

## 2<sup>nd</sup> YEN Zero Discussion Workshop - Summary

Dear YEN Zero members,

Last week we held a YEN Zero discussion workshop, the second of the three planned to take place in our pilot year. We had a great attendance of over 60 members encompassing our Sponsors, Growers, and their Supporters. The virtual event was hosted on the online conference platform [Remo](#) to enable better interactivity between attendees.

The aim of the workshop was to update YEN Zero members with the activities currently happening within the network, facilitate discussion between Growers and Supporters, and to start the conversation around soil carbon and how it relates to achieving net zero agriculture. The full agenda for the event can be found below with the main takeaway messages from each section.

### YEN ZERO DISCUSSION WORKSHOP AGENDA: 09.00-10.30, 13<sup>th</sup> January 2022

1.	Join the Remo platform and sit on a virtual table with your Sponsor, <i>All</i>
2.	YEN Zero network update, <i>Christina Baxter - ADAS</i>
3.	Potential C sequestration in UK arable soils & How to monitor and manage soil C, <i>Anne Bhogal – ADAS</i>
4.	Introduction to the breakout session, <i>Christina Baxter - ADAS</i>
5.	Opportunities to increase soil C/SOM on-farm and past learnings (breakout session), <i>All</i>
6.	Summary and distillation of breakout session, <i>Table facilitators</i>
7.	Soil parameters and the YEN database, <i>Daniel Kindred – ADAS</i>
8.	Meeting close, opportunity to network on tables, <i>Christina Baxter - ADAS</i>

### Take home messages

- ❖ Overall, 60 Growers, sponsors and supporters joined the second YEN Zero discussion workshop where we looked at the topic of soil carbon
- ❖ 61 Growers are participating in the pilot year of YEN Zero, and Growers are starting to return data to ADAS to create their carbon footprints
- ❖ Agricultural soils are a very large store of carbon, and this carbon must be protected to prevent it contributing to agricultural emissions
- ❖ Soil carbon can be increased through practices such as incorporating organic material, growing cover crops and reducing tillage intensity
- ❖ An increase in soil carbon is generally associated with an increase in soil health, which can provide a range of benefits such as improved nutrient recycling and better moisture retention
- ❖ Measuring the amount of carbon in soils, particularly soil organic matter (SOM) enables Growers to understand the impacts of their management practices and identify where there are opportunities to increase soil carbon
- ❖ Many YEN Zero growers are already measuring soil organic matter and managing their farms to build soil carbon

## Introduction to YEN Zero

Christina Baxter, Crop Research Consultant, ADAS

At the start of the meeting, Christina gave an overview of YEN Zero. This included presenting the aim: **To create a net zero community for the agricultural industry to share their knowledge, agree key metrics, present ideas, and test 'what works'.**

She then ran through the remaining activities in this year's YEN Zero. This included:

- Submission of participant data
- Analysis of the data to create carbon footprints
- Creation of benchmark reports for participants
- Presentation of results at a meeting at the start of March
- A final discussion workshop covering how to implement mitigation strategies on farm to reduce crop C footprints

The results meeting will present the main messages from the first year's crop C footprint dataset and highlight growers who are making gains to reaching net zero cropping.

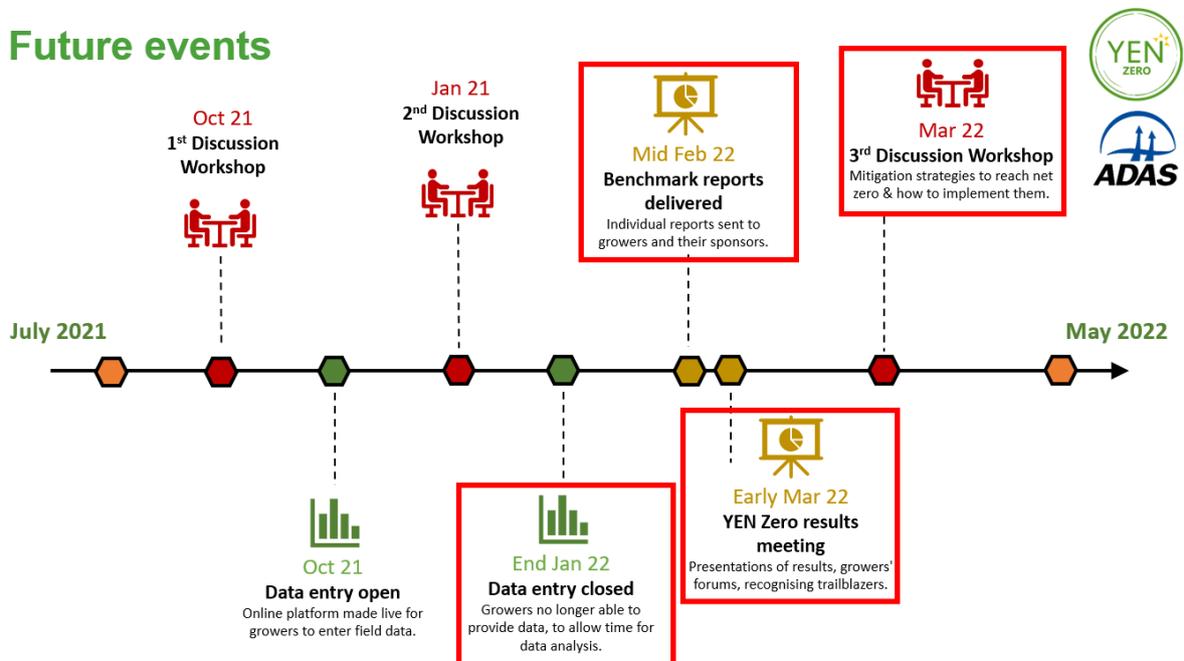
In this pilot year, there are a total of 61 Growers participating. These growers are widely located across Britain (see yellow markers on the map to the right).



### Field data

Growers can receive carbon footprints for up to six fields of combinable and forage crops, harvested in 2021 or prior, from the same field (e.g., for the rotation) or different fields. The deadline for data entry has been extended to the end of January and support can be provided by Sponsors or ADAS if participants require.

### Future events



### Net zero initiatives

The Growers represent a diverse range of farming systems and are at different stages on their Net Zero journeys. Some of the initiatives already being implemented on YEN Zero farms include:

- Ground sourced heat pumps
- Legume and herb rich pastures to reduce N use
- Companion cropping
- Moving to a reduced tillage system

## Report structure

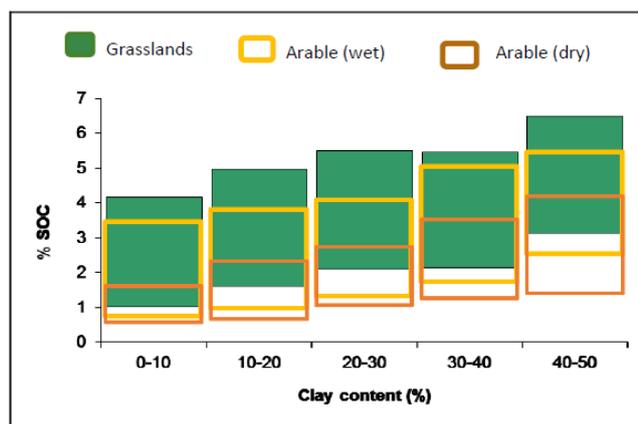
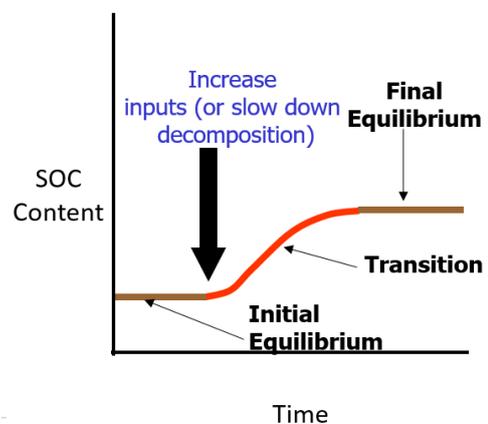
Christina gave an overview of the structure of the report that participants will receive. This included a look at the various data and benchmarks that participants will be able to use to understand their greenhouse gas emissions for their six fields.

## Potential carbon sequestration in UK arable soils

Anne Bhogal, Soil Scientist, ADAS

Anne gave a presentation on the potential for carbon sequestration within arable soils and how to monitor and manage this.

- Soil is the largest terrestrial carbon store – bigger than vegetation and atmosphere combined – but this carbon must be protected. This carbon is either **soil organic carbon (SOC)** or soil inorganic carbon. This SOC is part of **soil organic matter (SOM)**, which is plant or animal derived material that contains approximately 50% carbon.
- Increasing this carbon store involves **carbon sequestration** – the net transfer of C from the atmosphere to the land in soils and vegetation
- There is a limit to how much SOC a soil can contain (the concept of **saturation**) and increases in SOC are slow with rate of increase declining as the soil nears its saturation point. This increase in SOC is reversible (the concept of **permanence**) and practices need to be maintained to protect this SOC.
- SOC levels are determined by many factors and ranges are available for expected SOC levels for different soil types and levels of rainfall, but there is no easily defined critical level of SOC matter below which soil functions become impaired.
- Measuring SOM is a useful tool to indicate soil carbon content within the soil but also to highlight **soil health** – increasing SOM can help to improve soil characteristics that can boost productivity.
- To build SOC includes commonly used tools such as organic amendments, reduced cultivation, grass leys and cover crops, but they each have their own trade-offs.
- Anne cautioned that there was a limit to the potential of carbon sequestration to offset emissions due to permanence, saturation and **leakage** (where carbon is moved from one store to another). Measuring SOC accurately requires a lot of sampling and can be more costly than the value of the carbon being sequestered.



## Current and future practices for enhancing soil carbon, breakout session

*Facilitated by members of the ADAS Soils and YEN Zero teams*

Taking advantage of the Remo platform, a breakout session enabled small groups to virtually sit together to discuss soil carbon. The questions that were discussed included:

- What is your current system?
- Do you measure SOM, and if not, why not?
- Are you measuring soil C?
- Current practices implemented to improve SOM
- What other practices can be implemented to increase SOM?

### Farm types

YEN Zero participants represent a range of farm types, including mixed, arable and livestock farming, and these farms grew a range of crops, including potatoes and vegetable crops. Growers have had a wide range of experiences with soil carbon, with farm type, rotation, soil type and location influencing these experiences.

### Measuring soil carbon

Many of the participants were either monitoring SOM levels or were interested in doing so. Some participants had been doing this for many years. Others were just starting out on the process and learning about how best to do this. The majority were measuring SOM through loss on ignition measurement.

The main motivation was to increase farm resilience and to improve the quality of land for future years. There was a focus on maximising productivity through improved yield and reduced use of inputs.

A barrier to greater use of SOM monitoring was the knowledge gap on how to use SOM monitoring, which approach to take and how to use the data. Participants wanted to have a better understanding of how to sample, particularly where there was significant variation across a field. The key question was: how will the farm benefit from doing this?

### Strategies

Farmers were using a range of strategies for protecting or increasing soil carbon:

- **Reduced tillage** was widely used with some **zero tillage** and **direct drilling** used where feasible (such as direct drilling cover crops). Ploughing tended to be used more rotationally and strategically. A point was made about how broad a term reduced tillage is and how a better understanding of the impacts of specific types of reduced tillage would be beneficial.
- There was increasing use of **cover crops** though there is still a lack of knowledge about how to use them effectively, particularly around timing, destruction, impact of soil type.
- Participants were applying various **organic materials** to their fields and exploring opportunities for adding more, though finding availability to generally be low. Many farms were focused on returning straw, either directly or via straw for muck agreements. There was recognition of the nutritional value of organic manures, particularly due to the high costs of manufactured fertiliser.
- **Legumes** and **grass/herbal leys** were being added into the rotation, and **agroforestry** was being explored.

- There was increasing interest in integrating **livestock**, particularly where the use of grass leys and cover crops were being included in the rotation.

Participants wanted to understand what the best strategies were for building SOM, particularly with regards to specific soil types and rotation (e.g. with root crops).

### **Challenges**

Increasing SOM is associated with many challenges, particularly around the costs of making changes and the knowledge gaps around many of these practices. Other challenges included the long-term commitment required, how the use of contractors can cause issues in increasing SOM, and the difficulties of building SOM on rented land.

Although adding organic materials is one of the best options for improving SOM, there are limitations on its use. In some locations, the FRfW restrictions were incompatible with good practice for maintaining SOM. In other locations, organic materials are not easily available due to demand. There are also risks associated with the application of organic materials, including compaction from spreading and the potential for bringing in weed seeds.

Maintaining practices across the rotation proved to be challenging for some farms, particularly in reducing tillage intensity. Ploughing is usually required where root vegetables are grown and also to deal with issues such as weeds, pests and disease. There was interest in being able to measure climate impact across the rotation rather than focusing on individual crops.

### **Soil parameters and the YEN database**

*Daniel Kindred, Head of Agronomics, ADAS*

Following the breakout session, Daniel outlined initial findings following a wider analysis of YEN data relating to soil carbon and health. He highlighted that data indicated that soils with higher water retention properties (supported in turn by higher SOM levels) tended to yield higher, alongside crops where manure had been historically applied.

Daniel explained that although there was little evidence amongst YEN data to indicate a simple association between SOM and yield, the data had shown positive associations with grains per ear, grain protein content, grain mineral content and straw N%. Consequently, indicating a relationship between higher SOM and improved crop nutrient uptake.

### **Learnings from this workshop and future discussion workshops**

As with the first discussion workshop, the platform Remo was used to host it. Given the value in the breakout sessions, this has been an effective tool to use. Our next discussion workshop is due to take place in March shortly following the results meeting. This will focus on the mitigation opportunities for addressing agricultural emissions. We welcome any ideas/inputs into this event so please get in touch if you would like to contribute.

*YEN Zero is a recently established network in the ADAS YEN Family, with the overarching aim of creating a net-zero community. It aims to bring key players from across the agricultural industry together to meet the industry's target of achieving net zero emissions by 2040. The pilot year of this YEN network will conclude with a meeting to highlight to growers and stakeholders the results of this pilot in early March, with hopefully a wider rollout of the network in May 2022.*

We would like to acknowledge our YEN Zero Sponsors for making the setting up of this network possible and to all those who contributed to this YEN Zero discussion workshop.

Any questions or comments please get in touch: [christina.baxter@adas.co.uk](mailto:christina.baxter@adas.co.uk)

