



CROP C FOOTPRINT BENCHMARKING ASSESSMENT 2023

YEN User ID	
Entrant name	
Farm name	
Location	
Crop type(s)	W. Oilseed rape, W. Oats, W. Barley (malting), W. Wheat (feed), S. Barley (malting)
Harvest year(s)	2023
Sponsor/supporter	
Sponsor/supporter email	



INTRODUCTION

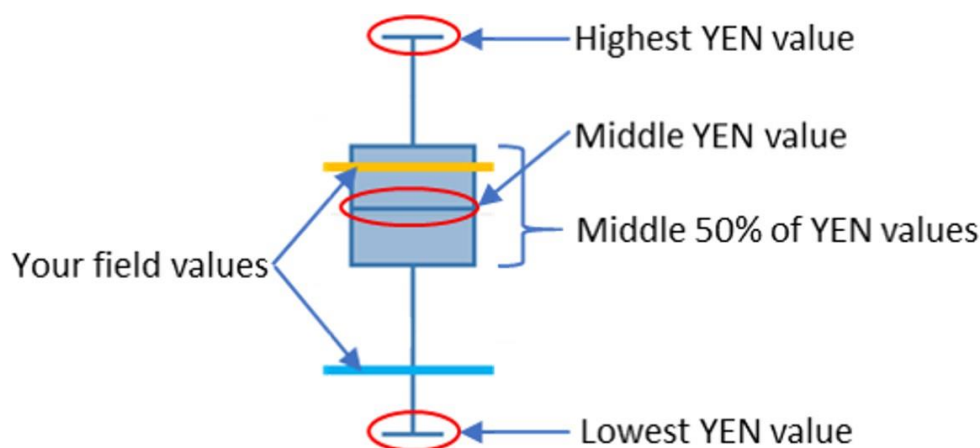
We would like to thank you for submitting your entries into the YEN Zero network. You are one of 19 growers who submitted data from a range of arable crops including wheat (43 entries), barley (25), OSR (9), oats (6), beans (10), peas (2) and others (14).

This report is the second report provided by YEN Zero in which your crop carbon footprint analysis is presented alongside the range of figures within the YEN Zero database for each crop type, to allow for comparison. Benchmarking your data in this way can indicate where you are performing higher or lower than other growers in the network, in terms of GHG emissions associated with different aspects of crop management.



UNDERSTANDING YEN BENCHMARKING

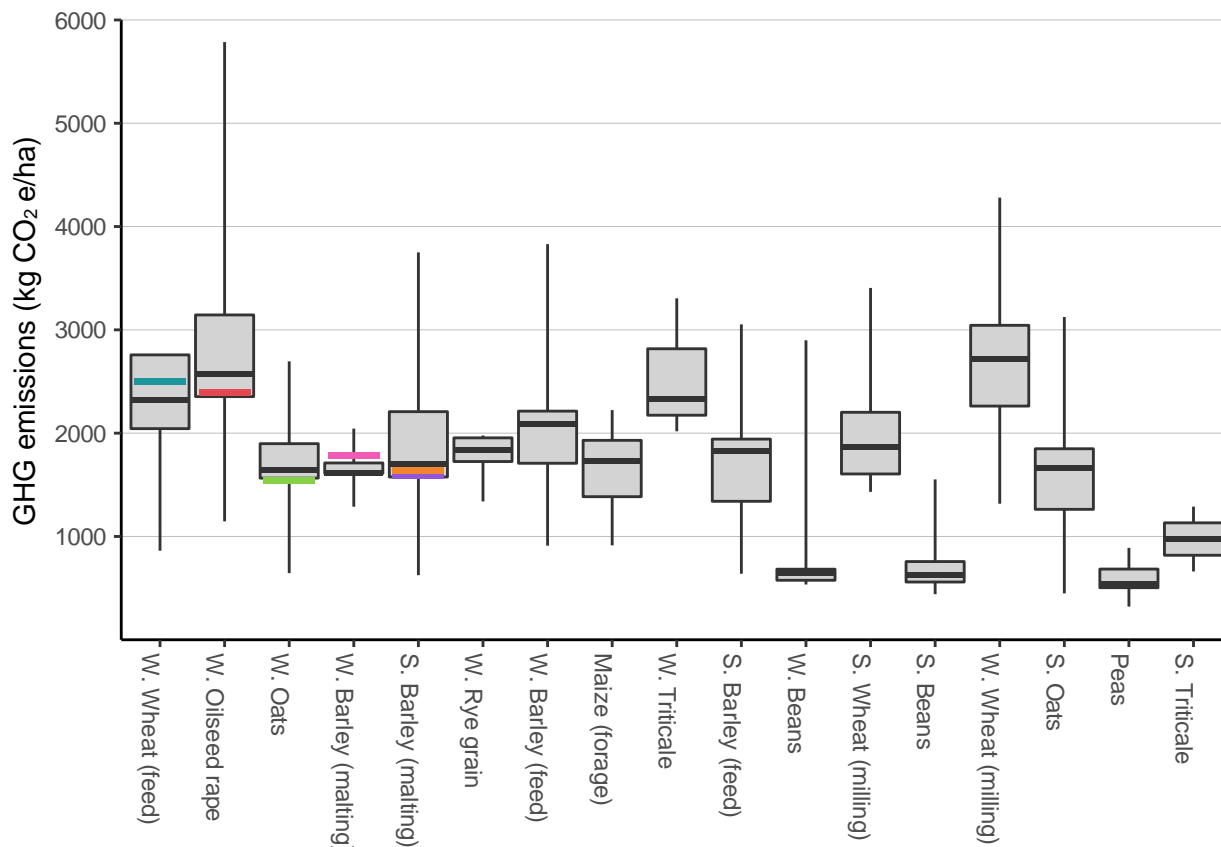
Benchmarking within the YEN Zero network allows you to gauge the performance of your crops against other crops in the network. This has provided the principal value of YEN to participants throughout other YEN networks. We do this with benchmark charts, which compare your values with everyone else's as per the following key:



The 'whiskers' show the range of YEN Zero values whilst the box shows the middle half of values, with a line for the mid-value. The coloured lines show the values for your entries.

YEN ZERO DATA SUMMARY

Presented below is the range of GHG emission intensities (GHG emissions per ha) for each crop within the YEN Zero network. The coloured lines show how your entries compared.



YEN ZERO DATA SUMMARY

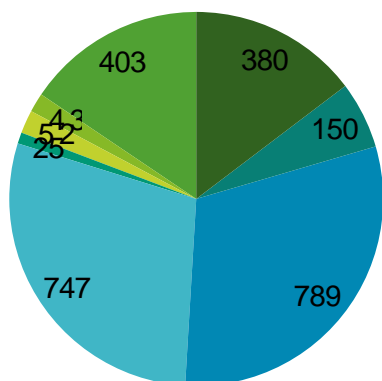
Below is a summary of the proportion of crops entered into the network which used particular crop management strategies such as cover cropping, manures, nitrification/urease inhibitors, and different cultivation strategies, to demonstrate the types of crops your data is benchmarked against.

Also summarised is the proportion each crop management category contributes to the carbon footprint of the main crops entered into the network, averaged from this year's dataset. These pie charts demonstrate how emission hotspots differ between crop types and where the opportunities lie to reduce the C footprint associated with different crops.

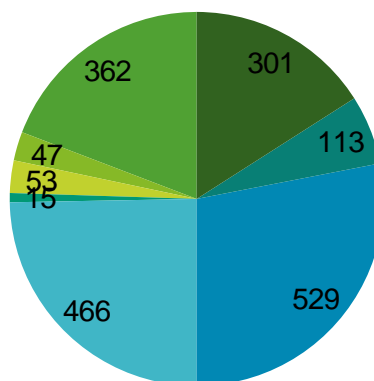
	Crop management	Proportion of crops
Cover crop after this crop	Yes	28%
	No	72%
Cultivation strategy	Plough-based	15%
	Deep non-inversion (>6cm depth)	23%
	Strip tillage	11%
	Minimum shallow tillage (<6cm depth)	20%
	Direct drill	32%
Manure use	Yes	33%
	No	67%
Inhibitor use	Yes	9%
	No	91%

The pie charts below show the average carbon footprint for a range of arable crops on a per hectare basis.

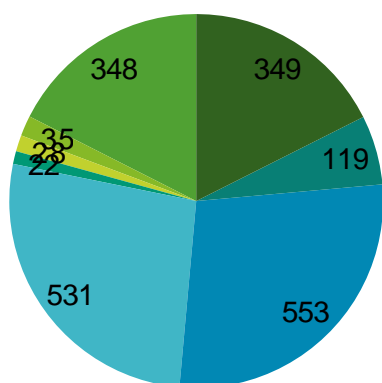
Winter wheat – 2589 kg CO₂e/ha



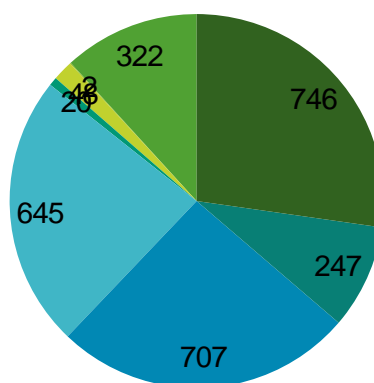
Spring barley – 1886 kg CO₂e/ha



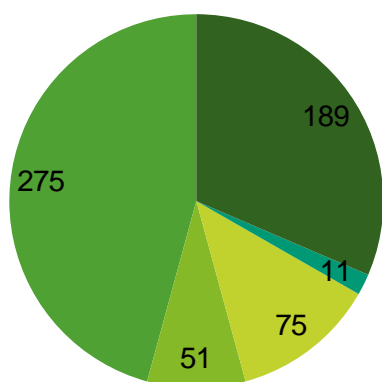
Winter barley – 1985 kg CO₂e/ha



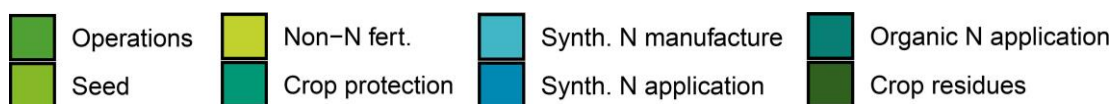
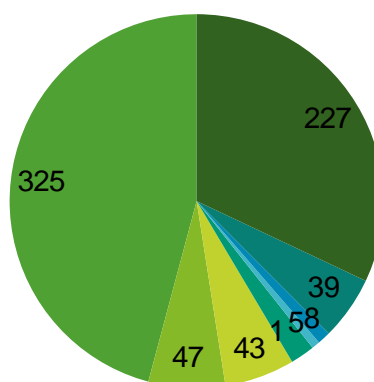
Winter OSR – 2737 kg CO₂e/ha



Peas – 601 kg CO₂e/ha



Spring beans – 709 kg CO₂e/ha

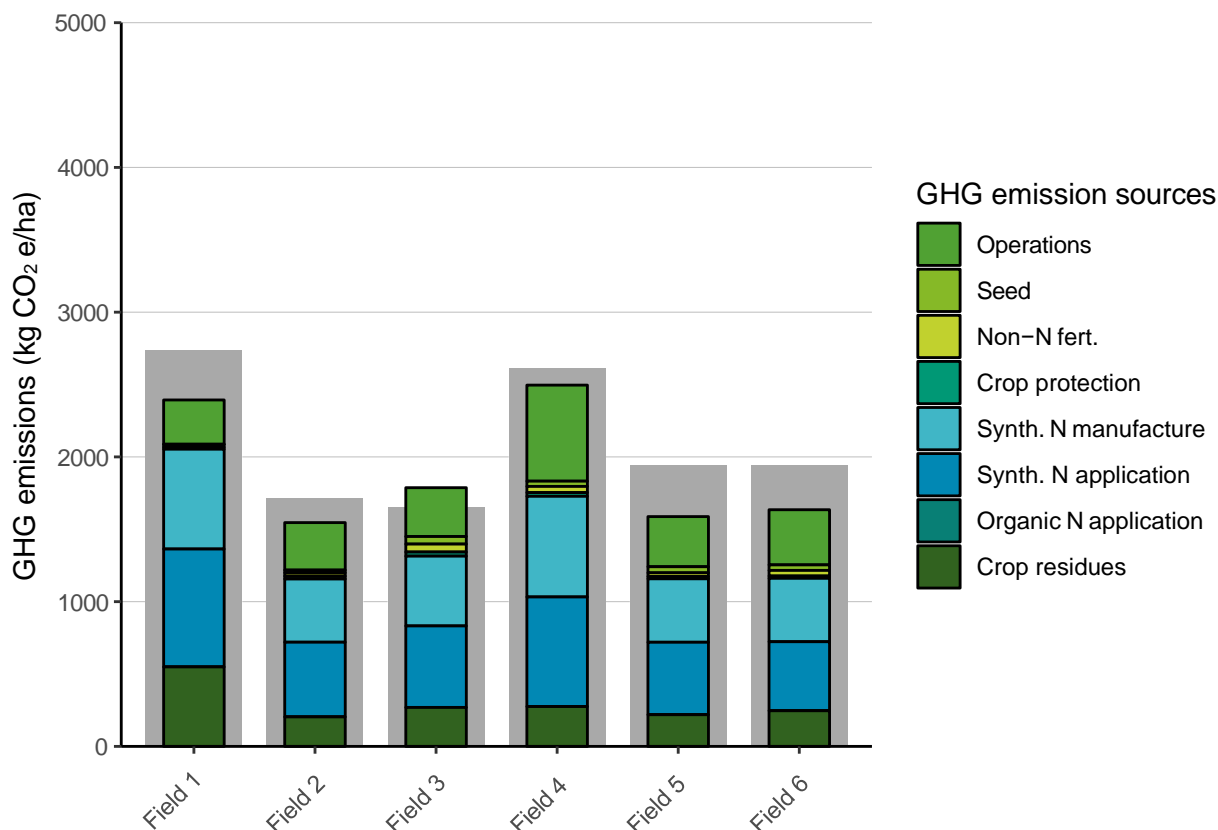


YOUR GHG EMISSIONS

This section provides detailed analysis of how the GHG emissions from your farming operations compare against others in the YEN Zero network.

Entry	Field name	Crop type	Variety	Yield	GHG emissions	
					t/ha	kg CO ₂ e/t
1	Field 1	W. Oilseed rape	Acacia	3.1	772	2393
2	Field 2	W. Oats	Mascani	5.8	263	1546
3	Field 3	W. Barley (malting)	Craft	6.5	276	1787
4	Field 4	W. Wheat (feed)	KWS Dawsum	8.4	303	2496
5	Field 5	S. Barley (malting)	Laureate	5.3	301	1587
6	Field 6	S. Barley (malting)	Laureate	6.0	276	1635

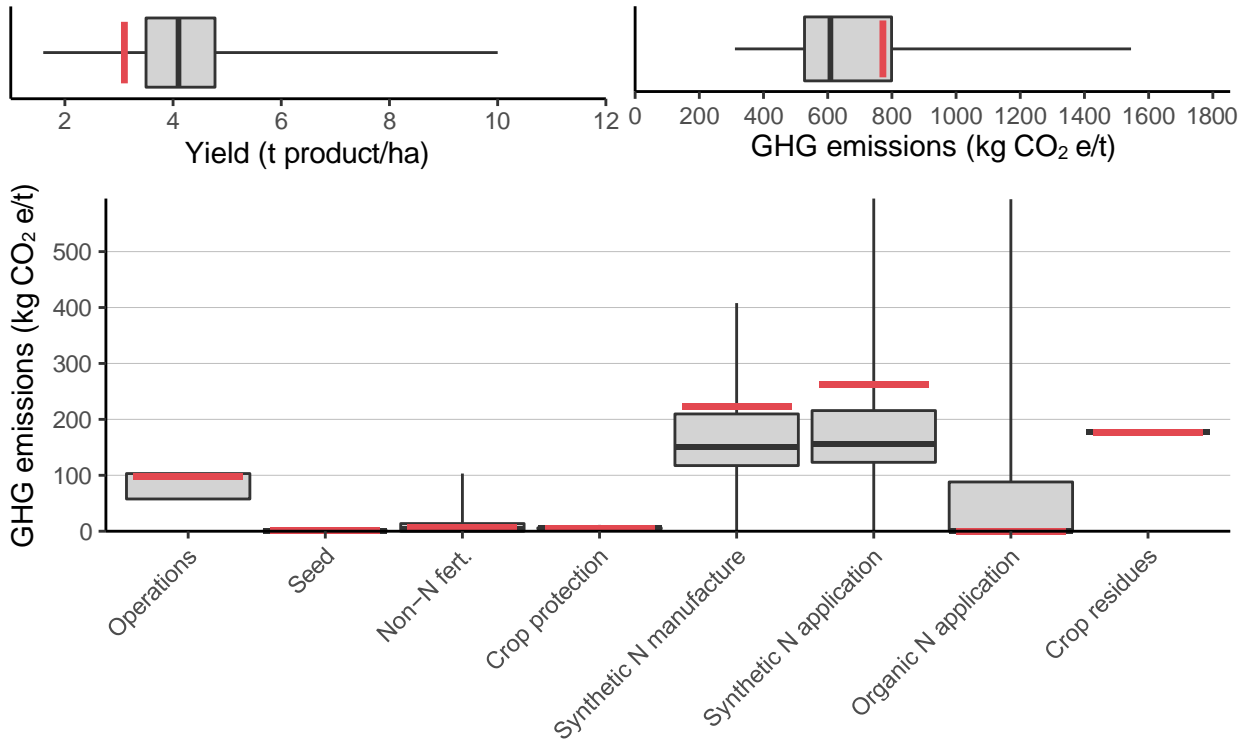
The graph below shows the total GHG emissions (per ha) for each of your entries, broken down into the main emission sources. The grey bars in the background show the average total GHG emissions for that crop type within the YEN Zero database.



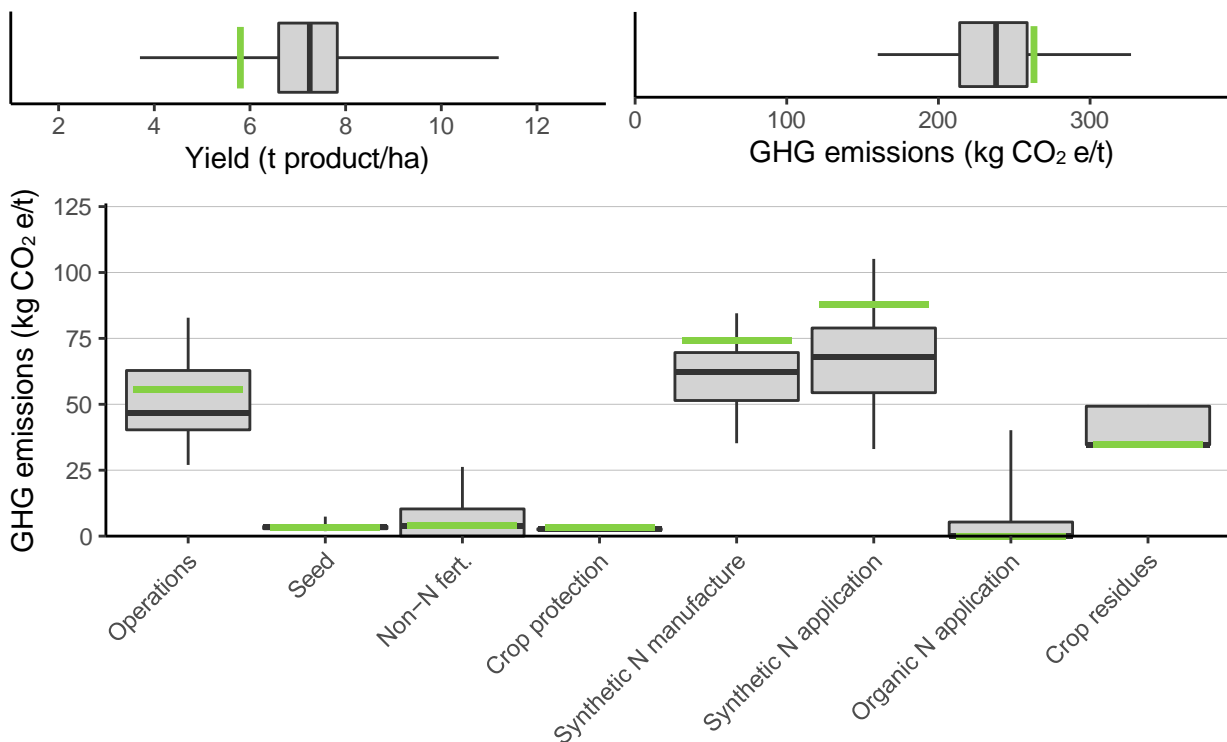
BENCHMARK ASSESSMENT

This benchmark assessment shows boxplots comparing your yield, GHG emissions intensity (kg CO₂e/t product), and GHG emissions by source, with the rest of the YEN Zero network.

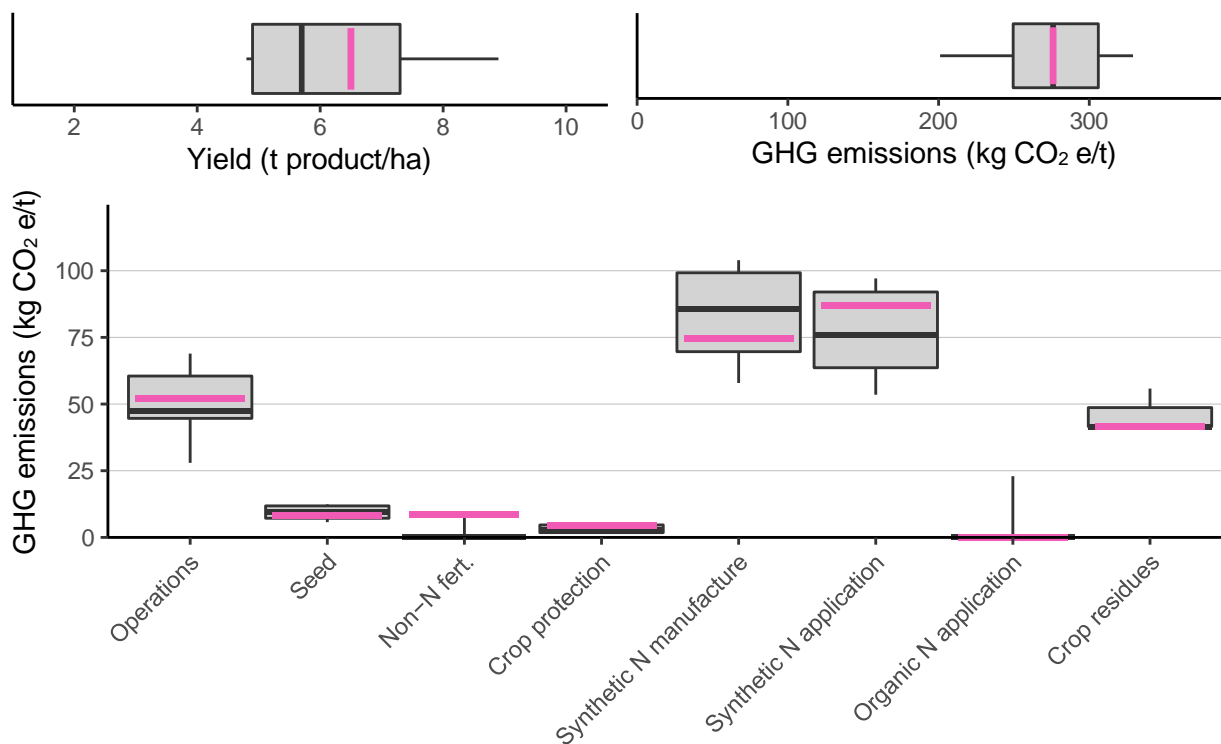
Field 1 - W. Oilseed rape



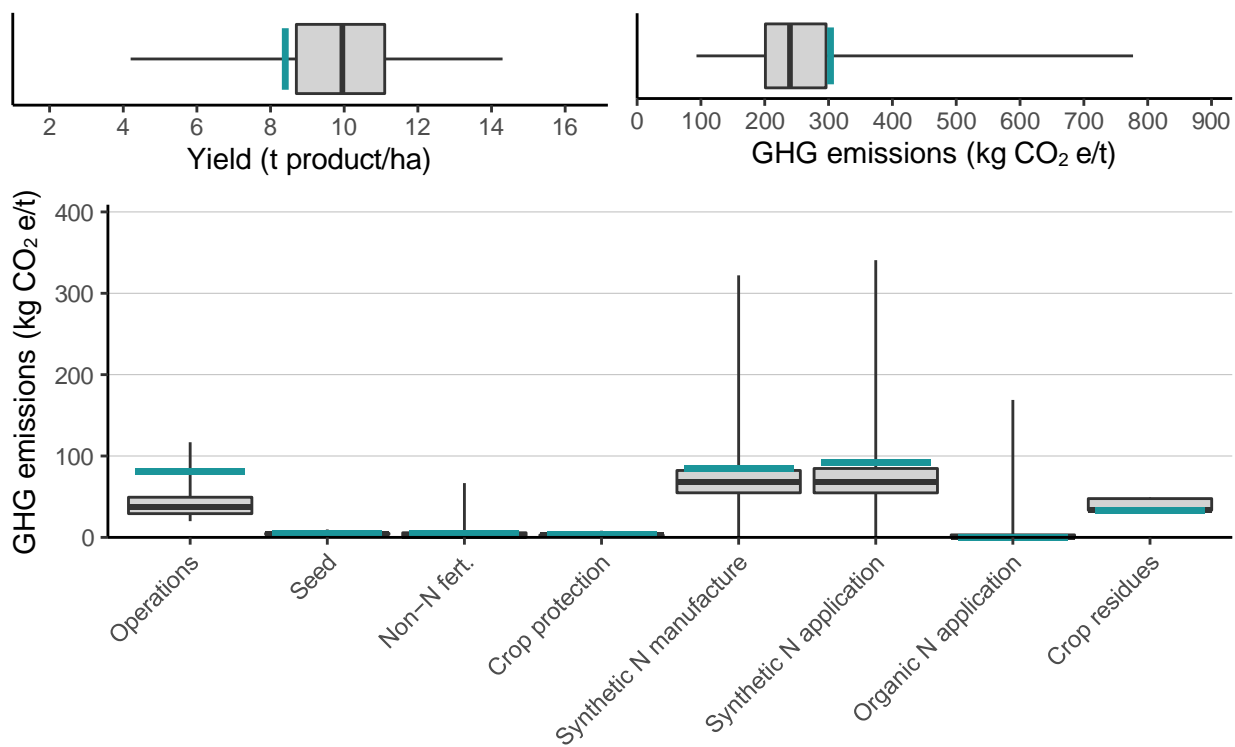
Field 2 - W. Oats



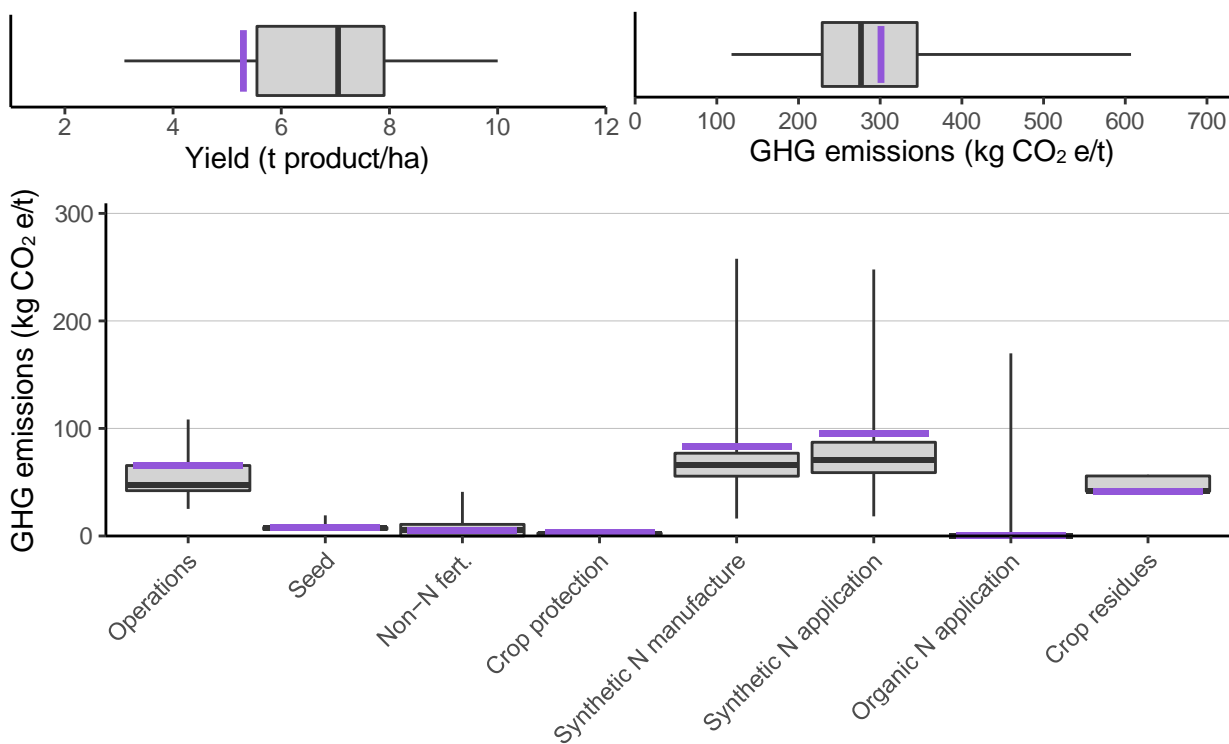
Field 3 - W. Barley (malting)



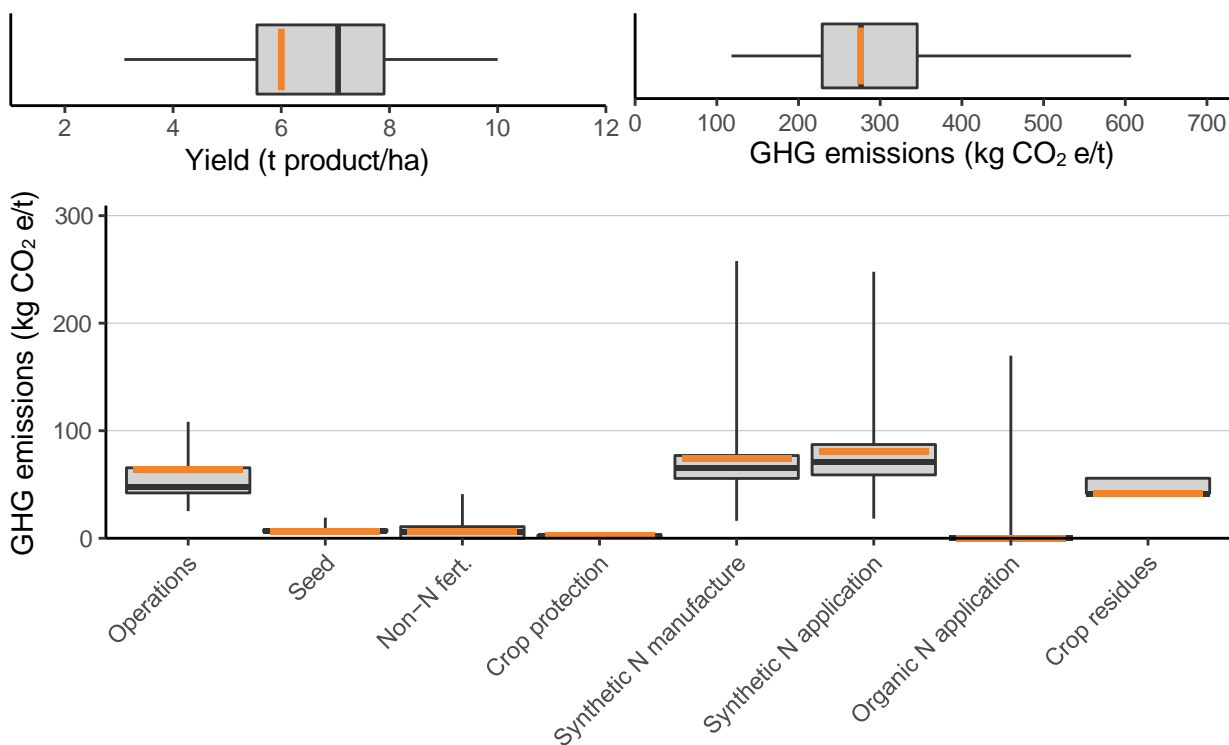
Field 4 - W. Wheat (feed)



Field 5 - S. Barley (malting)

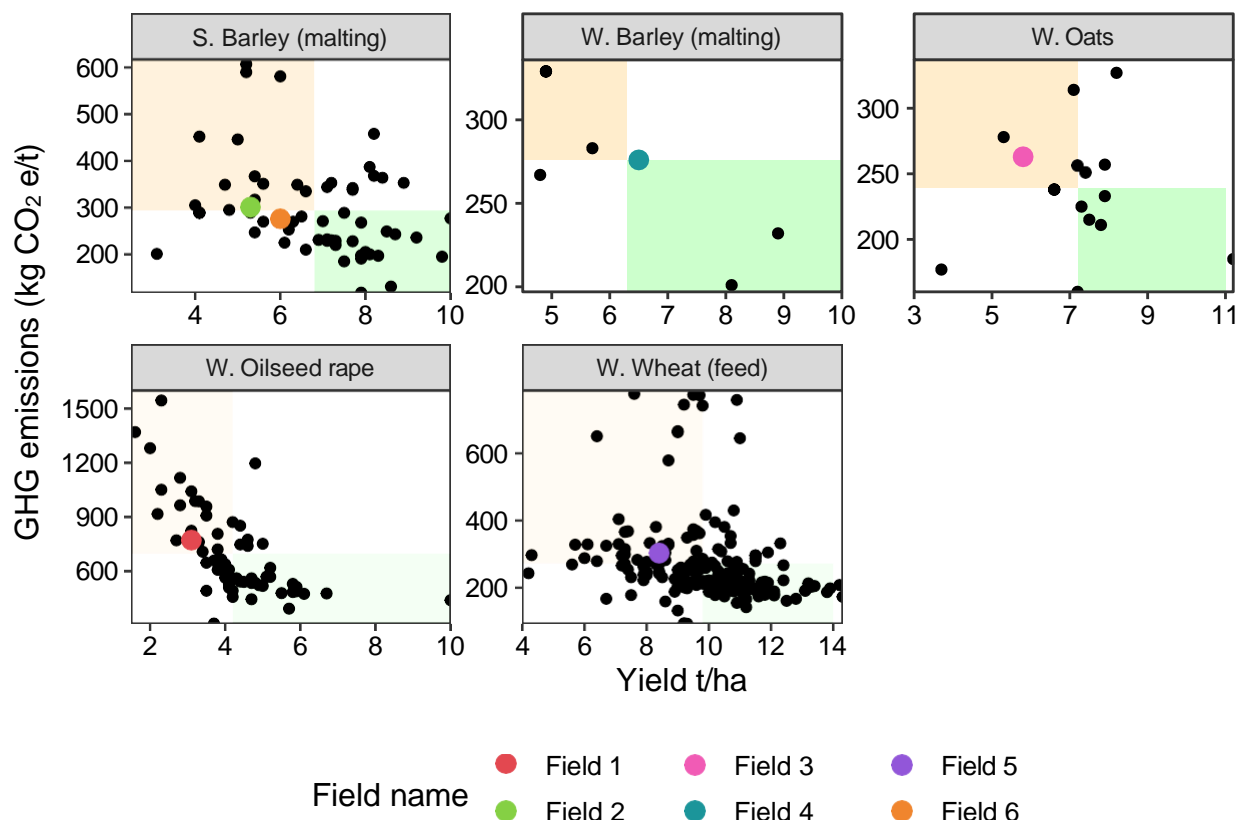


Field 6 - S. Barley (malting)



PRODUCTIVITY

To minimise GHG emissions and maximise profitability, it is key to improve productivity on-farm by producing more output with fewer inputs. The graph below shows the yield of all YEN Zero entries for the same crop against all GHG emissions per unit of productive output (the Carbon Intensity). This is the carbon emissions footprint of your crop per hectare divided by the yield, giving a Carbon Intensity value per tonne of yield. More efficient systems fall into the green shaded box, where yield is high and carbon is low. The coloured points show how your entries compared.



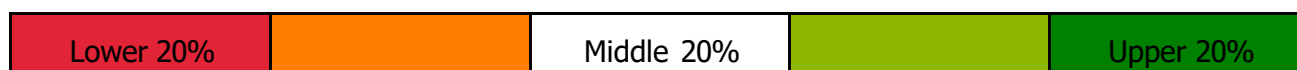
KPI BENCHMARKING

GHG emissions are driven by on-farm activities so it is important to quantify these in the form of key productivity indicators (KPIs) to identify emission hotspots. The table below outlines some of the main KPIs that influence GHG emissions from crop production, comparing your data to the average values within the network, for the same crop type. Values are colour coded to show comparisons to YEN average values for each crop type.

Gross margin figures are estimated based on standard figures from John Nix pocketbook. See methodology document on YEN webpage for full details.

		Field 1	Field 2	Field 3	Field 4	Field 5	Field 6
		W. Oilseed rape	W. Oats	W. Barley (malting)	W. Wheat (feed)	S. Barley (malting)	S. Barley (malting)
Yield	t/ha	3.1	5.8	6.5	8.4	5.3	6.0
GHG/t	kg CO2e/t	772	263	276	303	301	276
GHG/ha	kg CO2e/ha	2393	1546	1787	2496	1587	1635
N application rate, synthetic	kg N/ha	200	127	140	200	127	126
N application rate, organic	kg N/ha	0	0	0	0	0	0
N efficiency	kg N applied/t yield	65	22	22	24	24	21
Fuel use	L/ha	29.5	29.5	30.65	46.8	28.35	28.35
Total no. of passes	no.	8	9	10	11	8	8
Ag-chem spend	£/ha	129	51	151	199	130	130
SOM	%	5.9	4.6	5.3	5.6	6.1	6.6
Gross margin	£/ha						

Performance versus YEN Zero average for relevant crop type:



More green = more favourable result, e.g. higher Yield or lower N use.

YEN ZERO SPONSORS

We are most grateful to all our sponsors. They not only provide funding, but they are fundamentally involved in the management of YEN Zero and in supporting individual farms in making their entries. YEN Zero would not exist without them!



Upcoming YEN Zero Events

1. YEN Zero 2024/25

The next YEN Zero project year will be starting Spring 2024 and the data entry portal, now with 33 less questions, will be re-opening in June 2024. If you are interested in re-sponsoring YEN Zero for 2024/25, or are a grower interested in re-entering YEN Zero for 2024/25, then please contact yenzero@adas.co.uk.

This report is prepared using standard IPCC and UK National GHG Inventory methodologies for assessment of greenhouse gas (GHG) emissions. Full details of the methodologies used can be found at www.yen.adas.co.uk/projects/yen-zero. For any queries about your report, please contact yenzero@adas.co.uk.