

Variable Rate Fertiliser Application 2012

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Aim

To evaluate the economics of a variable rate approach to fertiliser applications over the 2012 growing season. This trial was also designed as a proof of concept trial for CSBP's Fertlogic Variable Rate Technology platform.

Background

Fertiliser is usually the highest cropping input cost, so it makes sense to target applications to increase fertiliser use efficiencies and return on investment. Fertiliser requirements depend upon nutrient supply and demand. Demand depends upon yield target and constraints. Yield is ultimately dependent upon rainfall, but soil constraints can often be managed.

A paddock was assessed for variability using Fertlogic. Using biomass imagery, a paddock was zoned up into 3 production zones - 'High', 'Medium' and 'Low'. The zone map was discussed with Noel and Aaron Mills to check whether the biomass imagery was consistent with their knowledge of past paddock performance. Discussions also led to realistic yield potentials being set for each of the zones. The paddock was then soil sampled to ground truth each zone and to understand any factors that could explain the variation across the paddock. Soil testing and realistic yield targeting are two of the more important aspects of variable rate farming. Soil test results were run through NULogic to vary nutrient rates according to yield targets. Each trial had 4 treatments: Nil fertiliser, Farmer practice (blanket application), NULogic recommendation, and 'High' fertiliser inputs.

Trial Details and Results

Property	Wenballa Farm, east of Dalwallinu
Plot size & replication	3 plot trials x 4 triple replicated treatments in each
Soil type	Variable
Soil pH (CaCl₂)	Variable (see tables 1, 3 & 5)
EC	Variable
Paddock rotation	2009 field peas, 2010 wheat, 2011 wheat
Variety	Mace
Seeding date	6/6/12
Seeding rate	65 kg/ha
Fertiliser	17/7/12 and 16/8/12: As per protocol
Herbicide	6/6/12: 1 L/ha Powermax, 2.5 L/ha Boxer Gold and 300 mL/ha Lorsban
Growing Season Rainfall	133mm

High Production Zone

Table 1: Soil Analysis from high production zone.

Depth (cm)	pH	EC	OC	Nit N	Amm N	P	PBI	K	S	Ex Ca	Ex Mg	eCEC	Cu	Al
0-10	4.6	0.03	0.5	1	1	9	60	163	17	1.8	0.6	3	0.3	2
10-20	4.4	0.02	0.7	3	1	11	87	86	11	0.6	0.2	1	0.2	11
20-30	4.7	0.03	0.3	1	10	5	66	133	11	2.0	0.6	3	0.2	1

* 1 sample only from each depth.

Economic Analysis

Table 7: Economic Analysis

Fertlogic VRT Zones	Area (ha)	Yield (t/ha)	Total (t/zone)	Total Cost (\$/ha)	Total Cost (\$/zone)
Low	24.6	1.19	29.27	46	1,137
Med	18.6	1.5	27.90	43	798
High	16.3	1.81	29.50	126	2,054
Total	59.5		86.68	72	3,988
Total Paddock Return- Wheat @ \$300/t					
	\$26,003				
Blanket	Area (ha)	Yield (t/ha)	Total Yield (t)	Total Cost (\$/ha)	Total Cost (\$)
	59.5	1.46	86.87	103	6,123
Total Paddock Return - Wheat @ \$300/t	\$26,061			Difference (Blanket minus Fertlogic)	2,134 (A)
Difference (Fertlogic minus blanket)					
	-\$57.90 (B)				
Comparison (Total Possible Return Diff + Cost Saving of Fertlogic (A+B))					
	\$2,076				
Benefit/Ha					
	\$35				

The above table indicates the potential cost savings to be had from using Variable Rate Technology (VRT). Even though the total production off the paddock was the same, the benefits from using VRT as compared to a blanket approach are due to top up nitrogen not being used in the medium and low zones. Top up nitrogen was left off these zones due to the high levels of nitrogen present in the soil at soil testing time. Without using a variable input approach to the paddock these zones would have received nitrogen that was not required.

Comments

This is the second year that this type of trial has been run in conjunction with the Liebe Group. The 3 key messages to take from the trial this year are:

- This trial again showed that varying fertiliser inputs over different zones of a paddock can provide economic benefit over using a “blanket” application approach. The value of zone management was highlighted.
- The omission of nitrogen from a large part of the paddock has provided a cost saving due to input reduction. Without VRT management, the whole paddock may have received nitrogen that was not required in some areas. Soil testing improved targeting of nitrogen applications.
- By zoning up the paddock and testing each of the zones, knowledge of the paddock has improved and this should help make better decisions on nutrient management going forward.

Acknowledgements

CSBP would like to thank the following people/groups:

- The Liebe Group for organising field walks and the Spring Field Day.
- The Mills family for hosting the 2012 Main Trial Site.
- Ryan Guthrie, Rowan Maddern and James Easton from CSBP Field Research.

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