



# Cotton & Wheat Gross Margin Analysis

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# How does Cotton Stack up in the New Global Commodity Environment?

The prolonged drought suffered in the eastern states has led to water resource stocks declining in many of Australia's cotton growing regions. Fortunately the weather pattern has changed and many dams are now filling or full and there is an air of optimism in rural communities about the prospects for the coming seasons.

The commodity complex has changed considerably over past seasons. With low global production and alternate use competition for coarse grains driving the price of those commodities to record highs.

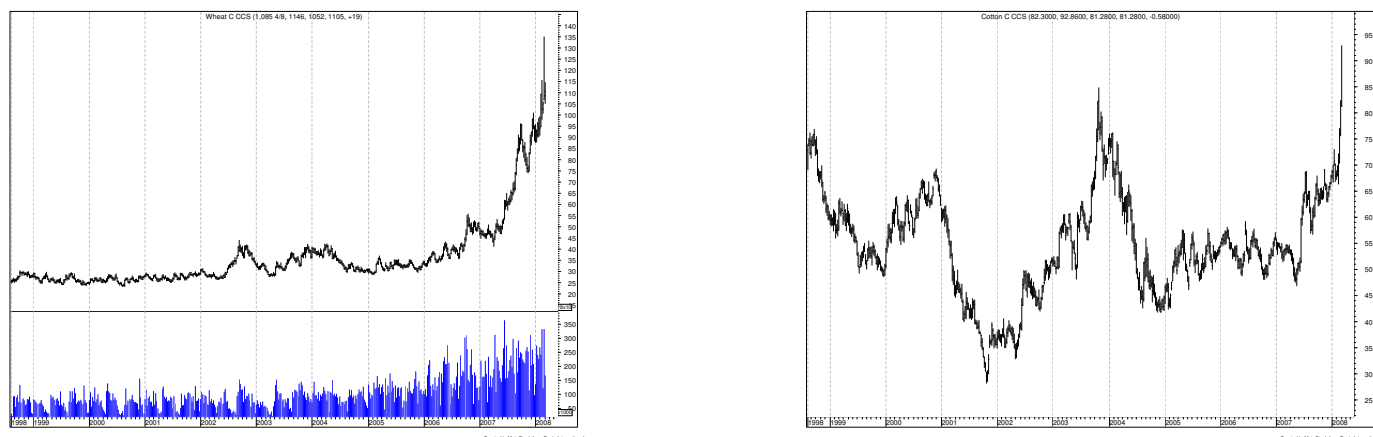
The decision for many irrigators now is

- The extent of their winter cropping program.
- What proportion of their country do they commit to fallow for cotton or other summer crops?
- What commodity is going to be the most effective and efficient per MI?

So the question is how does cotton fit into this new equation and does it still offer growers strong rewards for their endeavours?

In much of the talk of the soft commodities boom, the Australian cotton industry has been treated as the ugly sister to other commodities which have hit historical highs in price. Although not mirroring the historical high wave of success the fundamentals for cotton are very solid and optimistic. Wheat for example is experiencing record prices; well over double the average figure for the past 10 years (Figure 1). In the same period, the cotton futures market has yet to fully respond to the soft commodities boom, but has recently reached a ten year high. This has not been realised by Australian growers due to the high Australian dollar.

**Figure 1:** Continuous Futures for Wheat (Left) and Cotton (Right) From Chicago and New York Boards of Trade



This document states the case that cotton is still very much a viable option in the established cotton growing areas and highlights the potential up side and changes the industry has experienced in the past number of years. When examined, as paired commodities, cotton offers similar or better returns on a per hectare and per megalitre basis and is comparable to high input irrigated wheat (Table 1 and Figure 2).

Significant cotton industry funded research conducted for well over a decade has shown that wheat and cotton complement each other well in a rotational sense. Many of the benefits of a wheat rotation in the cotton system are the same regardless of the addition of irrigation water. The major additional benefit irrigated wheat would have in a rotational sense is the amount of organic matter the remaining stubble would put back into the system. Other benefits such as a disease and weed control break, soil amelioration through the drying and cracking cycle of heavy clay soils will be similar under a dryland wheat production scenario.

## What Makes Cotton An Attractive Option?

### Demonstrated Yield Improvement

In our gross margin analysis we have used 10.33 bales/ha as an example yield. This is the average yield of Sicot 71BR, the most popular variety in Australia, for all 98 large-scale commercial trials conducted by CSD using this variety over 4 seasons.

Consider however, that many growers have achieved yields consistently higher than this, resulting in significant improvements in gross margin with very little additional cost.

A new variety released last season is Sicot 70BRF has the potential to dethrone Sicot 71BR. Sicot 70BRF is part of a suite of high performance cotton varieties which are in limited release and seed production this season. Sicot 71BRF is also undergoing development and this variety is demonstrating a 2.5 % yield increase over Sicot 70BRF. The same yield gains cannot be said in terms of wheat breeding.

## Favourable Global Market

From a global perspective, cotton is currently viewed as a commodity with potential. This optimism in the market has seen the strengthening of the cotton futures price (Figure 1). A combination of increased global demand for cotton over the past two years and the reduction in planted area due to increasing prices for competing crops will see a reduction in the world ending stocks, which should further underpin prices over the medium term.

## Cotton Seed, a Valuable Commodity

Domestically the small cotton acreage over the last two seasons has seen the cotton seed market strengthen. This market has matured to the point where seed is no longer viewed only as a crushed commodity but also as an integral component of feed rations, both commercial and drought. It is reasonable to expect that higher prices across the coarse grains complex will support cotton seed values for the foreseeable future.

## Simplification of Cotton Growing

Since the introduction of biotechnology, cotton has become a more secure crop to grow. A number of operations have been reduced along with the pressure to be timely with insecticide and herbicide applications. Another benefit of biotech cotton is the certainty it provides to budgeting of a cotton crop. Costs of production can be predicted with much greater accuracy before planting and in many cases the large seasonal fluctuations in insecticide and herbicide costs have been eliminated from the equation. Payment terms developed by the technology provider also aid with cash flow management.

## Gross Margin Analysis

We have conducted a gross margin analysis on a sample irrigation farm in northwest New South Wales and southwest Queensland. The calendar of operations goes through a likely scenario in the lead up to the up-coming winter or summer cropping options.

It is not intended that these gross margins will reflect the operations of every property in the district, but are designed to be used as a guide and enable comparisons to be made. In this analysis we have been careful to apportion similar costs across both gross margins, and both take into account all aspects of production from field preparation to delivery of commodity to market.

Beware of comparative gross margins that use different input costs for the same inputs on different crops, and different rules on whether to include or exclude out of crop operations such as fallow management or field preparation.

Many growers have successfully used dryland or semi-irrigated wheat as a rotation for cotton in irrigated country; achieving yields of 2-5 tonnes/ha. Often this has been done with minimal inputs, particularly fertiliser. If growers are aiming to achieve wheat yields greater than 5 tonnes/ha, through extra irrigation, then it will require higher inputs, particularly fertilizer and management.

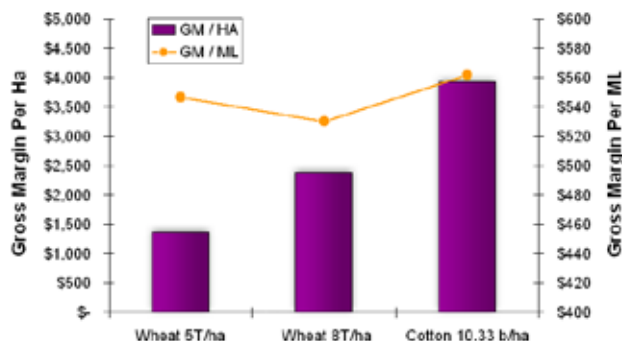
In this comparison the wheat yields of 5 and 8 tonne of were taken from the NSW DPI publication "Growing eight tonnes a hectare of irrigated wheat in southern NSW." by Lacy and Giblin, 2006. This publication gives a very good description of a recipe for irrigated wheat production in southern NSW. This publication is freely available from the NSW Dept. Primary Industries Web Site at [www.dpi.nsw.gov.au/agriculture/field/winter-cereals/wheat/eight-tonnes-hectare-irrig-wheat](http://www.dpi.nsw.gov.au/agriculture/field/winter-cereals/wheat/eight-tonnes-hectare-irrig-wheat)

Our analysis found irrigated cotton and irrigated wheat both offer growers good returns at current pricing regimes.

**Table 1(left) & Figure 2(right):** Comparison between irrigated wheat and cotton gross margins per hectare and per megalitre.

	Gross Margin/ha	Gross Margin/ML
Wheat Yielding 5T/ha	\$1,366.86	\$546.74
Wheat Yielding 8T/ha	\$2,385.32	\$530.07
Cotton Yielding 10.33b/ha*	\$3,932.03	\$561.72

Note: Wheat price \$470/T, Cotton Price \$500/Bale, Cotton Seed \$400/T. Average Yield 10.33b/ha is the average of yield of Sicot 71BR, the most popular cotton variety in Australia, calculated from 98 large-scale replicated variety trials conducted by CSD over the last 4 seasons.



In recent seasons it has become increasingly evident that water is the most limiting resource in irrigation agriculture in Australia. Being able to get the biggest dollar return per megalitre is of importance not only in terms of efficiency but also of stewardship of such a valuable resource.

We would like to draw you attention to the returns per megalitre at the bottom of each of the sensitivity analysis tables for these gross margins. Not only does cotton provide a very good return but also in terms of net profit per megalitre, it is in front of wheat at today's prices.

# Gross Margin Budget Summary

## Cotton Variable Costs

Cultivation	\$170.00
Sowing	\$114.00
Fertiliser and application	\$395.65
Herbicide and application	\$177.10
Insecticides and application	\$118.00
Irrigation (7 MI @ \$30/MI)	\$210.00
Defoliation and application	\$110.23
Contract harvesting	\$320.00
Haulage	\$83.00
Ginning Charges	\$537.00
CA and Research Levy	\$44.00
License Fees	\$375.00
Consultant	\$45.00
Refuge Crop	\$22.00
<b>Total Variable Costs</b>	<b>\$2720.98</b>

Note: Full details of irrigated cotton variable costs are located in Table 4, irrigated cotton calendar of operations.

**Table 2: Sensitivity Analysis of Yield and Commodity Price for Irrigated Cotton.**

### Per Hectare Analysis

Commodity Price		\$450	\$500	\$550	\$450	\$500	\$550	\$450	\$500	\$550
Seed Price		\$350			\$400			\$450		
Lint bales/ha	Seed t/ha									
9	3.24	\$2,463	\$2,913	\$3,363	\$2,625	\$3,075	\$3,525	\$2,787	\$3,237	\$3,687
10	3.6	\$3,039	\$3,539	\$4,039	\$3,219	\$3,719	\$4,219	\$3,399	\$3,899	\$4,399
11	3.96	\$3,615	\$4,165	\$4,715	\$3,813	\$4,363	\$4,913	\$4,011	\$4,561	\$5,111
12	4.32	\$4,191	\$4,791	\$5,391	\$4,407	\$5,007	\$5,607	\$4,623	\$5,223	\$5,823
13	4.68	\$4,767	\$5,417	\$6,067	\$5,001	\$5,651	\$6,301	\$5,235	\$5,885	\$6,535

### Per Megalitre Analysis

Commodity Price		\$450	\$500	\$550	\$450	\$500	\$550	\$450	\$500	\$550
Seed Price		\$350			\$400			\$450		
Lint bales/ha	Seed t/ha									
9	3.24	\$352	\$416	\$480	\$375	\$439	\$504	\$398	\$462	\$527
10	3.6	\$434	\$506	\$577	\$460	\$531	\$603	\$486	\$557	\$628
11	3.96	\$516	\$595	\$674	\$545	\$623	\$702	\$573	\$652	\$730
12	4.32	\$599	\$684	\$770	\$630	\$715	\$801	\$660	\$746	\$832
13	4.68	\$681	\$774	\$867	\$714	\$807	\$900	\$748	\$841	\$934

Note: Based on 7 MI/ha to successfully irrigate a cotton crop 4 out of 5 years

## Wheat Variable Costs

Target Yield	5t/ha	8t/ha
Cultivation	\$60.00	\$60.00
Sowing	\$152.80	\$152.80
Fertiliser and application	\$328.50	\$533.80
Herbicide and application	\$67.94	\$67.94
Fungicide and application	\$32.50	\$32.50
Irrigation (5t/ha @2.5MI)	\$75.00	
Irrigation (8t/ha @4.5MI)		\$135.00
Contract harvesting	\$76.00	\$115.00
Haulage (@50km haul)	\$125.00	\$200.00
Consultant	\$45.00	\$45.00
Levies (@1.02%)	\$20.40	\$32.64
<b>Total Variable Costs</b>	<b>\$983.14</b>	<b>\$1374.68</b>

Note: Full details of irrigated wheat variable costs are located in Table 5, irrigated wheat calendar of operations.

**Table 3:** Sensitivity Analysis of Yield and Commodity Price for Irrigated Wheat.

### Analysis For 5/ha Budget

Yield T/ha	Price	\$350	\$400	\$450	\$500
	3	\$67	\$217	\$367	\$517
4	\$417	\$617	\$817	\$1,017	
5	\$767	\$1,017	\$1,267	\$1,517	
6	\$1,117	\$1,417	\$1,717	\$2,017	
7	\$1,467	\$1,817	\$2,167	\$2,517	

### Analysis For 8t/ha Budget

Yield T/ha	Price	\$350	\$400	\$450	\$500
	6	\$725	\$1,025	\$1,325	\$1,625
7	\$1,075	\$1,425	\$1,775	\$2,125	
8	\$1,425	\$1,825	\$2,225	\$2,625	
9	\$1,775	\$2,225	\$2,675	\$3,125	
10	\$2,125	\$2,625	\$3,125	\$3,625	

### Per Megalitre Analysis at 2.5MI/ha

Yield t/ha	Price	\$350	\$400	\$450	\$500
	3	\$27	\$87	\$147	\$207
4	\$167	\$247	\$327	\$407	
5	\$307	\$407	\$507	\$607	
6	\$447	\$567	\$687	\$807	
7	\$587	\$727	\$867	\$1,007	

### Per Megalitre Analysis at 4.5MI/ha

Yield t/ha	Price	\$350	\$400	\$450	\$500
	6	\$161	\$228	\$295	\$361
7	\$239	\$317	\$395	\$472	
8	\$317	\$406	\$495	\$583	
9	\$395	\$495	\$595	\$695	
10	\$472	\$583	\$695	\$806	

Labour input has not been included in either gross margin. It is assumed that labour requirement is a fixed cost of both farming operations.

Fuel costs have not been included in the harvesting section of either gross margin. Whilst we would expect that fuel use would be more during cotton picking than wheat harvesting, it would not be enough to radically alter the gross margin.

Input costs used in these gross margins are correct at time of publication. This does not discount the fact that individual costs may vary post printing and within different farming operations.

## Conclusion

Ultimately the decision on the mix of winter wheat and summer crops will be different for every farming operation. From the perspective of using on-farm water to reduce evaporation, getting cash flow, and providing valuable organic matter, wheat is an excellent prospect.

However, biotechnology available to cotton growers such as Bollgard II® and Roundup Ready® incorporated in the world's highest yielding cotton varieties has allowed cotton production to not only improve but also be more stable. Cotton provides an excellent option to maximise returns per hectare, but more importantly on a megalitre basis also.



**Table 4: Calender of Operations for Irrigated Cotton**

Month	Operation	Description	Rate	Cost	Notes	Cost/ha
April	Fertiliser	P&K Blend	100 kg/ha	\$1,200.00		\$120.00
		Spreader			with above	\$10.00
	Cultivation	Listering				\$45.00
	Fertiliser	Anhydrous Ammonia	150 kg N/ha	\$1,066.00	with above	\$195.00
July	Herbicide	Glyphosate	1.5 l/ha	\$12.75		\$19.12
		Surpass	1.4 l/ha	\$5.10		\$7.14
		Application			with above	\$6.00
September	Herbicide	Glyphosate	1 l/ha	\$12.75		\$12.75
		Application			with above	\$6.00
	Cultivation	Cultipacker				\$15.00
October	Planting	Planting Seed	12 kg/ha	\$7.00		\$84.00
	Insecticide	Lorsban	500 ml/ha	\$9.00		\$4.50
		Sowing			with above	\$30.00
	Consultant	Consultant				\$45.00
	Irrigation	Water up	1.5 Ml/ha			\$45.00
November	Herbicide	Roundup Ready Herbicide	1.5 kg/ha	\$21.91		\$32.86
		Application			with above	\$6.00
December	Herbicide	Roundup Ready Herbicide	1.5 kgs/ha	\$21.91		\$32.86
		Application			with above	\$6.00
	Cultivation	Excel (Light chipping if requires)				\$25.00
	Irrigation	First in-crop	1.0 Ml/ha			\$30.00
	Herbicide	Diuron	1.5 kgs/ha	\$10.75	80% Band	\$13.05
		Gesagard	2.2 l/ha	\$13.25	80% Band	\$23.32
January		Application			with above	\$12.00
	Insecticide	Fipronil	60 ml/ha	\$325.00	80% Band	\$15.60
		Application			with above	\$8.00
	Irrigation	Second in-crop	1.0 Ml/ha			\$30.00
	Fertiliser	Urea	50 kg N/ha	\$650.00	with above	\$70.65
	License	Bollgard II®		\$300.00		\$300.00
		Roundup Ready Flex®		\$75.00		\$75.00
February	Irrigation	Third in-crop	1.0 Ml/ha			\$30.00
	Irrigation	Fourth in-crop	1.0 Ml/ha			\$30.00
	Insecticide	Steward	700 ml/ha	\$59.00		\$41.30
		Fipronil	60 ml/ha	\$325.00		\$19.50
		Application			with above	\$25.00
March	Irrigation	Fifth in-crop	0.75 Ml/ha			\$22.50
	Irrigation	Sixth in-crop	0.75 Ml/ha			\$22.50
	Insecticide	Dimethoate	500 ml/ha	\$8.20		\$4.10
	Defoliation	Dropp Ultra	150 ml/ha	\$70.00		\$10.50
		Prep	1.5 l/ha	\$8.75		\$13.13
		Spray oil	2 l/ha	\$2.15		\$4.30
		Application			with above	\$25.00
	Defoliation	Dropp Ultra	150 ml/ha	\$70.00		\$10.50
		Prep	2 l/ha	\$8.75		\$17.50
	Spray Oil	2 l/ha	\$21.50		\$4.30	
	Application			with above	\$25.00	
April	Harvest	Contract Picking				\$320.00
	Haulage	Contract Haulage @50km haul				\$83.00
	Mulching & Root cut	Contract				\$50.00
May	Ginning	Contract Ginning				\$537.00
	Levies					\$44.00
	Refuge Crop	Pigeon Peas @ 5%				\$22.00
	Centre Bust					\$35.00
<b>Variable costs</b>						<b>\$2,720.98</b>

**Table 5: Calender of Operations for Irrigated Wheat**

						Cost/Ha	Cost/Ha
Month	Operation	Description	Rate	Costs	Notes	5T / Ha	8T / Ha
April	Cultivation	Listering				\$45.00	\$45.00
	Fertiliser	Anhydrous Ammonia	100 kg N/ha	\$1,066.00	with above	\$130.00	\$130.00
	Cultivation	Scarify/cultipacker				\$15.00	\$15.00
May	Herbicide	Glyosphosate	1.5 l/ha	\$12.75		\$19.12	\$19.12
		Cadence	300 g/ha	\$48.50		\$14.55	\$14.55
		Application			with above	\$6.00	\$6.00
June	Irrigation	Pre Irrigate	1.5 ML/ha			\$45.00	\$45.00
	Sowing	Planting Seed @ 100kg/ha	100 kg/ha	\$1,100.00		\$120.00	\$120.00
		Seed dressing Premis	100 ml/ha	\$28.00	with above	\$2.80	\$2.80
	Fertiliser	Starter Z	100 kg/ha	\$1,280.00	with above	\$128.00	
	Fertiliser	Starter Z	105 kg/ha	\$1,280.00	with above		\$192.00
	Sowing				with above	\$30.00	\$30.00
	Consultant	Consultant				\$45.00	\$45.00
July	Herbicide	Axial	250 ml/ha	\$101.60	25% of crop	\$6.12	\$6.12
		Application				\$6.00	\$6.00
	Herbicide	Ally,	5 g/ha	\$105.00		\$0.53	\$0.53
		LVE MCPA	1.1	\$8.75	with above	\$9.62	\$9.62
		Application			with above	\$6.00	\$6.00
September	Fungicide	1lt Bayleton	1 l/ha	\$7.50		\$7.50	\$7.50
		Application			with above	\$25.00	\$25.00
	Irrigation	First In-crop	1.0 ML/ha			\$30.00	\$30.00
	Fertiliser	Urea – with Irrigation	50 kg N /ha	\$650.00	with above	\$70.50	
			100 kg N /ha	\$650.00	with above		\$141.30
October	Irrigation	Second In-crop	1.0 ML/ha				\$30.00
	Fertiliser	Urea – with Irrigation	50 kg N /ha	\$650.00	with above		\$70.50
	Irrigation	Third In-crop	1.0 ML/ha				\$30.00
November	Harvest	Contract @\$13/T				\$65.00	\$104.00
		Chaser Bin				\$11.00	\$11.00
	Cartage	@ 50km haul at \$25/T				\$125.00	\$200.00
	Levies	@1.02% of Value				\$20.40	\$32.64
<b>Variable Costs</b>						<b>\$983.14</b>	<b>\$1,374.68</b>

## Disclaimer

In the production of this document we have strived to be as accurate as possible with our figures and consistent across both commodities. Every effort has been made to provide accurate information. It is understood that commodity and input prices are subject to change and that prices quoted within this document are best estimates as of March 2008. It should be understood that by design this document is general in nature and the reader should seek further information for their own individual circumstances.

# Further Information

## The Web

[www.csd.net.au](http://www.csd.net.au)



## Your Local Extension & Development Agronomist



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