

Big increases in fertiliser, fuel and electricity prices during 2022 focused the mind on optimising inputs, adds Mr Smith. Unprecedented energy costs were the impetus needed to digitally map the rented potato area using Terramap, he says.

"It was the nudge for us to invest more in soil sampling to target our inputs further. We want to do all we can to improve efficiency and manage costs, but it must not be at the expense of quality and yield."

Terramap measures variations in four naturally emitted isotopes to build a detailed picture of a range of soil characteristics across the field. This includes pH, texture and nutrient status, organic matter content and water holding capacity.

Some 800 data points are recorded in every hectare, with results cross-checked against lab analysis of selected soil samples. The location of each sample is then GPS tagged so repeat sampling can be done in future years to monitor changes.

Terramap data is uploaded to Omnia, where results can be analysed alongside other layers of management information. This analysis and knowledge of individual fields is then used to generate variable rate nutrient application plans.

The initial focus for the 2023 season was on potassium and magnesium – two key nutrients traditionally applied at a flat rate in line with standard W-pattern soil sampling and RB209 guidelines. Analysis showed some clear variations within different fields.

In one 8.5ha field, Terramap results showed the potassium index varied from index 0.5 to 4 (see *image*). Historically, this field would have received a flat rate of around 580 kg of muriate of potash (MOP) across the whole area.

In contrast, the Omnia -generated variable application plan recommended rates varying from 375kg MOP/ha in areas with the highest index, up to 700kg MOP/ha where soil levels were lowest.

In total, 4.2t of product was applied to the field using variable rates, compared with 4.9t at the flat rate.

Across the entire potato area, this translated to a 3-5% saving in MOP, with a similar reduction in magnesium – all for what proved to be a relatively upfront investment.

Uniformity

"It is a benefit – but saving money on fertiliser is not why we're doing it," says Mr Smith. "Our aim is to achieve a more uniform crop and optimise yield by applying fertiliser exactly where it is needed rather than over- or under-treating any areas."

Mr Smith may try to quantify this in 2024 by using drone-based green area imaging. The farm is also mapping more of the land with Terramap, doing some of its own potato ground– as well as more detailed analysis of cereal-growing fields elsewhere.

"It costs us around £30/ha for the Terramapping, which does add up over a few hundred hectares," says Mr Smith. "But when you consider that total all-in growing costs for potatoes are around £10-12,000/ha, it's still a relatively small investment."

"Agriculture in general has been very good at producing lots of pretty maps, but the challenge is what we do with the information. I was a sceptic at first, but now I am much more confident in the accuracy of this technique and the benefits it offers."



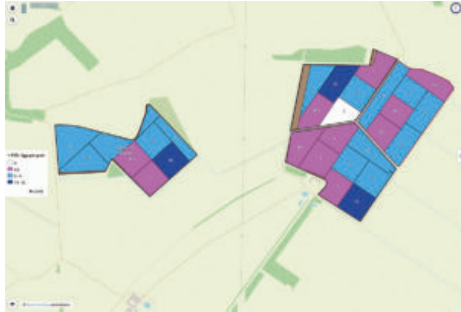
(<https://www.angliafarmer.co.uk/2023/11/29/its-vital-to-fuel-farm-potential/>)

Although not yet possible to quantify the impact of varying fertiliser rates on harvested yield, Farmacy agronomist Stefan Williams says the crop canopy was more even throughout the growing season.

Omnia also provides a platform for sharing information between anyone that needs access to it – particularly between farmer and agronomist, says Mr Williams.

"As an agronomist, it's really useful to be able to access a lot of information about any field at the click of a button, and compare multiple years. Through the Omnia Scout app, it's also much easier to share observations and information when out field-walking."

Simple system



Setting up and using the system has been relatively straightforward, adds Mr Smith. So too has adapting the farm's kit to variably apply fertiliser – so there was no need to replace the farm's two existing Kuhn fertiliser spreaders.

Instead, Mr Smith purchased all the equipment required for about £2000 – equivalent to just £4/ha when divided across the potato area. This included two GPS iPads, a wifi connector and associated cables.

Once variable rate plans are created in Omnia, they are easily transferred via the cloud to an iPad in the tractor cab, which sends information to the spreader's control box via the Wifi dongle.

"It's really easy to set up and move between tractors if you need to. It's compatible with a wide range of machines, and gives you access to all of the Omnia information and application plans out in the field," says digital services specialist James Lane.

For other farmers considering how they can best make more use of precision technology, Mr Lane recommends starting by identifying the exact goal, then look at how it can be achieved as cost-effectively as possible.

"That includes assessing the capability of the equipment you've already got to achieve your goals. Precision farming doesn't need to cost a fortune."

Mr Smith adds: "So far we've had one year using this system and haven't had to make a huge investment, yet we can now target inputs more precisely."

"Going forward, we're definitely interested in more precise management of soil zones, and finding ways to tailor management across the full rotation to benefit the business as a whole."

Farm facts: AG Wright & Son (Farms) Ltd

- Family-owned business, specialising in cereal and root crop production
- Total cropping extends to 1,850ha, including 250ha of potatoes

- Processing and chipping potatoes grown on black fen soils
- Pre-pack crops grown on lighter mineral soils to achieve required skin finish
- Business offers contracting and farm management services

Digital map helps manage nematodes

Digital mapping is helping to play a role in managing the risk of Potato Cyst Nematode (PCN) on land farmed by AG Wright & Son.

The farm employs Agri-Tech Services to undertake PCN egg counts.

Results are then used to create a digital PCN map that can be remotely uploaded directly into Omnia – once permission to do so is granted.

Fields are split into 1ha grids, and coloured according to the number of eggs from a 200g sample taken from 180 individual soil cores. This information is then used to plan cropping a

d targeting the best fields for resistant, tolerant and susceptible varieties.

“Some grids had egg counts of up to 18, which wouldn't be suitable for growing a non-resistant or non-tolerant potato variety, such as Maris Piper,” says Farmacy agronomist Stefan Williams (*right*).

Instead, PCN resistant or tolerant varieties can be targeted at higher-risk areas, and maps also allow nemathorin treatments to be applied exactly where they are needed, something that is increasingly important within nematicide stewardship.

“Unfortunately, our applicator is too old to do variable rates, and we couldn't justify the cost of buying a new machine,” explains farm director Jack Smith.

“But by giving the operator an iPad with the PCN map on it, he was able to manually turn the applicator on and off as it passed through the different zones. The bed tiller is fairly slow moving, so this was relatively easy to do.”

