

# Increasing economic returns of agronomic management using precision agriculture

Michael Wells PCT, Peter Treloar and Felicity Turner

## Key findings

- EM38 successfully mapped differences in soil water properties across the paddock
- There were no significant yield increases from increased fertiliser
- Reducing fertiliser on heavy soils had no negative impact on yield

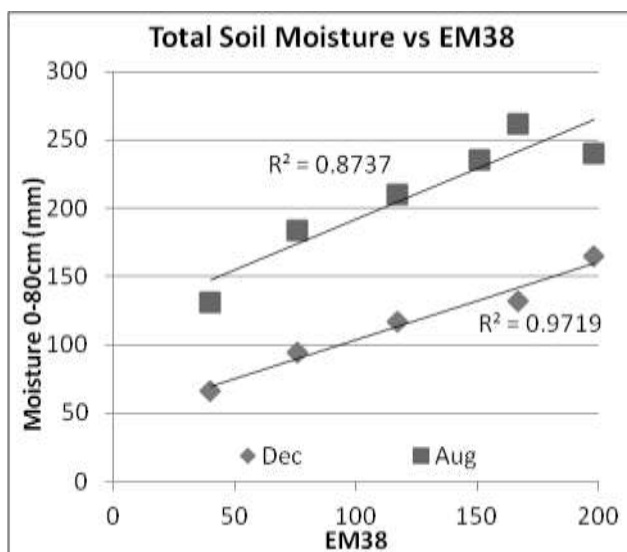
## Why do the trial?

EM38 soil surveying has been available in SA for many years, with varying levels of success in different regions. Gamma Radiometrics is another form of soil surveying that has been used in WA for many years and has been particularly successful in conjunction with EM38.

A 3 year project, funded by SAGIT, to investigate the use of Gamma Radiometrics in SA began in 2011. Five sites were established across SA - Edillilie, Kimba, Hart, Coomandook and Padthaway.

## What happened in 2012

### EM38 and Soil Moisture



Targeted soil moisture sampling at the end of 2011 illustrated a strong correlation between crop lower limit and EM38.

Sampling was repeated in August 2012, when the profile was estimated to be relatively full.

This again correlated well with EM38, indicating a potential to use EM38 zones to manage inputs.

As a result simple maps consisting of 3 Zones were generated based on EM38.

Fertiliser strips were placed across the zones in two paddocks, each trial consisted of 3 rates with two replicates. The strips

consisted of +/- 50% of the base 140kg/ha of 27:12.

These trial strips were very clear early in the season but with the very dry spring they gradually merged with the rest of the paddock.

Tissue testing was conducted on each rate and zone, as well as repeating DGT Phosphorus tests at each site. The major findings of the tissue testing were:

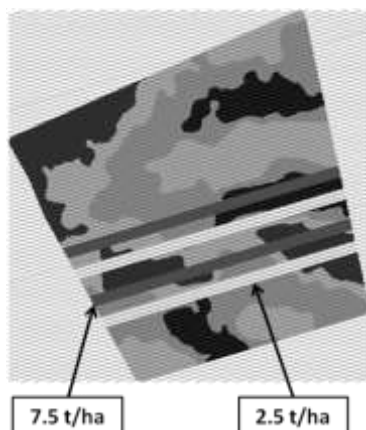
- Decreasing calcium as EM38 increases
- Large increases in chloride and sodium in the highest EM zone
- Low phosphorus and plant growth in lowest EM zone
- Increased nitrate levels with increased fertiliser

## *Trials Established in 2012*



Seeding fertiliser trial (left): Repeated stripes +/- 50% of the base 140kg/ha of 27:12.

Long term gypsum trial (below): High and low rates of gypsum through different levels of sodicity.



## **Results**

Early season observations showed a likely response to fertiliser across the different soil types. But as the dry spring continued these differences reduced. Protein was not collected.

*Table 1. Grain yield (t/ha) response to fertiliser rate (27:12) and paddock EM zone on commercial paddocks near Hart in 2012.*

Rate	Paddock 5			Paddock 6		
	Low EM	Med EM	High EM	Low EM	Med EM	High EM
70	<b>3.52</b>	3.98	3.82	<b>2.51</b>	3.08	3.10
140	<b>3.61</b>	3.95	3.88	<b>2.80</b>	3.01	3.14
200	<b>3.73</b>	4.02	3.82	<b>2.72</b>	3.00	3.11

The low EM zones produced the lowest yield in both paddocks, but in the lower yielding Paddock 6 there was a decrease in yield from extra fertiliser.

In Paddock 5 there was a slight trend of increased yield from increased fertiliser, unfortunately the increase was not economic as the extra yield did not pay for the extra fertiliser. This meant the most economic rate all three zones in both paddocks was 70 kg/ha.

## **Conclusions:**

EM38 has shown a strong correlation to historic yield and soil properties at Hart, indicating the potential to base long term management zones on EM38.

While no positive result was observed for increasing fertiliser, no negative results were seen for reducing fertiliser on the heavier soils. This was a common outcome across the state in other trials in 2012 due to the very dry spring.

These trials will be continued and further refined in 2013, including in crop nitrogen.