![agrovista precision logo]

Precision Farming guide

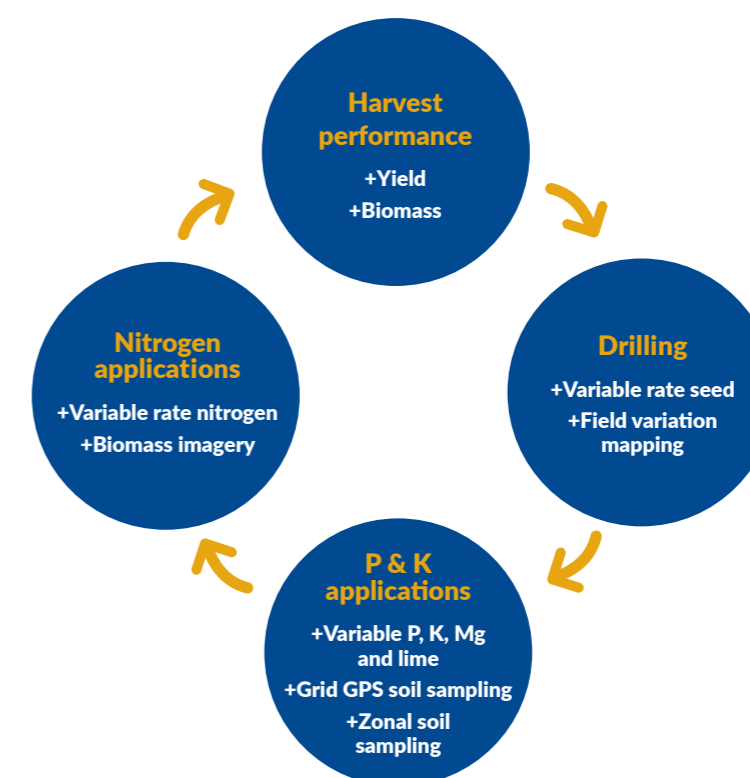*growing through*
innovation

Contents
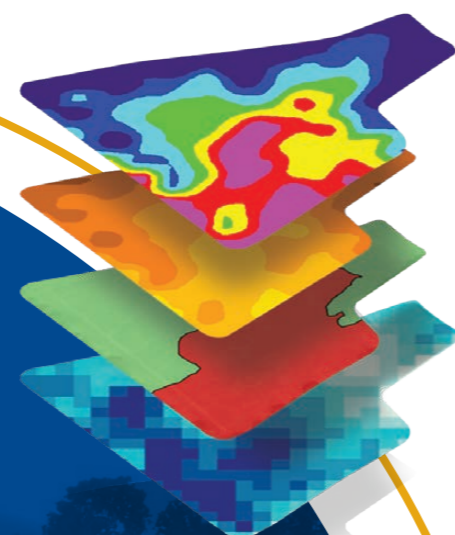
Precision Farming services

Agrovista Precision is about helping you make the right decisions for you and your farm.

We want to keep things simple by supporting you to make informed precision farming decisions with clear data backed up by expert agronomist knowledge.

Despite all the information out there, we believe this doesn't need to be an overly complex or expensive addition to your farming practices. Most importantly, it's about working together to ensure you achieve the best margin possible for each field.

Harvest performance
+Yield
+Biomass

Drilling
+Variable rate seed
+Field variation mapping

P & K applications
+Variable P, K, Mg and lime
+Grid GPS soil sampling
+Zonal soil sampling

Nitrogen applications
+Variable rate nitrogen
+Biomass imagery

Maximise field performance:
● Soil ● Data layers ● Yield ● Nutrition

What is it

Yield map cleansing can provide a critical check to compare and contrast operations undertaken during the season, highlighting those approaches that have worked and pinpointing others that need further refinement.

Identifying this variation is key to understanding what is happening in the field. Yield map cleansing enables us to remove header lifts and combine turns and also take into account part swaths.

Service use

• Overall crop view
• Basic variable rate seed
• Offtake variable rate P and K
• Problem solving
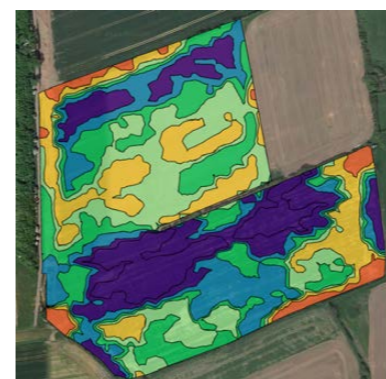
Benefits

• Better understand why areas are performing better or worse. Correct these issues for an increase in yield

• Action variable rate seed from previous performance to even up the crop

• Ensure indices do not drop

What is involved

1 Export your yield data from the combine

2 Send to your agronomist or precision specialist

3 Your precision specialist will process the data and send an overview of your fields back to you

4 A discussion can then take place and your precision specialist will advise you on next steps

Multiple years of yield data, which can be normalised (make all maps show the same figure) and layered together to identify trends and potential actions. For example, if an area always performs badly should it be put into an environmental scheme to make money rather than lose it? For most accurate results a minimum of three years of data should be used.

This data can be used to create basic seed maps, variable rate P and K based on offtake and to target soil sampling to understand variances better. Yield data can also be used to create profitability maps. All we need is the input costs of the land we are analysing.

"
A critical check to compare and contrast operations undertaken during the season.

Yield map cleansing

We can provide GPS soil sampling for nutrients and pH. There are three methods of precision soil sampling – grid mapping (randomly selected points, normally 1 per hectare), zone mapping (samples taken from specific field variation zones) and high-resolution grid mapping (a combination of satellite imagery and site-specific soil samples).

Grid mapping

What is it

Grid mapping is where precision farming started in the UK. It is a basic yet very important part of precision farming.

Grid mapping is designed to bring and maintain your nutrient levels to a given index, utilising variable rate technology on your spreader.

Service use

- Variable rate P, K, Mg and pH
- Addition of other nutrients where applicable
- Soil health analysis can also be added

Benefits

- Highly accurate results
- Identifying areas which require less/more nutrients

A year's worth of data collected by Agrovista showed that the following percentage of land required no fertiliser.

P₂0₅	K₂0	MG	Lime
25%	18%	86%	82%

What is involved

1 Map the boundary

2 Set sampling points, generally 1ha, ensuring points are not too close to areas such as boundaries, pits and trees

3 The sampler is guided to each sample point to collect 16 sub-samples

4 The sampler is able to relocate sampling points due to factors that could lead to inaccurate readings, such as cattle feeders, muck heaps or wet holes.

5 Samples are logged and sent to the laboratory for analysis

Once nutrient levels are measured your precision specialist will tailor variable rate prescriptions to start raising and maintain your indices.

Four years of application data is included in this service.

GPS soil sampling for nutrients

A farmer traditionally applies 300Kg/ha of 0-20-30 across three fields – 20.81ha.
20.81ha@300kg/ha = 6.24t @ £268/t
Total cost = £1672.32

After Agrovista Precision carried out GPS grid mapping:

Farm requirements: 1.70t of TSP @ £279/t = £474.30
3.85t of MOP @ £268/t = £1031.80
Total fertiliser cost = £1,506.10
Total fertiliser saving £166.22/year

Cost reduction 9.9%
Saving of £7.99/ha/year for four years

Zone mapping

What is it

Zone mapping utilises either soil variation or field variation maps.

Predetermined soil sampling points are set within soil type or productivity zones.

Basing soil sampling on variation maps is not only a more effective use of the variation maps but also adds greater accuracy to your nutrition variation.

Service use

- Variable rate P, K, Mg and pH
- Zone scans not included

Benefits

- Highly accurate results
- Identifying areas which require less/more nutrients

What is involved

1   Utilise previous soil type scans or field variation scans to accurately place soil sample points.

2   The sampler is guided to each sample point to collect 16 sub-samples

3   The sampler is able to relocate sampling points due to factors that could lead to inaccurate readings, such as cattle feeders, muck heaps or wet holes.

4   Samples are logged and set to the laboratory for analysis

Some soil types have the ability to hold certain nutrients better than others and a site-specific point within a zone will show this. However, variation can also occur within a particular zone, therefore overlaying 1ha grids over the variation maps is the most accurate way to determine nutrient levels. Each sample will still consist of a minimum of 16 cores.

"

The first field resulted in a saving on P and K of £18.50/ha, a figure that Stuart says is typical across the farm's light soils.

"I thought the equipment had stopped working in one field – I had to travel three-quarters the way around the headland before it started spreading.

"It just shows how much we have been overapplying. We've used a total of 455kg of TSP and 160kg of MOP on 38ha, compared with the 1500kg of compound we used on the same area last season, a saving of £700.

That's significant, and at current prices would be considerably higher. The service has already paid for itself – just think what a bigger unit could save."

Stuart Dickin, P & J Dickin & Son

Saving on P and K of
£18.50 /ha

High resolution grid mapping

What is it

Agrovista is the first agronomy company in the UK to offer 10m² nutrient and soil type maps from satellite imagery data.

This high-resolution data means we can identify critical areas that may be missed by grid mapping.

We have the added benefit of being able to examine micronutrients and soil type.

Service use

- Variable rate P, K, Mg, pH
- Variable rate seed
- Carbon levels

Benefits

- Greater resolution means deficient areas are more likely to be picked up
- Micronutrient maps ensure a better understanding of limiting factors
- Added benefits of being able to monitor carbon levels

What is involved

1   Map the boundary

2   Your precision specialist will then analyse satellite data for soil properties and work out where best to place site specific soil samples.

3   The soil sampler will then take ground truthing samples from sample locations, which are 3mx3m grids

4   Samples are analysed for requested nutrients

5   The map is then calibrated to the analysis providing data to a 10m grid
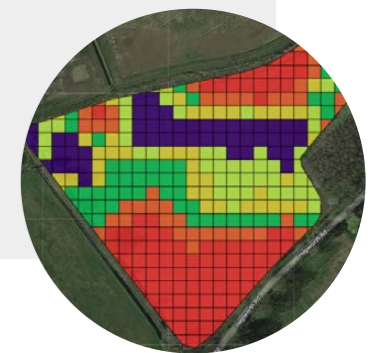
Information required for application data

1 **Type of analysis** – standard is S1 (P, K, Mg and pH). Further nutrients can be added for an additional fee. Two popular additions are Ca and organic matter

2 **Cropping** – to create a fertiliser recommendation the precision team require cropping, yield, target pH, muck information and straw policy

3 Once these reports have been created it is then time for a discussion with the grower and agronomist

The cropping form should be updated yearly for new recommendations. Four years of recommendations are supplied with this service.

Application maps can be made for all major manufacturers' equipment. Your precision specialist can advise on file type and format.

This service can also be loaded onto the Agrovista portal 'Insight'. For a greater depth of knowledge, it is suggested that a broad spectrum Solvita analysis (a measure of soil biology) is carried out for the whole field.

Standard services include
- P, K, Mg and pH maps
- Four years of recommendations
- Data interpretation
- Application files
- Soil variation scans NOT included

Key points to view in the results table:

Min-max and average index
The average index would be the equivalent to a standard whole field sample

Total field tonnages

Field No.	6					Calc Area Ha		8.92			Soil Type = Standard Mineral				
Yr 2018/19	Silage											Yield Goal = 3 Cut			
	Mg/l			Index			Kg/Ha Product			Target		Fertiliser			
Nutrient	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Index	Frequency	Tonnages			
Phosphorus	22	20.3	15	2+	2	2-	108	82	72	2	1st Cut	0.73	TSP		
							54	54	54		2nd Cut	0.48			
							33	33	33		3rd Cut	0.29			
Potassium	73	66.3	55	1-	1-	0+	233	215	208	2	1st Cut	1.92	MOP		
							200	188	183		2nd Cut	1.67			
							133	133	133		3rd Cut	1.19			
Magnesium	202	180	151	4	4	3+	0	0	0	1-	Triennial	0.00	Keis		
pH	5.8	5.7	5.5				7500	7500	7500	6.5	Triennial	66.86	Lime		

Min-max and average application rate for the field

Target index (presumed P2 K2 Mg1-)

Frequency of application (how often fertiliser should be applied)

Biomass imagery

What is it

Biomass imagery highlights areas of low and high biomass within your crop using satellite-derived NDVI (normalised difference vegetation index) images that indicate how photosynthetic a crop is. Multiple images are available throughout the season to track crop performance.

Service use

Biomass imagery is used to produce data on:

- Variable rate nitrogen applications
- Variable rate plant growth regulator (PGR) applications
- Intelligent crop walking
- Smart tissue analysis

Benefits

- Yield increases of 3-5% using variable rate nitrogen
- Variable rate nitrogen applications also help to reduce lodging risk

What is involved

1. Provide fields and locations for which you require maps
2. Let us know what fertiliser you are using
3. Let us know the preferred application rate
4. We'll do the rest and provide you with all the data you need

Intelligent crop walking

View and compare NDVI images to see how crops are performingthroughout the season. Images can be viewed on an app.

Variable rate nitrogen

Variable rate nitrogen is a simple process. You enter the average rate you wish to apply to the field and enter the percentage variation from that figure you would like to use.

Our partner provides figures on the variability of your crop. You can change grid sizes to fit with equipment size and rotate grids to fit tramlines.

Variable rate nitrogen application is not designed necessarily to save money, but more to optimise fertiliser application according to crop need. The main benefit of the service is the optimal increase in yields that are achievable.

> " *Variable rate nitrogen applications also help to reduce lodging risk*

insight

The place to go for your data

The Agrovista insight app
gives you access to all your precision services data, soil health and soil analysis reports, weather and disease prediction data along with delivery information.

Weather app
- View forecasts
- Weather station data
- Disease risks

Delivery notifications
- Track delivery status and delivery time slot
- View which products are on the delivery
- See where it has been delivered

Precision panel
- View data for any precision services carried out on your farm
- Add notes to your fields
- Manually draw zones for variable applications
- Measure areas and lengths and store them by category
- Download your application data

Customisable options
Additional customisable options include:
- Helm SKYFLD
- Xarvio
- Green light farm management

Soil health panel
- Store your analysis
- Soil health reports
- Precision reports
- Rural consultancy reports

insight
by agrovista

For more information contact your local agronomist

Drilling with variable rate seed at an appropriate seed rate shows on average a 4% yield increase.

Graeme Barrett, Agrovista UK

Field variation mapping

What is it

Field variation mapping is a new way of finding in-field variation, using multiple layers from two different satellites, which offers some very useful information at a competitive cost.

Field variation mapping looks at soil moisture index, soil properties, NDVI of a crop'sperformance and canopy cover to create one field variation map.

Gone are the days of comparing maps side by side, thanks to our map stacking ability.

The main advantage of using satellite data above an infield sensor is that we can get the data regardless of weather or crop. We can look back over three years to get the data you need for your field.

Service use

• Variable rate seed

Benefits

• P and K offtake more uniform
• More consistent harvesting speed
• Soil zones for variable rate P and K
  (Soil sampling not included. Please see page 8 for more details)
• Problem areas to place broad-spectrum Solvita samples

What is involved

1 Send the precision team your field locations. We request the data from the satellites and provide you with a variation map

2 Visual notes from the agronomist and growers

3 This combination can provide key information regarding zone performance

Obtaining a soil sample from high and low productive areas will provide an accurate indication of soil structure across the field (additional cost). In the example the red areas of the field are sandy clay loam with lower potassium levels and lower pH and the blue areas are clay loam with lower phosphate levels.

This data can be used to compare fields across the farm rather than just variation within the field (additional cost).
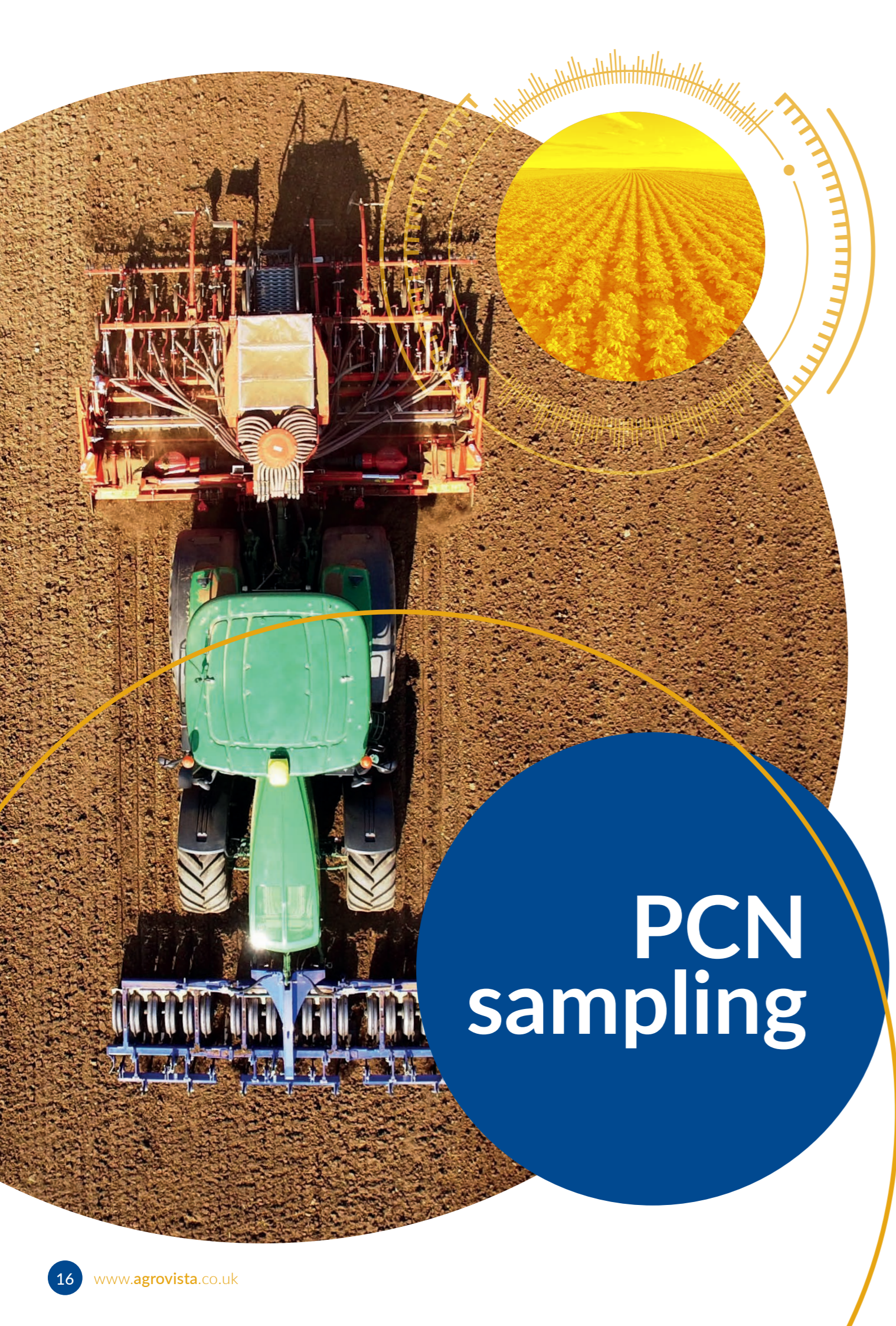
Seed rates in the first year are varied in a conservative manner and the most accurate way of providing the best maps is to count establishment percentages in year one. Zones will not change but tweaking rates is very important.

Wet hole

Blackgrass
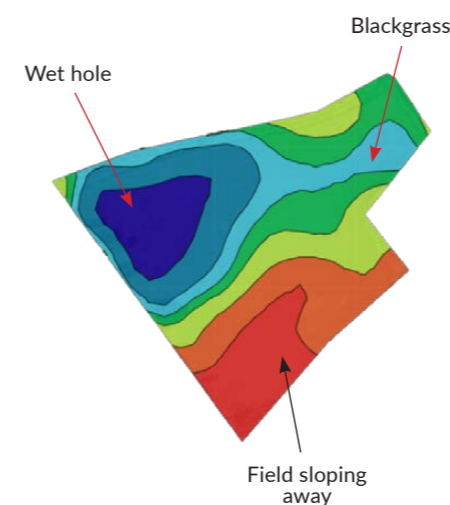
Field sloping away

Field sloping away

Blackgrass

PCN sampling

What is it

Potato cyst nematode is one of the most damaging pests of potato crops. Correct sampling is vital to successfully assess the population spread and reduce the risk of damage.

PCN sampling is carried out on a 1 hectare grid map, analysing 200g samples. This is the optimum technique, in line with AHDB guidance. Any other approach is not deemed sufficiently accurate.

Standard service

• Cyst and egg count including total, dead and full
• 49 cores/ha
• 200g soil analysed

Additional services

• Speciation
• Free-living nematode
• Tobacco rattle virus
• Nutrient analysis

What is involved

1 Provide fields to your agronomist or precision specialist.

2 Let your precision specialist know which way you plan to plant fields.

3 Ensure we know what analysis you require. We can advise you on what we think is best.

4 Your precision specialist will plot the sampling grids for our soil samplers.

5 We will provide you a detailed report so you can clearly see any issues.

This service is used mainly for PCN sampling and can also be used for one-off applications of nematicide. Analysis for free-living nematode and tobacco rattle virus can be added for a more detailed view of your fields.

Nutrient analysis can also be carried out and variable rate applications made.
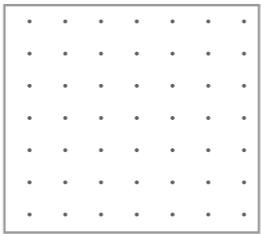
Field no.	12 Acre								
Yr 2015/16	Calc area = 6.37 Ha						Samples = 6		
	Count			Overview			Treatment		
Pest	Max	Avg	Min	Max	Avg	Min	Kg/Ha product		
PCN cyst count per 100 grams	10	4	0	Low	Low	NF			
PCN eggs per gram	14	6.6	0	Mod	Low	NF			

Order Number	Reference	Cysts /100g	Dead	Half Full	Full	Eggs /g	Category	Comments
E194058/01	17AC A 1	5	1	0	4	8	L	Low
E194058/02	17AC A 2	1	1	0	0	0	EC	Empty Cysts
E194058/03	17AC A 3	0	0	0	0		NF	Non Found
E194058/04	17AC A 4	10	1	2	7	14	M	Moderate
E194058/05	17AC A 5	0	0	0	0		NF	Non Found
E194058/06	17AC A 6	8	0	1	7	12	M	Moderate

Standard 49 Cores/ha

Correct sampling is vital to successfully reduce the risk of potato cyst nematode

Drone imagery

Real-time imagery of your field

What is it

Agrovista is the lead agronomy company when it comes to drones.

We utilise drone technology to help us map problematic fields/areas and also to collect data on higher value crops.

Our team carries out data analytics on different treatments or variety types to display how these changes in management practice have affected your crop.

There are so many uses for drone imaging now. The more data you measure the more you can manage.

Service use

- **Plant health** – determine crop variation, identify zones, use variable rate applications from biomass, map blackgrass, apply variable rate glyphosate, crop establishment
- **Plant count** – establishment, crop variation, count comparison, seed viability
- **Plant size** – yield prediction, crop variation, optimise harvesting, ability to forward sell crop more accurately
- **Data Analytics** – compare treatments
- Farm aerial imagery
- Weed mapping
- Blossom and vigour mapping in orchards
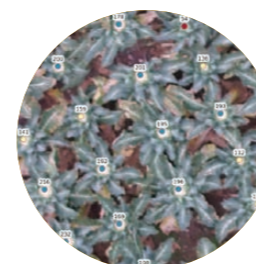
Plant sizing
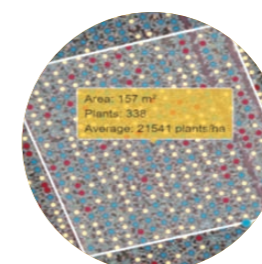
Plant count
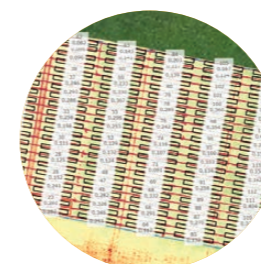
Trial plot health

Benefits

- Know your harvestable yield
- Understand what effect a given treatment has had to your crop.
- Save money with variable rate applications

What is involved

1 Provide your Agrovista specialist with the field locations

2 Decide what service you would like. This may change the type of drone or flight settings that we need

3 Ensure your precision specialist is aware of when the flight is best to be carried out. We can help you with this decision
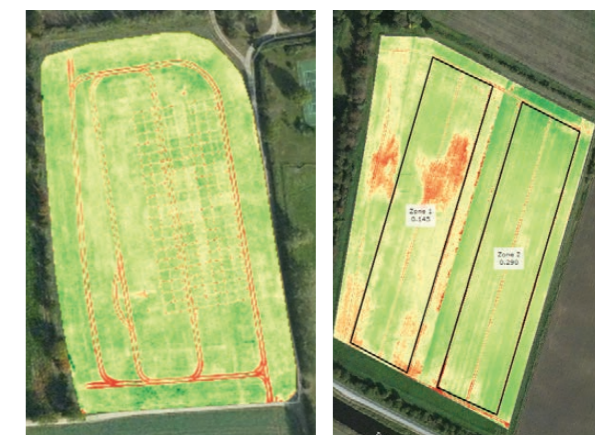
Blackgrass

" *Blossom and vigour mapping in orchards*

What is it

The Agrovista Machine Control (AMC) GPS system

Load your variable rate maps and let the AMC take the reins as you drive around the field.

With variable width and adaptive rate control, and an added option for guidance, there is also an option for the AMC variable rate only system.

Features

- Compact 7" LCD display
- Guidance option
- Built-in terrain compensation
- Headland guidance
- Straight line and curve AB lines
- Field area measurement and field recognition
- Wi-Fi and Bluetooth connectivity
- Job recording
- Optional auto shut-off

Benefits

- Cost-effective solution for most tractors and application equipment
- Easy to use, load your variable rate maps in minutes

What is involved

1 Load and utilise variable rate prescriptions. Your Agrovista precision specialist will aid with setting this up with your spreader.

2 Select the guidance option and you can utilise the AMC for straight line guidance.

> *A cost-effective solution for most tractors and application equipment*

> *Let the AMC take the reins*

Variable rate controllers

Carbon mapping

Measuring accurate carbon in field is the only true way to learn how carbon can benefit you.

We offer high resolution carbon mapping; Intensive detail will prove how your farming practices benefit the environment as well as pushing your field to full potential.

1. Carbon content on 1ha grids

2. High resolution carbon mapping 10m grids

3. Deep core carbon stock measurements

Compaction mapping

Compaction mapping utilising the AGXTEND SoilXplorer, a unique contactless, ISOBUS-compatible soil sensor which offers advanced soil sensing solutions. The SoilXplorer sensor emits an electromagnetic signal into the soil while four coils measure the soil conductivity at four different depths.

Additional services

- Deep core soil mineral nitrogen sampling, sampled at three depths: 0-30cm, 30-60cm and 60-90cm

- Green area index mapping on 10m grids

- Slope mapping

- Soil type mapping in orchards

- Xarvio precision tool, receive alerts on potential risks to your crops and know the optimal time for application, anytime and anywhere

xarvio®
Digital Farming Solutions
powered by BASF

Other services
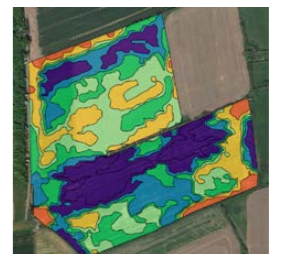
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