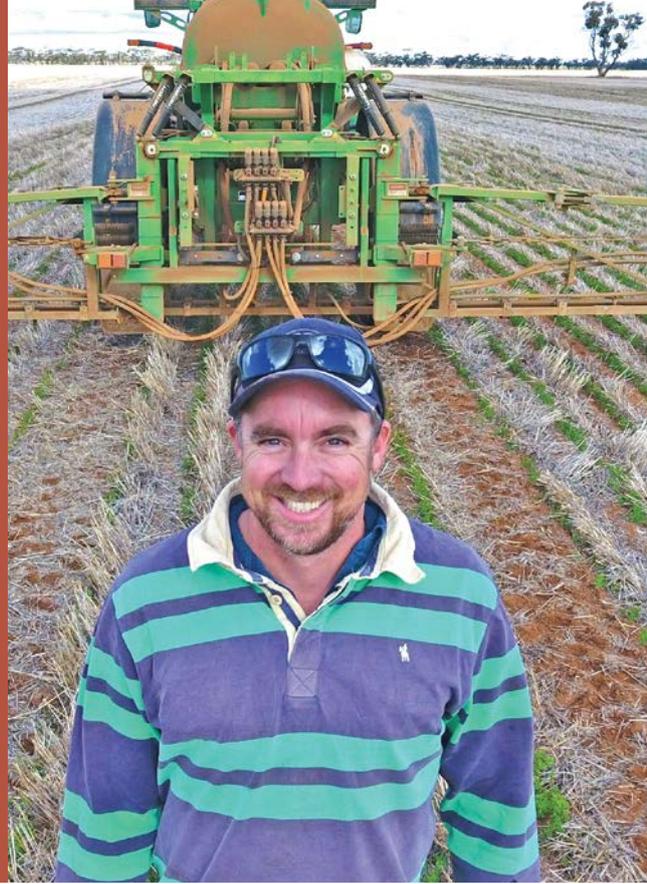


## CASE STUDY NINE

# Tailoring the farm by soil type

Being able to adjust inputs to suit the varying soil types across their property has helped the Bryan family farm more efficiently and increase overall yields.



### Farm profile

**Farming personnel:** Leigh and Susie Bryan

**Farm location:** Swan Hill, Mallee, Victoria

**Annual rainfall:** 340 millimetres

**Soil types:** Sandy clay loams to sandy loams

**Farm area:** 2400 hectares

**Topography:** Mallee

**Enterprises (crops, stock, etc):**

Wheat, barley, lentils, field peas, chickpeas, canola

**Average wheat yield:** 2.45 tonnes per hectare

**SPAA member:** Yes

**PA consultant:** Self

**Agronomy consultant:** Matt Whitney, Dodgshun Medlin

### Why did you choose to adopt precision farming technology?

The main feature of precision farming technologies for me is the guidance technology and the accuracy it offers in functions like variable rate applications and auto steering. We manage inputs to suit our different soil types and their needs. We have a mix of light, sandy soils and heavier loams and precision farming allows us to feed up the sandy areas and back off on the heavier types. It means we do not overfeed the better soil or underfeed the lighter zones. In other words, we are not investing more

### PA timeline

Guidance –	2003
Autosteer –	2005
On-farm trials –	2005
Yield mapping –	2006
Direct Injection Spraying –	2006
Variable rate –	2007
Inter-row seeding –	2007

than we need to in fertilisers and we can be very accurate about how we place that investment.

We also operate a no-till farming system, so guidance and auto-steer helps us to accurately plant in between the previous crop rows or into the previous year's stubble, depending on the crop.

Finally, the guidance reduces mental and physical fatigue. Automated steering means fatigue does not impact on the accuracy of row placements or input applications. It all adds up to less waste, lower costs and better yields.

### Which technology tools or components have you adopted and (which do you) continue to adopt?

Along with the guidance-based technologies, we also make use of drone and satellite imagery to map biomass and soil types for our variable rate input programs. For example, we use the maps to adjust the herbicide rate applied on sandy soils, which tend to

### Top PA tips

- *Keep your solutions as simple as you can. Aim for one screen and stay with one system*
- *Don't try to be perfect. Getting from 90 per cent to 100 per cent accuracy adds a lot of work for little gain*
- *Have local support so any issues can be resolved quickly*

leech the chemicals more than a heavy soil. We can also reduce the risk of crop damage by mapping sensitive crops and reducing the herbicide application rate in those zones.

Another technology we've adapted is yield mapping on the header, which informs our variable rate fertiliser map. We're able to run a maintenance type program, where the yield data allows us to replace minerals like phosphorus and zinc based on what was removed through harvesting. In paddocks which we know are low in those elements, we can adjust the map to apply a 'maintenance plus' rate that helps us to build those soils up.

We also share maps between machinery. For example, I audit the yield maps and add a layer for soil type. The modified map is then used on the seeder to vary the seed and urea rates based on the soil type.

## **What are the factors that motivate you to adopt and use each of the different tools or PA components?**

The investment in precision technologies is based on cost savings and efficiency. It is about maximising yield, which is ultimately about the profitability of input costs versus returns.

In the past, we could not justify applying fertiliser at a blanket rate that suited the sandy soils because that would also mean putting three times too much onto the heavy soils, so we had to compromise on both types. Now that we can adjust the inputs by soil type, we are able to feed those sandy soils appropriately. They are now our best soil types, because we can match their nutrition to their plant-available water. We were never able to do that before.

## **What types of data and information are you collecting to guide your decision-making to adopt or not adopt each PA component?**

Generally, social media is the first place I pick up on something new, or someone doing something different. My membership in SPAA and the no-till groups also turns up new ideas.

However, a lot of the research I did years ago has remained valid. I have had the screen for my variable rate seeder for over 14 years now, so the technology does hold up surprisingly well. I have changed my guidance system in that time and there have been various upgrades to the steering screens over the years. Often, those will be raised by the machinery dealer. As the machinery needs to be replaced, an upgraded guidance screen will usually be a part of that renewal.

## **Has the adoption of precision agriculture increased profitability on your farm? How?**

Yes, definitely – just through the cost savings and yield increases. With precision technology, there is no need to under and over-do applications as there was in the past. These days, we can apply each input as the crop and soil types need it. It is still not 100 per cent perfect by any means, but it is vastly better than ‘blanket’ applications.



## **How are you using the data generated by PA? Is it leading to further practice change? If so, what kind of practice change?**

Yes, it is leading to further practice change. For example, I recently normalised my annual yield data from the past 14 years and produced a map showing where we had been getting above and below-average yields. It showed that some areas of the farm were not really worth planting certain crops on. As a result, we have now applied a virtual division into some paddocks and will sow different crops on either side of the line. A paddock that may have had lentils all the way across it has now been sown with lentils on one half and peas as a brown manure crop on the other.

Previously I thought we had grown some reasonable lentil crops in those areas, but the accumulated data clearly showed this was not the case and planting lentils there just wasn't worth the risk. I have created precise seeding maps based on how our soil types lie but they are too irregular. It becomes impractical to manage spraying and harvesting. In the end, simply dividing the paddock has worked out very well. A few good areas ended up on the wrong side of the line, but not enough to worry about.

## **Who is influencing or assisting you with the adoption of PA?**

I do it all myself. When I started experimenting with precision agriculture back in around 2005, I had to figure most of it out myself and fortunately I can do that. Being able to perform tasks like converting drone imagery into application maps means I do not need to out-source a lot of those operational tasks.

## **Are you planning to adopt more or less of these various precision farming technology components in the future?**

Camera sprayers have been an area of interest for several years now and I have been watching them improve. The introduction of green-on-green algorithms will take them to another level. For the moment, however, I am happy to wait until I feel I need one. We don't have a pressing weed problem to justify it yet.

Protein monitoring is also on the horizon. Again, I am waiting for the technology to mature and the prices to be a little more attainable. As that happens, I think it will become a very valuable tool for mapping crop performance and matching that data to the variable inputs we can manage with precision guidance.

## **Contact details**

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