

## 1<sup>st</sup> YEN Zero Discussion Workshop - Summary

Dear YEN Zero members,

We held our first of three discussion workshops this week, planned to take place in our pilot year, with 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 introduce YEN Zero to Grower members, facilitate discussion between Growers and Supporters, and to start the conversation around solutions which are required to achieve 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 am 19<sup>th</sup> October

1.	Join the Remo platform & sit on a virtual table with your Sponsor, <i>All</i>
2.	Introduction to YEN Zero & measuring crop carbon footprints, <i>Christina Baxter &amp; Sarah Wynn - ADAS</i>
3.	YEN Zero Sponsors' motivations to strive for net zero, <i>YEN Zero Sponsors</i>
4.	The NFU roadmap to net zero, <i>Allie Hesketh – NFU</i>
5.	YEN Zero Growers' perspectives on net zero, <i>YEN Zero Growers</i>
6.	What solutions can be put in place today or in the future to achieve net zero (breakout session), <i>All</i>
7.	Summary & distillation of breakout session, <i>YEN Zero Sponsors and Pete Berry - ADAS</i>
8.	Solution to net zero through YEN Zero, <i>Daniel Kindred – ADAS</i>

### Take home messages

- ❖ 60 Growers, Sponsors and Supporters joined our first YEN Zero discussion workshop.
- ❖ For a typical arable crop, more than half of the GHG emissions are associated with the manufacture and application of N fertiliser, with about 16% associated with fuel use.
- ❖ Analysis of YEN data showed wide variation in GHG emissions between wheat crops, and a trend for high yielding crops to have fewer GHG emissions per tonne of grain.
- ❖ Potential solutions, suggested through workshop attendees, to reduce crop C footprints included i) technologies to make bread with low protein grain, ii) technologies to improve the efficiency of N fertiliser & manure use, iii) use of cover crops, iv) electric or hydrogen powered vehicles, v) heat pump powered grain drying.
- ❖ The consensus communicated through YEN Zero Sponsors and The NFU is that we will only make progress by working together and sharing ideas as an industry.

## Introduction to YEN Zero

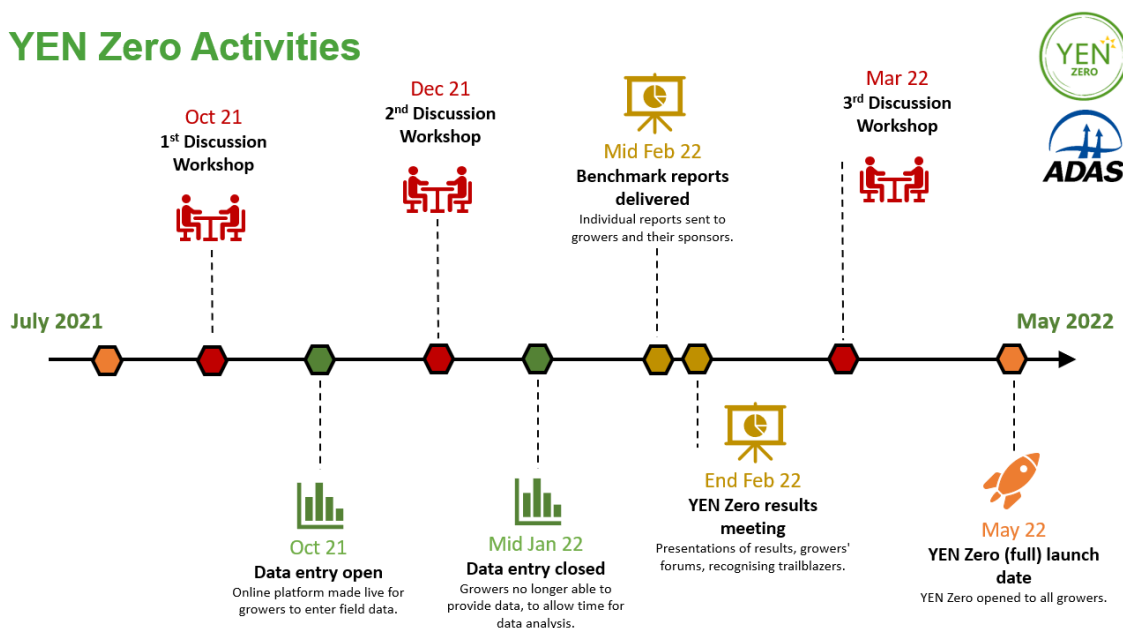
Christina Baxter, Crop Research Consultant, ADAS

- A third of our global greenhouse (GHG) emissions come from the food system with 70% of the food system emissions being associated with the agriculture sector, predominantly land use change and growing and harvesting food (Crippa et al., 2021).
- We require dedicated mitigation strategies to reduce the major contribution food production has on our global emissions.
- YEN Zero was founded this year to help the UK agriculture industry identify and test mitigation strategies which have the potential to help us move towards net zero.

**The aim of YEN Zero is to create a net zero community for the agriculture industry to share their knowledge, agree key metrics, present ideas, and test 'what works'.**

- The YEN Zero pilot year will run from July 2021 – May 2022, with an initial focus on combinable crops.
- Key activities taking place within the network include:
  - Benchmarking of crop C footprints of harvested fields (prior to the 2022 harvest season). C footprints will be calculated using the new AHDB Environmental Benchmarking Calculation Engine (EBCE).
  - Discussion Workshops on key topics within net zero.
  - End of year results meeting to discuss the main findings from the benchmark analysis and highlight successful mitigation strategies in action.

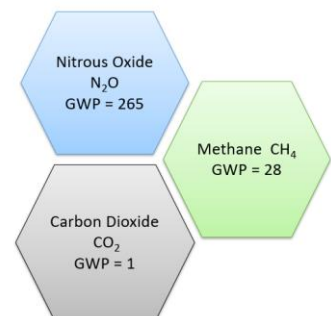
## YEN Zero Activities



## Measuring crop carbon footprints

Sarah Wynn, Managing Director Climate and Sustainability, ADAS

- The predominant agricultural GHGs are Nitrous oxide (N<sub>2</sub>O), Methane (CH<sub>4</sub>), and Carbon Dioxide (CO<sub>2</sub>) which have different Global Warming Potentials (GWP) which influence their potency. N<sub>2</sub>O has the highest GWP, making it a big contributor to our agricultural GHG emissions.
- There are 2 different approaches to carbon (C) accounting which include The National Inventory approach and the Product or Organisation approach



The National Inventory	Product or Organisation
GHG emissions for the nation.	GHG emissions per farm or per ha or per unit of produce.
Separates out industry sectors e.g., agriculture has its own GHG inventory.	Includes all emissions from raw materials to the end point of the product.
Embedded emissions e.g., manufacture of fertilisers and transport are not included in the agricultural GHG inventory.	Embedded emissions included, e.g. manufacture of inputs

- For the National Inventory, the key sources of agricultural emissions are associated with enteric fermentation, manure management and the application of artificial fertilisers to soil.
- In addition to reducing emissions, we need to focus on increasing the areas of land capturing C e.g., grassland and woodland.
- From an organisational/product perspective, more than half of a typical arable crop C footprint is from emissions associated with the manufacture and application of nitrogen fertiliser, with 16% from fuel use.

### Sponsor's motivations to strive towards net zero

YEN Zero Sponsors' motivations for being part of the YEN Zero network are presented in the word cloud, the dominant reasons for our Sponsors to support YEN Zero are:

- To help to reduce C footprints
- To better understand C accounting on farm
- To reduce confusion around the topic
- To support farmers in identifying opportunities to reduce their crop C footprints



We heard from 3 of our YEN Zero Sponsors at the workshop who communicated their motivations for striving towards net zero in their area of the agriculture industry:

*Harley Stoddart, Senior Environment Scientist, AHDB*

AHDB are very proud to be sponsoring YEN Zero - we believe it is very important to empower farmers to know and understand their C footprints. Especially as there is a close link between increased profitability and lower C footprints. Resource use efficiency is a common driver.

*Mike Green, Agricultural Sustainability Manager, BASF*

We have created climate change collectively and we need to address it collectively. We need to work together to deliver climate neutrality and be prepared to change our behaviours. YEN Zero will provide transformative data to help us identify the journey to net zero. The collective strength of the YENs is the activity at the farm level and can hopefully help us identify climate champion farmers.

*Peter Nelson, Operations Director, The Glenmorangie Company*

We're an end user of malting barley and the agricultural part of our supply is a third of our total C, so it is a critical area for us to understand more about. Our 2 main ambitions are to understand the impact of growing malting barley on the environment, and to support the supply chain in reducing this. As an end user we accept things have to change, through better understanding we can stay engaged with our farmers and supply chain and support them in this journey, and not just sit waiting for things to happen. We hope to send a message to the growers that we are part of this journey and that we want to contribute to and find the solutions.

### The NFU roadmap to net zero

*Allie Hesketh, Combinable Crops Adviser, NFU*

- The NFU has an ambition for the agricultural industry to be net zero by 2040. This target is based on the UK agriculture GHG inventory.
- The roadmap to net zero is based on land sharing not land sparing, in a manner that does not threaten food production. This involves undertaking practices on farm to reduce C footprints and enhance C sequestration, alongside agricultural production.
- This is based on the three key principles of 1. We cannot undermine food production, 2. We cannot export our footprint, 3. We cannot achieve net zero alone.
- The NFU's ambition is dependent on support from government and stakeholders, working together across the industry to achieve a fair and just transition to a low C rural economy.
- The three pillars defined by the NFU to help us achieve net zero are 1. Boosting productivity and reducing emissions, 2. Farmland and C storage, 3. Coupling bioenergy to C capture, utilisation, and storage.
- The NFU's primary role is to influence policy to enable farmers to reach net zero and to work towards this in a commercially viable way, rewarding farmers for C storage and supporting environmental services.
- Some of the NFU's asks are to ensure future productivity and environmental schemes such as ELMs truly support farmers in reducing their C footprint; better infrastructure in rural areas to support a low C rural economy; a modern approach to the UK planning system to help farmers diversify buildings to help prepare for the future; ensuring farmers are awarded for maintaining C stores on farm; policy that enables farmers to explore wider crop rotations and diversify their businesses; ensure a level playing field on a global scale that prevents C leakage.
- To support these asks we've established a net zero steering group to challenge us and help us keep on course. We have 150 members taking part in our ELMs test and trial work to show how we think ELMs can work to support farmers to reduce their C footprints; we have launched a countryside COP to show opportunities around net zero.
- The NFU, AHDB and CHAP have recently commissioned the UK net zero cropping review which pulls together all the available research to build a UK GHG footprint baseline for certain arable and horticultural crops and highlights where more research is needed and assesses opportunities available now and in the future to reduce our footprint. The report will be released in full in January 2020.

### YEN Zero Growers' net zero perspectives

We heard from 3 YEN Zero Growers who shared their net zero perspectives and any changes they're implementing on farm to help reduce the environmental impact of their cropping systems:

*Luke Medd, mixed farm in county Durham & Robert Bowes, Agrii agronomist. Sponsored by Agrii.*

- Farming Wagyu beef and sheep, forage, spring and winter crops.
- Running a long-term soil health trial, currently in the first year, which has been ploughed and combi drilled with winter wheat and spring crops in a small rotation for the past 30 years.
- The field was scanned with Rhiza to assess soil variation and split into 2 halves with one going into cover crops and the other half winter wheat.
- The main difference is crop establishment with one half being ploughed and the other half moving to no till. The no till area has been sub-soiled followed by a low disturbance disc drill.
- As well as building soil health it will be interesting to test the overall C emission between these two strategies through YEN Zero.

*Andrew Williamson, farmer in Shropshire, combinable crops business. Sponsored by Bayer.*

- Currently moving to a zero/reduced tillage system over the last 3-4 years with some successes and challenges.
- This has led us to look into soil health and try to fit this into net zero which is a target of ours.
- Hoping we can learn more about C footprinting through YEN Zero and where we currently are in terms of our emissions and how we can improve things.
- Agriculture needs to be seen as the solution to these problems and not the cause.

*David Fuller-Shapcott, farmer in the Scottish Borders. Sponsored by InchDairnie.*

- We are trying to improve the soil on our farm by moving away from a power harrow based system to direct drill which we have tested on a single field. We are now seeing the yields on this field increase and are ready to roll this out across the whole farm whilst reducing our nitrogen input at the same time.
- We have our eye on being able to sell C credits in the future and are also in the process of installing a ground source heat pump for grain drying.

### Solutions to achieve net zero, breakout session

*Pete Berry, Head of Crop Physiology, ADAS*

The attendees of the workshop took part in a breakout session to discuss, on their Sponsor's tables, solutions which can be put in place today, or in the future, to allow UK agriculture to move towards Net Zero. The priority solutions which were identified by attendees are summarised in the table below. Generally, there was good consensus across YEN Zero members on which solutions have the most potential to help us achieve net zero.

	TODAY	FUTURE
Nitrogen	Improve fertiliser use efficiency. Make use of cover crops.	New technologies to improve use efficiency.
	Make better use of manures and digestate.	Alternative fertiliser manufacture methods e.g., green ammonia.
	Relax high protein requirement of milling wheat.	Breeding advances e.g., gene editing.
	Can variable rate N or seed dressings play a role?	
Fuel use	Decrease cultivation intensity without reducing yield. Need to understand soils better.	Alternative fuels such as hydrogen or electric. Can robots reduce fuel use? Different ways of grain drying.

General	Need to measure baseline at start of system change.	Beware to avoid pollution swapping.
	Need for similar C calculation approaches.	Use of different crop species e.g., soya or perennial crops

### Journey to net zero with YEN Zero

*Daniel Kindred, Head of Agronomics, ADAS*

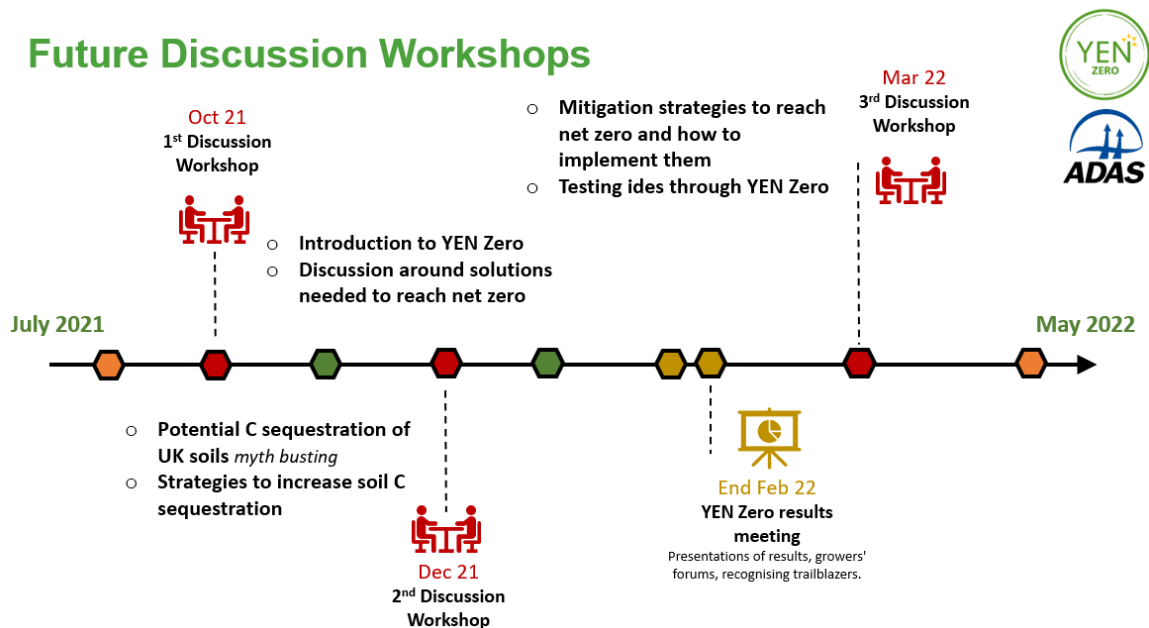
- The YEN was founded in 2012 to work together to improve crop performance and realise potential through a learn by sharing approach which encompasses gaining understanding, sharing and benchmarking data, analysing that data, and networking.
- The YEN networks are guided by 4 key pillars which feed into a circular process of sharing and gaining knowledge:
  1. This process starts with defining the knowledge base through a shared conceptual framework, like with the AHDB growth guides.
  2. This knowledge helps to define the metrics which we measure and use to compare and benchmark on-farm data through our networks.
  3. The benchmarking and analysis of this data leads to the development of ideas which can help to improve that data.
  4. These ideas can then be tested on-farm in a scientifically robust manner using the ADAS Agronomics approach. The results of these tests then feed back into our knowledge and understanding within pillar 1.
- The Morley Foundation recently funded the analysis of the cereal YEN database for the GHG cost of these crops in terms of the C footprint on a per tonne of output basis. This analysis demonstrated the dominant influence of nitrogen fertiliser and N<sub>2</sub>O emissions. The data also showed a high variability between crops in terms of their C footprint, but there was a trend for higher yielding crops to have fewer GHG emissions per tonne of grain. YEN Zero can help us to understand the main drivers of this variability to help identify cropping systems and strategies to help reduce C footprints.
- The ADAS YEN team are currently developing the online platform where YEN Zero Growers will be able to input their agronomic data for 6 fields, from the end of October. We are also working on how to report the benchmarked data back to YEN Zero members in the form of a report which we will ask for input on from the network.

### Learnings from this workshop and future discussion workshops

This 1<sup>st</sup> discussion workshop was hosted in the online conference platform Remo which facilitated great discussion on virtual tables hosted by YEN Zero Sponsors and allowed members to join us on stage to share experiences with the attendees. However, we are aware some YEN Zero members had difficulty joining us in Remo and we had some sound issues. We will be doing a review before our next workshop on what the most efficient platform is to use for these events, keeping network members in mind. Additionally, we will consider hosting some of our planned events in person if social distancing rules allow.

Our next discussion workshop is due to take place in December where the topic of discussion will be around the potential C sequestration of UK soils and what strategies can be put in place to increase C sequestration on-farm. We welcome any ideas/inputs into this event so please get in touch if you would like to contribute.

## Future Discussion Workshops



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)

