Irrigated cereal production put to the test

By Donald McMurrich, AgCentral Grain Systems

I'm going to start this article off with plenty of excuses, so you can already tell there was nothing really to brag about by way of exceptional cereal yields in our 2005 irrigated experiments. These trials formed part of the Super Crop Challenge initiated in *Australian Grain* magazine in 2004. We are searching for whole farm system approaches to help maximise grain yields and returns.

For the first six months of last year we were in drought. This was coupled with a long 2004–05 summer crop growing season resulting in slightly higher water use by the irrigated cotton phase of our production system. This meant that through the winter crop decision-making period of March, April and May, we were in a quandary as to whether to even plant the winter crop.

With some crops in the ground, and no rain predicted, it was decided to start watering up some fields. Then it started to rain, and rain some more — for the next four or five weeks when the bulk of the crop should have been sown.

By the middle of August the fields were dry enough to work on again but by then we decided that these 'late' crops should be taken through on the 'cheap and cheerful'. We reasoned that if it became hot in late October — an extremely critical period of winter cereal plant growth — the extreme heat would shut the plant down.

These very wet conditions meant that some of the farmers I have been working with around Gunnedah, on the Liverpool Plains, didn't get much of a crop in.

TABLE 1: Variety trial 2005

Variety	Yield t/ha	% of control
GS 02 (NZ)	8.37	124
LPB 01 (France)	8.34	123
LPB 02 (France)	8.06	120
LPB 04	8.01	119
GS 01 (NZ)	7.77	115
GS 03 (NZ)	7.59	112
LPB 03	7.06	105
LPB 05	7.04	104
HRZ 04	6.94	103
Giles (Aust'n)	6.75	100
HRZ 02	6.36	94

Sowing accuracy and the resulting crop configuration from the Sulky one-pass system.

Of the crops that were planted and watered up, subsequent water-logging caused very inconsistent planting configurations and patchy fields. It was decided these crops should not be 'pushed' as the yield potential for these fields was already greatly reduced.

So by August, with only a small number of fields with any potential, and with most of the farmers I have worked with for the previous three seasons out of the game, it was clear the crops were never going to be blinders.

SULKY ONE-PASS SYSTEM

Given the difficult 2005 season we did what was possible at sowing time. For the first time we introduced a 'Sulky' one-pass establishment system.

This system incorporates the trash from the cotton crop, creates a tilth and pulls the soil from one metre hills to two metre beds. It packs it all down firmly with a packer roller and sows the cereal crop at 12.5 cm (five inch) row spacings.

This gave us 14 rows of wheat on top of the bed. Coupled with the increase in plant population, this greatly improved the Crop Canopy Index or the crops' ability to intercept light.

This machine really proved its worth last season as it was confronted with soil which could only be described as concrete at the end of the dry spell, to the other very wet extreme later in the season. It was working in the wet soil conditions before any of the standard sowing gear.

During the growing season we followed the growth stages of the plants and introduced nutrition, plant growth regulators and fungicides where necessary.

Last season more replicated work was done to see if there were varieties with a greater genetic potential to yield under these high input systems (Table 1).

We are essentially modeling our system on a European/New Zealand style of production. Is there an advantage in having access to international genetic material?

The short answer is 'yes'. In 2005 we introduced both European and New Zealand germplasm with some impressive results in small replicated plots. Table 1 shows that it may be possible to increase yield by 24 per cent by changing varieties. Given that variable costs remain pretty much the same, it means a 24 per cent increase in gross return.

The seed companies involved were Grainsearch and Longreach and the CSIRO (HRZ) High Rainfall Zone plant breeding program.

In coming years the higher yielding varieties will be available with specific agronomic packages, which if followed closely, should allow farmers to replicate and improve on current trial successes.

THE MONEY END

These Super Crop demonstrations have revealed that the dollar return per hectare can be improved through this style of high input production system. The dollar return per megalitre can also be enhanced.

Table 2 shows that the highest yielding irrigated crop in a very difficult 2005 season was 8.0 tonnes per hectare. Coupled with a very low commodity price, the gross margin was much lower than the previous season at $357 per hectare.

But on a positive note a return per megalitre of $178 was still achieved. This is a very encouraging figure as it suggests very strongly that as we refine our high input crop establishment and agronomy — and with access to higher yielding, high input cereal varieties — a return of between $300–$500 per megalitre is achievable.

There is also the rotational benefit to following crops to be considered.

The Cotton Catchment Communities CRC will further investigate the benefits of high input/irrigated wheat production.

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TABLE 2: Cereal gross margins and returns per megalitre under the high input production systems, 2003–05

Crop history	Cotton[1]	Fallow[2]	Fallow[3]
2003, 8.60 t/ha	$180/t		
2004, 10.24 t/ha		$175/t	
2005, 8.03 t/ha			145/t
Income $/ha	1548	1792	1164
Variable costs			
Estab./seed	210	210	210
Starter fertiliser	110	30	55
Herbicide	20	10	
Plant Growth Regulator (PGR)	21	22	22
Spring nitrogen	200	172	170
Fert. application & micronutrients	85	60	45
Fungicides	60	60	55
Irrigations x 2	100	100	100
Harvesting costs	158	185	150
Total variable costs ($/ha)	964	849	807
Gross margin ($/ha)	584	943	357
Water use (ML/ha)	2.70	1.50	2.00
Return ($/ML)	216	629	178

CROP HISTORY & LOCATION NOTES

[1]Wheat following a 2002–03 cotton crop at Boggabri;

[2]Wheat following a February 2004 ploughed out cotton crop on the Breeza Plain; and,

[3]Wheat following a 12 month fallow at Warren.