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***Economic Impacts from Coal Seam Water on
Agricultural Enterprises***

Case Study: Chinchilla District, Queensland

David Monckton

Contributed presentation at the 60th AARES Annual Conference,
Canberra, ACT, 2-5 February 2016

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Economic Impacts from Coal Seam Water on Agricultural Enterprises

Case Study : Chinchilla District, Queensland

David Monckton

*School of Agriculture and Food Sciences,
University of Queensland*

The Issues

- Farmers won't necessarily use CSW
 - Economic benefits difficult to predict
 - What is best use of CSW on farm?
 - Who made the most profit?
 - How extensive is the benefit?
 - Can/should this be repeated?
-

Research Method

- Literature review
 - Farm interviews
 - Economic model of farm gross margins;
 - Farmers who refused CSW
 - Substitution of other water with CSW
 - New enterprises using CSW
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Literature Review

UQ Library catalogue - 9 search engines

General search;

- 85 journals – 39 referenced
 - 135 government – 51 referenced
 - 76 industry documents – 43 referenced
-



Scope

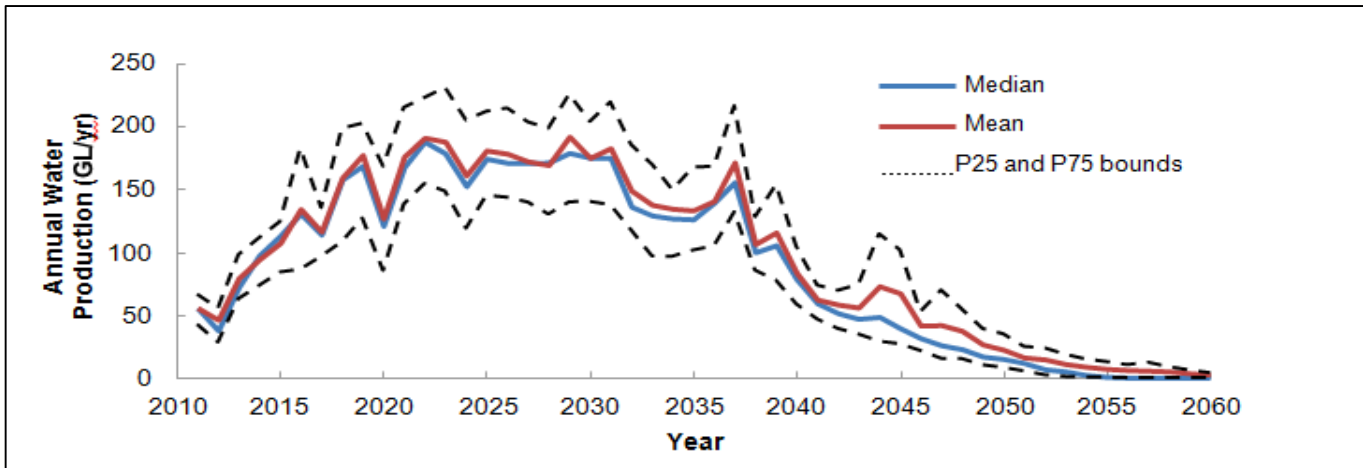
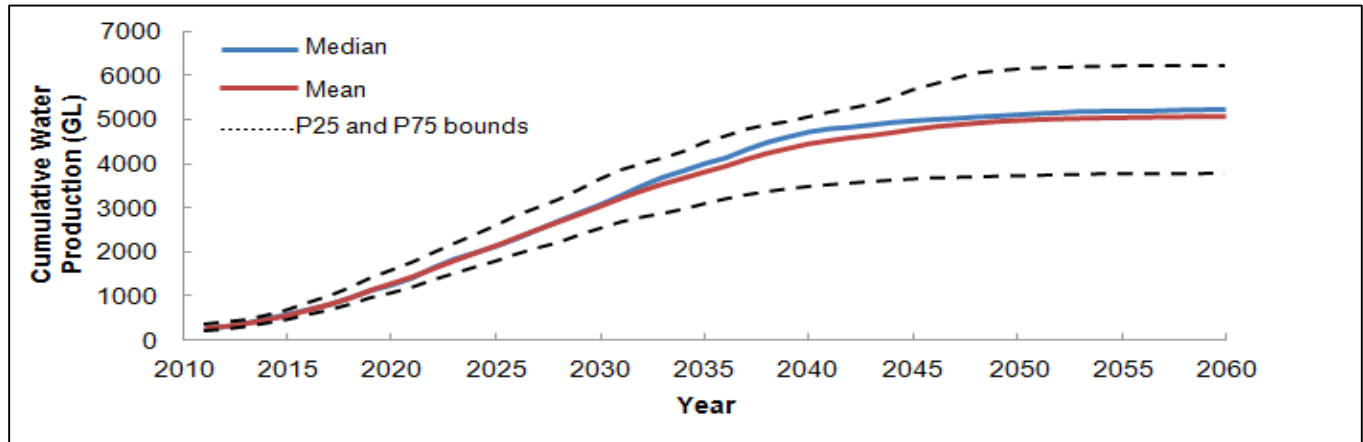
In scope:

- How much water is available
- How landholders decide whether or not to use CSW
- Which irrigators gained most benefit
- What factors are necessary to optimise profit

Out of scope:

- Impact on groundwater sustainability
 - Impact on the environment
 - Distribution and equity issues
 - Best options for disposal
-

CSW Production Forecasts for Queensland



CSW Treatment Plant Capacities in Chinchilla District

Plant	Company	Capacity MI/day	Treated CSW Capacity MI/day
Kenya	QGC	90	85
Talinga/Condabri	APLNG	60	55
Orana	APLNG	NA	NA
Ironbark	Origin	NA	NA
Tipton, Daandine	Arrow Energy	60	55

Source: APLNG 2012, Arrow 2014, QGC 2013

NVivo Analysis

In-depth Interviews:

Type	Number	Average time
Farmer with CSW	14	2 hours 15 minutes
Farmer without CSW	9	3 hours 5 minutes
Expert commentator	13	1 hour 45 minutes
<u>Total:</u>	36	2 hours 10 minutes



Case Studies

Three case study farm types

1. Dryland farmers and graziers
 2. Irrigators who replaced other water with CSW
 3. New enterprises
-



Economic Modelling

Partial budget

- $PB_{csw} = GM_{csw} - IC_{csw} - GM_{bc/oi}$

Net Present Value

- $NPV = \sum (\text{Net Period Cash Flow} / (1+R)^T) - \text{Initial Investment?}$

APSIM

- 5 x 20 year climate simulations
-



Farm Gross Margin

Farm type	Before CSW Gross Margin \$/ha	After CSW irrigation Gross Margin \$/ha	Water efficiency \$/ML
Dryland grazing	10	47	95
Dryland cropping	878 (sorghum)	2992 (cotton)	598
Irrigation	1234 (sorghum)	2992 (cotton)	598
New enterprise: • lucerne • feedlot	- -	3705 3951	617 658

Research Results

Dryland farmer/graziers:

- Farmers doing better than graziers depending on season
 - Both groups making more from CSG well compensation than farming/grazing
 - Both groups significantly improved income with CSW irrigation
-



Research Results

Irrigators:

- CSW preferred water source based on reliability and price
 - Shift from sorghum to cotton to improve gross margin
 - Highest gross margin for existing irrigator based on use of existing infrastructure
-



Research Results

New enterprises:

- Lucerne growers doing even better than cotton
 - New enterprise cattle feedlots better again
 - Lucerne and silage value-add to feedlots
 - Most integrated feedlots making highest \$/AE
-



Results: Beneficial Use of CSW, Chinchilla District, 2015

Beneficial use	Number of customers	Annual Water Use (ML)	Percent of Total
Irrigated crops	17	23106	39.2
Lucerne and feedlot	7	14715	25.0
Fish farming	1	282	0.5
Human consumption	1	2750	4.7
Stream release	1	4900	8.3
Industrial	7	13177	22.4
Total:	34	58930	100.0



Conclusion

- Dryland graziers and farmers on Western Downs struggle on farm income alone
 - Irrigators who switched to CSW made highest gross margin and NPV/ha because no “initial capital”
 - Largest new enterprises made highest NPV with highest water efficiency and gross margin.
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Questions?



NPLNG water supplied to private irrigator in study area



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