Changes to farm payment systems and the need to satisfy supply chain requirements may require a closer look at carbon balance in the future. **Marianne Curtis** talked to one carbon neutral farmer and two consultants about their carbon auditing systems.

How growers could benefit from carbon auditing

With businesses in the supply chain now being challenged to deliver carbon net zero, farmers have a role in helping them do this, says Steve Cann, director of Future Food Solutions and founder of Sustainable Futures *(see panel on p25)*.

"Brands are keen to reduce their carbon footprint and set benchmarks to become carbon net zero within a certain time frame.

"They can be innovative around electric vehicles, green energy and recycling, but they do not have direct control of carbon in the agricultural supply chain. There is an opportunity to buy into the front end [farming] with respect to carbon," says Mr Cann.

Graham Potter, who farms near Thirsk, North Yorkshire, is one of four farmers selected by Sustainable Futures to help develop carbon auditing.

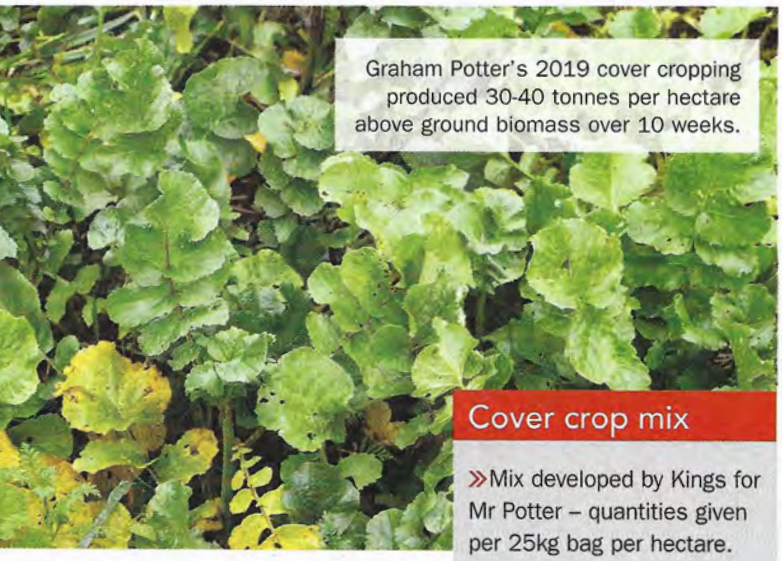
He says: "Given we are losing the Basic Payment Scheme and the Government is having to reform what we do and how we are paid, there could be benefits if we can prove we are farming carbon neutrally here.

"If we can sell carbon credits, this would be another income stream."

The fact Mr Potter has good farm records on Gatekeeper has helped him develop the carbon audit.

Mr Cann says: "We wanted to find out the scale of the carbon issue, set benchmark values and understand how we can influence things at farm level.

"We wanted to look at cropping, the farm and rotation, and put together core information about where carbon is generated and how we can ▶



Graham Potter's 2019 cover cropping produced 30-40 tonnes per hectare above ground biomass over 10 weeks.

Cover crop mix

»Mix developed by Kings for Mr Potter – quantities given per 25kg bag per hectare.

- **Vetch** 5kg
- **Siletina oil radish** 5kg
- **Phacelia** 1.5kg
- **Berseem clover** 1.25kg
- **Buckwheat** 2.5kg
- **Winter oats** 9.75kg

manage this. The numbers help us identify where the problems are and what the quick wins are, which could simply be choosing a different type of nitrogen.

"Then we can look at everything else we may have to do to meet the requirements of the new Agriculture Bill, or the needs of the supply chain.

"We can take a hectare of arable land and convert it to woodland, which captures carbon but will not feed anyone.

"Graham is showing us it is possible to catch carbon and produce food, by looking at the soil side of things as well as carbon emissions associated with diesel use, fertiliser and agchem."

Records

For the carbon audit research, Mr Potter sends digital crop records to independent soil scientist Neil Fuller.

Neil Fuller examines soil at Graham Potter's farm.

He says: "We analyse the data using Intergovernmental Panel on Climate Change values for carbon, our own field data and information from suppliers, for example carbon certificates from Yara for each of their products.

"The results show us carbon management is more about optimising inputs than simply reducing them.

"Using less nitrogen and crop protection products may reduce carbon emissions per hectare, but if yield is compromised, carbon emissions per tonne can increase significantly, which affects the entire supply chain."

Benefits of carbon auditing

- Opportunity to establish true value for carbon
- Helps focus on resource use on-farm e.g. nitrogen use efficiency
- Proving to Government your farm is carbon neutral
- Carbon credits

Source: Neil Fuller and Graham Potter

Farm facts: W. Potter and Sons, Thirsk, North Yorkshire

200 hectares arable, including:

- 85ha winter wheat
- 32ha spring beans
- 9.6ha grass ley, rented to sheep farmer and used for the Deer Shed Music Festival
- 44ha oilseed rape – high erucic acid content

Markets

- Wheat delivered 2.5 miles away from farm to KW

Alternative Feeds for animal feed

- Spring barley sent to Muntons for malting
- OSR delivered to Frontier
- Spring beans, destination yet to be decided

Net zero farming

»When Graham Potter began making changes to his farming system, carbon was not being measured.

He says: "Nine years ago, we were not chopping straw or growing cover crops, but we were ploughing and using lots of diesel. We decided to make the change to precision agriculture and seven years ago started direct drilling. Five or six years ago we started growing cover crops and for the second time around, we have cover cropped everything, even between first and second wheats."

Soil organic matter has improved by 3-4% over the last six years, a gain of five to six tonnes per hectare of carbon a year.

"Straw chopping helped a lot and cover crops boosted it even more," says Mr Potter.

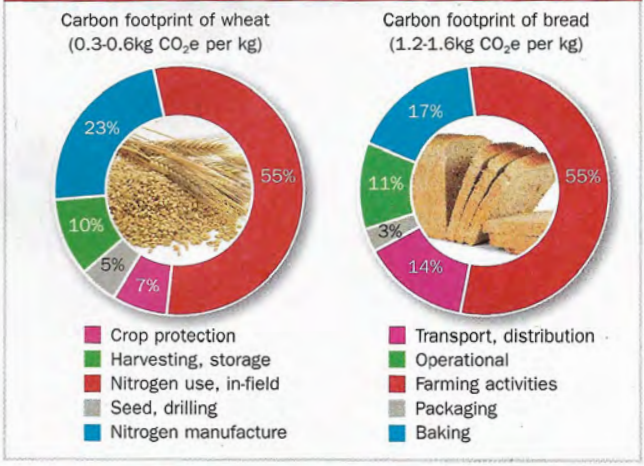
He only uses fertiliser where it is needed, using the N-Sensor, N-Tester and a drone to monitor crops and variably apply Omex liquid, 24% N + 7.5% S.

Mr Potter says he has seen yield benefits following his conversion to a different crop establishment system.

"When we started with the Claydon system we saw yield increase in the first year, then drop off over three years. Now it has started to rise again, going up and up in the last three years.

Supply chain carbon audit

SOURCE: Sustainable Futures



What is Sustainable Futures?

»Sustainable Futures is a programme initiated eight years ago and delivered by Future Food Solutions, a firm of specialists with more than 15 years of experience working across the whole supply chain.

It links global brands such as Heineken, food processors and about 250 farmers together along the supply chain. Its goal is to deliver more resilient and sustainable food and drink in the UK and beyond.

The Sustainable Landscapes programme, launched in July 2018, brings together groups of forward-thinking arable farmers to explore sustainable farming practices which will positively benefit soil health and ultimately improve water quality in specific river catchments.

Yorkshire Water is also involved in the project.

Sustainable Futures' carbon audit system

»Steve Cann says Sustainable Futures has developed a workable system which can generate the necessary numbers and is now taking steps to gain accreditation so industry partners can incorporate carbon audits into their farm record systems.

"We can fine tune it. We need to make it as quick and easy to use as possible. Results need to be meaningful, valuable and informative," he says.

Last year wheat averaged 12t/ha with some doing 14.5t/ha."

Also, despite the wet autumn and winter in 2019/2020, surface waterlogging is rare and Mr Potter was able to drill most of his winter wheat.

"The soil is like a sponge – it can absorb more water and hold it without losing structure."

Mr Fuller says Mr Potter's cover cropping in 2019 produced 30-40t/ha above ground biomass over 10 weeks.

"That's a carbon input of 3-4t/ha, but less than 1t/ha is needed for Graham to declare he is carbon neutral. It's everything else Graham is doing that makes this achievable."