

Working with regional natural resource management bodies to improve water management

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Introduction

A new relationship between the Cotton Industry and Regional Natural Resource Management (NRM) bodies has successfully capitalised on the implementation of NRM Best Management Practices within cotton catchments. The Regional NRM bodies' co-investment with research organisations such as the Cotton Catchment Communities CRC (Cotton CRC) enables them to align their on-ground investment to the latest research, to gain greater access to technical specialists and gives them credibility when working with growers. From an industry perspective it enables incentive funding by Regional NRM Bodies to be directly linked to the farming systems in order to achieve both production and catchment outcomes. As a result these partnerships link incentives and support available, to farmer's practical management changes. This accelerates the implementation of best management practices on cotton farms and enables the industry to demonstrate to the broader community its responsible stewardship of these resources.

This paper presents two examples of how these partnerships work to improve water management and highlights some of the catchment and industry outcomes that can be obtained from such partnerships.

Partnership 1

Namoi Catchment Management Authority / Cotton CRC

In 2006, the Namoi CMA and Cotton CRC signed a three year partnership agreement to deliver natural resource outcomes within cotton growing areas of the Namoi catchment. The partnership has six programme areas under the agreement including; information collation, capacity building, improving water use efficiency and soil health, delivering BMP, on-ground incentives and benchmarking & monitoring. A common theme across many of these areas is improving water use efficiency to deliver both production and environmental outcomes. In order to achieve this, the partnership has worked to provide Namoi cotton growers with the capacity to implement water use efficiency best practice on farm through access to:

1. Technical resources and advice;
2. Training and education; and,

3. Financial assistance to undertake on-ground activities on farm which implement best management practice.

In order to deliver technical resources and advice to Namoi cotton growers, the Namoi CMA has firstly co-invested with the Cotton Industry (Cotton CRC, Cotton Australia and Cotton Research and Development Corporation) to employ technical staff, which includes a Catchment Officer, BMP Officer and Irrigation Officer. In addition, the Namoi CMA has purchased technical equipment needed to assist the Irrigation Officer develop demonstration sites on farms.

Secondly, to improve grower training and education in water use efficiency practices, the Namoi CMA has worked with the industry to align its on-ground incentive projects with the Cotton CRC's 'Irrigated Cotton and Grains' workshop series. Growers were encouraged to attend relevant training modules of this series as a part of receiving incentive funding to make on-ground water use efficiency improvements.

The third and most significant area of co-investment has been in the implementation of actual on-ground works. Using an application process, growers were encouraged to submit projects that would lead to improved water use efficiency. The criteria and guidelines for investing in these on-ground projects were determined through consultation with Namoi CMA representatives, industry irrigation experts and local consultants. All projects needed to be able to benchmark current water use and irrigation efficiency, implement management changes and evaluate the efficiency gains of those management changes. Applicants were competitively assessed based on water potential water savings (either percentage saved and/or actual megalitres), the groundwater zone the grower was located in (high priority zones receiving more money) and the number of hectares that the water savings would be made across.

Outcomes

Using this multi-pronged approach, the partnership has seen the water use efficiency skills and knowledge of growers and consultants increase through; access to technical information, participation in training and education programmes and financial assistance to implement on-ground changes. Over the last two years, 80 growers have participated in the Cotton CRC's 'Effective Irrigation Knowledge Management Systems' training workshop series, 20 growers, consultants and industry staff have participated in the Cotton CRC's groundwater systems workshop (funded by the Department of Agriculture Fisheries and Forestry (DAFF)) and 15 growers have successfully accessed incentive funds to implement on-ground changes.

Through the last component of the partnership, in excess of \$1.2 million of Cotton CRC, Namoi CMA and cotton grower contributions have been invested in improving water use efficiency practices on the cotton farms in the Namoi catchment. The types of activities invested in include the:

- installation of monitoring equipment such as soil moisture probes and storage seepage/evaporation equipment (Plate 1 &2);
- purchase of software to measure and evaluate in-field and delivery system efficiencies, and
- on-ground works such as laser levelling, lining of channels, earthworks in storages and EM surveys to better match soil type to irrigation scheduling.



Plate 1 Wee Waa AIMS consultant Mitch Carter installing Irrimate storage evaporation meter



Plate 2 Cotton grower Paul Hawkins from 'Willawah' Wee Waa with soil moisture C-probe.

Table 1 summarises the financial contributions made by both the Namoi CMA and the participating growers as well as the number of megalitres saved through implementing these practices. On average, farms have improved their water use efficiency by 15% and this equates to at least 5000 megalitres of saved water over 8000ha of irrigated cropping land, all of which is now managed under best practice.

At first, uptake of the incentive funding was slow in the valley due to limited availability of the region's Irrigation Officer, in addition to a small number of private consultants with the technical expertise to assist growers with the development of water use efficiency projects. Without the technical support needed, growers struggled to determine what their potential water savings would be. However, the continuation of the drought and water entitlement cutbacks has seen growers put much more emphasis on improving water use efficiency and demand a different set of expertise and services from their consultants. More recent water use efficiency funding has also seen much more collaboration in developing individual projects with local grower consultants. In the end, interest from growers in undertaking water use efficiency incentive projects has far exceeded available funding.

Namoi WUE whole farm projects	Namoi CMA contribution (\$)	Grower Contribution (\$)	Total project Contribution (\$)	Hectares of irrigation (Ha)	Megalitres saved (ML)	WUE improvement (%)
1	50 645	49 125	99 770	770	440	20
2	41 800	43 384	85 184	326	200	20
3	40 700	15 840	56 540	340	184	15
4	56 400	52 940	109 340	500	700	20
5	57 860	43 780	101 640	640	300	20
6	51 220	33 370	84 590	400	500	20
7	38 900	25 615	64 515	487	250	15
8	54 500	29 832	84 332	851	589	15
9	76 293	50 205	126 498	1 721	600	10
10	24 750	1 800	26 550	454	-	15
11	19 480	5 120	24 600	420	200	15
12	40 000	342 500	382 900	650	540	-
13	12 775	1 000	13 775	230	230	-
14	20 500	16 500	37 000	277	-	10
15	12 362	8 756	21 118	398	-	15
TOTAL	598 185	719 767	1 318 352	8 464	4 733	N/A

Table 1. Namoi CMA and grower investments and outcomes from on-ground water use efficiency projects.

Partnership 2.

Condamine Alliance / Cotton CRC

In 2007, Condamine Alliance and the Cotton CRC, through funding from the DAFF project “Natural Resource Management Delivery in the Australian Cotton Industry”, initiated a \$150 000 project to address the low adoption of water use efficiency best management practices within the Condamine catchment. At the time, adoption of water use efficiency best management practices within the Condamine catchment was approximately 10% of the industry and this low adoption rate was attributed to a range of factors including:

- A lack of grower and consultant knowledge and skills in regards to water use efficiency best management practices;
- A lack of clear evidence for the economic, production and environmental benefits of improved water use efficiency; and

- The need for some financial assistance to help consultants and growers up-skill and implement water use efficiency best management practices.

The project aimed to address these barriers and the low adoption rate through firstly; engaging with and developing the skills of both the cotton consultants who service the industry and their grower clients, secondly; undertaking an economic evaluation of the benefits of adopting various water use efficiency practices, and finally; providing some incentive funding to assist growers to have water use efficiency evaluations undertaken on their properties by consultants. An expected outcome of the project was that the skills and knowledge transferred to the cotton consultants and their grower clients as a result of this joint investment would continue to deliver environmental and economic outcomes beyond the life of the project.

Sarah Hood was engaged through Cotton Australia to deliver the 10 month project which used a 'Participatory Action Research' (PAR) approach. This involved researchers and extension staff working closely with consultants and growers in a mentoring capacity to achieve:

- a further 10% of land under irrigated cotton in the Condamine Catchment utilising best management practice in water use efficiency (representing 2000 ha);
- a 10% increase in the number of growers with the skills and knowledge in water use efficiency principles and application (representing 20 growers);
- a 25% increase in the number of Cotton Consultants with skills and knowledge in water use efficiency principles and application (representing 5 consultants);

Additionally Gretchen Carrigan and Rod Strahan from Queensland Department of Primary Industries and Fisheries were engaged to undertake an economic evaluation of the proposed water use efficiency changes that were recommended to participating growers throughout the life of the project.

Outcomes

Using the PAR approach and actively linking into and utilising other existing government and industry projects such as the Queensland 'Rural Water Use Efficiency Initiative Phase 3' project, the Cotton Industry's 'BMP Programme' and the Cotton CRC's 'Effective Knowledge Management Systems' project, the project team was able to deliver a range of outcomes including:

- 2344ha of irrigated cotton land within the Condamine Catchment now utilising best management practice in WUE;
- a 25% increase in the number of cotton consultants and a 6.5% increase in the number of growers with skills and knowledge in WUE principles and application (these figures are expected to increase in the future as a post project interview of participating consultants found that they felt they had developed confidence, knowledge and skills to deliver further advice to their wider client base which consist of another 100 growers across the Condamine Catchment).
- estimated water savings of 0.15ML/ha to 0.72ML/ha for the 13 participating farmers.

The economic analysis also found that the recommended changes resulting from each grower's water use efficiency evaluation would result in a positive return on investment for the grower. Examples of the range of proposed changes, the level of required capital investment by the grower, the net present value of the investment and the pay off period are shown in Table 2.

Proposed change	Capital Investment (\$)	Net Present Value (\$)	Pay off Period (years)
Siphon flow rate	6 200	104 000	1
Storage check, dam meter	5 000	68 500	1
Storage check + earthworks	55 000	18 400	11
Storage check, dam meter	10 000	26 025	3
Earthworks	50 000	103 000	4
Lateral move (installation)	325 000	270 000	7
Lateral move (systems check)	2 000	32 000	1

Adapted from: S Hood, G Carrigan & R Strahan (2008) 'Delivering increased adoption of best management practices in water use efficiency to the Cotton Industry in the Condamine Catchment' Cotton CRC / Condamine Alliance Final Report.

Table 2 Selected examples of the capital costs of WUE practice change, the net present value and the payoff period.

Conclusions

These case studies are examples of how the Australian Cotton Industry and Regional NRM Bodies can collaborate to improve water management and achieve both production and environmental outcomes. Improving water use efficiency leads to not only decreased deep drainage, reduced water logging and reduced risk of salinisation from a catchment health perspective but also the production of more bales per megalitre and compliance with industry best practice guidelines.

The case studies also demonstrate how the delivery of financial NRM incentives within a structured extension program linked to industry best practice, and backed by economic data on production and environmental benefits, can provide a catalyst for the permanent adoption of new and developing technologies. More importantly, collaboration creates a more efficient use each organisation's resources and greater synergies between the organisations.