

Case study: variable rate liming

Innovative and cost effective solutions for the treatment of soil acidity



Above - Precision soil pH mapping

Background

Throughout the SA Murray-Darling Basin NRM region more than 267,000ha of land is susceptible to soil acidification, a process that degrades the soil and reduces crop and pasture growth.

This project was developed to provide greater awareness and understanding of soil acidity, and to promote innovative and cost effective solutions to manage soil acidity

The project occurred in country between Hallet and Burra and is a region that was traditionally grazed. Over time, economic pressures have changed farming practices to high yielding intensive cropping with high nitrogen inputs.

As a result surface and sub-surface soil acidity has become a production issue.

The method

The project involved 12 landholders. Soil pH mapping and soil sampling took place on their properties, with the total area mapped reaching 126ha.

Results were collated and analysed, and presented at a landholder workshop.

The results

An 'on-the-go' soil pH machine was used to measure and map the spatial variability of soil pH across three demonstration paddocks.

Mapping demonstrated the large variation in soil pH across the paddocks. On two of the paddocks the soil pH varied between 4.5 and 6.5.

Mapping of soil pH within paddocks gives landholders the information to target their liming programs. Landholders can save money by applying lime only to those areas that need it rather than applying a uniform or 'blanket' application over the paddock.

Mapping of one property showed that in one paddock there was no need to apply lime. The other two paddocks showed there was a need for lime application but costs could be reduced by up to 30% (including lime, freight and spreading) by targeting limespreading compared with a 'blanket' application of lime.

Apart from soil pH mapping 20 paddocks were sampled. The results showed that 70% of the soil samples (0-10cm depth) had a pH less than 5.5 (CaCl₂) and 30% of the soil samples had a pH less than 5.0 (CaCl₂).

Nine landholders attended a soil acidity workshop about; the results of the sampling, causes and effects of soil acidity, lime and lime sources, lime trials and precision soil pH mapping.

A local farmer also talked about his experiences with managing and treating soil acidity using mapping and variable rate lime application.

The diagram on the next page is a paddock pH map showing the variability of pH across the paddock. In this instance the blue, green and yellow areas require no lime application, the orange areas a lower application rate and the red areas a higher application rate.

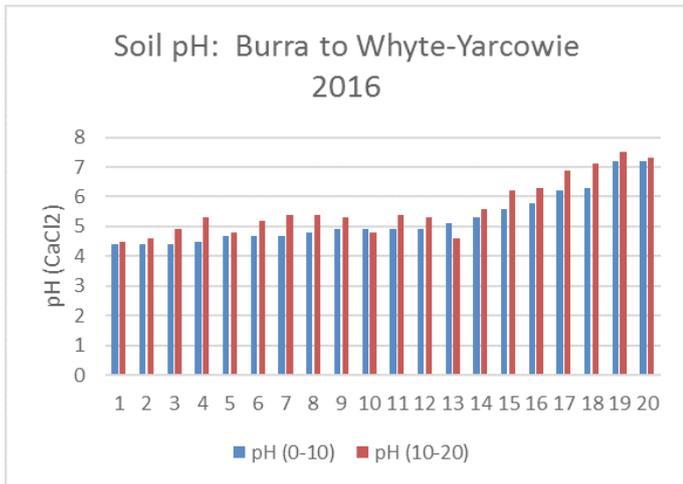
Recommendations

Soil pH mapping to inform variable rate liming has been promoted throughout South Australia over the last few years. Adoption of this technology can improve production and profitability as well as reducing liming costs.

Natural Resources SAMDB Land and Water Management Team Coordinator, Tony Randall said

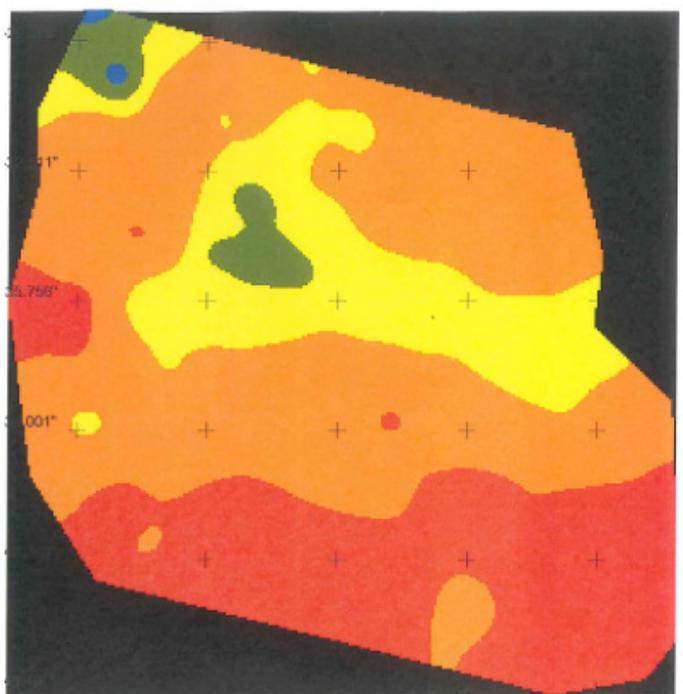
'The management of soil acidity is very important for maintaining crop health and production levels, particularly in high input cropping systems where the process of soil acidification is more rapid. Adopting pH mapping to determine pH levels across the farm, and correcting pH through variable rate lime application will save money directly through reduced lime purchase, freight and spreading costs, and will also result





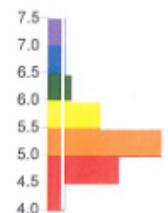
Above - Precision soil pH mapping

in improved crop performance and profitability as soil acidity is reduced. In high input cropping systems on soils that are susceptible to acidification, consideration should be given to the application of 'maintenance' lime to maintain pH rather than running it down and then applying larger volumes of lime for correction'.



138° 53' 47.276" 138° 53' 51.151" 138° 53' 55.027" 138° 53' 58.902" 138° 54' 2.777" 13

2015-Column 3



Above - Soil acidity map showing different pH zones.

Location: mid north of SA

Project: Project demonstration of variable rate technology to assist landholders decision-making about where to and how much to lime to improve productivity. Soil pH mapping across a paddock can result in more targeted application of lime, resulting in more effective use of resources.

Project partners: The Agricultural Bureau of South Australia with assistance from PIRSA Rural Solutions SA.

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