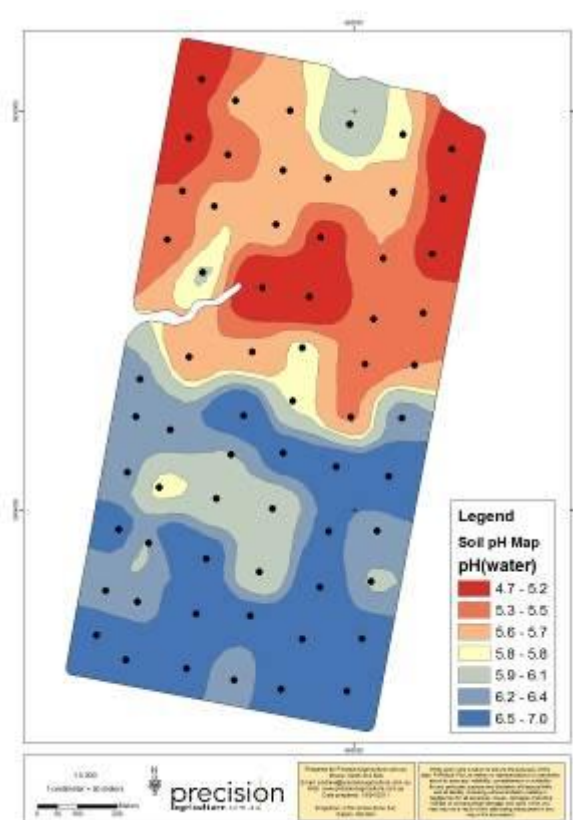


Proof of concept results for onsite pH testing

Variable rate lime makes clear sense as an entry point into precision agriculture. The process is easy to implement as there is a well understood relationship between pH values and lime requirements, soil pH plays a major role with nutrient availability and many farmers already use contractors with variable rate capacity.

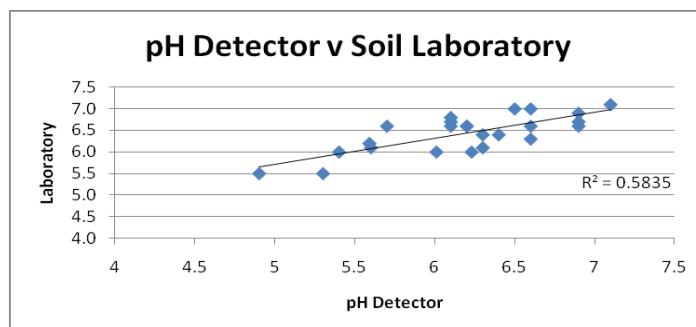
The traditional method for soil pH mapping is however an exhaustive process of grid soil sampling which are sent to a laboratory for analysis which can therefore add up to be quite expensive. There is however an emerging technology which collects soil pH data in real-time, offering a cost-effective method of soil pH mapping for variable rate applications of lime.

The first and only VERIS soil pH-Detector was imported into Australia by a precision agriculture company "Farmpos Pty Ltd". They have been working with clients in southern Australia with promising results. The pH Detector is mounted on a quad bike which is also equipped with a GPS unit. The soil chamber is pushed into the soil (depth of approx 5cm, depending on soil conditions) and then the soil pH sensor is inserted into the chamber, the sensor gathers a soil pH value reading after approximately 5 seconds, the sensor is removed from the chamber and washed, finally this data is stored on a data logger along with the GPS coordinates enabling the creation of soil pH maps as seen below.



Here is an example map of a paddock (124ha) which was sampled on a 2ha grid. Soil pH values ranged from 4.7 to 7.0.

Initial testing of the soil pH-Detector has found a relatively good correlation with results from a soil laboratory, however all this testing has occurred in Southern Victoria. Further investigation is required to understand accuracy of the pH-Detector in cropping soils of Southern NSW.



Additional key questions to confirm effectiveness of onsite pH testing technology:

1. What density of samples is ideal for both accuracy and cost-effectiveness?

Project targets = 5/ha over 150ha

2. How accurate is the pH detector compared with traditional laboratory analysis?

Project targets = 5 lab tests / ha at each site tested by the probe

3. Is the technology suitable for a range of soil types and conditions?

Project targets = Selection of range of soil types representative of the region

4. Can this process of implementing variable rate lime even-out the level of variability in soil pH within a paddock?

Project targets = Retest all sites after year 1 harvest to determine actual results

5. Does the soil pH map match up with other precision agriculture datasets such as yield maps and crop biomass (NDVI) maps?

Project targets = Analyse historical yield maps and project year data to determine correlation between probe sampling, lab test results and yield. Compare NDVI, EM survey and yield data for correlations with probe & lab test data.

6. What information other than just soil pH is required in order to determine lime requirements (i.e. aluminium levels and cation exchange capacity)? And how should we be sampling for this information?

Project targets = conduct Electrical conductivity (Ec) and Aluminium testing of all lab samples. Determine Cation exchange capacity (CEC) from existing soil test data from the growers.

www.PrecisionAgriculture.com.au

Tim Neale

118 Herries St

Toowoomba 4350

0428 157 208

tim@precisionagriculture.com.au

Andrew Whitlock

16 Queen Victoria St

Ballarat, Victoria 3350

0458 312 589

andrew@precisionagriculture.com.au