmers the flexibility to make choices that are right for their farm, incentivising the most sustainable combinations of actions, and getting more land into ELM schemes, in order to achieve positive soil health outcomes.

60. *Using an analysis of recent soil health trends, the Government should set out, by 2026, long-term plans for how ELM schemes will become more ambitious for soils. This should include:*

- a) *Putting all basic actions known to improve soils into the SFI if evidence suggests that the economic drivers are lacking to adopt such measures.*
- b) *Adapting CS so that it provides more attractive options which expand upon the basic soil actions in the SFI and offer a way for farmers to easily ratchet up their soil health ambitions.*
- c) *Working with the agricultural sector to develop a common understanding of “sustainable soil management”. By 2030, ELM scheme participants should be incentivised to combine SFI and CS actions that meet this definition. This definition should be flexible enough to allow for local innovation, experience and geodiversity.*
- d) *Setting a target for more than 90% of agricultural land to meet a definition of “sustainably managed” by 2040.*

193 Q66; Q101; Elise Wach, [Environment plan for England asks farmers to restore nature – but changes are likely to be superficial](#), The Conversation, 3 February 2023; Compassion in World Farming ([SH0061](#)); CPRE, the countryside charity ([SH0077](#)). Nature Friendly Farming Network ([SH0030](#)): the NFFN and Soil Association endorse steps that they believe work well together, including soil monitoring; increasing organic matter in soils; reducing tillage and chemical usage; soil cover all year round; and reducing compaction from machinery.

194 Organic Research Centre ([SH0047](#))

195 CPRE, the countryside charity ([SH0077](#)); McCain Foods GB ([SH0068](#))

196 Sustain: the alliance for better food and farming ([SH0029](#)); Environment Agency ([SH0044](#)); Compassion in World Farming ([SH0061](#)); Sustainable Soils Alliance ([SH0094](#)); The Wildlife Trusts ([SH0063](#)); Soil Association ([SH0066](#))

197 Game & Wildlife Conservation Trust ([SH0076](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); Nature Friendly Farming Network ([SH0030](#))

Evaluation and feedback

61. The Government's soil health initiatives need to have clear, monitorable targets to ensure they are having the desired impact. Evidence suggests that previous agri-environmental schemes have often lacked a full evaluation of their environmental outcomes.¹⁹⁸ In our last report into ELMs, we called for the Government to not only publish measurable objectives for ELMs, but also for a clear indication of how Natural England would evaluate schemes.¹⁹⁹ Although the Government did publish a set of outcomes for ELMs following our report,²⁰⁰ they are not measurable, as noted above. Furthermore, as the Sustain Alliance noted, there is still no published evaluation strategy²⁰¹ despite the fact the agricultural transition to ELMs is halfway through. To enable "constant evaluation" and improvements to the ELM schemes, the Sustainable Soils Alliance wants the Government to "establish a clear thread between guidance, practices, metrics and outcomes that will clearly demonstrate how ELMs, SFI and individual standards will contribute to the delivery of national environmental ambitions."²⁰²

62. There have also been calls to produce regular reports on SFI uptake²⁰³ and improve direct farmer feedback mechanisms within schemes,²⁰⁴ in line with the co-design principle behind ELMs.²⁰⁵ This could help tackle doubts amongst farmers about the effective delivery of schemes and also about Defra's commitment to consultation, doubts that both the NAO and this Committee have noted.²⁰⁶ However it should be recognised that ELMs—particularly the SFI—have been demonstrably changing in response to feedback about flexibility. The Minister highlighted that Defra already engages with farming organisations and a "group of farmers" from across the country.²⁰⁷

63. It is disappointing that the Government has not acted on our previous calls for a set of measurable targets and an evaluation programme for the Environmental Land Management (ELM) schemes. The impact of ELM scheme must be monitored more effectively than previous environmental management schemes to gain the benefits of the iterative approach. This would ensure that ELMs deliver positive outcomes for the environment, which paying for actions does not guarantee, and demonstrate that public money is being well spent. If this is done successfully, alongside seeking feedback from farmers, it would enable a better analysis of the impact that the ELM scheme actions are having, both independently and in combination with each other.

64. *By the end of 2024, the Government should publish an evaluation programme for ELMs. This should be designed alongside the soil health indicators so that they can consistently measure progress on soil health. It should also use anonymised and*

198 [Q102–3](#); Environment Agency ([SH0044](#)); State of Nature Partnership, [State of Nature Report 2023](#), 2023, p.56

199 House of Commons Environment, Food and Rural Affairs Committee, [Environmental Land Management and the agricultural transition](#), Second Report of Session 2021–22, 21 October 2021, para 46

200 Defra, [Environmental land management schemes: outcomes](#), 6 January 2022

201 [Q96](#)

202 Sustainable Soils Alliance ([SH0094](#))

203 Compassion in World Farming ([SH0061](#))

204 [Q103](#); NAO, [The Environmental Land Management scheme](#), Session 2021–22, 15 September 2021, HC 664, paras 3.13 - 3.14

205 Defra defines 'co-design' as a "design approach that actively involves users and stakeholders from the beginning of a project, right through to roll-out." See the Defra blog, [What we mean by "co-design"](#), 11 December 2020, for more details.

206 NAO, [The Environmental Land Management scheme](#), Session 2021–22, 15 September 2021, HC 664, paras 3.13 - 3.14

207 [Q390](#)

aggregated data collected by farmers and enable them to feedback into the system directly and regularly. The Government should also publish an annual report detailing: levels of uptake for each scheme; which actions participants are undertaking; how farmer feedback is influencing the development of ELMs; the impact on the environment, including soils; and how this is driving progress towards a set of measurable national targets for soils.

Addressing other economic drivers

65. The Institution of Environmental Sciences and academics suggested that a holistic approach to the whole food supply chain is needed to encourage more sustainable soil management.²⁰⁸ This may be especially important given that ELMs and other private ecosystem marketplaces are arguably only compensating for, rather than resolving some of the fundamental drivers of unsustainable soil management identified earlier in this chapter. Examples of some supply chain issues and potential resolutions are outlined below.

Synchronisation of assurance standards and other sustainability demands

66. Evidence to this inquiry and comments in our soil health survey indicate that many farmers already adhere to assurance standards like Red Tractor or must comply with soil management and measurement practices required by retailers to be retained as a preferred supplier.²⁰⁹ With no standard definitions of sustainable soil management or testing systems across these public or private initiatives, there is a significant risk that farmers will be required to duplicate efforts, which in turn could increase their costs or cause them to be pulled in opposing directions.²¹⁰ The OEP and other national and international organisations are considering how well these different standards are working and whether they could be better integrated,²¹¹ but various organisations have called for the Government and industry to work together to develop a more integrated approach and “raise the bar” on soil health measures, as the Environment Agency suggested.²¹²

Development of environmental food labelling

67. To encourage consumers to choose food that has been produced in sustainably managed soil, various organisations in the food and environment sector, as well as the Environment Agency, believe that we must develop robust environmental food labelling

208 University of Leeds ([SH0087](#)); Institution of Environmental Sciences ([SH0091](#))

209 NRM, part of Cawood ([SH0035](#)); McCain Foods GB ([SH0068](#)) - provided an example of its relationship with farmers; World Benchmarking Alliance, [Food and Agriculture Benchmark](#), October 2023; see appendix A for more information about our survey

210 NRM, part of Cawood ([SH0035](#)); “Will fmcs play fair with regenerative farming?” The Grocer, 12 October 2023; Global Farm Metric, [About the Global Farm Metric](#), accessed 30 November 2023; Agribusiness Task Force, [Scaling regenerative farming: an action plan](#), 2022, p.17

211 HM Government, Contracts Finder: [Review of evidence: Sustainable Management of Agricultural Soils in England](#), 24 October 2023; Global Farm Metric, [About the Global Farm Metric](#), accessed 30 November 2023

212 NRM, part of Cawood ([SH0035](#)); NIAB ([SH0064](#)); Q283; Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023, pp36–7; Sustainable Soils Alliance ([SH0094](#))

systems to enable consumers to make better choices.²¹³ This is a highly complex project requiring better data and, again, a consensus on what sustainable soil management looks like.²¹⁴ The Food Data Transparency Partnership, set up by the Government as part of its Food Strategy,²¹⁵ is looking to “establish a mandatory methodology for voluntary food eco-labels.”²¹⁶ It is not clear if soil health and management will be a part of this.

Profitability

68. As the Game and Wildlife Conservation Trust has said, “the supply chain has to allow more of the profit to get to farm level to allow for reinvestment in more sustainable farming methods, which can often 1) have large up-front costs 2) reduce yield, if only in the shorter term and 3) remove land from production.”²¹⁷ Making sure that farming is still profitable is also potentially a way to prevent the most productive land being taken out of food production; we are increasingly hearing that this problem is pushing more farmers to diversify into areas—such as solar energy—which may not be beneficial for soil health.²¹⁸ Responses to our survey have similarly underscored the profitability problem, for example:

“As a result of neglect and in pursuit of economic survival farmers have had to pursue short term policies that kept them afloat financially but were bankrupting the agronomic health of their farm.”

“Basically if farming was economically viable then soil health and management would be very close to the top of the list”²¹⁹

To bring about more profitable farming, the Sustain Alliance argues that the Government should introduce statutory supply chain codes of practice using powers under the Agriculture Act 2020 and “catalyse investment and growth in better and more diverse routes to market for farmers”.²²⁰

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- 213 Tetra Pak, [Food positive: driving change to decarbonise the UK food system](#), March 2023, pp13–4; Environment Agency ([SH0044](#)); [Q315](#); Floodplain Meadow Partnership ([SH0083](#)); Conscious Planet - Save Soil ([SH0099](#)); “[Brits blame ‘greedy’ supermarkets for higher costs of green living](#)”, The Grocer, 10 October 2023; Vypr, [Food for Thought. Does sustainability matter?](#) September 2023; [Agri-food businesses at risk of ‘greenwashing’ over unsubstantiated regen-ag claims](#), The Grocer, 20 September 2023; The Competition and Markets Authority is investigating “green” claims across many consumer items, including on food products: Competition and Markets Authority press release, [CMA to scrutinise ‘green’ claims in sales of household essentials](#), 26 January 2023
- 214 The Sustainable Food Trust, [Feeding Britain from the Ground Up](#), June 2022, p.108 and 119
- 215 Defra, [Government food strategy](#), June 2022, section 2.3
- 216 [Food Data Transparency Partnership website](#), accessed 30 November 2023
- 217 Game & Wildlife Conservation Trust ([SH0076](#))
- 218 “[The British farmers swapping sheep for solar panels](#)”, The Telegraph, 8 November 2023; “[A quarter of all farmers plan to cut production, says survey](#)” Farmers Weekly, 21 September 2023; CPRE, [CPRE statement on solar energy](#), 2 February 2022
- 219 See appendix A for more details about the survey. Many of the responses to the questions highlighted how financial factors were some of the primary motivators for thinking about soil health
- 220 Sustain: the alliance for better food and farming ([SH0029](#))

Incentivising organic inputs

69. While the Government believes that the economic drivers are already in place to incentivise the use of organic inputs,²²¹ the Chartered Institute of Wastes Management told us that a “holistic, systems-based approach is required to link Government’s resources and waste strategy with soil protection and enhancement.”²²² We have noted calls for:

- Assistance with transporting manures from areas of excess to areas that need them²²³ or encouraging a return to more mixed farming so that manures can be easily deposited back on arable land, where it is particularly needed.²²⁴
- More government support for on-farm storage facilities and application equipment that meets regulations; this would allow more precise and timely application and prevent valuable manure and slurry being rejected by farmers due to a lack of space.²²⁵ Government does provide some funding²²⁶ and Defra has promised that it will work with “farmers and innovators” to promote technologies for more efficient manure use.²²⁷ A recent review of novel fertilisers noted more research was needed to develop new approaches.²²⁸
- Standardising feedstocks for the organic recycling sector: particularly food waste which the Government will require to be collected from all household and businesses by 2026.²²⁹
- Diverting a suitable amount of food waste to compost production, rather than just digestate, as compost is thought to be a better long-term soil improver²³⁰ either through reviewing subsidies for anaerobic digestion²³¹ or encouraging more diverse organic recycling facilities.²³²

221 [Q414](#)

222 CIWM ([SH0092](#))

223 National Farmers Union ([SH0082](#)). There are nutrient pollution events around intensive livestock farms, suggesting these farms struggle with over-abundance of manure that could be redirected: Sustain press release, [Alarming levels of industrial animal waste poisoning UK rivers](#), June 2023; [“Livestock farming polluted rivers 300 times in one year”](#), BBC News, 16 December 2022

224 Combining arable and livestock on the same farm, sometimes referred to as ‘silvopasture’. This has been mentioned by Bill Grayson (Organic Farmer at Morecambe Bay Conservation Grazing Co.) ([SH0098](#)); Organic Research Centre ([SH0047](#)); The Wildlife Trusts ([SH0063](#)); Soil Association ([SH0066](#)); and [Q183](#). We have been told that it most efficient and environmentally friendly way to use manures ([Q332](#)). It also introduces grasses into rotations which can also bring benefits to soils and manage weeds ([Q212](#))

225 Future Biogas ([SH0059](#)); National Farmers Union ([SH0082](#))

226 Via its [Slurry Infrastructure Grant](#). Defra also highlights that its Farm Equipment and Technology Fund can help with storage and application of slurry.

227 Defra, [Integrated plan for delivering clean and plentiful water](#), 2023, p.46

228 Defra / ADAS, [Novel Fertilisers: a rapid evidence synthesis](#), revised September 2023

229 The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#)); Renewable Energy Assurance Limited ([SH0040](#)); [Q238](#): The country only recycles about 2 million tonnes out of the 9.6 million tonnes generated each year, so this is likely to be a significant growth area. However such organic inputs can suffer from microplastic contamination which these stakeholders would like to see reduced.

230 Digestate behaves more like a traditional fertiliser because it has a high nutrient content. Compost can improve soil structures and can help soils retain soil organic matter in the long-term, perhaps more effectively than manure. It can also add more micronutrients and its macronutrients can be more slow-release. [Q229](#); [Q240](#); The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#)); TIPA (Compostable Coalition) ([SH0057](#)); CIWM ([SH0092](#))

231 Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, [Green Gas Support Scheme](#), last updated 21 October 2023

232 [Q240](#); [Q247](#)

70. ELMs and the establishment of private ecosystem marketplaces do not tackle all the fundamental economic drivers of unsustainable soil management within the supply chain. We would like to see the Government set out how it will deal with the poor profitability within the sector, which is a barrier to more sustainable food production; take steps to ensure that assurance standards and contracts with retailers support a consistent and robust definition of sustainable soil management; and consider measures that will help consumers make more sustainable choices. The Government should also set out how it intends to boost supply and access to a diverse range of organic inputs, which are critical for improving soil health. Given that food waste is expected to be collected from all businesses and households by 2026, it is important to have a clear picture for the organic recycling industry before then.

71. *By mid-2025, the Government should develop an action plan setting out how it will make organic inputs a more economical choice for farmers. This should include measures that boost the availability and diversity of organic inputs to achieve soil health targets and ensure the organic recycling and agricultural sectors have the facilities and technologies to produce, store and spread a diverse range of organic inputs, including compost, digestate and biosolids. The Government also needs to support research into novel fertilisers and new technologies that can enable more use of organic inputs.*

72. *The next Environmental Improvement Plan, due by 2028, should incorporate this action plan. It should also set out how the Government will address other drivers in the wider food supply chain that encourage poor soil management. These include a lack of profitability in the sector and unsustainable consumer and retailer demands. To support this, the Government should work with industry to develop a common understanding of sustainable soil management that assurance standards and retailer-supplier agreements can adhere to. The Government should also ask the Food Data and Transparency Partnership to consider how this definition could be part of a future ecolabelling system in the future.*

5 Soil regulations

A regulatory framework for soils

73. Effective regulations ensure that the ‘polluter pays’ for adverse impacts on the environment, an important concept now embedded in the Government’s Environmental Principles Policy Statement.²³³ Several regulations contain provisions related to aspects of soil health.²³⁴ The most important include the Reduction and Prevention of Agricultural Diffuse Pollution (England) Regulations 2018/151, often referred to as the “Farming rules for water” (FRfW),²³⁵ which require farmers to manage nutrient inputs to protect watercourses. Nitrate Vulnerable Zones (NVZs) place additional requirements on fertiliser use in areas deemed to be “at risk from agricultural nitrate pollution” which equates to around 55–60% of land in England.²³⁶ Cross Compliance, rules that farmers must follow to receive payments under the legacy Basic Payments Scheme, also include some soil protection measures.²³⁷

74. Various issues have been identified in current soil protections: a 2021 study has indicated that the FRfW may reduce nitrate leaching losses, but cause other nutrient losses and emissions, failing to consider the “balance of risks” for water, air, and soil.²³⁸ Cross Compliance has been criticised for being limited in scope.²³⁹ The single largest issue raised by stakeholders, however, was that soil protections are contained in a patchwork of regulations, guidance and codes of practice, that often view soil health through the lens of other environmental assets, often water quality,²⁴⁰ and fail to address the range of threats they face such as wind erosion, soil compaction and biodiversity loss.²⁴¹ Finally, as Cranfield University highlighted, nearly 10% of land in England is at risk of soil degradation and is not subject to soil protections at all.²⁴²

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- 233 Defra, [Environmental Principles Policy Statement](#), 31 January 2023. From November 2023, the Government has to apply these principles when policymaking.
 - 234 ClientEarth ([SH0086](#)). There are other regulations that requires soil health impacts to be considered in decision-making for significant projects and preventing burning of crop residues and heather/grass.
 - 235 Defra and EA, [Rules for farmers and land managers to prevent water pollution](#), 2 April 2018
 - 236 Environment Agency, [2021 River Basin Management Plan](#), October 2019; Defra / ADAS, [Novel Fertilisers: a rapid evidence synthesis](#), revised September 2023. For an explainer on Nitrate Vulnerable Zones, see Defra and EA, [Nitrate vulnerable zones](#), last updated 17 September 2021;
 - 237 Principally under “Good Agricultural and Environmental Condition” (GAEC) rules 4, 5 and 6, although other GAEC rules can help soil health.
 - 238 ADAS, [Impact Assessment – Farming Rules for Water](#), June 2021
 - 239 The Wildlife Trusts ([SH0063](#)); House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, paras 55–69
 - 240 ClientEarth ([SH0086](#)); Soil Association, [Saving Our Soils](#), 2021; UK Centre for Ecology & Hydrology ([SH0034](#)); [Qq12–14](#); [Q49](#)
 - 241 Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#)); Soil Association ([SH0066](#)); Game & Wildlife Conservation Trust ([SH0076](#)); NIAB ([SH0064](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#))
 - 242 Cranfield University ([SH0088](#))

75. There have been calls for a more holistic or overarching regulatory framework that “puts soils on a par” with water and air, which do have their own specific regulations.²⁴³ Many environmental organisations and academics suggest that, once sufficient numbers of farmers have been onboarded into ELMs and more sustainable soil management becomes the “norm”, lower-level actions within them could become part of a future regulatory baseline along with Cross Compliance measures, which are being phased out. As ELM schemes become more ambitious, so could the regulatory baseline, an increasing “backstop” to prevent further soil degradation.²⁴⁴ Sustain, Client Earth and Natural England have suggested that eventually regulations should concern soil health *protection*, while incentive schemes focus on soil health *restoration* or exploring innovative techniques.²⁴⁵ Natural England believes that many of the SFI soils actions are already effectively a “minimum acceptable standard” and a good candidate for being part of a regulatory baseline.²⁴⁶

76. However, establishing a regulatory framework will require robust data on soils,²⁴⁷ definitions of sustainable soil management practices,²⁴⁸ and striking a careful balance between regulations, incentives and guidance, particularly since there are limited resources for monitoring compliance.²⁴⁹ Although the Environment Agency (EA) agrees that a new regulatory baseline for soils is needed, it emphasises that it must be crafted with care and “possibly not all at once.”²⁵⁰

77. Not everyone agreed that new regulations are the answer. John Williams, Head of Soils and Nutrients at ADAS (an agricultural consultancy), argued that awareness of, or engagement with, the rules can be more of the problem behind poor compliance.²⁵¹ The Agricultural Industries Confederation (a trade association for the agri-supply industry) stated that growing soil health awareness will ensure that progress is made; they also highlight that more advanced rules would need to be site-specific to be relevant, which they believe is impractical.²⁵² While Defra is reviewing current farming and land management regulations,²⁵³ its focus is its voluntary Environmental Land Management schemes, rather than a regulatory approach.²⁵⁴ However, as the Sustainable Soils Alliance explained, not all farmers will join ELM schemes and, even among those that do, not all will take on soil health related actions. The voluntary approach therefore risks soil “falling out” of ELMs entirely.²⁵⁵

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- 243 Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); [Q13](#); Soil Association ([SH0066](#)); Sustainable Soils Alliance ([SH0094](#))
- 244 [Q53](#); Sustain: the alliance for better food and farming ([SH0029](#)); Nature Friendly Farming Network ([SH0030](#)); The Wildlife Trusts ([SH0063](#)); [Q32](#); [Q51](#); [Q53](#); [Q154](#); [Q158](#); Compassion in World Farming ([SH0061](#))
- 245 Sustain: the alliance for better food and farming ([SH0029](#)); Natural England ([SH0081](#)); [Q64](#)
- 246 Natural England ([SH0081](#))
- 247 Agriculture and Horticulture Development Board (AHDB) ([SH0031](#))
- 248 Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#))
- 249 LEAF (Linking Environment And Farming) ([SH0049](#)); [Q281](#)
- 250 [Q320](#)
- 251 [Q221-2](#)
- 252 Agricultural Industries Confederation ([SH0023](#))
- 253 Defra blog, [Understanding and improving farming regulation](#), 2 March 2022; As an example, Defra has recently launched a consultation on how to regulate the protection of hedgerows as Cross Compliance is dropped: see Defra, [Protecting hedgerows in England](#), 28 June 2023
- 254 [Q384](#); [Qq401-405](#)
- 255 [Q66](#)

78. Current soil regulations contain significant gaps both within and particularly outside of agriculture. Historically, regulations have seen soil as a medium and vector for the pollution of other natural assets, so a wide array of soil health aspects are not protected. This situation is likely to get worse as Cross Compliance is phased out in 2024. While we acknowledge that most farmers want to do the right thing, a new soil protections legislative framework is needed as a backstop to address gaps, enforce the 'polluter pays' principle, and establish minimum acceptable standards for those who choose not to engage with the voluntary ELM schemes.

79. A new soil protections framework will be a major project and rely on data that is not yet available, suitable definition(s) of 'sustainable soil management', and engagement with a wide range of stakeholders. We also recognise that it is also a difficult time for farmers during the transition away from the Basic Payments Scheme. We agree that offering incentives to change is initially a better way to engage farmers with this potentially quite disruptive and costly transition to improved soil management. We also strongly believe that focusing on incentives for the time being will build a better relationship between Defra and the agricultural community. The Government is right to suggest that we should get a full understanding of how well the ELM schemes work before acting. We also believe, however, that some kind of regulatory baseline will be needed, likely one that prevents soil degradation wherever possible, while Government incentives concentrate more on soil restoration. Shifting incentives in this way will also only be possible once private sector initiatives are well established and other underlying supply chain issues are resolved. All this will take time.

80. *Using improved soil health and soil management data, as well as its evaluation of the success of the ELM schemes, the Department should work with industry, academics and regulators on a more robust regulatory baseline for soils. These regulations should be in line with any future soil health targets and any future definition of 'sustainable soil management'. This new regulatory framework should be consulted on, legislated for and clearly communicated before 2030, with provisions coming into force by 2035, to give land managers and owners time to prepare. The new laws would preferably take a combined approach with other areas, such as water and air quality but could take the form of a soil-specific regulatory framework. While agriculture should be an important focus, we would also like to see a framework offering protections for all types of soils.*

81. *In the agricultural sector, the regulatory baseline should be designed to work in tandem with ELM schemes. Initially it should incorporate most of the soil health actions in the Sustainable Farming Incentive, with all ELM schemes becoming more ambitious on soils. As the ELM schemes become more ambitious, so too should the regulatory baseline: we recommend that regulations and ELMs are reviewed every five years to ratchet up soil protections and incorporate the latest evidence on what works. In the long-term, the Government should aim for a situation where regulations prevent soil degradation and ELM schemes focus on soil and habitat restoration.*

Tackling contamination

The scale of soil contamination

82. In 2019, the Environment Agency estimated that 300,000 hectares of land are contaminated in England (out of a total of over 13m).²⁵⁶ Contamination has occurred due to legacy and current industrial pollution (particularly on brownfield land), as well as agricultural inputs and air pollution.²⁵⁷ Contamination can affect the soil's ability to produce food, support a balanced microbiome, purify water, regulate the climate and cycle nutrients.²⁵⁸ However the extent of the problem is not well known. The UK CEH, Natural England and the University of Leeds have called for more research and data to better understand the impacts of contaminants on soils.²⁵⁹ The British Geological Survey argued for a shared digital database of brownfield, contaminated land which could help local authorities measure potential net gains from remediating such soils.²⁶⁰

83. All agricultural inputs are thought to pose some contamination risks but there are some additional concerns about organic inputs as they can contain microplastics, pharmaceutical products, pathogens, and other trace elements consumed by humans and animals.²⁶¹ Manures (which are usually untreated) and sewage sludge (through mixing with wastewater and the variety of chemicals often flushed alongside it)²⁶² are thought to pose a particular risk. While not all environmental organisations agree,²⁶³ application to land of these wastes is the disposal route most compatible with a circular economy; Professor Karen Johnson (Durham University) and the CIWM believe that overall the benefits to soils outweigh the potential risks from trace elements.²⁶⁴ Britain recycles around 77–94% of treated sewage waste (biosolids) onto land,²⁶⁵ and increasing this to closer to 100% could provide a significant boost in supply—and potentially to soil health—but will rely on land managers having confidence that they are safe to spread.

Do the regulations for organic inputs work?

84. To be used freely, digestate and compost must adhere to the end of waste quality protocols which set the point at which waste management controls are no longer required.²⁶⁶ The EA is leading on reforms which will tighten the thresholds within quality protocols for contaminants allowed in final products.²⁶⁷ REAL's Compost Certification Scheme and

256 Environment Agency, [The state of the environment: soil](#), June 2019, p.14

257 FAO, [Global assessment of soil pollution](#), Chapter 5 and 8, 2021; NSA ([SH0042](#))

258 FAO, [Global assessment of soil pollution](#), Chapter 4, [Ecosystems impairment caused by soil pollution, 2021](#)

259 UK Centre for Ecology & Hydrology ([SH0034](#)); University of Leeds ([SH0087](#)); Natural England ([SH0081](#))

260 British Geological Survey ([SH0033](#))

261 FAO, [Global assessment of soil pollution](#), Chapter 3, Sources of soil pollution and major contaminants in agricultural areas, 2021; Canterbury Christ Church University ([SH0097](#)); Buglife - The Invertebrate Conservation Trust ([SH0095](#)); Compassion in World Farming ([SH0061](#))

262 The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#)); CIWM ([SH0092](#)); [Q329](#); Professor Jonathan Leake (Professor of Plant-Soil Interactions at The University of Sheffield); Dr Jill Edmondson (Senior Lecturer at Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#))

263 Fidra ([SH0037](#)); Compassion in World Farming ([SH0061](#))

264 [Q193](#); CIWM ([SH0092](#))

265 Sustainable Food Trust article, [Human manure: Closing the nutrient loop](#), 15 May 2015; Defra, [Wastewater treatment in England: data for 2020](#), 21 December 2022; Assured Biosolids, [About biosolids](#), accessed 30 November 2023

266 Environment Agency, [Quality protocols: converting waste into non-waste products](#), last updated 15 December 2020

267 The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#))

Biofertilizer Certification Scheme ensure that these products abide by the British Standard Institutions' Specifications²⁶⁸ to ensure they are safe for spreading. While biosolids must be treated as waste, they can be spread onto land and the voluntary Biosolids Assurance Scheme aims to ensure that sludge is treated according to acceptable standards and is spread appropriately.²⁶⁹ John Williams (ADAS) argued that the scheme ensures that "there is no untreated sludge going to land", meaning that "the risk from biosolids is very, very low".²⁷⁰

85. FRfW and Cross Compliance broadly set out rules to ensure that farmers apply organic inputs sustainably: at the right time and in the right conditions. As noted below, however, awareness and enforcement of these rules is limited. There is also a code of practice for spreading sewage sludge, which helps farmers follow the Sludge (Use in Agriculture) Regulations 1989 (SUiAR) and other laws and best practices, although this is broadly a "complex", "inconsistent" and in some instances "unregulated" area.²⁷¹ The Environmental Permitting Regulations (England and Wales) 2016 (EPR), which require potentially highly polluting organisations to acquire permits from the EA, include intensive pig and poultry farming, which generate a lot of manure.

86. Areas for improvement have been identified. Sustain has called for a future "action plan" that tackles soil contamination,²⁷² while Natural England and academics suggested that more testing and guidelines for safe levels of chemicals could be helpful.²⁷³ The CIWM points out none of these procedures and certificates are based on soil health impacts, and calls on the EA to work on a consistent approach that is "evidentially linked to soil health/functionality".²⁷⁴ The EA itself believes that sewage sludge regulations—much of which are 30 years old—are inconsistent and do not reflect modern practices and supply chains. It thinks that they should instead be brought into Environmental Permitting regulations, which would allow it to better limit the risks from biosolids.²⁷⁵ The EA's 2020 strategy for safe and sustainable sludge suggested these changes would be brought into effect by 2023, but this deadline has reportedly since been removed from the strategy.²⁷⁶

87. The Government has announced that it would consider extending the EPR scheme to dairy and intensive beef farms by 2025,²⁷⁷ but otherwise, when we talked to the Minister about his plans for tackling contamination, he stated that the Government would only "seek to encourage [good farming practice]" such as testing of organic inputs,²⁷⁸ suggesting a guidance or incentive-based approach.

268 Publicly Available Specification 1103 (PAS110) for digestate, and Publicly Available Specification 1004 (PAS100) for compost

269 Assured Biosolids, [Biosolids assurance scheme](#), accessed 30 November 2023

270 [Q249](#)

271 Defra, [Sewage sludge in agriculture: code of practice for England, Wales and Northern Ireland](#), 23 May 2018; CIWM ([SH0092](#)); Environment Agency, [Environment Agency strategy for safe and sustainable sludge use](#), updated 1 August 2023

272 Sustain: the alliance for better food and farming ([SH0029](#))

273 [Q176](#); [Q193](#); Natural England ([SH0081](#))

274 CIWM ([SH0092](#))

275 [Q329](#); Environment Agency ([SH0044](#)); Environment Agency, [Environment Agency strategy for safe and sustainable sludge use](#), updated 1 August 2023

276 "EA faces legal action over microplastics in sewage sludge" ENDS Report, 2 November 2023

277 Defra, [Integrated plan for delivering clean and plentiful water](#), 2023 p.45; [PQ 102538 \[on Agriculture: Standards\]](#) 12 January 2022

278 [Q418](#)

Rules for soil remediation

88. There are many ways in which soils can be remediated.²⁷⁹ Outside of requiring the polluting organisation or individual to cover the costs (if identifiable) or the owner (if able), the Government expects the planning system and local authorities to remediate contaminated soils. As the Environmental Audit Committee (EAC) highlighted in its previous *Soil Health* inquiry, the costs of this can be off-putting to developers, particularly in low-value areas.²⁸⁰ This can prevent remediation or lead to contaminated soils being landfilled and undermine progress towards the 2050 goal to achieve zero avoidable soil waste in the construction industry. Local authorities have a statutory responsibility²⁸¹ to identify and remediate land if no other liability exists but the EAC found that, after ring-fenced funding for this was absorbed into the Revenue Support Grant after 2017, there was a significant drop in local authority-led remediation efforts. The EAC called for the return of ringfenced funding.²⁸² The Government rejected this recommendation.²⁸³

89. Although local authorities must compile soil contamination registers,²⁸⁴ the EAC and responses to this inquiry have additionally called for more sophisticated data and reporting on soil contamination to help councils identify land of concern, understand the harms they cause and set out the value of restoring these soils, to incentivise progress.²⁸⁵ The EA has also called for more direct funding to regulators to tackle unaddressed soil contamination.²⁸⁶

Other approaches to preventing soil contamination

90. Other witnesses pointed to non-regulatory steps that could prevent or contain soil contamination such as embracing newer approaches that can make crops less reliant on inputs (such as gene edited crops or the addition of biofertilisers²⁸⁷), and using minerals that can make contaminants inaccessible to the broader environment and food chain.²⁸⁸ However, these were not proposed as alternatives to toughened regulations.

91. REA, Wildlife and Countryside Link, and the EA have made the case that the most effective measure would be to prevent contamination at source, for instance through more controls and incentives preventing plastics getting into food waste streams and contaminating digestates.²⁸⁹ This may require more policies to align whole supply chains

279 Canterbury Christ Church University ([SH0097](#)) and the waste business Enviva, (see [Treatment methods for contaminated soils](#), accessed 6 November 2023) explain various methods of soil remediation that are possible.

280 House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, para 11

281 Under part 2A of the Environmental Protection Act 1990

282 House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, paras 8–24

283 House of Commons Environmental Audit Committee *Soil Health: Government Response to the Committee's First Report of Session 2016–17*, Third Special Report of Session 2016–17, pp2–3

284 [Q46](#); A requirement under the Environmental Protection Act 1990

285 House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, paras 27–28; British Geological Survey ([SH0033](#)); Natural England ([SH0081](#))

286 Environment Agency ([SH0044](#))

287 ScienceDirect, [Biofertilizer - an overview](#), accessed 30 November 2023. Biofertilisers contain microbes that can help make nutrients more available to plants, so less inputs might be needed.

288 [Q177](#); [Q187](#); [Q196](#)

289 Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); Environment Agency ([SH0044](#)); The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#))

around sustainable principles; one such method is Extended Producer Responsibility which charges fees on producers according to the environmental impact of products they put on the market.²⁹⁰ This is currently being introduced for plastic packaging, and the Government has suggested that this policy could be expanded to other sectors.²⁹¹ The EAC, in its report on *Water quality in rivers*, has similarly called for Extended Producer Responsibility to be introduced for products that contaminate watercourses, such as hygiene products, and well as tyres and textiles, using powers under the Environment Act 2021.²⁹²

92. Soil contamination is a well-known yet not well-understood problem. There has been a longstanding and unacceptable failure to remediate historical soil contamination that acts as a barrier to nature recovery. As for contamination through agricultural inputs, the Government should also improve controls and protocols—both for their production and application—to give the sector more confidence to use these more freely. It is particularly disappointing that regulatory updates for sewage sludge have not yet happened. However, the most effective measure to tackle soil contamination is to prevent it in the first place.

93. *By the end of 2025, the Government and Environment Agency should review the current regulations for the production, testing and application of organic inputs to make sure that are delivering enough protections against soil contamination. This review should set out a plan for closing any gaps in protections by 2026/27.*

94. *The national soil monitoring programme should aim to gain a better understanding of the scale of soil contamination. To spur progress on nature recovery targets, this information should identify problematic areas that local authorities and developers are encouraged to remediate. Contamination data should also be used to develop Extended Producer Responsibility for products that pollute agricultural inputs, soils and water as soon as possible. The Government should publish a timeline for delivery by 2026, which should then be incorporated into the Environmental Improvement Plan update scheduled for 2028.*

95. *The Government should set up a soil remediation taskforce in 2024 to tackle the barriers to soil remediation. This should consider the role that new technologies can play with hard-to-remediate soils, as well as the provision of funding to either developers, local authorities or regulators to tackle the cases that the planning system and private sector are incapable of improving. The Taskforce's proposals should inform the updated Environmental Improvement Plan due by 2028, which should set out how soil remediation will help the Government make progress towards its nature recovery targets.*

Tackling soil waste

96. The Government's 2009 *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites* encourages responsible organisations to map out how excavated soils will be managed, redeveloped or relocated.²⁹³ Another voluntary construction code

290 Q248; OECD website, [Extended Producer Responsibility](#), accessed 30 November 2023

291 HM Government, [Our waste, our resources: a strategy for England](#), 2018, section 1.1.4

292 House of Commons Environmental Audit Committee, [Water quality in rivers](#), Fourth Report of Session 2021–22, paras 265 and 275

293 Defra, [Construction Code of Practice for the Sustainable Use of Soils on Construction Sites](#), 2009

of practice, the *Definition of Waste: Development Industry Code of Practice* (DoWDICoP),²⁹⁴ was developed by industry with the support of several Government bodies and helps the construction industry decide how to either dispose of or reuse excavated materials, like soil. Despite these, soil waste makes up 58% of the tonnage received by landfills—this equated to 58.5 million tonnes in 2018.²⁹⁵

97. The Society for the Environment has argued that the DoWDICoP is too complex, inconsistently applied, and offers little deterrence due to its “self-regulated” approach.²⁹⁶ A representative told us that the current system encourages excavated soil to be treated by default as a waste, rather than a resource.²⁹⁷ The Society suggests that “regulatory resources and active enforcement” could help improve industry compliance with the code, including a permit system to fund EA-led assessment reports, alongside a new soil legislation framework.²⁹⁸ Natural England has similarly highlighted that the Construction Code of Practice should be updated and made mandatory.²⁹⁹ The Society for the Environment, and others, also point out that there should be mechanisms to repurpose soil and divert it from landfill, through perhaps a “database of donors and receivers” or soil banks that could enable other organisations to make use of excavated soil.³⁰⁰

98. The Government’s 2023 Waste Prevention Programme for England announced a goal to reduce soil to landfill by 75% by 2040, and work towards “zero avoidable construction and demolition waste by 2050” including soils.³⁰¹ In 2026, the Government and its arms-length bodies will trial a Soil Re-Use and Storage Depot scheme. A “revised Code of Practice for the sustainable use of soil on construction sites” is also expected.³⁰² These actions are similar to some recommendations made to this inquiry by stakeholders, although as the Institution of Environmental Sciences argues, they may not “motivate change at the scale of urgency required” and stronger regulation would provide more “clarity” to the sector.³⁰³

99. We are pleased to see that the Government has announced plans to reduce the amount of soil sent to landfill. These reforms are an update to guidance and the trialling of soil storage sites, which stakeholders welcome but it remains to be seen if these are enough to bring about real change. Regulation may be required to make currently voluntary codes of practice mandatory.

294 CL:AIRE, [Definition of Waste: Development Industry Code of Practice](#), September 2008

295 Defra, [UK statistics on waste](#), 28 June 2023

296 Society for the Environment, [Soils and Stones: Sustaining Our Future By Influencing Change in the UK and Beyond](#), April 2021, p.12

297 [Q43](#)

298 Society for the Environment, [Soils and Stones: Sustaining Our Future By Influencing Change in the UK and Beyond](#), April 2021, p.16

299 Natural England ([SH0081](#))

300 L Long ([SH0073](#)); Professor Karen Johnson (Professor of Environmental Engineering at University of Durham); Professor Simone Abram (Professor at University of Durham); Professor Tony Roskilly (Professor at University of Durham); Dr Maggie Bosanquet (Low Carbon Economy Team Leader at Durham County Council); Mr Richard Hurst (Education Development Advisor – Sustainability Education at Durham County Council); Ms Lisa Hodgson (Impact Manager at University of Durham); Rachael Richards University of Durham (Director of Public Affairs at University of Durham) ([SH0020](#)); [Q184](#)

301 Although the Government gives no definition of “avoidable”, this target essentially follows the [Routemap for Zero Avoidable Waste in Construction](#), published by the Construction Leadership Council’s Green Construction Board in 2021. It sets out an expectation that by 2050, no soil should be sent to landfill “unless required for landfill operation purposes”.

302 Defra, [Environmental Improvement Plan 2023](#), 2023, p.181; [Q264](#)

303 Institution of Environmental Sciences ([SH0091](#))

100. *By 2027, the Government should review progress with the Soil Reuse and Depot scheme and revised construction codes of practice. This should include a consultation with stakeholders on whether these voluntary codes should become mandatory and regulated by an independent body or the Environment Agency. The revised 2028 Environmental Improvement Plan should incorporate any further actions the Government will take.*

Enforcement

Environment Agency

101. The EA is responsible for issuing permits under the Environmental Permitting (England and Wales) Regulations 2016 and enforces some soil-related regulations including the Storing silage, slurry and agricultural fuel oil (SSAFO), Farming Rules for Water (FRfW) and Nitrate Vulnerable Zones (NVZs) rules.³⁰⁴ The EA told the Committee that they focus on farms most at risk of impacting protected areas, and chiefly focus on farmyard infrastructure, manure storage and nutrient management. Officers will inspect 10% of fields “if time allows” but they will investigate particular areas if they have received a report of a soil management issue or identified a potential issue using remote technology.³⁰⁵ Early in this inquiry, several environmental and farming organisations highlighted that the EA inspected on average only one farm per day between April 2018-March 2020,³⁰⁶ equating to around only 2% of farms per year.³⁰⁷ The EA is now conducting more farm inspections, following the Government providing increased resources for monitoring and enforcement in the last spending review.³⁰⁸ However, the new target for 4000 farms per year³⁰⁹ is estimated to be only a marginal improvement to around 4% of farms.³¹⁰

102. The EA itself has told us that only the Environmental Permitting Regulations give the EA a “charging mechanism” to assess the spreading of fertilisers on the land. They have called for “better funding mechanisms”, following the ‘polluter pays’ principle, that allow the EA to monitor potentially polluting activities such as land spreading³¹¹ and add that “increased funding” would allow them focus more on soil and land management elements of the FRfW.³¹² Ministers have, however, denied that there is need for additional resources, adding that new technologies, such as satellite photographs, can help instead;³¹³ several environmental organisations have argued these technologies are not sufficiently effective at monitoring sustainability, particularly soil health.³¹⁴

103. In early 2023, the EA told us that overall “compliance with limited soil-related legislation is considered poor, or at best inadequately assessed,” with 31% of the farms inspected unable to “demonstrate adequate soil testing” under FRfW.³¹⁵ In 2022–23,

304 Environment Agency ([SH0107](#))

305 Environment Agency ([SH0107](#))

306 Nature Friendly Farming Network ([SH0030](#))

307 Soil Association ([SH0066](#))

308 [Q317](#); [Q318](#)

309 Environment Agency ([SH0107](#))

310 The Nitrogen Collaboration ([SH0105](#))

311 Environment Agency ([SH0107](#))

312 Environment Agency ([SH0107](#))

313 [Q408](#)

314 [“‘Quite easy by satellite’: Farm inspections unnecessary to ensure ELMs compliance, says minister”](#) ENDS Report, 21 February 2023

315 Environment Agency ([SH0107](#))

nearly 40% of the farms inspected were non-compliant with at least some regulations.³¹⁶ Awareness of current rules is part of the problem,³¹⁷ due in part to little promotional activity,³¹⁸ but many environmental organisations point to low levels of enforcement activity.³¹⁹

104. This is not necessarily because the EA lacks the powers to address non-compliance.³²⁰ Limited formal enforcement is a deliberate Government policy, as we have heard previously,³²¹ starting with informal conversations to improve compliance before moving to sanctions.³²² The EA states that their advice “usually results in farmers taking the action necessary to bring themselves into compliance”³²³ although we, and other organisations, have not seen much quantitative evidence to support this claim.³²⁴ Tony Grayling, Director of Sustainable Business and Development at the EA, suggested that this approach might change “as these rules become more established”.³²⁵ ClientEarth told this Committee that in 2020–21, out of over one thousand breaches, only a single sanction was made;³²⁶ in 2022–23, the EA issued 5,477 actions to farmers to address noncompliance and started enforcement against 144 farms.³²⁷ This does appear to suggest that the EA is taking more, if still limited, enforcement action.

Rural Payments Agency

105. The Rural Payments Agency (RPA), with support from the Animal and Plant Health Agency (APHA), is responsible for Cross Compliance visits under the old BPS, the enforcement of which has previously been found to be lacking.³²⁸ The RPA will continue to monitor compliance with ELMs using a “range of methods”, including documentation checks, site visits and remote monitoring.³²⁹ No detail has been published about the expected frequency and choice of the most appropriate checks.³³⁰ Unlike the EA, it cannot

316 Environment Agency ([SH0107](#))

317 Sustain: the alliance for better food and farming ([SH0029](#)); Nature Friendly Farming Network ([SH0030](#)); NIAB ([SH0064](#)); [Qq221–222](#)

318 Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); The Nitrogen Collaboration ([SH0105](#))

319 [Q52](#); [Q154](#)

320 The Agricultural Industries Confederation ([SH0023](#)) argues that the EA has sufficient powers to protect soils.

321 As we heard during our inquiry into the Farming Rules for Water, [Oral evidence taken on 11 January 2022 HC \(2021–22\) 927](#), Q51 [John Leyland, Environment Agency]

322 [Qq317–318](#); [Q407](#)

323 Environment Agency ([SH0107](#))

324 Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#))

325 [Q317](#)

326 ClientEarth ([SH0086](#))

327 Environment Agency ([SH0107](#))

328 As by the previous Environmental Audit Committee inquiry: House of Commons Environmental Audit Committee, [Soil Health](#), First Report of Session 2016–17, HC 180, 2 June 2016, para 55–69

329 Defra and Rural Payments Agency, [SFI Handbook for the SFI 2023 offer](#), last updated September 2023, section 5.3

330 The RPA told us that in 2022–23, they carried out 7,950 visits (and an additional 1,200 virtual visits), but this was not just for the BPS or new ELM schemes: see Rural Payments Agency ([SH0109](#))

issue fines for noncompliance; it can terminate agreements and take steps to demand the return of monies paid but Defra has made clear that visits are to be “supportive” rather than punitive.³³¹

106. While most criticisms we heard during this inquiry focused on the EA, some of the individuals and organisations we talked to were unsure how the RPA and EA are going to work together in the future to flag compliance concerns.³³² In 2021, the NAO expressed concerns that Defra has not set out a full strategy for countering fraud, which will require “appropriate monitoring, audit and reporting procedures” which should have been considered alongside policy design.³³³ Despite the launch of the SFI, we have not yet been given a full picture of how the RPA will ensure that public money is being spent wisely. It told us that it is still “testing opportunities to monitor actions required as part of SFI and CS which will help ensure the aims of the schemes are achieved.”³³⁴

107. **The Environment Agency and the Rural Payments Agency should continue to take an initially supportive approach when monitoring compliance, given the low levels of engagement and the fact that most farmers want to do the right thing for their soils. Follow ups will be essential to ensure that compliance breaches are being adequately addressed. If this “supportive” approach is, however, a key method of spreading awareness of farming regulations, then the inspections regime should also be boosted. We recognise that remote technologies and approaches will be able to help, and we are pleased that the EA has more funding to conduct site visits, but these still need to be more comprehensive and frequent; visiting just 4% of farms every year will not act as a deterrent to bad actors, nor help the farmers that could benefit from the “supportive” approach.**

108. **More monitoring will mean that these agencies need to be fully resourced. In the case of the Environment Agency, where funding for monitoring usually comes via the Environmental Permitting regulations, the Department needs to come up with ways of driving up this funding. This could be achieved by putting more activities under Environmental Permitting or by developing new systems for funding compliance visits.**

109. *The EA and the RPA should continue with the “supportive” approach to compliance monitoring. By the end of the agricultural transition in 2028, however, Defra and these institutions should publish a clear and transparent regime of comprehensive site visits and other actions that they will take to help farmers comply with rules, prevent fraud and ensure that compliance actions issued are followed. To ensure that any new regulatory soil framework is effective, and let farmers benefit more from the “supportive” approach they are taking, the EA and RPA should be adequately resourced so that farms can expect routine visits every few years. To achieve this, the Department and the EA will need to develop ways to increase funding for compliance monitoring.*

331 Defra and Rural Payments Agency, [SFI Handbook for the SFI 2023 offer](#), last updated September 2023, section 5.3

332 [Q50](#)

333 NAO, [The Environmental Land Management scheme](#), Session 2021–22, 15 September 2021, HC 664, para 3.5

334 Rural Payments Agency ([SH0109](#))

6 Local skills and guidance

Education, training and guidance

110. The Society for the Environment and others argue that more comprehensive, consistent and well-signposted training and guidance are needed to improve land management practices and soil health in a number of sectors.³³⁵ Ineffective agricultural guidance was mentioned by respondents to our survey, particularly the idea that it is often too ‘one size fits all’;³³⁶ similarly a variety of stakeholders have called for better quality guidance built into ELM schemes³³⁷ as well as impartial syntheses of evidence-led guidance, tailorable to local needs, and delivered by a trusted organisation.³³⁸

111. Education may also need reform: the National Trust has argued that agricultural training has had a narrow focus on nutrients and yields³³⁹ and various stakeholders have expressed fears that the education system is failing to train the next generation of environmental advisors and land managers to protect soil health as a whole.³⁴⁰ Natural England told us that soil science needs to be represented throughout the education system to address the “soil skills gap”.³⁴¹ More soil health related further and higher education courses may help and also be useful for wider society by, for instance, encouraging communities and local organisations to become advocates of healthy soil in planning or enabling sustainable consumer choices.³⁴² Others have called for more training for land managers,³⁴³ particularly training that focuses on “whole farm” approaches. Such holistic approaches—considering all elements of a farming business that impact soils—can better embed agroecological principles³⁴⁴ and are more likely to bring about positive soil health outcomes.³⁴⁵

335 Game & Wildlife Conservation Trust ([SH0076](#)); Society for the Environment, [Soils and Stones: Sustaining Our Future By Influencing Change in the UK and Beyond](#), April 2021, pp25–6; Rothamsted Research ([SH0104](#)); National Trust ([SH0028](#))

336 See appendix A

337 McCain Foods GB ([SH0068](#)); Sustain: the alliance for better food and farming ([SH0029](#)); Natural England ([SH0081](#)); Soil Association ([SH0066](#))

338 [Q172–3](#); [Q195](#); [Q82](#); [Q183](#); [Q213](#). This point was raised by some in our survey: see appendix A.

339 National Trust ([SH0028](#))

340 [Q139](#); Natural England ([SH0081](#)); This was also mentioned by participants at one of our site visits that supported this inquiry.

341 Natural England ([SH0081](#)). The Society for the Environment also talked of a general “skills gap”: see [Q40](#)

342 Professor Karen Johnson (Professor of Environmental Engineering at University of Durham); Professor Simone Abram (Professor at University of Durham); Professor Tony Roskilly (Professor at University of Durham); Dr Maggie Bosanquet (Low Carbon Economy Team Leader at Durham County Council); Mr Richard Hurst (Education Development Advisor – Sustainability Education at Durham County Council); Ms Lisa Hodgson (Impact Manager at University of Durham); Rachael Richards University of Durham (Director of Public Affairs at University of Durham) ([SH0020](#)); Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023; [Q54](#)

343 National Trust ([SH0028](#)); The Wildlife Trusts ([SH0063](#)); Natural England ([SH0081](#)); Arcadis ([SH0074](#)). The Lords Science and Technology Select Committee has made a similar point, calling for “ambitious skills and training programmes for land managers” that cover, amongst other things, nature-based solutions to restore natural ecosystems and restore carbon to soils - see House of Lords Science and technology Select Committee, [Nature-based solutions: rhetoric or reality? - The potential contribution of nature-based solutions to net zero in the UK](#), 2nd Report of Session 2021–22, 27 January 2022, para 28.

344 Compassion in World Farming ([SH0061](#)); Nature Friendly Farming Network ([SH0030](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidora; PAN UK ([SH0065](#)); Soil Association ([SH0066](#))

345 [Q66](#)

112. The Minister told us that the upcoming land use framework will help some local decision-making³⁴⁶ but the Government is also contributing to the development of a professional development body for the agricultural industry called the Institute for Agriculture and Horticulture (TIAH) which aims to remove the “fragmentation” of the “learning and skills landscape” and enable “greater uptake of skills”.³⁴⁷ The Government has also introduced T-Levels in Agriculture, Land Management and Production, which does cover sustainability.³⁴⁸ In addition, some guidance will also be developed to support soil testing under ELM schemes³⁴⁹ and Natural England is also scoping a project to provide “decision support” for land managers and advisers so they can optimise land use to deliver environmental outcomes such as improved soil health.³⁵⁰ There is, however, a notable lack of detail on all of these measures.

Advisory services

113. Access to expert and trusted advice on soil health is important in any sector that involves the design of natural and built assets³⁵¹ and will also be essential for developing natural capital pricing underpinning future ecosystem service marketplaces; so far Norwich Research Park believes that these skills are “largely absent” on the local level.³⁵² In the agricultural industry, farmers often consult with agronomists and other relevant professionals³⁵³ and it is likely that farmers will rely increasingly on such third party advisors to make decisions about accessing ELM schemes.³⁵⁴ 61% of the farmers that responded to our survey already used an agronomist for soil health issues and several survey comments underscored the fundamental importance of this relationship.³⁵⁵

114. Some of the comments to the survey also highlighted that advisors are already time-pressured.³⁵⁶ Coupled with the fact that the advisory sector already might have problems with staff retention³⁵⁷ and limited consistency in its advice and resourcing,³⁵⁸ this could inhibit the ability of the sector to respond to a surge in applications from farmers and other actors in the wider supply chain that are keen to boost their environmental credentials.³⁵⁹ We have also heard concerns about the affordability of these advisors³⁶⁰ and there have

346 [Q421](#)

347 [PQ HL6821 \[Horticulture: Vacancies\]](#), 31 March 2023

348 HM Government, [Agriculture, Land Management And Production T Levels](#), accessed 30 November 2023

349 [Qq366–367](#)

350 [Q270](#); Natural England ([SH0081](#))

351 Arcadis ([SH0074](#))

352 Norwich Research Park, University of East Anglia ([SH0045](#))

353 [Q33–4](#); Rothamsted Research ([SH0104](#))

354 [Q138](#)

355 See appendix A

356 See appendix A

357 [Q319](#)

358 Cornwall Council ([SH0021](#)); [Qq139–140](#); Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023, p.28, Rothamsted Research ([SH0104](#))

359 Agricultural Industries Confederation ([SH0023](#))

360 Sustain: the alliance for better food and farming ([SH0029](#))

been calls for all advisors to have BASIS accreditation (many already do³⁶¹) as part of a wider drive to ensure that advisors are impartial and rely solely on evidence-based knowledge.³⁶²

Knowledge exchange and farmer-led research

115. Peer-to-peer knowledge exchanges continue to be an effective and well-received way for farmers to learn from each other about more sustainable farming and engage harder-to-reach individuals.³⁶³ Demonstration farms, including those run by the AHDB and LEAF (Linking Environment and Farming), will have an important role to play in improving soil management practices. Many want to see more of these activities to encourage more sustainable soil management. However, hosting such events can be expensive and time-consuming³⁶⁴ and recent Government funding for such initiatives has been reduced.³⁶⁵

116. As trial and error is often an integral part of farming, many stakeholders also believe that farming and academia should join forces to boost our evidence base about ‘what works’ when it comes to sustainable soil management,³⁶⁶ something we saw being put to great effect in our site visits in support of this inquiry.³⁶⁷ To encourage more collaboration, the Soil Association proposes that 10% of public money given to agricultural research should go towards farmer-led approaches, putting them “at the cutting edge of where the science is” rather than passively receiving guidance.³⁶⁸ This Committee has made similar recommendations in previous inquiries into ELMs.³⁶⁹

117. The Government has said that the TIAH is “exploring setting up special interest groups to support knowledge exchange between farmers”³⁷⁰ and that “Farmers and land managers will have a pivotal role in [...] supporting knowledge sharing and peer to peer learning, delivering benefits for soil health.”³⁷¹ Again, there is no further information about what this will look like.

361 Agricultural Industries Confederation ([SH0023](#))

362 [Q216](#); [Q220](#); For instance, Sustain: the alliance for better food and farming ([SH0029](#)); [Qq33–34](#); Compassion in World Farming ([SH0061](#)); Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); [Q334](#);

363 [Q99](#); [Q112](#); [Qq139–140](#); [Q214](#); [Q267](#), This was mentioned by Cornwall Council ([SH0021](#)), Sustain: the alliance for better food and farming ([SH0029](#)), Soil Benchmark ([SH0055](#)), Sustainable Soils Alliance ([SH0094](#)), Wildlife & Countryside Link, A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust; Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts, The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#)); National Farmers Union ([SH0082](#)), Nature Friendly Farming Network ([SH0030](#)), [Q140](#); Soil Association ([SH0066](#)); Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023

364 Demos, [Sowing resilience: Unlocking the potential for regenerative farming](#), September 2023, p.29

365 University of Leeds ([SH0087](#))

366 [Q214](#), [Q140](#); Soil Association ([SH0066](#))

367 Rothamsted Research ([SH0104](#))

368 [Q214](#)

369 House of Commons Environment, Food and Rural Affairs Committee, [Environmental Land Management and the agricultural transition](#), Second Report of Session 2021–22, 21 October 2021, p.87

370 House of Commons Environment, Food and Rural Affairs Committee, [Environmental Land Management and the agricultural transition: Government Response to the Committee's Second Report of Session 2021–22](#), Sixth Special Report of Session 2021–22, p.11

371 Defra ([SH0080](#)) para 1.3

118. There are gaps in local knowledge and skills when it comes to soil health and soil management across the economy. As environmental outcomes become more embedded in policy through agricultural, planning, construction and other reforms, it is vital that consultants and advisors as well as land managers are well-prepared to make decisions. The land use framework could help but it is no replacement for effective training, well-resourced consulting and ensuring that advice is based on the latest scientific knowledge. Stakeholders have made the case for improved education, training and guidance that is relevant to different soils and farm systems, as well as a well-resourced advisory sector. We agree that we need to see much more farmer-led research, combined with peer-to-peer knowledge exchange, to develop best soil management practices. We believe this could create a more positive feedback loop to encourage greater take-up of ELM schemes.

119. *By 2026, the Government should publish a review into the skills and training available to support key initiatives for nature recovery across all relevant sectors. This review should analyse the training, guidance and advisory services available in the agricultural sector and set out a plan for improving their quality by ensuring that they are based on robust scientific and impartial evidence. It should also ensure that they are accessible and affordable to all that need them.*

120. *The review should also identify where guidance documents for sustainable farming—including sustainable soil management—could be better synthesised and made more specific to particular settings. Working closely with respected organisations such as the AHDB, the Government should invest in research projects to develop guidance and decision-making support tools for the delivery of future ELM objectives, ones that encourage a “whole farm” approach. ELM schemes should also subsidise collaborations between farmers and academics as well as events that facilitate knowledge exchange in the agricultural sector.*

Conclusions and recommendations

Soil data

1. We are pleased that the Government is developing a set of soil health indicators and a soil health baseline. Data, and a common approach to measuring soil health, is essential for setting targets, tracking progress, evaluating the ELM schemes and understanding the merits of different interventions. The Government should develop these as soon as possible, particularly the soil health indicators which will underpin future policy development. Soil monitoring must also not be a “one-off exercise”: soils will always be a vital natural asset and changes to soil health can take place over many years. (Paragraph 15)
2. *The Government must ringfence the funding for the soil health monitoring programme to ensure a long-term commitment to this precious national resource. This funding should be on the same scale as funding for the monitoring of other critical assets such as water and air quality. The Government should also finalise the soil health indicators by December 2024 at the latest.* (Paragraph 16)
3. The soil health baseline will not be established until 2028 and determining trends from that data will potentially take longer still. Given the importance of soil health, we feel it is essential to take steps now to use existing soil data and identify priority areas of concern. Furthermore, unlike the Minister, we believe that comparing soil data is helpful at an individual farm level and that this data is vital for assessing the impact of ELMs. The Government’s Natural Capital and Ecosystem Assessment Programme should therefore be more ambitious and aim to collect more detailed, granular data to support land managers and inform future policy development. ELMs—as well as benefitting from more thorough data—could also be an effective mechanism for funding, standardising and collecting such field-level data. We are not convinced that guidance alone will be enough to sufficiently standardise soil tests and assessments around agreed metrics. However, this must be done in such a way to alleviate privacy concerns and avoid additional administrative burdens. (Paragraph 24)
4. *By 2025, Defra should adapt the Environmental Land Management schemes to fund the testing and assessment of all key physical, chemical and biological soil attributes decided by the soil health indicators project. These schemes should only support tests that are easy to use, cost-effective, and meet an approved standard, to collect more robust and comparable data. This must involve working with industry on suitable tests and assessments and collaborating with supply chain assurance standards to ensure farmers need only produce data for one common set of soil health tests. The ELM schemes should incorporate mechanisms to feed publicly funded data back into the soil health monitoring programme. This data and analysis should be anonymised, aggregated, secured and not be used to monitor progress on individual farms.* (Paragraph 25)

5. *In order to gain an insight into recent trends, the Government should also, by 2026, commission and publish an analysis of existing soil health data held by third parties. This should be used to inform future policy development, including incoming iterations of ELM schemes. (Paragraph 26)*

Soils strategy and leadership

6. There is a lack of leadership and focus on soil health in Government policy. The awaited land use framework could certainly help but, given that the Environmental Improvement Plan (EIP) and the Environment Act targets are already the central focus of policy and scrutiny, we believe that it would be better to also focus these targets on soils, giving them equal status to air and water and therefore encouraging better integration of these interdependent elements of the environment. The next update of the EIP is due by 2028, a date by which a baseline map of soil health should be ready. This presents a perfect opportunity to update the EIP and the Environment Act targets to better incorporate soils; and for the Government to refine its target to get more soils under “sustainable management.” (Paragraph 37)
7. *By May 2024, the Government must publish the new National Action Plan for Sustainable Use of Pesticides and its Land Use Framework. The Framework should provide clear guidance and leadership to stakeholders on the most effective uses for types of soils, and the trade-offs between different outcomes, such as increased biodiversity and improved food security. Once established, the Land Use Framework should be frequently updated to incorporate the latest data and also should be integrated into other government incentive schemes, such as ELMs, to reward sustainable decision-making. (Paragraph 38)*
8. *Once a soil baseline and health indicators are in place, the Government must work with industry and academia to develop a set of binding and measurable targets for improving soil health in England, based primarily on the agreed soil health indicators, and giving a clear but realistic indication of how the use of agricultural inputs will be reduced over time. By the end of 2028, the Government should have amended the Environment Act 2021 section 1, subsection 3 to explicitly mention soil health, put soil on an equal, harmonised footing with water and air, and to bind future governments to these targets. (Paragraph 39)*
9. *The 2028 Environmental Improvement Plan should incorporate and develop these new soil health targets and ensure that soil improvement features across all related sectors, particularly construction, planning and agriculture. Goals for biodiversity, waste, food security, land use and net zero should ensure that soil health plays a role in their delivery. The EIP should also aim for nearly all farmers and growers (90% or more) to be part of an ELM scheme by 2040, and work with the agricultural sector to develop clear, reasonable and measurable definitions of “sustainable soil management” within ELMs, which are adaptable to different contexts and that all participants should be strongly incentivised to adopt. (Paragraph 40)*

Incentivising sustainable soil management

10. The Government's Environmental Land Management (ELM) schemes are an important economic incentive to protect and restore natural assets, such as soils. Until private ecosystem marketplaces are fully regulated and established for a variety of soil health benefits, ELM schemes will be the main tool for encouraging the restoration of soil health. Most stakeholders believe that paying for sustainable practices is the right approach, although effective regulation and evaluation will be essential to ensure that they deliver the right outcomes. Attractive payment rates will also be crucial, rates many believe to be too low at present. Higher rates that reflect environmental benefits and additional costs could boost take-up, lead to further savings in the longer term, keep ELMs true to the 'public money for public goods' philosophy, and keep the Government on track to meet its targets. ELMs also do not, in general, address the capital investment barriers to more sustainable farming, although we recognise that some grant funding has been made available. The Government needs to keep a careful eye on this problem and come up with solutions if needed. (Paragraph 49)
11. *By 2025, the Government should commission and publish a review considering what financial barriers, including upfront investment costs, are preventing more sustainable farming systems. Based on these findings, the Government should develop, alongside the industry, measures to combat the problem. These could include enabling access to more upfront grants, more Government-funded advisory services, low-cost finance or encouraging the sharing and pooling of resources.* (Paragraph 50)
12. *By 2026, payment rates for the Sustainable Farming Incentive and Countryside Stewardship schemes should be increased and calculated on the basis of income foregone, costs and an additional uplift for the public goods potentially provided. These payment rates should be developed using data collected under the Natural Capital and Ecosystem Assessment Programme and ELMs. Underlying methodologies used to calculate payment rates should be made publicly available.* (Paragraph 51)
13. We are also concerned that significant numbers of farmers may struggle to access ELMs and so be unable to improve their soils. We are concerned about access for non-arable farmers, small-scale farmers, the horticultural sector, those with common land grazing rights and, in particular, tenant farmers. *While we welcome the progress made for tenant farmer access to the SFI, we encourage the Government to continue the monitoring of uptake amongst different types of farmers and take steps to remove barriers to all ELM schemes when identified.* (Paragraph 54)
14. We are pleased to see soils being targeted specifically as part of the new Environmental Land Management (ELM) schemes. While these measures are a good start, the measures in the Sustainable Farming Incentive (SFI) are basic and lack essential actions that are known to protect and enhance soils. The role of the Countryside Stewardship (CS) and Landscape Recovery (LR) schemes in improving soil health also needs to be clearer. Low initial ambition is understandable while the Government is focusing on increasing farmer engagement with ELMs, improving its evidence base and establishing soil health baselines. In the long run, as 'sustainable soil management' is defined, the Government needs to strike a better balance

between giving farmers the flexibility to make choices that are right for their farm, incentivising the most sustainable combinations of actions, and getting more land into ELM schemes, in order to achieve positive soil health outcomes. (Paragraph 59)

15. *Using an analysis of recent soil health trends, the Government should set out, by 2026, long-term plans for how ELM schemes will become more ambitious for soils. This should include:*
 - a) *Putting all basic actions known to improve soils into the SFI if evidence suggests that the economic drivers are lacking to adopt such measures.*
 - b) *Adapting CS so that it provides more attractive options which expand upon the basic soil actions in the SFI and offer a way for farmers to easily ratchet up their soil health ambitions.*
 - c) *Working with the agricultural sector to develop a common understanding of “sustainable soil management”. By 2030, ELM scheme participants should be incentivised to combine SFI and CS actions that meet this definition. This definition should be flexible enough to allow for local innovation, experience and geodiversity.*
 - d) *Setting a target for more than 90% of agricultural land to meet a definition of “sustainably managed” by 2040. (Paragraph 60)*
16. It is disappointing that the Government has not acted on our previous calls for a set of measurable targets and an evaluation programme for the Environmental Land Management (ELM) schemes. The impact of ELM scheme must be monitored more effectively than previous environmental management schemes to gain the benefits of the iterative approach. This would ensure that ELMs deliver positive outcomes for the environment, which paying for actions does not guarantee, and demonstrate that public money is being well spent. If this is done successfully, alongside seeking feedback from farmers, it would enable a better analysis of the impact that the ELM scheme actions are having, both independently and in combination with each other. (Paragraph 63)
17. *By the end of 2024, the Government should publish an evaluation programme for ELMs. This should be designed alongside the soil health indicators so that they can consistently measure progress on soil health. It should also use anonymised and aggregated data collected by farmers and enable them to feedback into the system directly and regularly. The Government should also publish an annual report detailing: levels of uptake for each scheme; which actions participants are undertaking; how farmer feedback is influencing the development of ELMs; the impact on the environment, including soils; and how this is driving progress towards a set of measurable national targets for soils. (Paragraph 64)*
18. ELMs and the establishment of private ecosystem marketplaces do not tackle all the fundamental economic drivers of unsustainable soil management within the supply chain. We would like to see the Government set out how it will deal with the poor profitability within the sector, which is a barrier to more sustainable food production; take steps to ensure that assurance standards and contracts with retailers support a consistent and robust definition of sustainable soil management;

and consider measures that will help consumers make more sustainable choices. The Government should also set out how it intends to boost supply and access to a diverse range of organic inputs, which are critical for improving soil health. Given that food waste is expected to be collected from all businesses and households by 2026, it is important to have a clear picture for the organic recycling industry before then. (Paragraph 70)

19. *By mid-2025, the Government should develop an action plan setting out how it will make organic inputs a more economical choice for farmers. This should include measures that boost the availability and diversity of organic inputs to achieve soil health targets and ensure the organic recycling and agricultural sectors have the facilities and technologies to produce, store and spread a diverse range of organic inputs, including compost, digestate and biosolids. The Government also needs to support research into novel fertilisers and new technologies that can enable more use of organic inputs. (Paragraph 71)*
20. *The next Environmental Improvement Plan, due by 2028, should incorporate this action plan. It should also set out how the Government will address other drivers in the wider food supply chain that encourage poor soil management. These include a lack of profitability in the sector and unsustainable consumer and retailer demands. To support this, the Government should work with industry to develop a common understanding of sustainable soil management that assurance standards and retailer-supplier agreements can adhere to. The Government should also ask the Food Data and Transparency Partnership to consider how this definition could be part of a future ecolabelling system in the future. (Paragraph 72)*

Soil regulations

21. Current soil regulations contain significant gaps both within and particularly outside of agriculture. Historically, regulations have seen soil as a medium and vector for the pollution of other natural assets, so a wide array of soil health aspects are not protected. This situation is likely to get worse as Cross Compliance is phased out in 2024. While we acknowledge that most farmers want to do the right thing, a new soil protections legislative framework is needed as a backstop to address gaps, enforce the 'polluter pays' principle, and establish minimum acceptable standards for those who choose not to engage with the voluntary ELM schemes. (Paragraph 78)
22. A new soil protections framework will be a major project and rely on data that is not yet available, suitable definition(s) of 'sustainable soil management', and engagement with a wide range of stakeholders. We also recognise that it is also a difficult time for farmers during the transition away from the Basic Payments Scheme. We agree that offering incentives to change is initially a better way to engage farmers with this potentially quite disruptive and costly transition to improved soil management. We also strongly believe that focusing on incentives for the time being will build a better relationship between Defra and the agricultural community. The Government is right to suggest that we should get a full understanding of how well the ELM schemes work before acting. We also believe, however, that some kind of regulatory baseline will be needed, likely one that prevents soil degradation wherever possible, while Government incentives concentrate more on soil restoration. Shifting incentives in

this way will also only be possible once private sector initiatives are well established and other underlying supply chain issues are resolved. All this will take time. (Paragraph 79)

23. *Using improved soil health and soil management data, as well as its evaluation of the success of the ELM schemes, the Department should work with industry, academics and regulators on a more robust regulatory baseline for soils. These regulations should be in line with any future soil health targets and any future definition of 'sustainable soil management'. This new regulatory framework should be consulted on, legislated for and clearly communicated before 2030, with provisions coming into force by 2035, to give land managers and owners time to prepare. The new laws would preferably take a combined approach with other areas, such as water and air quality but could take the form of a soil-specific regulatory framework. While agriculture should be an important focus, we would also like to see a framework offering protections for all types of soils. (Paragraph 80)*
24. *In the agricultural sector, the regulatory baseline should be designed to work in tandem with ELM schemes. Initially it should incorporate most of the soil health actions in the Sustainable Farming Incentive, with all ELM schemes becoming more ambitious on soils. As the ELM schemes become more ambitious, so too should the regulatory baseline: we recommend that regulations and ELMs are reviewed every five years to ratchet up soil protections and incorporate the latest evidence on what works. In the long-term, the Government should aim for a situation where regulations prevent soil degradation and ELM schemes focus on soil and habitat restoration. (Paragraph 81)*
25. Soil contamination is a well-known yet not well-understood problem. There has been a longstanding and unacceptable failure to remediate historical soil contamination that acts as a barrier to nature recovery. As for contamination through agricultural inputs, the Government should also improve controls and protocols—both for their production and application—to give the sector more confidence to use these more freely. It is particularly disappointing that regulatory updates for sewage sludge have not yet happened. However, the most effective measure to tackle soil contamination is to prevent it in the first place. (Paragraph 92)
26. *By the end of 2025, the Government and Environment Agency should review the current regulations for the production, testing and application of organic inputs to make sure that are delivering enough protections against soil contamination. This review should set out a plan for closing any gaps in protections by 2026/27. (Paragraph 93)*
27. *The national soil monitoring programme should aim to gain a better understanding of the scale of soil contamination. To spur progress on nature recovery targets, this information should identify problematic areas that local authorities and developers are encouraged to remediate. Contamination data should also be used to develop Extended Producer Responsibility for products that pollute agricultural inputs, soils and water as soon as possible. The Government should publish a timeline for delivery by 2026, which should then be incorporated into the Environmental Improvement Plan update scheduled for 2028. (Paragraph 94)*
28. *The Government should set up a soil remediation taskforce in 2024 to tackle the barriers to soil remediation. This should consider the role that new technologies*

can play with hard-to-remediate soils, as well as the provision of funding to either developers, local authorities or regulators to tackle the cases that the planning system and private sector are incapable of improving. The Taskforce's proposals should inform the updated Environmental Improvement Plan due by 2028, which should set out how soil remediation will help the Government make progress towards its nature recovery targets. (Paragraph 95)

29. We are pleased to see that the Government has announced plans to reduce the amount of soil sent to landfill. These reforms are an update to guidance and the trialling of soil storage sites, which stakeholders welcome but it remains to be seen if these are enough to bring about real change. Regulation may be required to make currently voluntary codes of practice mandatory. (Paragraph 99)
30. *By 2027, the Government should review progress with the Soil Reuse and Depot scheme and revised construction codes of practice. This should include a consultation with stakeholders on whether these voluntary codes should become mandatory and regulated by an independent body or the Environment Agency. The revised 2028 Environmental Improvement Plan should incorporate any further actions the Government will take. (Paragraph 100)*
31. The Environment Agency and the Rural Payments Agency should continue to take an initially supportive approach when monitoring compliance, given the low levels of engagement and the fact that most farmers want to do the right thing for their soils. Follow ups will be essential to ensure that compliance breaches are being adequately addressed. If this “supportive” approach is, however, a key method of spreading awareness of farming regulations, then the inspections regime should also be boosted. We recognise that remote technologies and approaches will be able to help, and we are pleased that the EA has more funding to conduct site visits, but these still need to be more comprehensive and frequent; visiting just 4% of farms every year will not act as a deterrent to bad actors, nor help the farmers that could benefit from the “supportive” approach. (Paragraph 107)
32. More monitoring will mean that these agencies need to be fully resourced. In the case of the Environment Agency, where funding for monitoring usually comes via the Environmental Permitting regulations, the Department needs to come up with ways of driving up this funding. This could be achieved by putting more activities under Environmental Permitting or by developing new systems for funding compliance visits. (Paragraph 108)
33. *The EA and the RPA should continue with the “supportive” approach to compliance monitoring. By the end of the agricultural transition in 2028, however, Defra and these institutions should publish a clear and transparent regime of comprehensive site visits and other actions that they will take to help farmers comply with rules, prevent fraud and ensure that compliance actions issued are followed. To ensure that any new regulatory soil framework is effective, and let farmers benefit more from the “supportive” approach they are taking, the EA and RPA should be adequately resourced so that farms can expect routine visits every few years. To achieve this, the Department and the EA will need to develop ways to increase funding for compliance monitoring. (Paragraph 109)*

Local skills and guidance

34. There are gaps in local knowledge and skills when it comes to soil health and soil management across the economy. As environmental outcomes become more embedded in policy through agricultural, planning, construction and other reforms, it is vital that consultants and advisors as well as land managers are well-prepared to make decisions. The land use framework could help but it is no replacement for effective training, well-resourced consulting and ensuring that advice is based on the latest scientific knowledge. Stakeholders have made the case for improved education, training and guidance that is relevant to different soils and farm systems, as well as a well-resourced advisory sector. We agree that we need to see much more farmer-led research, combined with peer-to-peer knowledge exchange, to develop best soil management practices. We believe this could create a more positive feedback loop to encourage greater take-up of ELM schemes. (Paragraph 118)
35. *By 2026, the Government should publish a review into the skills and training available to support key initiatives for nature recovery across all relevant sectors. This review should analyse the training, guidance and advisory services available in the agricultural sector and set out a plan for improving their quality by ensuring that they are based on robust scientific and impartial evidence. It should also ensure that they are accessible and affordable to all that need them.* (Paragraph 119)
36. *The review should also identify where guidance documents for sustainable farming—including sustainable soil management—could be better synthesised and made more specific to particular settings. Working closely with respected organisations such as the AHDB, the Government should invest in research projects to develop guidance and decision-making support tools for the delivery of future ELM objectives, ones that encourage a “whole farm” approach. ELM schemes should also subsidise collaborations between farmers and academics as well as events that facilitate knowledge exchange in the agricultural sector.* (Paragraph 120)

Appendix A: Soil health survey

Methodology and sample size

1. During the summer of 2023, we launched a survey for farmers with the assistance of several farming organisations. It asked the following substantive questions in order to find out more about farmers' approaches to sustainable soil management and what difficulties they have encountered:

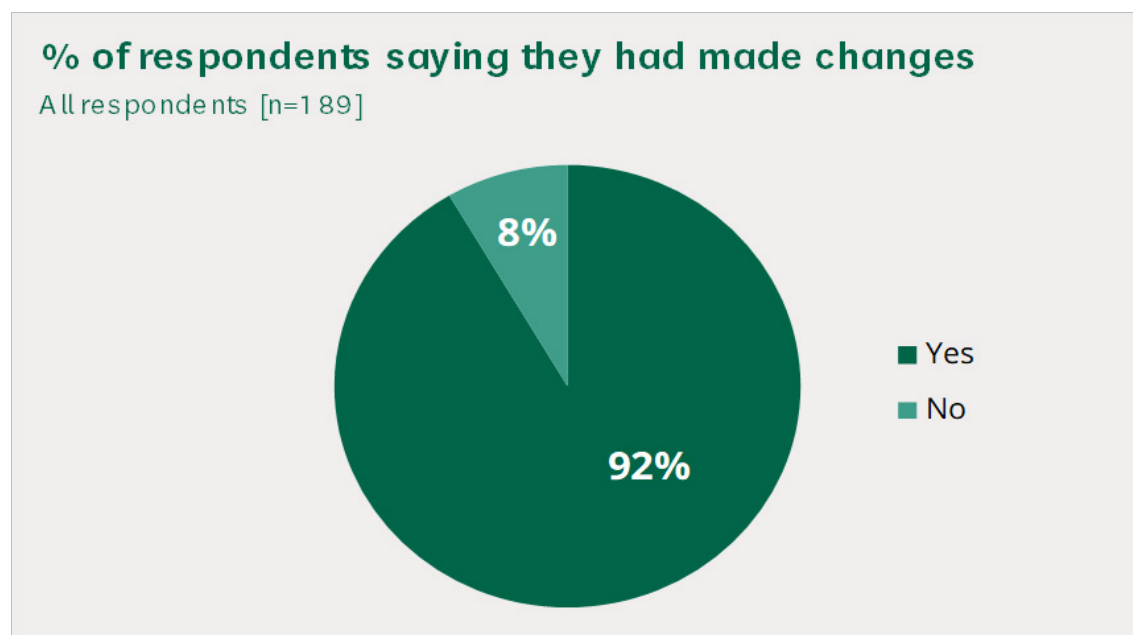
- Have you attempted to change any farming practices in the past 10 years specifically to improve your soil health?
- If you answered yes, how important were the following factors in your decision? [followed by a list of factors, see below]
- How did you change your practices?
- What has stopped you from changing soil management practices to improve soil health?
- Where do you usually get your advice on soil health?
- Could more be done to improve the guidance or advice available? Do you need more information about aspects of health and its implications for productivity or future resilience?
- If you measure soil health on your farm, can you tell us more about what you look for?
- If applicable, who conducts soil health assessments on your land?
- If applicable, how affordable and easy do you find soil testing?
- To help build a national picture of soil health and help with benchmarking, in principle would you be happy to input anonymous soil health data from your farm into a national database?

2. Some of the answers were multiple choice and many contained free text boxes. In total we received 189 responses, which we acknowledge is a relatively small sample size. We did not undertake any steps to ensure the sample was reflective of the demographic diversity of the farming population, so the results are not necessarily representative, although they may provide some insights into the motivating factors and barriers that farmers encounter. While we are not publishing the full results in this report for reasons of brevity and anonymity, some analysis is presented below.

Soil health survey analysis

3. The vast majority of respondents had made changes to improve soil health in the past 10 years.³⁷²

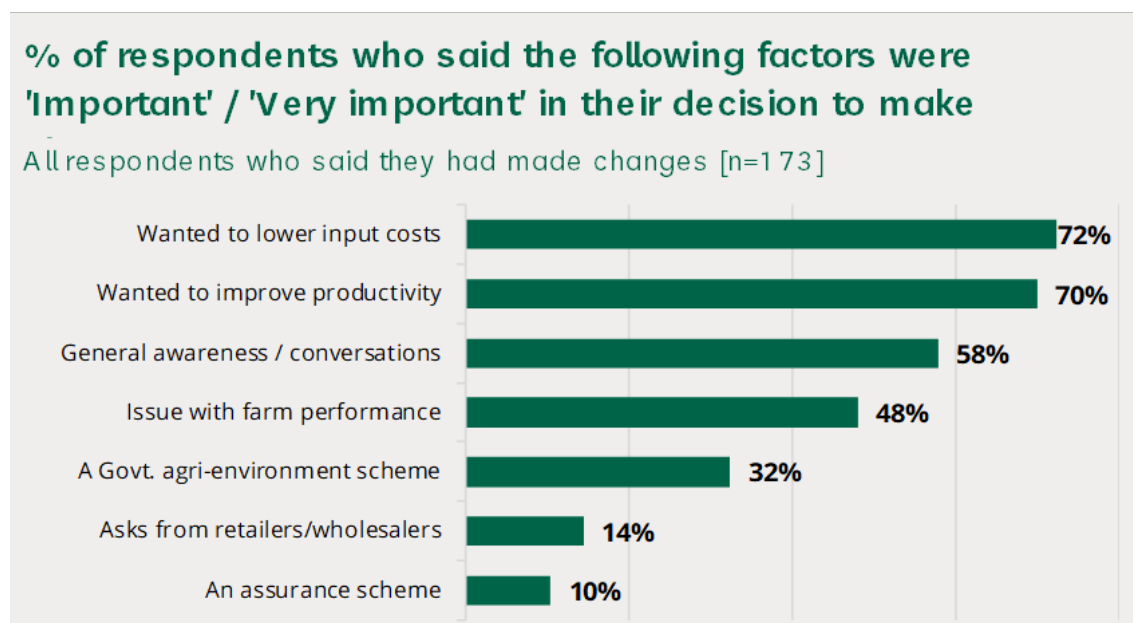
372 Q3. 'Have you attempted to change any farming practices in the past 10 years specifically to improve your soil health.'



4. Those who work on arable farms³⁷³ were slightly more likely to say they had made changes (92%) than those who worked on livestock farms³⁷⁴ (80%).

5. Of the 16 respondents who said they had not made changes, the majority said they were already managing their soils as sustainably as possible and/or that their soil appeared healthy (10 respondents each).³⁷⁵

6. Wanting to lower input costs and improve productivity were the most important factors in respondents' decision to make changes to improve soil health.



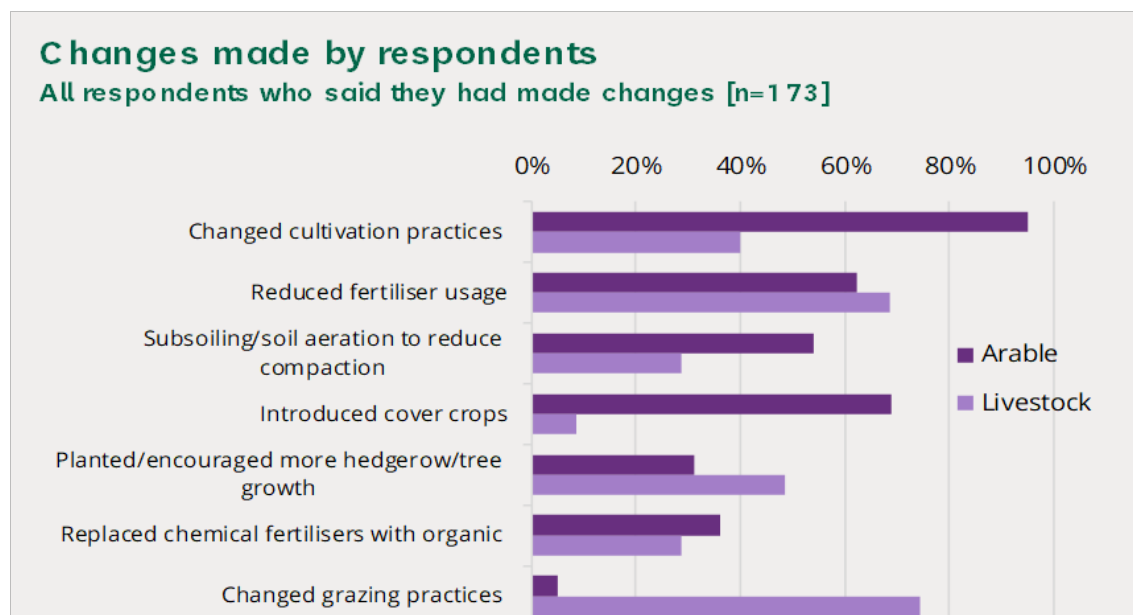
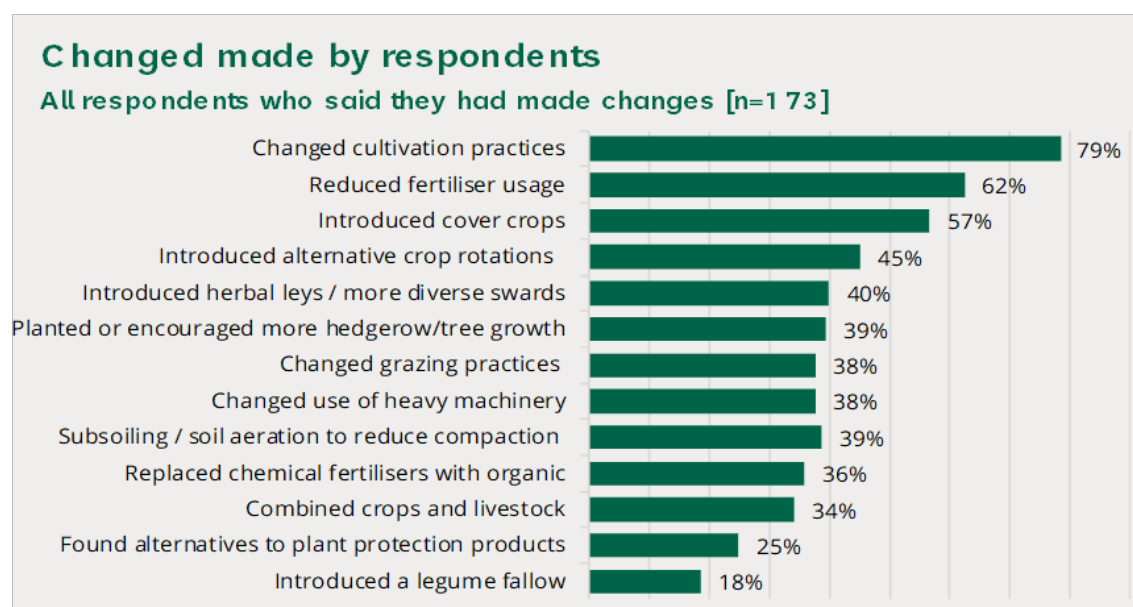
373 n=66

374 n=44 (caution: low base size)

375 Q6: "If you answered no to question 3, what has stopped you from changing soil management practices to improve soil health?"

7. Those working on arable farms (54%) who had made changes³⁷⁶ were more likely to say that noticing an issue with farm performance was an important or very important factor in their decision than livestock farmers³⁷⁷ (34%).

8. The most common changes made by respondents include changing cultivation practices, reducing fertiliser usage and introducing cover crops.



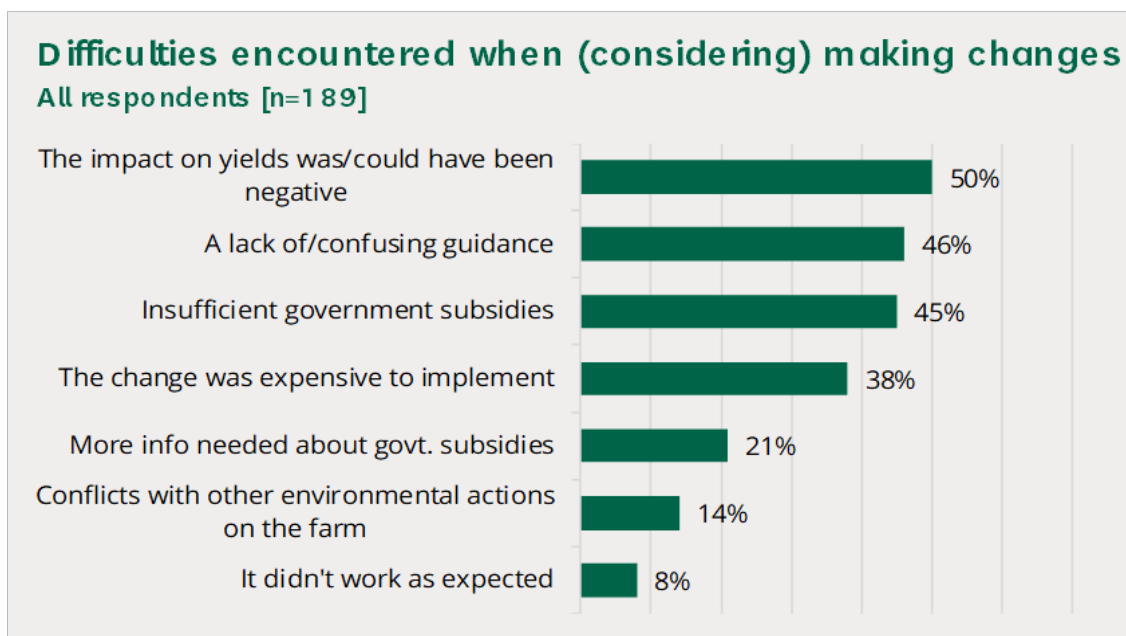
9. Almost all arable farmers who responded to our survey (95%) said they had changed cultivation practices, compared to only two fifths of livestock farmers (40%).

10. 44% of tenant farmers had combined crops and livestock, 37% had found alternatives to plant protection products and 26% had introduced a legume fallow.

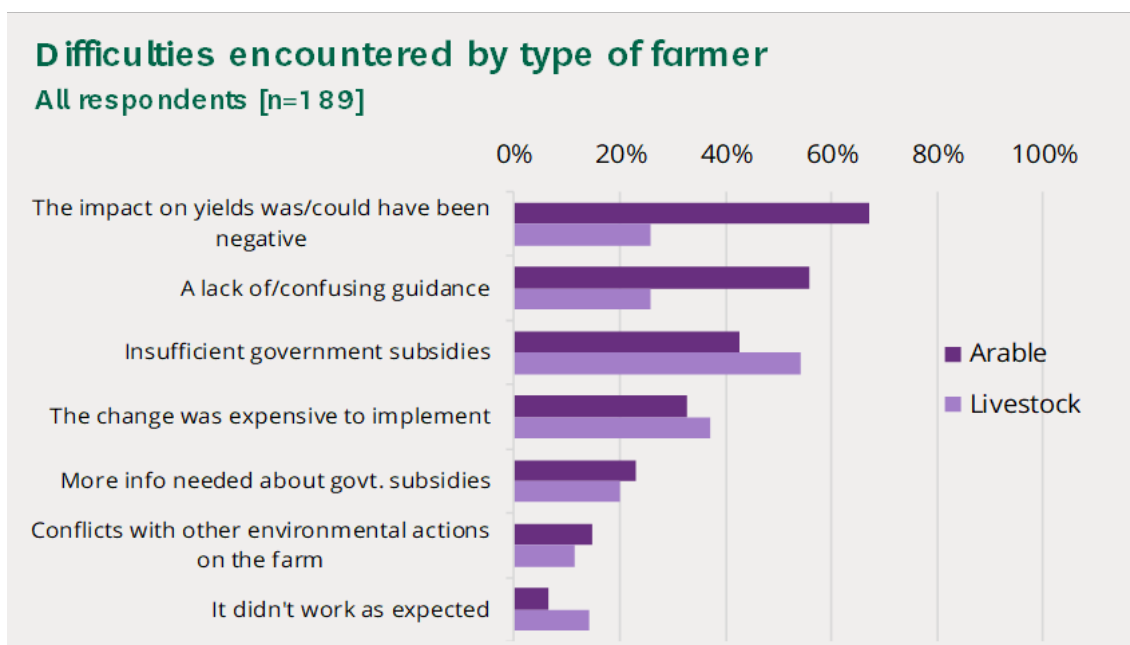
³⁷⁶ Respectively, n=27 (caution, low base size) and n=61

³⁷⁷ n=35 (caution, low base size)

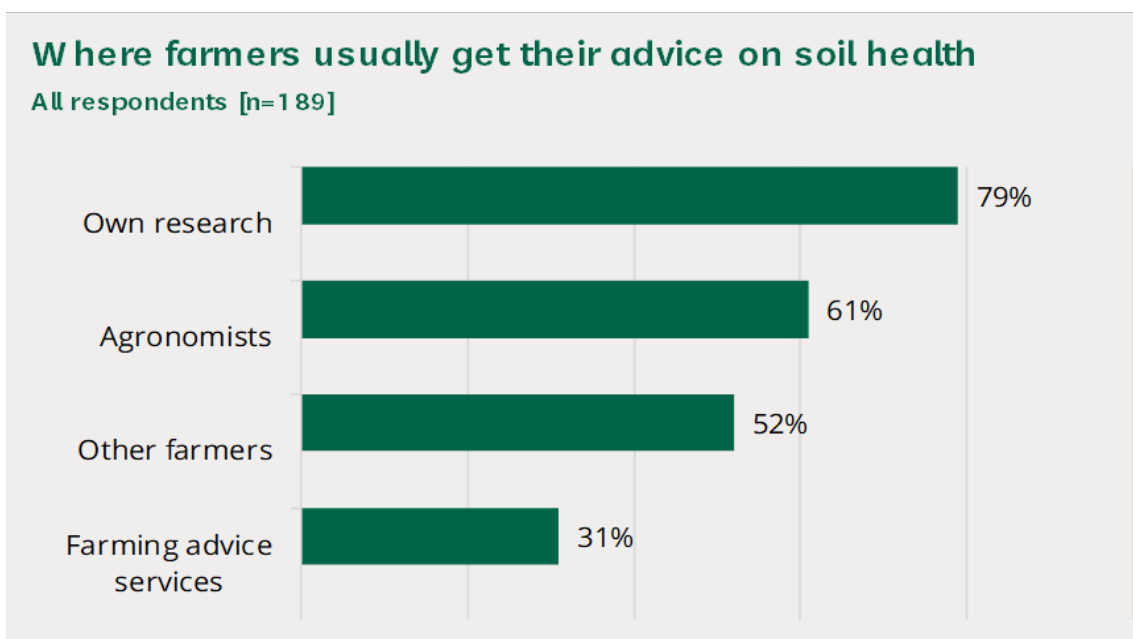
11. When asked about the difficulties faced when contemplating or making changes, half of respondents had found that the impact on yields from changes was, or could have been, negative.



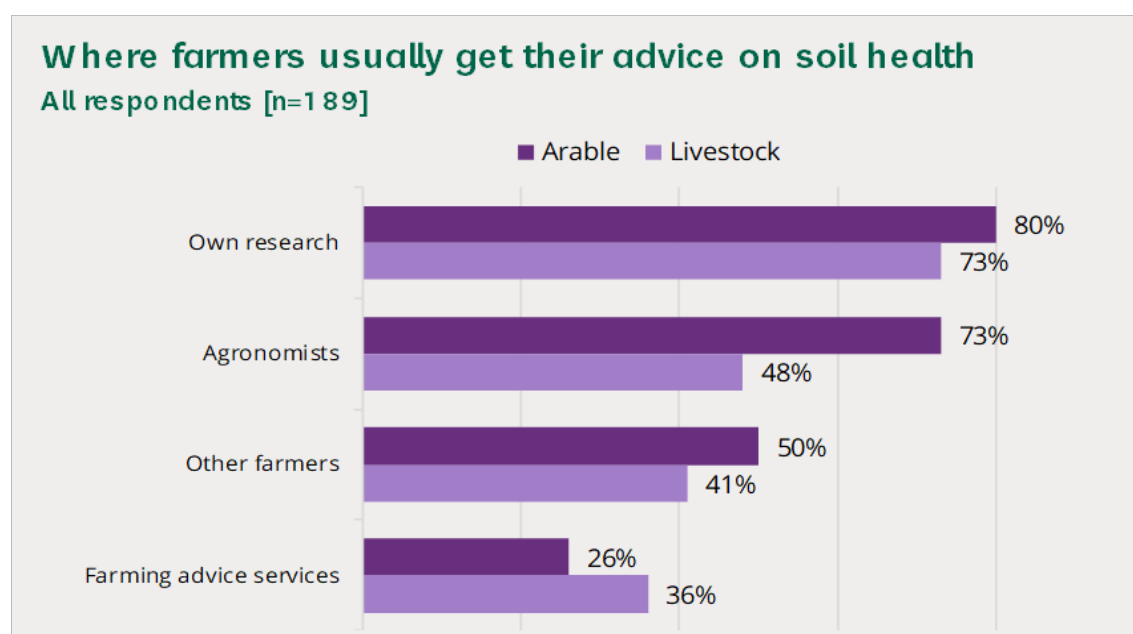
12. Actual or potential negative impacts on yields was the most cited difficulty from arable (67%) farmers, while for livestock farmers it was insufficient government subsidies (54%).



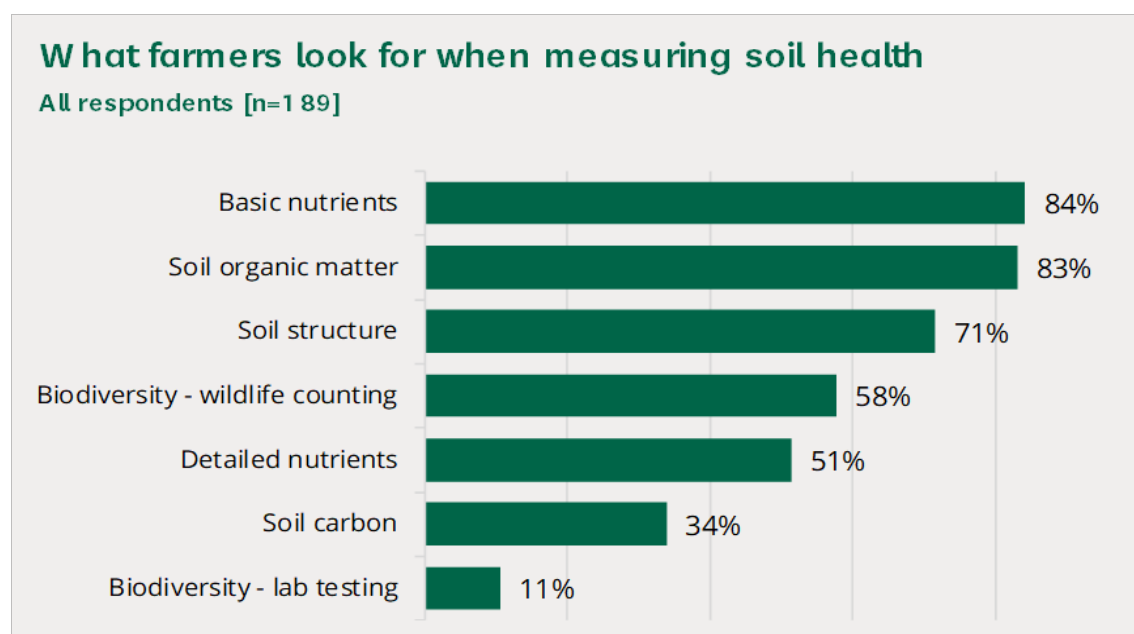
13. 8 in 10 respondents used their own research to advise them on soil health, while nearly a third used farming advice services.



14. Arable farmers were more likely to use their own research and the advice of agronomists on their soil health than livestock farmers, while livestock farmers had a higher proportion who relied on farming advice services:

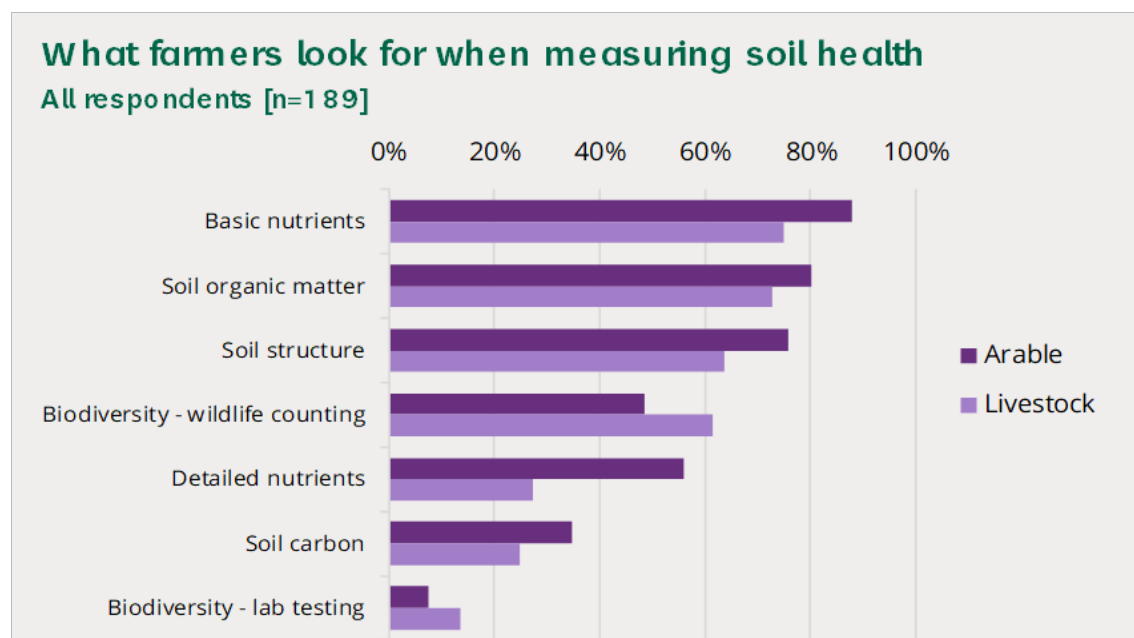


15. Over 70% of respondents said they look for basic nutrients, soil organic matter and soil structure when measuring soil health on their farms.

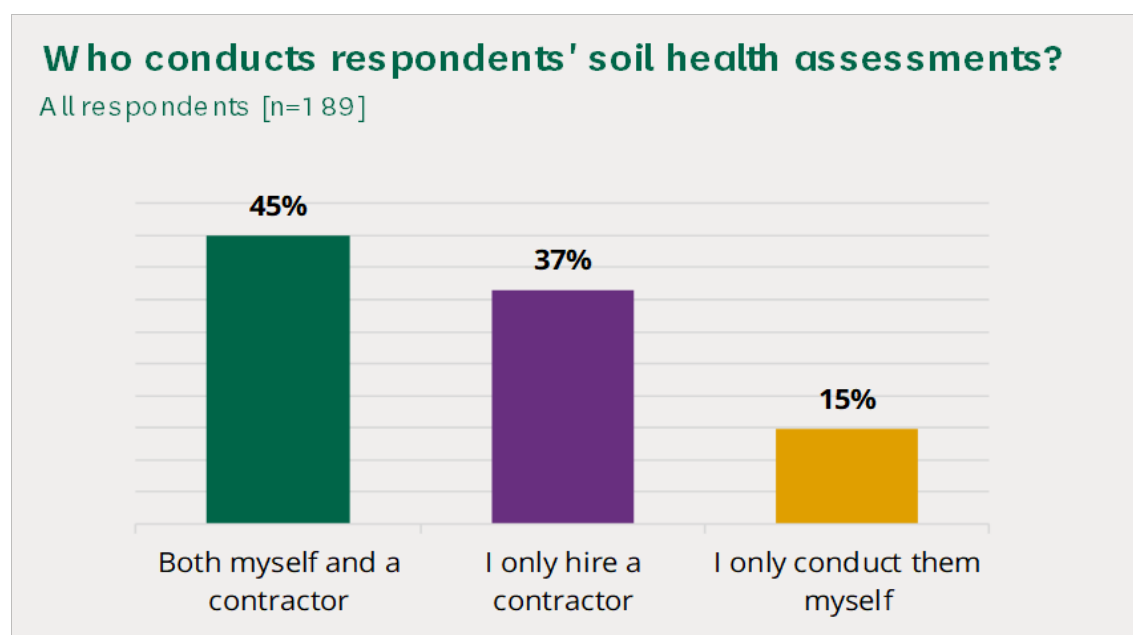


16. Higher proportions of livestock farmers said they looked for biodiversity–wildlife counting (61%) than arable farmers (48%) as well as biodiversity–lab testing (14%).

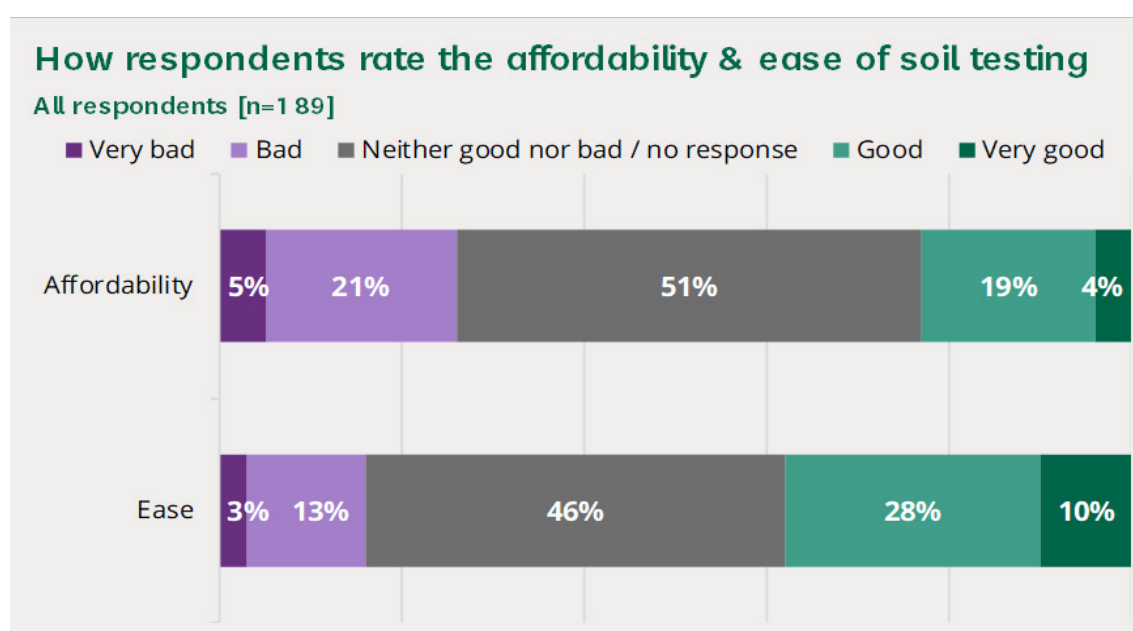
17. Conversely, lower proportions of livestock farmers said they looked for detailed nutrients (27%) and soil carbon (25%):



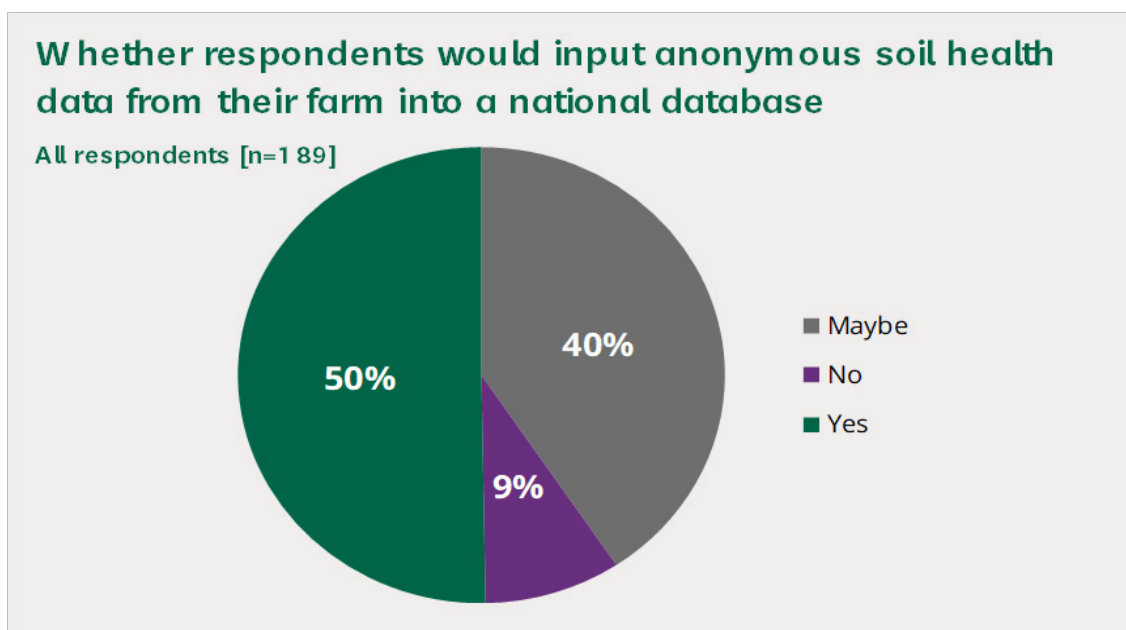
18. Only 15% of respondents only conduct soil health assessments by themselves.



19. Only 23% of respondents feel the affordability of soil testing is 'good' or 'very good', while 38% feel it is an easy thing to do.



20. Half of respondents would be happy in principle to input soil health data into a national database, while 40% say they might be.



Formal minutes

Tuesday 28 November 2023

Members present

Sir Robert Goodwill, in the Chair

Steven Bonnar

Ian Byrne

Dr Neil Hudson

Mrs Sheryll Murray

Cat Smith

Draft Report (*Soil health*) proposed by the Chair, brought up and read.

Ordered, That the Chair's draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 120 read and agreed to.

Appendix and Summary agreed to.

Resolved, That the Report be the First Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available (Standing Order No. 134).

Adjournment

Adjourned till Tuesday 5 December 2023 at 2.00 p.m.

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the [inquiry publications page](#) of the Committee's website.

Tuesday 7 March 2023

Professor Bridget Emmett, Head for Soils and Land Use, UK Centre for Ecology and Hydrology; **Martin Ballard**, Soil and stones project lead, Society for the Environment; **Dr Jacqueline Hannam**, President, British Society of Soil Science

[Q1–47](#)

Mr Matthew Orman, Director, Sustainable Soils Alliance; **Mr Kyle Lischak**, Head of UK, ClientEarth; **Mr Graeme Willis**, Agricultural Lead, CPRE - The Countryside Charity

[Q48–72](#)

Tuesday 9 May 2023

James Robinson, England Vice Chair, Nature Friendly Farming Network; **Richard Bramley**, Chair, NFU Environment Forum; **Professor Pippa Chapman**, Chair in Biogeochemistry in the School of Geography, University of Leeds; **James Woodward**, Sustainable farming officer, Sustain Alliance

[Q73–163](#)

Wednesday 24 May 2023

Professor Karen Johnson, Professor in Environmental Engineering, Durham University; **Dr Martin Blackwell**, Soil Biogeochemist, Rothamsted Research; **Professor David Spurgeon**, Ecotoxicological researcher, UK Centre for Ecology & Hydrology (UKCEH)

[Q164–250](#)

Tuesday 13 June 2023

Tony Grayling, Director of Sustainable Business and Development, Environment Agency; **Dr Eleanor Reed**, Principal Specialist in Soils, Natural England; **Professor John Gilliland OBE**, Special Adviser, Agriculture and Horticulture Development Board (AHDB)

[Q251–338](#)

Tuesday 18 July 2023

Rt Hon Mark Spencer MP, Minister for Food, Farming and Fisheries, Department for Environment, Food and Rural Affairs; **Fiona James**, Deputy Director for Policy Design, Farming and Countryside Programme, Department for Environment, Food and Rural Affairs; **Sion McGeever**, Deputy Director for Access, Landscapes, Peatland and Soil, Department for Environment, Food and Rural Affairs

[Q339–425](#)

Published written evidence

The following written evidence was received and can be viewed on the [inquiry publications page](#) of the Committee's website.

SH numbers are generated by the evidence processing system and so may not be complete.

- 1 Agricultural Industries Confederation ([SH0023](#))
- 2 Agriculture and Horticulture Development Board (AHDB) ([SH0031](#))
- 3 Anglo American ([SH0043](#))
- 4 Anguilano, Dr Lorna (Senior Research Fellow, Brunel University London); and Onwukwe, Dr Uche (Research Fellow, Brunel University London) ([SH0017](#))
- 5 Applied Microbiology International ([SH0024](#))
- 6 Arcadis ([SH0074](#))
- 7 Bio-based and Biodegradable Industries Association (BBIA) ([SH0015](#))
- 8 British Geological Survey ([SH0033](#))
- 9 British Society of Soil Science ([SH0069](#))
- 10 British Sugar ([SH0056](#))
- 11 Buglife - The Invertebrate Conservation Trust ([SH0095](#))
- 12 CL:AIRE ([SH0072](#))
- 13 Canterbury Christ Church University ([SH0097](#))
- 14 Chartered Institution of Wastes Management (CIWM) ([SH0092](#))
- 15 Chemical Industries Association (CIA) ([SH0052](#))
- 16 ClientEarth ([SH0086](#))
- 17 Compassion in World Farming ([SH0061](#))
- 18 Conscious Planet - Save Soil ([SH0099](#))
- 19 Cornwall Council ([SH0021](#))
- 20 Council for the Preservation of Rural England (CPRE) ([SH0077](#))
- 21 Cranfield University ([SH0088](#))
- 22 Culley, Mr ([SH0062](#))
- 23 Defra ([SH0080](#))
- 24 Energy Institute ([SH0070](#))
- 25 Environment Agency ([SH0107](#))
- 26 Environment Agency ([SH0044](#))
- 27 Everett, Dr Rod (Farmer and researcher, Volunteer researcher Food Futures for North Lancashire) ([SH0060](#))
- 28 Fidra ([SH0037](#))
- 29 Floodplain Meadow Partnership ([SH0083](#))
- 30 Forest Stewardship Council (FSC) UK ([SH0022](#))
- 31 Future Biogas ([SH0059](#))
- 32 Game & Wildlife Conservation Trust ([SH0076](#))

- 33 Grayson, Bill (Organic Farmer, Morecambe Bay Conservation Grazing Co.) ([SH0098](#))
- 34 H B Paynter Ltd ([SH0026](#))
- 35 Harris, Professor Jim (Chair in Environmental Technology, Cranfield University) ([SH0058](#))
- 36 Holmes, David ([SH0006](#))
- 37 Horticultural Trades Association ([SH0054](#))
- 38 Institution of Environmental Sciences ([SH0091](#))
- 39 Johnson, Professor Karen (Professor of Environmental Engineering, University of Durham); Abram, Professor Simone (Professor, University of Durham); Roskilly, Professor Tony (Professor, University of Durham); Bosanquet, Dr Maggie (Low Carbon Economy Team Leader, Durham County Council); Hurst, Mr Richard (Education Development Advisor – Sustainability Education, Durham County Council); Hodgson, Ms Lisa (Impact Manager, University of Durham); and Durham, Rachael Richards University of (Director of Public Affairs , University of Durham) ([SH0020](#))
- 40 Knowles, Tom (Soil Scientist, Village Farm) ([SH0078](#))
- 41 LEAF (Linking Environment And Farming) ([SH0102](#))
- 42 LEAF (Linking Environment And Farming) ([SH0049](#))
- 43 Leake, Professor Jonathan (Professor of Plant-Soil Interactions, The University of Sheffield); and Edmondson, Dr Jill (Senior Lecturer, Plants, Photosynthesis and Soil, School of Biosciences, The University of Sheffield) ([SH0071](#))
- 44 Long, L ([SH0073](#))
- 45 MK Soil Science Ltd ([SH0046](#))
- 46 McCain Foods GB ([SH0068](#))
- 47 Measures, Mr Alan (Director, Measures Farms Ltd) ([SH0079](#))
- 48 Murray-Philipson, Mr Hylton (Managing Director, Philipson Estates) ([SH0050](#))
- 49 NFU Scotland ([SH0032](#))
- 50 NIAB ([SH0064](#))
- 51 NRM, part of Cawood ([SH0035](#))
- 52 NSA ([SH0042](#))
- 53 National Farmers Union ([SH0082](#))
- 54 National Trust ([SH0028](#))
- 55 Natural England ([SH0106](#))
- 56 Natural England ([SH0081](#))
- 57 Nature 2030 ([SH0089](#))
- 58 Nature Friendly Farming Network ([SH0030](#))
- 59 Norwich Research Park and University of East Anglia ([SH0045](#))
- 60 Organic Farmers & Growers CIC ([SH0084](#))
- 61 Organic Research Centre ([SH0047](#))
- 62 Powell, Anthony ([SH0051](#))
- 63 Promessa Organic UK Ltd trading as Carbon Farm Hub ([SH0016](#))

- 64 Quinton, Professor John (Professor of Soil Science, Lancaster University) ([SH0014](#))
- 65 Renewable Energy Assurance Limited ([SH0040](#))
- 66 Renison, Mrs Nicola (Farmer, Renison's Farm) ([SH0011](#))
- 67 Rothamsted Research ([SH0104](#))
- 68 Rural Payments Agency ([SH0109](#))
- 69 Sheppard, Mr Jonathan (Amateur Horticulturist, National Plant Collection holder of Alcea and Cosmos Bipinnatus) ([SH0001](#))
- 70 Society for the Environment ([SH0085](#))
- 71 Soil Association ([SH0066](#))
- 72 Soil Benchmark ([SH0055](#))
- 73 Southern Water ([SH0039](#))
- 74 Spencer, Mark (Minister of State for Food, Farming and Fisheries, Department of Environment, Food and Rural Affairs) ([SH0108](#))
- 75 Sustain ([SH0100](#))
- 76 Sustain Alliance ([SH0029](#))
- 77 Sustainable Soils Alliance ([SH0094](#))
- 78 T.I. Soil Ecology Laboratory ([SH0036](#))
- 79 TIPA UK (Compostable Coalition) ([SH0057](#))
- 80 The Anaerobic Digestion and Bioresources Association (ADBA) ([SH0090](#))
- 81 The Association for Renewable Energy and Clean Technology (REA) ([SH0038](#))
- 82 The Carbon Free Group (CIC) ([SH0075](#))
- 83 The Greenhouse Gas Removal Hub (CO2RE) and the GGR-D Programme; and Agile Initiative: How do we scale up Nature-based Solutions ([SH0048](#))
- 84 The Nitrogen Collaboration ([SH0105](#))
- 85 The Soil Association ([SH0103](#))
- 86 The Wildlife Trusts ([SH0063](#))
- 87 Turner, Mr John (PhD Student, Loughborough University) ([SH0053](#))
- 88 UK Centre for Ecology & Hydrology ([SH0034](#))
- 89 UK Petroleum Industry Association ([SH0041](#))
- 90 United Kingdom Without Incineration Network (UKWIN) ([SH0096](#))
- 91 University of Leeds ([SH0087](#))
- 92 Unyte Group and Cannabis Industry Council ([SH0007](#))
- 93 Voulvoulis, Professor Nick (Professor of Environmental Technology and Deputy Head of Department, Centre for Environmental Policy, Imperial College London); and Waring, Dr Bonnie (Senior Lecturer, The Grantham Institute for Climate Change and the Environment and the Georgina Mace Centre for the Living Planet, Imperial College London) ([SH0019](#))
- 94 Westaway, Dr Elizabeth ([SH0067](#))
- 95 Wildlife & Countryside Link; A Rocha; Angling Trust; Amphibian & Reptile Conservation; Bumblebee Conservation Trust; Butterfly Conservation; CHEM Trust;

Friends of the Earth (E&W); National Trust; Plantlife; The Rivers Trust; RSPB; Soil Association; The Wildlife Trusts; and The Pesticide Collaboration; Fidra; PAN UK ([SH0065](#))

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the publications page of the Committee's website.

Session 2022–23

Number	Title	Reference
1st	Australia FTA: Food and Agriculture	HC 23
2nd	Pre-appointment hearing for the Chair-designate of the Environment Agency	HC 546
3rd	The price of plastic: ending the toll of plastic waste	HC 22
4th	Rural mental health	HC 248
5th	Species Reintroduction	HC 849
6th	Protecting Marine Mammals in the UK and Abroad	HC 697
7th	Food security	HC 622
1st Special	Tree Planting: Government Response to the Committee's Third Report of Session 2021–22	HC 323
2nd Special	Labour shortages in the food and farming sector: Government Response to the Committee's Fourth Report of Session 2021–22	HC 412
3rd Special	Australia FTA: Food and Agriculture: Government Response to the Committee's First Report	HC 700
4th Special	The price of plastic: ending the toll of plastic waste: Government Response to the Committee's Third Report	HC 1044
5th Special	Species Reintroduction: Government response to the Committee's Fifth Report	HC 1931
6th Special	Marine Mammals: Government Response to the Committee's Sixth Report	HC 1942
7th Special	Rural Mental Health: Government Response to the Committee's Fourth Report	HC 1945

Session 2021–22

Number	Title	Reference
1st	Moving animals across borders	HC 79
2nd	Environmental Land Management and the agricultural transition	HC 78
3rd	Tree planting	HC 356
4th	Labour shortages in the food and farming sector	HC 713
5th	Pre-appointment Hearing: Chair of Ofwat	HC 1253

Session 2019–21

Number	Title	Reference
1st	COVID-19 and food supply	HC 263
2nd	Pre-appointment hearing for the Chair-Designate of the Office for Environmental Protection (OEP)	HC 1042
3rd	The UK's new immigration policy and the food supply chain	HC 231
4th	Flooding	HC 170
5th	Air Quality and coronavirus: a glimpse of a different future or business as usual	HC 468
6th	Public Sector Procurement of Food	HC 469
7th	Covid-19 and the issues of security in food supply	HC 1156
8th	Seafood and meat exports to the EU	HC 1189