



Optimising Irrigated Grains

Focus Paddock results: Riverine Plains Irrigation Discussion Group

Project Aims:

1. Test several amelioration strategies for a heavy clay soil under a lateral pivot irrigator. Subsoil manuring is the practice of drilling high levels (20 t/ha) of (mainly chicken) manure into the upper subsoil.
2. Economic analysis of strategies.

Did your focus paddock go according to plan? If not what did you do differently?

The focus paddock was sown to Maize in November 2019 and harvested in April 2020. The site was affected by heavy rains in April May 2020. The paddock was then sown to Sceptre wheat on 12 June 2020 and was monitored to gauge the ongoing effects of the sub-soil amelioration. The site was in a low part of the paddock and received 420mm of rain for the first half of 2020. The rain caused water logging and affected the establishment of the wheat.

What results have you collected? Yield, biomass, water applied, soil tests etc?

Measurements were taken mid tillering (24/07/2020) and mid flowering (22/10/2020). The germination of the site was affected by waterlogging and treatments 1 and 2 had 50% of the plot lying under water and insufficient plants to be worthwhile counting. The control and treatment 5 also had poor germination on the northern end of the plots.

Head counts at mid flowering (22/10/2020) showed that the waterlogging also affected crop tillering and caused plant death, with head numbers per metre squared lower than plant counts (Table 1). The wheat heads were also stunted, about 50% of the size of a normal wheat head.

Table 1. Measurements for Sceptre wheat at soil amelioration site, winter 2020.

	Control	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5
		Poultry surface	Deep rip only	Sub soil poultry	Gypsum surface	Subsoil poultry plus gypsum
Plant/m ²	97			153	197	130
Head/m ²	75			129	128	112

After consultation with the farmer and agronomist, it was decided that the very poor head counts indicated that the waterlogging had affected germination to the extent that the numbers would not show any difference between treatments. It was decided that it would not be worth while taking any more measurements from the site in 2020. However, when the paddock goes back to a summer crop, potentially maize in 2021, measurements could then be taken.

How do results compare with farmer practice?

The results in the paddock demonstration site were similar to the rest of that part of the paddock, which was also had been badly affected by waterlogging.

What is the financial benefit/cost of the project?

The cost of the sub-soil amelioration with poultry manure has been estimated at \$1,800/ha. The benefits of the amelioration are expected to occur over a 5-year period. As the results were inconclusive in the first year, measurements are required in subsequent years to see if the project is financially viable.

What would it take for growers to adopt this practice change and what would be the consequences for the farming operation?

At this stage, the risk of poor establishment in the crop, in this case maize, after the sub-soil manuring is a major barrier to farmers adopting this practice. Farmers require more certainty on how to implement the practice change to ensure no negative impact on the first crop following the amelioration. More information is required about the benefits in subsequent years.

It would be beneficial to have a soil specialist advising on the soils that would benefit from amelioration, as well as the timing and implementation of the practice. In this focus paddock, the low lying nature of the site has made it prone to waterlogging, so drainage may need to be addressed as well.

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