# GRDC PODCAST TRANSCRIPT

**Implementing variable rate technology on-farm**

[00:00:05] **Intro** This is a GRDC podcast.

[00:00:12] **Shannon Beattie** Precision agriculture has been around for more than two decades and while some growers are only just starting to experiment with the technology, others have been on the journey since the early days. Hi, I'm Shannon Beattie. At Beaumont, near Esperance, in the south of Western Australia, the Longmire family are old hands at using variable rate technology on their 5700-hectare farm, cropping a five-year rotation of field peas, wheat, canola, wheat and barley with the odd opportunistic lentil crop, Tom and his parents Phil and Bindi use VRT to control every input on the farm to some degree. They've become so adept at using the technology that they were asked to share their experiences with other growers at workshops organised by the Society of Precision Agriculture Australia, with investment from GRDC. I caught up with Tom on the farm at Beaumont to hear how they got started with VRT and discover his best tips to help other growers get going.

[00:01:08] **Tom Longmire** Back in 2004, my dad went on a Nuffield trip sponsored by GRDC looking at the economics of variable rate and precision ag technology and researching how people worldwide actually making money off this technology. From there, sort of developed and as I've got involved in the farm and come back home after university and stuff, I've had a personal interest in it and probably continued on with implementing it.

[00:01:33] **Shannon Beattie** Amazing. And I'm sure you probably don't want to put words into Dad's mouth, but I've met Phil and I don't think he's going to mind. So why was he interested in taking on that Nuffield in the first place?

[00:01:44] **Tom Longmire** I think it was a lot of personal interest in the technology and the precision ag and that side of it. So, I think it was quite a nice gel of being able to fulfil a bit of personal interest stuff, but actually go and research it worldwide. And one of our big philosophies about it all is actually making sure that at the end of the day it's making a profit and you're making more by implementing some of this technology, because if we're not, then we're just wasting our time, really.

[00:02:10] **Shannon Beattie** And tell me more about that on farm implementation. How have you guys going about it over the past, you know, almost 20 years.

[00:02:18] **Tom Longmire** So once Dad sort of got back, he saw a farmer in Manitoba changing his seeding and fert rates on some salty country, which we sort of saw was the best fit to start with. And so, we got an EM map and our grey sodic and salty clays correlated quite well with our red clay on the EM map. So, it's very defined area in some of these problem spots. So, from there we decreased our fertiliser rate by 15% and increased the seeding rate by 15% on those areas. We noticed wheat and barley wasn't tillering as well on these sodic and salty soils. So purely just to get more plant numbers there and the decrease of fert, one of them to get the nitrogen toxicity out of the root zone, and these areas have probably been over fertilised previously before the variable rate, it would have enough the potential.

[00:03:10] **Shannon Beattie** Now you did just speak about fertiliser a fair bit then and as we know, the price of fertiliser has been, I'm going to say, not pleasant over the past few years. So how has the price of fertiliser been impacting you guys on-farm?

[00:03:25] **Tom Longmire** It hasn't been ideal and it's nice to see that everything's coming back. Hopefully it stays that way for a bit. With the price of fert it probably makes our zone variation rate amounts larger. The way we've sort of gone about it - the cheaper the fert, probably the less it varies and you're not cutting your poorer production areas back as much unless there is a significant problem there that can't produce over a certain yield. But we've got our budget of this is how many dollars a hectare we're going to spend on urea. And so, if you say your first application, we're putting on 60 kilos of urea on some barley. It is a difference between applying 50 and 70 in areas to average at 60 instead of just going and blanketing a 60.

[00:04:08] **Shannon Beattie** That makes a lot of sense, so the higher the price of fertiliser is, the more you guys are varying rates on-farm and you're able to keep that top end more without having to worry about dropping off the bottom end quite so much. How has using VRT on-farm helped you guys mitigate the price of fertiliser and the risks involved with fert applications over the past years?

[00:04:29] **Tom Longmire** We don't do the whole farm of VR. We've got certain soil types and certain paddocks where we're confident in the layers that we're using to create a map such as radiometric, potassium or EM that correlate very well to the production zones and soil types. If we're not confident in the map we're creating is actually maximising both potential production but also not yield limiting other areas, we sort of just go with a blanket. But in the last couple of years being able to push the areas, like our sort of loamy sands that we know will produce reasonably well in a dry finish, but also in a wet year needs a bit of a boost and has the potential to really kick on. Being able to apply some of those areas a bit heavier and actually try boost as much out of those zones as we can. That's, I guess, where we've been using the last couple of years’ worth, trying to mitigate some of these higher fert prices to get a best bang for our buck.

[00:05:24] **Shannon Beattie** And that's, I guess, how you've been using it for fertiliser. But in general, when it comes to VRT, you've been on this journey, so to speak, for about 20 years or so now. What's been the biggest success story on the farm in that entire time?

[00:05:39] **Tom Longmire** Where we first started was gypsum and that's I guess where it first kicked off with the EM map and those grey sodic soils. We've heavily applied gypsum over the years, some of our heavy grey sodics have had north of 20 tonne a hectare across multiple applications. And probably what we're noticing now is that the yield maps aren't correlating as well to our EM map. So previously when we first started, the grey sodics didn't have as high a potential, so the yield map correlated quite well to your EM map. But now that we're starting to improve the production potential out of these areas with gypsum and managing seeding rates and the whole sort of picture, yeah, we're not saying you met variation that we previously have.

[00:06:24] **Shannon Beattie** And as we said, you have been on this journey for a fair while now, whereas there are other growers who are probably just starting off and just getting involved in VRT and precision ag. What are the challenges that those growers are going to face as they start on this journey?

[00:06:39] **Tom Longmire** Probably everyone's going to have their own challenges. Is finding what layers across your farm best suit. We find it with our place where one paddock we use a radiometric potassium layer and then through the fence we'll use EM because it best fits its production potential and the soil types. So being confident in the layer that you're going to use and ground truthing some of the maps. One of the challenges that we've sort of noticed and have constantly been improving and trying to get better at is the zone size of some of these maps based on the capability of your machinery to rate change at different speeds. So our airseeder is a good one where it can't change rates very quick, so some of the maps we're getting from consultants, they have very small zones throughout the paddock that by the time the airseeders changed its rate to that small zone, you're already through it and you've got alarms going off all day that you rate's too high and by the time your through it, you rates too low. So, we've been working pretty closely with our consultants and spreading contractors and people that we've got implementing this technology, as well as ourselves, that trying to find a zone size that we can go righto, these are the zone sizes we need for different machinery that we're not going to have any issues with that actually being able to match that rate capability.

[00:07:55] **Shannon Beattie** A few very good tips there for growers getting into VRT. Do you have any other hints for them that might help them on this journey?

[00:08:04] **Tom Longmire** One of the big ones that we're trying to do a lot of is there's a lot of really good people out there that have a lot of experience in the software and data analysis, and we don't need to know the complete ins and outs of every program that we utilise on the farm, but we know how to make maps and stuff like that. But the general technical part of it, using your consultants to actually get the best out of the data that you've got available for them. They've got a very good idea of what's going on and having that ground truthing. And actually, when you're building a map with your consultant actually saying no, no, that doesn't match what we're seeing in the paddock is a good one. And utilising what capabilities there if you can do it. I think a lot of technology, such as section control and a couple of those bits with accurate boundary mapping, are very easy to implement and their savings are a very quick payback. The last two years with the high fert prices at seeding with our liquid N and starter phosphorus, we've saved over $100,000 in each season, which has paid the technology off within one round of cropping.

[00:09:06] **Shannon Beattie** That's an incredible saving, as you say, in just one season and I think it's a really good tip to not be afraid to ask for help from the people who know the most about this. You did just mention section control. Can you tell us a little bit more about that and how you've been using it on-farm?

[00:09:22] **Tom Longmire** A lot of the boom sprayers and spreaders now have had section control for a long time, and we've been utilising that technology on sprayers for a long time now. And in the last five years or the last eight years, section control and airseeding equipment’s now come to a point it's actually quite reliable. So, 2019 we got a new aircart that had section control capabilities on it and we're really impressed with the results. Some of our paddocks before we had section control, we'd battle with a lot of internal lakes and our largest paddock, by the time we'd done two headlands around every lake, it ended up at 36% overlap. So, we're cutting it back - it's only got four sections across an 18-metre bar so there's always going to be overlap. But compared to that, it's a big saving.

[00:10:09] **Shannon Beattie** It sounds like an incredible piece of technology. You did this year ago with your dad, Phil, to a couple of workshops where you were sharing your experiences with VRT in Broomehill and Green Range with SPAA and GRDC. What was the purpose of sharing your experiences at that workshop?

[00:10:28] **Tom Longmire** I get a lot out of grower learning when I go to field days and people come over from over east or different areas and come and talk. And for me the opportunity to actually share what we've been up to and also, I get a lot out of the discussion after the actual presentation and stuff. Being able to chat to a few of the farmers there, what they're dealing with and how they're utilising EM maps and radiometric maps, they're all the same whether you're here or anywhere. It's the same data layer and the same scale. So actually, finding out what some of the soil properties people are dealing with and their way of going about it might change the way that we look at some of the bits we've done. Having a chat to a few of the growers there who are utilising the same consultant that we use, their different implementations for the data they're getting. Come back and Dad and I are driving home, had a good discussion about what we can change or how we can look at it differently for what we're actually doing at the moment.

[00:11:20] **Shannon Beattie** Good four-and-a-half-hour drive from Beaumont to Green Range. Plenty of time to discuss all of the things that you've found out. It sounds like though you see a real benefit in that grower to grower learning?

[00:11:30] **Tom Longmire** Yeah, I quite enjoy going to some of the grower days and some of the discussions that you can have with people. At Green Range and Broomehill day that we went to, having a couple of people like Alice Butler there who is very experienced in her PA and has seen a lot and made a lot of different maps for a lot of different people. It was nice to be able to have a chat to her about some of the stuff we're doing and just get her ideas I guess, on what we're doing and whether we're looking at it the right way and getting in contact with a few of the people who can probably help us progress into the next step and utilising or trying to adapt some of this variable rate stuff onto autonomous solutions such as a Swarmbot for baiting and pest management is sort of, I guess, where we next say our next jump into VR.

[00:12:14] **Shannon Beattie** Thank you so much for joining me on the podcast today, Tom, and best of luck with all of your VR in the future.

[00:12:20] **Tom Longmire** Thanks for having me, Shannon.

[00:12:29] **Shannon Beattie** That was Tom Longmire speaking about how his family utilises precision agriculture and variable rate technology on-farm. I'm Shannon Beattie, this has been a GRDC podcast and thanks for listening.