# GRDC VIDEO or PODCAST TRANSCRIPT

**Rethinking applied N for irrigated maize**

[00:00:12] **Sally Maguire** Hello, I'm Sally Maguire. Assisting growers to work smarter with their inputs to increase profitability is the focus of many GRDC investments. Recently, Australian maize growers have found there's a peak in the nitrogen response curve, beyond which there is no measurable effect on yield. Meantime, irrigation discussion groups expanded into paddock scale demonstration, which provided growers with the opportunity to further investigate key management options. Today, we're exploring the outcomes of those recent trials into irrigated grains, specifically maize. And first up, I spoke to Charlotte Aves from the Irrigation Farmers Network.

[00:00:53] **Charlotte Aves** Maize growers are quite diverse, so we've got those guys that are consistent maize growers, they're growing maize every year, they're top of their game, they're getting 20 tonnes a hectare. They're all over it in terms of getting their establishment right. They're investing significantly in nitrogen. And you can say to them, what are the big dramas and it would probably be marketing pests, nutrition, but then we have a whole heap of growers that dip in and out of it based on water price. And their issues would be establishment, cultivation, irrigation scheduling, nutrition. So their list would be much greater than those guys that are doing it all the time.

[00:01:33] **Sally Maguire** The GRDC funded project facilitated action learning groups to support profitable irrigated farming systems in the northern and southern regions. Tell me about that investment and how did it play out in the field?

[00:01:46] **Charlotte Aves** Yeah, so the Optimising Irrigated Grains project was three linked projects, one of which was a research component led by FAR Australia, and that looked at optimising yields for canola, faba beans, chickpeas, barley, maize and durum. And that was supported or run alongside an economics project which developed the WaterCan Profit tool, and that was led by the University of Tasmania. And the third project within there was the Irrigation Discussion Group. So there was eight of those across southern and northern zones stretching up as far as Griffith. And they really were there to support the extension of the project. And each of those groups throughout the life had the opportunity to run multiple focus paddocks to really validate what was coming out of the research component in the paddock. Since then, that project's wrapped up and there was some really great findings which have been pulled together into their good management guides, which are available online either through the GRDC website, or through our own website. And we wanted to continue extending those messages beyond the research. So this project is continuing those irrigation discussion groups. And again, they've had a budget to be able to create focus paddocks to validate some of those findings out on farm.

[00:03:14] **Sally Maguire** How many focus paddocks did you have and across what sort of regions?

[00:03:18] **Charlotte Aves** We've had six focus paddocks across the three states, so that's New South Wales, Victoria and Tasmania and they've been focussed predominantly on maize because water price this year has been good and favourable for maize growth, and we've had others looking at winter crops. So barley and wheat.

[00:03:38] **Sally Maguire** What were some of the findings that have come out of the focus paddocks?

[00:03:42] **Charlotte Aves** So with the maize focussed paddocks, four out of the five focussed on nutrition and nitrogen, so every single focus paddock took a different approach. Northern Victoria really focussed on different rates of applied N starting down at that rate recommended as the findings with the optimising irrigated grains and going up from there to farmer practice, which is about 450, so 200, 300, up to about 450 was applied in strips there to really validate whether or not we could back off on nitrogen. With the Riverine Plains group, they were really looking at bolstering bagged N with organic N. So they looked at a vetch that they either cut for hay or brown manure. And then they sowed the maize. They put a bit of cow manure out there and topped up with bagged urea. So they really looked at increased efficiency of in N through using organic sources versus inorganic sources. Southern Growers took a different approach. They felt that N wasn't the biggest issue so they had a look at potassium and sulphur as top ups to their regular nitrogen, phosphorus, zinc products that they would normally apply out from paddock there. And up in Griffith, they had a look at a product which is a biostimulant, which is Utrisha N, to see if they could get better uptake of nitrogen using that. Everything focussed on that nitrogen lever and nutrition lever.

[00:05:27] **Sally Maguire** So far have there been any kind of tangible results that growers need to know about?

[00:05:32] **Charlotte Aves** What we've seen across the four paddocks is we've not seen any yield differences at all, despite all those different strategies and all these different paddocks. What you could say is that it doesn't matter, but the reality is, is it is very important and we still have some way to go to understand the system. Probably the lens that we can put across this is a lot of the rates that growers were using were above what that recommendation was in the Good Management guide. But the other side of the coin is there's a real risk factor. If we do back off nitrogen and you lose yield potential, it's a high value crop. So the cost of loss is quite significant. So there's a reason that people are reluctant to back off that nutrition pedal, particularly when crop uptake through the year is about 450-500 kilos of N. So the crop will take a big portion of it out of a system. We're only exporting about 270-290 out of the gate. So we're replacing a fair chunk back with whole residues, but it needs to be better understanding of that cycling the value of the N that we're banking. We've seen significant N levels left at the end of the season in some of these treatments. So a real understanding of that value of banked N from some of these summer crops, particularly where people are managing the risk of lost yield potential in a high value crop. There is probably a bit more thinking to be done. Probably the key take home is we're getting reasonably consistent yields across, so water is not a limiting factor. Nitrogen and nutrition is potentially not a limiting factor. So what is really holding these crops back from meeting their potential? Because we've still got quite a yield gap in there between crop potential and what we're achieving commercially in the paddock.

[00:07:38] **Sally Maguire** I understand that a management guide for maize was produced as a result of this investment. So tell me about that and how that's going to be useful for growers.

[00:07:47] **Charlotte Aves** That's got some really, really good information around the importance of establishment and getting that right. You mess up at sowing and there's no coming back. So getting that right is really, really important. And there's some good information in terms of plant populations, row spacings and getting that established and established well. There's good information there in terms of nutrition management. So there's some good information there in terms of producing these 19-20 tonne crops.

[00:08:18] **Sally Maguire** What do you think needs to happen next to further this research?

[00:08:22] **Charlotte Aves** I think we need to get a really good handle on what's achievable. The modelling for maize hasn't really highlighted where there's potential opportunities in there. We need to get a better handle on what's achievable within our climate. And if the levers are on N or water to push us over that 20 tonnes consistently, what are they? Pests is one of those things that crops up pretty regularly to and pest management. So yeah, I guess a researcher's work is never done right.

[00:08:58] **Sally Maguire** That was Charlotte Aves from the Irrigation Farmers Network. And one grower who has had a long history with irrigated grains is Ray Thornton from northern Victoria.

[00:09:10] **Ray Thornton** We're not far from the Murray River north of Shepparton. So the farmer is basically all border-check gravity irrigation. Crops include corn, wheat, canola, faba beans. Times gone by we also grew sunflowers and soybeans as well. But the later years I'm only concentrating on maize and canola and wheat or barley.

[00:09:29] **Sally Maguire** So then when it comes to maize, what are some of the challenges that you as a maize grower face?

[00:09:35] **Ray Thornton** Manking sure the gross margins going to work for a start, Sally. It's a very costly crop to grow so you can't take shortcuts, you'll get your fingers burnt if you try to take shortcuts on any of the operations, fertiliser, sprays, whatever. So the major challenges here, we're on a clay loam, we do suffer from crusting as well. So I normally pre-irrigate and sow into moisture. And one of the biggest challenges i establishing the population, getting a population of plants that's capable of giving you the yield that you are after. I've been growing for 30 years so I've fully got that mastered. Just to give you an idea, we normally we sow about 93,000 plants a hectare. In the past, we expect to get probably 85,000 - 87,000 plants established. There's been a few after market with John Deere planters, and a few after market attachments have come to light within the last two or three years, and I'm using one of them a couple of actually, but one of them mainly which changes the whole idea of how you close that seed trench up. So we've gone from 93,000 seeds planted up to 90,000 emergence. That's probably a hell of a difference of a difference. Seed is so dear you want every plant producing. And one of the issues with corn is of course it's not like it's like say canola or wheat or barley it doesn't still out. It doesn't make up for a low population at the start of the crop. It's just one plant and that's it. So then there's fertiliser rates. How much, where and the placement of it. Insects. Fall armyworm are becoming a major problem in the northern zones. I have found up here, two or three years ago, we actually went into the paddocks and opened a cob up and here's a fall armyworm, but then tried for another 100 cobs and couldn't find another one. So we normally only get fly-in populations here I think. So that might be our saviour but umm. So how do you manage heatwaves with an irrigation? The last three years corn growing have been particularly soft down here. Really no real heat. In years gone by we might get a week of 40 degrees. And you got to manage that. On my system here you virtually have to irrigate every four days when those sorts of things are happening, which is quite easy to do on automated but flood irrigation. So there's a lot of issues that crop up.

[00:11:25] **Sally Maguire** Tell me how you were involved in the recent GRDC investment, which was really trying to address some of those issues you've just highlighted.

[00:11:33] **Ray Thornton** The one I'm involved with was the farm focus paddock regarding the total N applied, which is the total nitrogen required to grow sort of an 18 tonne crop of corn. So it was established through a couple of trial sites and one of the projects, 240-250kg of actual N. That's all you needed to grow a crop of 18 tonne. That was picked poohoo's by everybody and it was questioned. So I ended up doing the farm focussed product trial here. Basically I got 50m bays 400m long, I duplicated the two with a normal applications, about 350kg odd of actual N. And their recommendation is you only need 240-50 to basically pre-planting I applied 140-150kg of pre-plant N through the strip tiller pre-plant with urea. Two runs in this particular bay rip the duplicate either side. And beside that was my normal run which was 350kg of urea in that pre-plant. So everything else after that was the nitrogen applied and the planting was, top-up et cetera et cetera was the same. So when you come to harvest the yield was 18 tonne and there was no statistically difference to claim there was any benefit an extra 200kg. What that meant was, was actually 220kg of actual urea applied per hectare over and above on my normal planting. Above what the recommendation of a total N budget of 240kg, which equates to nearly $150 a hectare. What it said to me is we need to do a whole lot more research into soil types, and people come up with the arguments oh well if the N is still there then the next crop will use it. There's that argument. You go well $150 bucks you're spending on a pretty large outlay as well. If you can save that much money when you're growing 100 hectares or plus that's $15000 grand in extra expenditure, so pretty worthwhile trial to come out of it actually so I was rather surprised.

[00:13:24] **Sally Maguire** That was Victorian grower Ray Thornton. And you can read all about Ray's focus paddock trials and outcomes in issue 170 of GRDC's GroundCover publication. Earlier, I spoke to Charlotte Aves from the Irrigation Farmers Network, and if you're looking for more information on this topic, it can be found in the description box below or online at GRDC.com.au I'm Sally Maguire. This has been a GRDC podcast. Thanks for listening.