



# Modern Machinery Matters

## Following the precision ag path

By Mark Bender, The Willows, Lockhart

**M**y father Keith and I run a wheat, barley and canola cropping enterprise at Lockhart in southern NSW. Our path into precision agriculture was originally more coincidental than a carefully thought out plan.

It all started in 2002 when we purchased a new Case IH 2388 combine which was setup with yield mapping capability.

From this point we have steadily increased both our use of – and benefits gained from – precision ag technology.

We made a change in our operation in 2004 from driving round and round paddocks to going up and back. We then entered the GPS guidance arena with the purchase of an EZ-Guide Plus. Then in the following year, we upgraded to EZ-Steer.

We made the choice to instal EZ-Steer into our Steiger tractor for the seeding operation. Although not completely accurate, our thinking was that with a few simple side shifts, the auto-steer could still drive a lot straighter than me.

### What to do with the yield maps

After having a few years of yield mapping data at hand, we sat down and thought through what we could do with it.

Do we just look at the pretty pictures and go “wow, that looks good!” and then put them in the cupboard – or do we do something with them?

We decided to do something with them.

So we looked carefully at the maps and information and initially became very confused. We almost didn't take it any further.

But after more consideration we decided to give the variable rate technology (VRT) a go – and give it a go we did.

We upgraded our Flexi-Coil 2640 three-bin air seeder to full VRT capability. And because something as simple – and frustrating – as a blocked seeding or fertilising hose can quickly unravel your carefully worked out variable input strategy, we have recently installed

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a blockage monitoring system. The system uses an optical sensor to monitor material flow down the tube to the sowing boot.

The system can sense material flow down to as low as 0.5 kg per hectare and if there is a blockage, an alarm immediately sounds and the problem hose is pinpointed.

### Creating prescription maps

In 2006, we put our new hardware to work by creating prescription maps from our yield data. We located and plotted the trees and gullies in our paddocks and went about increasing or decreasing the rates of MAP in those areas.

Then in 2007, we fitted a second EZ-Steer unit with an EZ-Boom system to our ‘spray tractor’.

We found this to be very worthwhile as it cut out a lot of overlap as well as missing (on purpose) the fiddly bits in the paddock, especially around trees.

We now circle the trees to eliminate the ‘tear drops’.

### Another drought, time to review

After harvest in 2008, and yet another drought, we all sat down and had a rethink about our farming system: Where were we and where did we want to go?

We asked a lot of questions and looked at many different set-ups. Finally, the following decisions were made:

- We would buy a set of press wheels;
- We would install an RTK AccuSteer system with a Pro 600 display to our Steiger STX 450 tractor; and,
- We would progress towards a controlled traffic system with full stubble retention and inter-row sowing to retain more moisture and to minimise unnecessary machine movements.

The wheels of progress were set (precisely) in motion. The next step was to maximise our paddock efficiency and reduce any unnecessary overlaps.

## GENUINE INPUT SAVINGS

There are considerable input savings generated by precision farming and these savings are generally higher the better the level of integration of the PA hardware used on the farm's machinery.

As an example, Case IH Brand Manager for AFS & Patriot Sprayer, Ross Johansson, points out the major benefits of matching a genuine Case IH AccuGuide system with Case IH equipment as:

- The steering valve is designed specifically to suit the hydraulic requirements of the machine, be it a closed centre, open centre, or load sensing system. This ensures the steering geometry of each make and model is perfectly matched for unsurpassed accuracy. The AccuGuide system will be more accurate because the steering valve is part of the machine and not an aftermarket add on.
- The AccuGuide system communicates in the CAN bus of the machine so it can also monitor engine, transmission and implement operations. For example engine temperature, gear selected, engine load, fuel usage as well as some safety features like the operator seat switch (the operator has to be in the seat or the autoguidance won't work) are all controlled by the one system and displayed on the one screen.
- With the AccuGuide system and a guidance ready machine, you only need to swap the display, navigation controller and receiver from one machine to the next saving costs if the owner doesn't want to leave these components in his header for the nine months a year it is not being used.

### Maximising paddock efficiency

To do this we turned to our Case IH Advanced Farming Systems desktop software not only to manage our seeding, harvest and spatial data, but to also compare the paddock boundaries and arable areas to our seeding and spraying operations.

Once we pinpointed potential efficiency gains we went about realigning or removing fences and changing our travel direction.

For example, we went from a north-south direction to east-west so we could operate between parallel fences rather than between out of square tree lines.

When it comes to considering new machinery and/or technologies, I think that looking to the future – and the direction that you want to head in that future – is very important.

It often allows you to more easily upgrade and expand your system with minimal capital expenses.

The collection and management of data for precision ag is also very important.

I'm a firm believer in taking a little bit more time to do the job properly and ensure that the system is setup correctly. The data is then able to do its job while nagging concerns – such as

'have I backed up my valuable data' – all pretty much happens automatically in the background.

### The farm's getting smaller!

With the adoption of GPS guidance and up and back seeding on the farm, our precision ag data is telling us

**Mark Bender points out the optical sensor used to detect hose blockages.**



## PUTTING PA INTO PROFITABLE PRACTICE

Precision agriculture is about doing the right thing, in the right place, in the right way, at the right time. It's also about the economics. In a recently published *Precision Agriculture Fact Sheet*, the GRDC identifies some major agronomic and economic benefits for farming systems adopting the PA path.

### Examples of how PA can benefit a farming system

- Match the seed rate to soil type for improved germination;
- Changing varieties or crops within a paddock to match soils;
- Site-specific targeting of lime or gypsum;
- Redistributing seeding fertiliser to match paddock potential;
- Creating fertiliser replacement maps based on previous crop yield;
- Reducing overlap;
- Inter-row weed control and seeding;
- Reduced soil compaction with autoguidance combined with controlled traffic;
- Targeting in-crop nitrogen to potential production to reduce crop lodging and increase yield; and,
- Identify least productive paddock areas with yield maps and then modify management.

Annual \$/hectare benefit of adopting various PA technologies				
	Overlap saving	Fertiliser management	VRT benefits	Other*
WA growers	9	12	—	6
SA growers	6	8	7	13

\* Other benefits include inter-row sowing, reduced soil compaction and shielded herbicide spraying.  
 Figures are based on the average results in the 2006 and 2007 seasons for six WA and eight SA farms (source: CSIRO in WA; Dr Matthew McCallum in SA).

### SOME KEY CONSIDERATIONS WITH PA

Precision agriculture enables land and crop variability to be identified and more effectively managed. But...

- Do your sums carefully before investing in PA technology to ensure any investments increase returns or improves efficiency and ideally, both.
- If you move to VRT, tackle the less time-critical input applications first such as lime, gypsum or top-dressed nitrogen or potassium.

**SOURCE: GRDC Precision Agriculture Fact Sheet, September 2009.**



Many modern tractors have autoguidance factory-fitted.

our paddocks are around four to six per cent smaller than they were six years ago!

This reduced overlap quickly adds up to reduced input costs.

On top of these reduced bills, the extra savings through variable rate application of fertiliser at seeding – or the more 'appropriate' application rates of gypsum, lime or urea – are worth chasing.

It's the one and two per cents that could mean the difference between that new machine or land purchase – or even being able to go on a well deserved holiday. ■