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Investing in soils to support sustainable farming

Farmers, their agronomists and the wider food supply chain are all faced with a range of political, economical and social drivers to increase sustainable food production. For growers, soil health is at the very core of responding to these drivers. The importance of soil health has also been illustrated in the new Agriculture Bill which sets out how farmers will be rewarded with public money for 'public goods'. Meanwhile, resilient soils are also likely to help growers withstand increasingly unpredictable and extreme weather patterns.

Investment in researching alternative soil management approaches and technologies is vital because it will help farmers to rise to these challenges.

At Frontier, we're supporting research into soil health by investing in seven Soil Life demonstration sites. According to soil and plant health specialist Jim Stotzka, these sites will support farmers in the new era of focusing on what's under the ground, to benefit what grows on top.

"The landscape is changing politically, with more emphasis on soil health and how it's managed in the Agriculture Bill," says Jim.

"Farmers will need to focus on their soils in order to adapt to the direction of legislation. Meanwhile, shoppers are increasingly interested in the provenance of their food. This is creating demand and, in some cases, premiums from food manufacturers for produce they can promote as sustainably sourced.

"We're therefore looking for a stronger emphasis on what can be done to manage soils well and the techniques we can help farmers implement to benefit their productivity, as well as meeting sustainability targets."

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With soil health in the spotlight, Frontier is working with the growers at the seven Soil Life sites to trial new techniques and innovative approaches to improving soil health.

"The sites are working farms, meaning data coming from them will provide practical and relevant advice for other growers because it has been gathered in a real farm situation, often at field-scale. The work at each trial is managed in partnership with the host farmer and their agronomist, with guidance and support from our technical team.

"Frontier's technical team will also use data from the Soil Life sites to ground-truth the latest scientific studies around soil health."



Data collation in a farming environment

Jim explains the purpose of the Soil Life demonstration sites is to make use of the best existing technologies and test what is possible, as well as what is not, in a range of scenarios. Trials look at the addition of a range of organic materials and methods, including cover crops, reduced tillage and wider rotations.

"We're also at the forefront of utilising new technologies, such as near-infrared and DNA soil analyses, which may offer deeper insights into what the future of soil health management could be," he adds.

"We're also at the forefront of utilising new technologies"

The team at each site collaborates with Frontier's Kings and SOYL teams to draw on their expertise in stewardship, environmental management and precision farming. It is important that data resulting from successful trials can be cascaded to other growers as a coordinated approach to crop production and soil management. Host farmers and the Soil Life team use mapping data within the MyFarm farm management platform to help monitor progress.

"Each farm is trialling an element which is linked to how we can support farmers to build crop production systems that are resilient to climate change and political developments. These are the farms that will be ready to take advantage of future commercial opportunities."



Finding your baseline

Using the MyFarm platform alongside advice from our agronomists and SOYL team, growers can review three core areas of soil health – nutrients and pH, organic matter levels and microbial activity.

This information provides a benchmark on the current soil health status and, crucially, allows a plan to be implemented which can be reviewed regularly. You're then able to record what improvements are made, to quantify what methods are working and importantly which may not suit your system, to build upon the following season.



Farm-based research network focused on sustainable soil management

Frontier's 'Soil Life' demonstration sites are part of our 3D Thinking trials and research programme.

Working in partnership with host farmers, we research and demonstrate best practice around soil management; helping farmers to develop sustainable arable systems.

- **Ross-on-Wye** Herefordshire
- Haddington East Lothian
 - Consett Durham
 - Nassington Peterborough Carbon Focus Site
- 5 Beverley East Yorkshire

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- 6 King's Lynn Norfolk Regenerative Agriculture Focus Site
- 7 Longfield Kent

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Supporting farmers with regenerative agriculture techniques

Regenerative agriculture may be the buzzword of the moment but, at the Frontier Soil Life demonstration site in west Norfolk, this approach has always been at the fore.

Ken Hill Farm is working in conjunction with Frontier to review and improve its overall soil health status.

"At previous farms, I've learnt the hard way that if you push soil to its limits, you're not rewarded and there's a lot of hard work to be done to get it back to a productive level," says Nick Padwick, Ken Hill Farm's farm manager.

"When I started here, I wanted a strong emphasis on soil health management and turned to Frontier to support us in creating plans which are 'outside the box'."

Frontier agronomist Jeremy Town works with Nick and his team across the 1,400ha estate, which includes the Soil Life demonstration site, trialling regenerative agriculture techniques.

"Soil health is at the heart of this system and we're constantly pushing the boundaries of what can be practically achieved on a working farm to improve it," Jeremy explains.

"Soil health is at the heart of this system"

"It's important the principles suggested by science are tried and tested in a farming setting across several years so the theory is underpinned with tangible data.



"At the site, we're not afraid to trial techniques, such as including wildflower mixes to support pollinators and other beneficial insects," he notes.

"We're not afraid to trial techniques"

The farm also experiments more conventional regenerative agriculture concepts, such as cover crops and companion crops, comparing methods like grazing livestock versus invasive cover crop removal and ploughing with traditional cultivation versus direct drilling.

Jeremy adds that the trials are developed with the help of the SOYL precision and Kings environmental teams.

"This allows Frontier to provide a holistic advice offering to Nick, using the MyFarm platform to track progress and specifically map areas of the site which are benefitting more than others.

"We're also able to change up what we're trialling – if something isn't working, Nick and the team are happy to rip up the rulebook



and find an alternative method which suits. For us, this is great as we can convey this back to our wider customer base.

"What may work for one farm doesn't necessarily suit another, so we need experience in all scenarios, soil types and techniques."

Although the majority of the techniques will require long-term analysis to see results, Nick is already seeing small changes from adapting to methods that put soil health first.



"In fields where we planted cover crops, we're already seeing improvements in soil structure and earthworm numbers, proving immediate benefits can be seen with just one or two alterations.

"Don't be afraid to try something new; it may just be the tool needed to boost soil productivity and performance."

The future of soil management – what's next?

To improve soil health, you have to play the long game, adapting to new techniques and not sitting on your laurels hoping change will happen. At the Frontier Soil Life demonstration site in East Yorkshire, embracing future technology is hugely benefitting overall soil health.

Frontier agronomist Chris Harrold oversees the site, working closely with farm director Tamara Hall to incorporate new scientific analysis, striving towards better soil health and structure.

"Historically, this farm has led with min-till techniques which, over the years, has improved the structure and organic matter profile in the soil," explains Chris.

"To continue this improvement, Tamara wants to move to direct-drilling across the board, but the clay profile is making this a difficult move."

There are several management techniques, such as incorporating cover crops and direct-drilling, which are all proven to have long-term benefits to soil health, but, to push to the next level, the Frontier team wanted to delve below ground.

"We want to diligently analyse the structure and microbial make-up of what we're currently working with, to then create a plan of attack," Chris explains.

Along with comparing different techniques to improve soil structure, a focal point of this Soil Life demonstration site is to use new technologies such as near-infrared and DNA analyses to provide a full-spectrum assessment of the microbial species, including the proportion different fungi and bacteria present, and structural build-up of the soil.

"We'll use the results from these assessments to help identify the techniques that are most beneficial to soil health. This will help us make short and long-term management plans that incorporate the techniques that work best.



"If this can work in a farm setting on our demonstration site, it's a service we could offer to customers in the future."

For Tamara, using this tool means immediate decisions can be made, along with providing justification that current management techniques are working.

"Rather than having to wait two to five years to see improvements, the assessment is testing if what we're doing is benefitting organic matter and soil structure," she says.

"There's evidence of the introduction of new beneficial bacterial and fungal groups already, from incorporating compost and manure in fields - we have the quantitative data to back up the theory.

"Looking ahead, I hope what we're exploring with Frontier will help other farmers who want to create resilient and healthy soils, to support a profitable farming future."



Expert focus: Rob Nightingale, specialist in break crops and sustainability

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Prior to joining Frontier in 2015 as an agronomist, I worked as a farm manager for five years, so I've been at both sides of the table.

My primary role at Frontier is sharing expertise around break crops and sustainability with Frontier agronomists and their farmers. As a business, we're constantly striving to support growers adapting to outside factors; helping them to create a more resilient and profitable business. Part of my job is to ensure we're giving our customers the right advice in relation to sustainability and carbon management.

There's an industry-wide focus on improving soil health at the moment and, through the work at our Soil Life demonstration sites, we can keep growers up-to-speed on the latest techniques to benefit soil health, soil structure and organic matter. I act as a 'middle-man', relaying results from these sites to our agronomists and their customers. My job is to update them on what has worked in a given scenario, with a view to adopting new approaches on their farm. I am also here to provide specialist advice on carbon management to farmers.

Helping farmers manage carbon

There's a lot of interest in carbon, whether it be incorporating cover crops or adapting rotations, or looking to the future when there may be access to carbon-related contracts. I'm here to be a sounding board for agronomists and their growers, for example, to help them understand and implement carbon calculators. My job, along with the wider Frontier sustainability team, is to provide insight and help agronomists and their farmers keep ahead of the curve."

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Soil Life reports: The next step on your journey to sustainable soil health

If you'd like to know more about the ground beneath your feet, our Soil Life reports are a great place to start. With three types of analyses available, you can choose the one most relevant to you and the characteristics of your farm – whether you want a benchmark for organic matter levels, a breakdown of your available nutrients or a concise investigation into the components of your soil.

To see which report can provide you with the right level of detail, visit www.frontierag.co.uk/soil-life-reports

Frontier has a UK-wide team of 130 BASIS qualified agronomists, including 44 Diploma holders, working with growers to deliver fully integrated agronomy advice on all aspects of profitable and sustainable crop production. To find out more about Frontier's agronomy services in your area email agronomy@frontier.co.uk, call 0800 227 445 or visit www.frontierag.co.uk

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