

COTTON RESEARCH AND DEVELOPMENT CORPORATION

An Economic Analysis of Investment to Support and Coordinate a Highly Trained, Efficient and Effective Cotton Extension Team

Background

The Cotton Research and Development Corporation (CRDC) commissioned BDA Group in July 2009 to undertake a benefit cost analysis of three randomly selected sub-programs across their 2003/04 to 2007/08 research and development portfolio. These analyses form part of a wider assessment of the return from rural research that is being conducted by the Council of Rural Research and Development Corporation Chairs.

Over the period 2003/04 to 2007/08 one of CRDC's main investment programs was "People and Knowledge". The objective of this program was to improve the capacity of industry and the community to use knowledge and innovations gained through research and development and to support a continuing culture of innovation in the industry and viability of rural communities. This program had 7 sub-programs that were aimed at building skills across extension staff and industry members; the ongoing development of tools, packages and decisions support systems to foster the rapid uptake of new technologies; supporting the development of opportunities for women in the industry; supporting the adoption of appropriate OH&S work practices; and facilitating effective coordination and partnerships with R&D providers, industry and community organisations.

CRDC's investment in sub-program, 1.1 was aimed at supporting and coordinating a highly trained, efficient and effective cotton extension team. The extension team works collaboratively with growers and other industry personnel to aid the early adoption of research outcomes. This sub-program is the focus of this evaluation.

The Projects

There were 38 projects funded in sub-program 1.1 between July 2003 and June 2008. Research partners included the Australian Cotton Cooperative Research Centre, NSW Department of Primary Industries, Queensland Department of Primary Industries, Bill Gordon

Consultancy, CSIRO Plant Industry, Land and Water Australia and Rural Industries Research and Development Corporation.

Between 2003/04 and 2007/08 CRDC and partners invested just under \$6m in total, as reported in Table 1. Across the 38 projects CRDC has contributed 40% of funds in nominal terms. Investment projects all commenced in 2003/04 except for nine projects that were carried in from previous years. These were for several Industry Development Officers and the national Cotton Extension Coordinator. Most of the investment (64%) was made in the first and last year with a major review of extension activities occurring in early 2005. Most of the 2007/08 investment projects will be funded in 2008/09 and beyond.

Table 1: CRDC and Partner Investment (nominal \$)

Year	CRDC Investment	Partner Investment	Total
2004	\$851,777	\$764,844	\$1,616,621
2005	\$124,701	\$220,773	\$345,474
2006	\$375,135	\$473,808	\$848,943
2007	\$220,544	\$717,386	\$937,930
2008	\$798,890	\$1,410,650	\$2,209,540
Total	\$2,371,047	\$3,587,461	\$5,958,508

Note: Year refers to year ending June.

Outputs and Outcomes

Investment funds have largely been used to support extension services to cotton growers, consultants and the broader community. In the early years investment funds were used to support individual Industry Development Officers (IDOs) who worked in specific cotton growing areas, such as the Lower Namoi, Border Rivers and St George. In latter years investments funds were still largely used to support extension staff in each of the main cotton growing areas but specialist positions and activities were also supported (such as Healthy Soils, Silverleaf Whitefly, Water Use and Spray Drift).

Extension staff undertake many activities, largely acting as information brokers between researchers and industry. Specific outputs can be grouped as¹:

- (1) ***Trials and demonstrations*** – support provided to growers and researchers in undertaking farm trials as part of cotton research and development activities.
- (2) ***Group work*** – including support of Area Wide Management groups and regional reference groups as well presentations to and liaison with local government and other community groups.
- (3) ***Information delivery*** – including field days, and farm walks, media coverage and extension specific media such as the *Cotton Tales* newsletter.
- (4) ***Training*** – including support for formal training courses provided to industry and other issue specific workshops.

Investments made under sub-program 1.1 should ideally be considered as part of the broader investment by CRDC and partners in technology adoption. While investments made under this sub-program will, to some extent, accelerate the take-up of technologies across the cotton industry these outcomes have been considered in the evaluation of specific technologies². Attributing these outcomes here would serve to double count outcomes across CRDC's investment portfolio. To avoid this double counting problem sub-program 1.1 has been assessed in terms of the value of information provided through it to cotton growers, consultants and the wider community. This is a reasonable approach given that extension staff largely act as information brokers rather than as generators of new information. This approach would also seem reasonable on the basis that both cotton growers and consultants value the extension activities noted above rather than the use of extension staff to drive the assessment and implementation of new technologies on farm³.

There are four groups that access information available through the extension team. These include cotton growers, cotton consultants, researchers and associated community groups. The counterfactual can be considered in terms of other pathways that these groups would use

¹ These groups were listed in the Final Report for the Border Rivers IDO position for the period July 2004 to June 2005. Other final reports provided to BDA Group indicated that the work of extension staff could broadly be described in terms of the groups noted for the Border Rivers IDO.

² Evaluations were carried out last year by BDA Group for the CRDC as part of a broader review carried out by the Council of Rural Research and Development Corporation Chairs.

to access the information that they require. Without the extension team people would have to use more traditional methods of obtaining relevant information and keeping up to date, as is the case for most non-agricultural related business activities in Australia. This might include subscriptions to research and industry publications or engagement of appropriate people on a short term basis. It is unlikely that industry and community groups would not use other sources to access information. The level of education and experience across the industry is high and industry members are well placed to assess the value of information they access. Over 60% of growers have a Certificate qualification or higher and over 40% have been in the industry for over 21 years. Consultants are typically independent (70%) agents with over 70% holding a Bachelor degree or higher⁴.

Benefits

Benefits can be described in terms of the costs that would otherwise be incurred by different groups to obtain the information that they require. Economic benefits are described in terms of cost savings to cotton growers and social benefits are described in terms of costs savings to consultants, researchers and broader community groups. It is unlikely that there would be any direct environmental benefits. A summary of sub-program benefits is presented in Table 2 and discussed in the following sections.

Table 2: Benefits (current \$)

Year	Economic	Social	Total
2004	\$652,000	\$1,958,400	\$2,610,400
2005	\$652,000	\$1,958,400	\$2,610,400
2006	\$652,000	\$1,958,400	\$2,610,400
2007	\$652,000	\$1,958,400	\$2,610,400
2008	\$652,000	\$1,958,400	\$2,610,400

Note: Year refers to year ending June.

³ CRDC Annual Report 2005/06 Figures 12 & 13 – Consultants and growers prioritisation of regional extension services and value placed on extension services.

⁴ Western Research Institute Survey of Cotton growers and consultants 2008.

- **Economic**

There is no data on the costs that cotton growers would have otherwise incurred in the absence of the CRDC supported extension team. The possible magnitude of these costs has been estimated at, on average, \$960 per farm per year.

Based on final reports to CRDC it was estimated that there are approximately 100 growers for every extension officer. Each extension officer has around 1,600 hours each year that they can direct at different extension activities, with 200 hours directed at administration and travel. Further, assuming that 25% of an extension officers time is directed at cotton growers, each cotton grower would have access to, on average, some 4 hours a year of an extension officers time. Because it is unlikely that individual growers would achieve the same effectiveness in accessing information as extension staff can it was assumed that the growers would need to allocate 8 hours to achieve the same level of information access. Using a consultant cost of \$120 per hour growers would need to invest \$960 each to obtain the same service that the extension team currently provides to them. Across 680 cotton growers the total industry cost would be \$652,800 a year.

- **Social**

Social benefits include benefits that accrue to non-cotton growers. This includes researchers, farm consultants and the wider cotton community. Assuming non-cotton growers would need to allocate time on the same basis as cotton growers to obtain the information they require the total cost incurred would be nearly \$2m a year.

Results

All costs and benefits were expressed in current dollars using the CPI. A discount rate of 5% was used from the commencement of the CRDC investment in 2003/04.

Investment criteria were estimated for the both total investment and CRDC investment alone⁵. Results are presented in Table 3. Only the “0 year” or up to the end of 2008/09 criteria are presented as benefits are generated in the same year that costs are incurred. Also, the internal rate of return is not reported as benefits exceed costs in each year.

Table 3: Investment Criteria for Total Investment

Criterion	0 years
Present value of benefits (\$m)	\$11.30
Present value of costs (\$m)	\$5.46
Net present value (\$m)	\$5.83
Benefit cost ratio	2.07

Table 4: Investment Criteria for CRDC Investment

Criterion	0 years
Present value of benefits (\$m)	\$1.15
Present value of costs (\$m)	\$2.22
Net present value (\$m)	-\$1.08
Benefit cost ratio	0.52

The results show that the benefits to cotton growers on CRDC’s investment has been less than the costs incurred and that the main benefits accrue to non-cotton growers.

Sensitivity Analysis

Sensitivity analysis was carried out on the assumed cost that cotton growers would incur to achieve the same level of services provided to them as they received under the CRDC supported extension team between 2003 and 2008. Results are reported in Table 5. Two scenarios were considered a cost saving of, on average, (1) \$2,000 per farm and (2) \$3,000 per farm. The return to CRDC was found to be somewhat sensitive to the assumed cost saving

⁵ Following ACIL evaluation guidelines, benefits to CRDC were taken as the returns to cotton growers adjusted in proportion to their share of total investment across all partners.

to cotton growers with the break-even saving estimated at close to \$2,000 per farm. While the precise value of the extension team to cotton growers is unknown the duplication and loss of efficiency in accessing information if growers were to undertake this themselves is unlikely to be more than a factor of 3 or 4 as growers regularly use consultants and other sources of information, and hence returns to the CRDC are likely to be modest even under higher cost savings than assumed in this analysis.

Table 5: Sensitivity of CRDC investment return to a higher cost saving for cotton growers.

Criterion	Base Assumptions	\$2,000 per farm	\$3,000 per farm
Present value of benefits (\$m)	\$1.15	\$2.40	\$3.60
Present value of costs (\$m)	\$2.22	\$2.22	\$2.22
Net present value (\$m)	-\$1.08	\$0.17	\$1.37
Benefit cost ratio	0.52	1.08	1.62

Conclusion

CRDC investment in Sub-Program 1,1 was mainly aimed at providing an effective information broking service to cotton growers, consultants and the wider community. The return to the CRDC was estimated to be modest with the real value of the investment accruing to non-cotton growers. However, it was recognised that the extension team also provides support to the adoption of new technologies and as the benefits of this support was excluded in this evaluation, evaluation results will understate the actual returns that have been generated.