

# Soil pH Summary

## Nhill & Yarriambiack

### ABS Statistical Area



Soil pH is a measure of the concentration of hydrogen ions in the soil solution and is one of the fundamental soil properties governing nutrient availability, elemental mobility and toxicity, microbial activity, and plant growth.

The pH of the surface soils in Australia ranges from about pH 4 to pH 10. These extremes in acidity and alkalinity present problems for the production of many crop species and soil biota. Rapidly reducing the pH of strongly alkaline soils is generally impractical, although the use of nitrogen fertilisers and legume crops over the long term will acidify soil.

To increase soil pH in strongly acid soils is comparatively much easier, and is usually achieved through the application of agricultural lime. The quantity of lime needed will vary between soils.

Generally, coarse textured soils (e.g. sands) need less lime than finer textured soils with more clay content. Also, soils with little organic matter need less lime than peaty soils. A lime requirement test will incorporate these effects when

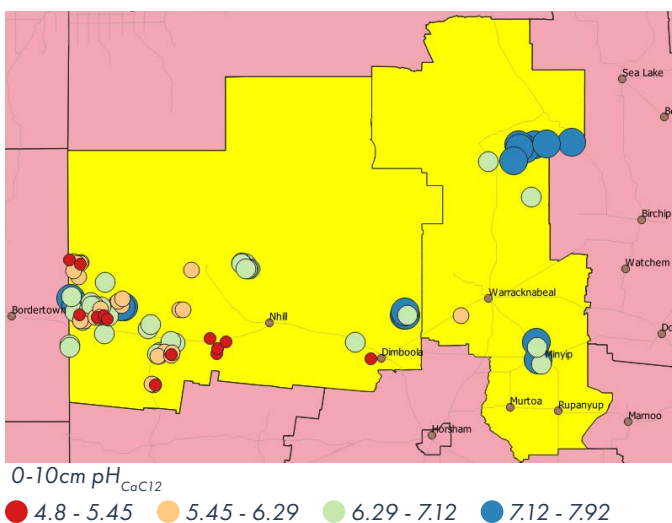
used to determine the amount of lime needed to raise soil pH. Other factors needed to determine an appropriate lime rate include current soil pH, target soil pH for the specific crop, lime particle size and neutralising value, method of application, and economics.

The Nhill & Yarriambiack ABS Statistical Areas sits largely within the Wimmera CMA, it is an area of 18,182 km<sup>2</sup>, stretching from west of Sea Lake to the SA border and south to Dimboola and Rupanyup. The dataset consists of 80 paddocks with four or less samples which had an average pH of 7.3. The data analysed in this regional note consists of 90 paddocks which had 5 or more samples, encompassing 2480 samples collected between June 2016 and June 2022.

Over the full dataset the average pH was 6.4 ranging from 4.2 to 9.4. When we break the dataset down to individual paddocks the average pH within a paddock ranged from 4.8 to 7.9. These paddock averages are shown in Figure 1 with both symbol size and colour adjusted to show the variation in pH.

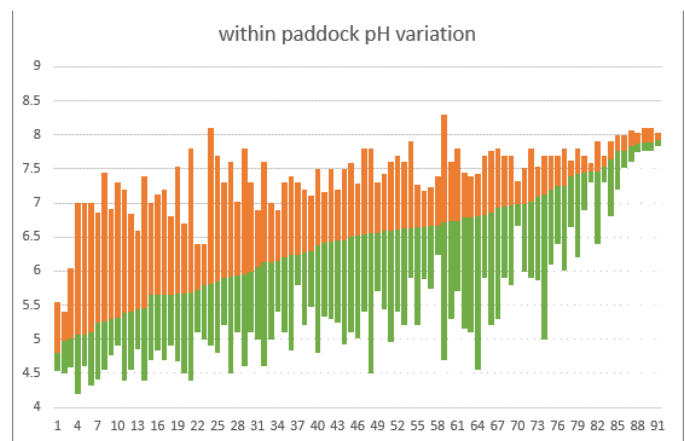
**TABLE 1. NHILL & YARRIAMBIACK SURROUNDS SOIL pH DATASET SUMMARY STATISTICS.**

Paddock Average pH		pH variation in a paddock		pH CoV within a paddock	
Mean	Range	Mean	Range	Mean	Range
6.4	4.8-7.9	1.95	0.2-3.6	9.5%	1.1%-19%



**Figure 1.** Paddock average surface pH for 90 paddocks across the Nhill & Yarriambiack ABS Statistical Areas, where a paddock has a minimum of 5 samples.

### WITHIN PADDOCK pH VARIATION

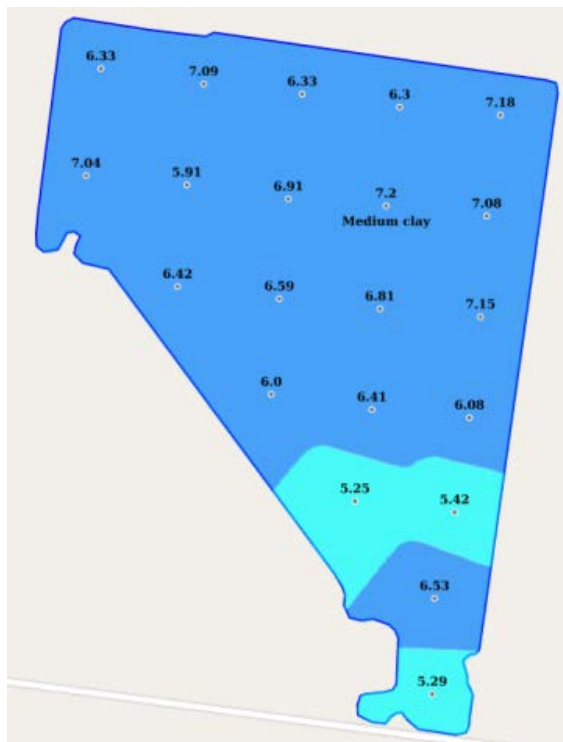


**Figure 2.** Soil pH data for individual paddocks sorted by paddock average pH. The green line is the minimum to average pH and the orange line is the average to maximum pH in individual paddocks.

## WHAT DOES AN AVERAGE Paddock LOOK LIKE:

A representative paddock was selected from this dataset for illustrative purposes, this 42 ha paddock was sampled in January 2020, with 21 samples collected (Figure 1).

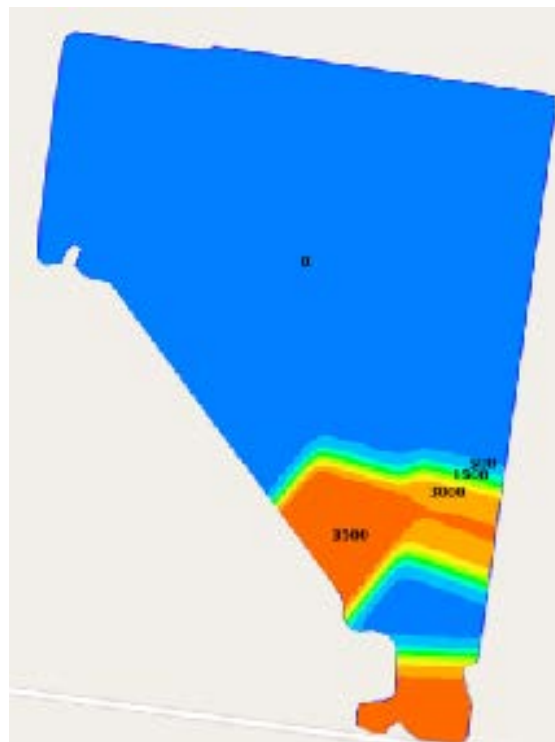
The mean soil pH for paddock was the same as the regional paddock average, with a range of 2.0 units compared to the regional range of 1.9 pH units per paddock. The total lime requirement calculated to raise soil pH to 5.8 was 19.3 T, an average rate of 0.46 T/ha, with variable rate spreading as shown in Figure 2.



■ Above 5.8 pH   ■ 5.2 - 5.79 pH   ■ 4.8 - 5.19 pH  
 ■ 4.5 - 4.79 pH   ■ Below 4.49 pH

Figure 1. Representative paddock from the Nhill ABS Statistical Areas, soil pH.

Summary statistics for this paddock's data are shown in Table 2.



■ 4000 kg/ha   ■ 3500 kg/ha   ■ 3000 kg/ha  
 ■ 2500 kg/ha   ■ 2000 kg/ha   ■ 1500 kg/ha  
 ■ 1000 kg/ha   ■ 500 kg/ha   ■ 0 kg/ha

Figure 2. Variable rate lime application recommendation map, based on a target pH of 5.8.

**TABLE 2. REPRESENTATIVE Paddock, FROM THE NHILL ABS STATISTICAL AREAS SOIL pH DATASET SUMMARY STATISTICS.**

Mean	Standard Error	Median	Mode	Standard Deviation	CoV	Range	Maximum	Minimum
6.4	0.13	6.4	6.3	0.62	9.6%	2.0	7.2	5.2

The mean soil pH for paddock was 0.1 units higher than the regional paddock average, with a range of 1.6 units compared to the regional range of 1.2 pH units per paddock.