Cross-RDC Impact Assessment and Performance Reporting Update

Stage 1:
Cross-RDC Impact Assessment for the Period
1 July 2009 to 30 June 2015

FINAL REPORT

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Prepared For

The Council of Rural Research and Development Corporations

Submitted By

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Glossary of Economic Terms

Cost-benefit analysis:	A conceptual framework for the economic evaluation of projects and programs in the public sector. It differs from a financial appraisal or evaluation in that it considers all gains (benefits) and losses (costs), regardless of to whom they accrue.
Benefit-cost ratio:	The ratio of the present value of investment benefits to the present value of investment costs.
Discounting:	The process of relating the costs and benefits of an investment to a base year using a stated discount rate.
Internal rate of return:	The discount rate at which an investment has a net present value of zero, i.e. where present value of benefits = present value of costs.
Investment criteria:	Measures of the economic worth of an investment such as Net Present Value, Benefit-Cost Ratio, and Internal Rate of Return.
Modified internal rate of return:	The internal rate of return of an investment that is modified so that the cash inflows from an investment are re-invested at the rate of the cost of capital (the re-investment rate).
Net present value:	The discounted value of the benefits of an investment less the discounted value of the costs, i.e. present value of benefits - present value of costs.
Present value of benefits:	The discounted value of benefits.
Present value of costs:	The discounted value of investment costs.

Acronyms and Abbreviations

ABS	Australian Bureau of Statistics
AECL	Australian Egg Corporation Limited
Agtrans	Agtrans Research and Consulting Pty Ltd
AMPC	Australian Meat Processor Corporation
APL	Australian Pork Limited
AWI	Australian Wool Innovation
BCR	Benefit-Cost Ratio
BSES	Bureau of Sugar Experiment Stations
CBA	Cost Benefit Analysis
CRDC	Cotton Research and Development Corporation
CRRDC	Council of Rural Research and Development Corporations
DAWR	Department of Agriculture and Water Resources
FRDC	Fisheries Research and Development Corporation
FWPA	Forest and Wood Products Australia
GDP	Gross Domestic Product
GRDC	Grains Research and Development Corporation
GWRDC	Grape and Wine Research and Development Corporation
Hort. Innovation	Horticulture Innovation Australia Limited
IRR	Internal Rate of Return
MIRR	Modified Internal Rate of Return
MLA	Meat and Livestock Australia
NPV	Net Present Value
PIRD Act	Primary Industries Research and Development Act
PVB	Present Value of Benefits
PVC	Present Value of Costs
R&D	Research and Development
RD&E	Research, Development and Extension
RDC	Research and Development Corporation
RIRDC	Rural Industries Research and Development Corporation
SRA	Sugar Research Australia
SRDC	Sugar Research and Development Corporation
USB	Universal Serial Bus (digital storage device)
WTP	Willingness to Pay

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Executive Summary

The Council of Rural Research and Development Corporations (CRRDC) commissioned the evaluation team, consisting of Agtrans Research and Consulting (Agtrans) in association with AgEconPlus Consulting and EconSearch, to conduct a Cross-Research and Development Corporation (RDC) Impact Assessment and Performance Reporting Update.

The project was undertaken in two stages carried out concurrently. Stage 1 was to review and report on existing impact assessment and performance information covering the period 1 July 2009 to 30 June 2015. Stage 2 set out to identify and develop a future framework for the collection and reporting of data and evidence of impact across the RDCs, building on the existing CRRDC Impact Assessment Guidelines and Procedures.

Cross-RDC impact assessment reports were published in 2008 and 2010. In 2011, a third cross-RDC impact assessment report was drafted but never published. As no aggregation of the RDC evaluations was undertaken over the 2010 to 2015 period, the CRRDC initiated the current cross-RDC aggregation to assess the collective impact of the combined RDC investment in research, development and extension (RD&E) over the 6-year period.

The evaluation team collected, and assembled data from, economic evaluation reports containing a total of 288 individual evaluations of various RDC RD&E investments carried out during the period 2010 to 2015. The individual 288 economic evaluations were conducted by at least 10 independent consultancies and represented 13 of the 15 RDCs. The investments evaluated in the submitted reports included single projects, project clusters (two or more projects grouped together for evaluation), and whole RDC programs or sub-programs. For the purpose of this analysis, all investments that were evaluated and recorded for the assessment are referred to hereafter as project clusters as per the CRRDC methodology.

For the purpose of the current Cross-RDC Impact Assessment, some of the 288 evaluations had to be excluded from the final population. Evaluations were included in the final population based on the following criteria:

- the evaluation must have been submitted during the assessment period, years ended 30 June 2010 to 2015 (project brief)
- the investment being evaluated must have been randomly chosen (CRRDC methodology requirement)
- the evaluation report had to include data for the total investment, as well as the RDC contribution to the total investment, for the project cluster (CRRDC methodology requirement)
- the individual evaluation report needed to include investment criteria results for net present value (NPV) and benefit-cost ratio (BCR) at 30-years after the last year of investment as per the CRRDC Impact Assessment Guidelines (CRRDC methodology requirement)

Based on the above criteria, the total population of 288 economic evaluations was reduced to a ‘hard cut’ population of 167 representing nine of the 15 RDCs.

The total present value of benefits (PVB) for the 167 project clusters evaluated across the 2010 to 2015 period was estimated at $6.3 billion (in 2015/16 dollar terms) with an aggregate present value of investment costs (PVC) of $1.4 billion, and a NPV of approximately $4.9 billion over a 30-year period.

The total nominal investment from all sources recorded for all 167 project clusters was estimated at $983 million, with the RDCs’ contributions to the total investment estimated at $432 million (across the nine RDCs represented in the hard cut population). The RDC contribution to the investment represents approximately 19% of the total RD&E expenditure of the nine RDCs (approximately $2.3 billion) over the six-year assessment period.

A comparison of the estimated RDC RD&E expenditure in the 167 project clusters ($432 million) against the total estimated investment in the clusters ($983 million) indicates an average leverage

ratio of approximately 1.27 to 1, meaning that for every $1 contributed by the RDCs, co-investment partners contributed, on average, $1.27 to the RD&E investment.

Several additional sensitivity analyses were carried out on the total population based on different sets of exclusion criteria in order to test the robustness of the above results. In general, the additional results generated were informative and were consistent with the results of the general aggregate analysis of the 167 project cluster evaluations.

Information on environmental and social impacts for each project cluster evaluated was also recorded in the data collection template. Qualitative data were summarised and analysed and the impacts were then grouped into seven environmental impact categories and seven social impact categories based on the frequency of the type of specific impacts identified. Of the 167 project cluster evaluations assessed, 118 reported one or more environmental impacts, and 149 reported one or more social impacts.

The Cross-RDC Impact Assessment process for 2010-2015 identified some issues to be considered for future assessments. These include a lack of continuing commitment to the CRRDC evaluation approach, inconsistent evaluation reporting (including neglect of adherence to a standardised process and inconsistent estimation of investment costs), absence of specific data on co-investment, loss of corporate memory, and limited reporting of cross-RDC collaborative investments.

Overall, the results of the 2010-2015 Cross-RDC Impact Assessment are highly positive and results demonstrate that the investment by the RDCs as a whole has been delivering significant benefits to Australia.

1. Introduction

The Council of Rural Research and Development Corporations (CRRDC) commissioned the evaluation team, consisting of Agtrans Research and Consulting (Agtrans) in association with AgEconPlus Consulting and EconSearch, to conduct a Cross-Research and Development Corporation (RDC) Impact Assessment and Performance Reporting Update.

The project was undertaken in two stages carried out concurrently. Stage 1 was to review and report on existing impact assessment and performance information reported during the period 1 July 2009 to 30 June 2015. Stage 2 set out to identify and develop a future framework for the collection and reporting of data and evidence of impact across the RDCs, building on the existing CRRDC Impact Assessment Guidelines and Procedures[1].

This report presents the findings of the evaluation team for Stage 1 of the Cross-RDC Impact Assessment and Performance Reporting Update 2010-2015. The analysis of the data collected has allowed a generalised assessment of the performance of the RDCs regarding their past investment.

[1] The CRRDC Impact Assessment Guideline and Procedures documents are available on the CRRDC website:
Procedures: http://www.ruralrdc.com.au/wp-content/uploads/2016/04/CRRDC-Impact-Assessment-Procedures-V.1-070514.pdf
Guidelines: http://www.ruralrdc.com.au/wp-content/uploads/2016/04/CRRDC-Impact-Assessment-Guidelines-V.1-070514.pdf

2. Context and Background

2.1 The Rural Research and Development Corporations

The Rural Research and Development (R&D) Corporations are a network of organisations which have been formed under a partnership between different agriculture, fisheries and forestry industries and the Australian Government to drive innovation and improvement in, and for, rural industries.

The RDCs provide a range of services to the industries that they support and are funded through a mix of Australian Government and industry contributions. Their particular role and place within the rural innovation system as investment managers, custodians of public and private funds, and service providers to industry and Government, means that there is a high regard for ensuring a strong focus on governance and accountability of funds being managed, on efficiency and effectiveness of process employed, and on delivering value and impact from activities.

Historically all of the RDCs were established as agencies of the government under Commonwealth legislation, the Primary Industries and Energy Research and Development Act 1989 (now the Primary Industries Research and Development (PIRD) Act). The Act outlines the expectations, functions, roles and responsibilities for the RDCs, including delivery of economic, environmental and social benefits to rural industries, rural and regional communities, and the nation, through strategic investments in research, development and technology transfer or adoption.

Over time many of the RDCs have transitioned to become independent, not-for-profit companies owned by the industries they serve. This has happened where industry has seen an opportunity to merge and streamline organisations and structures, and where flexibility was needed to provide services such as market development, market access and promotion. There are now 10 industry-owned company RDCs and five statutory corporations owned by the Commonwealth under the PIRD Act (Rural R&D Corporations, 2016).

The 15 RDCs include[2]:

Statutory bodies:

- Grains Research and Development Corporation (GRDC)
- Fisheries Research and Development Corporation (FRDC)
- Rural Industries Research and Development Corporation (RIRDC)
- Cotton Research and Development Corporation (CRDC)
- Wine Australia

Industry owned companies:

- Horticulture Innovation Australia Limited (Hort. Innovation)
- Meat and Livestock Australia (MLA)
- Dairy Australia
- Australian Wool Innovation (AWI)
- Sugar Research Australia Limited (SRA)
- Australian Pork Limited (APL)
- Australian Meat Processor Corporation (AMPC)
- Forest and Wood Products Australia (FWPA)
- Australian Egg Corporation Limited (AECL)
- Livecorp

[2] See Appendix 1: List of all 15 Current RDCs with Web Page Links for the complete list of RDCs with links to each of their associated web pages.

2.2 The Council of Rural Research and Development Corporations

The RDCs come together through the CRRDC which provides a leadership forum to discuss and work collectively on important issues. The role of the Council is to support and facilitate the RDCs working together to fulfil their broad purpose and deliver economic, environmental and social benefits for rural industries and the broader community.

The aims of the Council are to (Rural R&D Corporations, 2016):

- support, encourage and facilitate continual improvement in the delivery of efficient and effective services to rural industries and the community, particularly with regard to research, development, technology transfer and adoption
- effectively represent and position the Rural RDCs as participants in the rural innovation system
- influence national and rural innovation policy
- provide a unified voice for the RDCs on matters of national importance.

2.3 The Purpose of Cross-RDC Impact Assessment

The RDCs operate in an area of high visibility and consistently strong demand for accountability of expenditures, operations and results. RDCs undertake project, program and operational assessments and performance reviews in line with CRRDC impact assessment guidelines and the requirements of various contractual and regulatory arrangements with the Australian government.

Through the CRRDC, the RDCs need to refine, update and implement processes for collating and aggregating impact assessment and performance information to support communication of the results to relevant stakeholders. This includes exploring, assessing, combining and synthesising existing material and potentially identifying additional evaluation work required.

Generating and documenting evidence of impact and demonstrating performance of the RDCs as a collective is a key objective of the Council. The evaluation initiative also strongly aligns to the CRRDC's Stakeholder Engagement and Communications Strategy (2015-2017) that is currently being rolled out.

2.4 Summary of Methods and Findings from the 2008 and 2010 CRRDC Cross-RDC Impact Assessment Reports

December 2008 Report: Measuring economic, environmental and social returns from Rural Research and Development Corporations' investment

Method
In 2007, the CRRDC developed an evaluation framework for assessing the impact of RDC investments and their compliance with government requirements and priorities. The framework enabled independent estimates to be provided of the net benefits of cross-RDC investments, including achievements and industry benefits, relative to Government priorities. The purpose was to provide robust and objective information on the overall economic, social and environmental impacts produced by the RDC portfolio.

The methodology behind the framework had three elements:

1. Examination of the return of 36 specifically-selected highly successful projects (known as "hero" projects).

2. Examination of the returns of 32 randomly selected projects[3] from a pool of 600. These projects were chosen at random from the entire range of projects in order to provide an indication of the average return to Australia from the RDC investment.
3. Examination and evaluation of a sample of current RDC programs that involved collaboration and had a high level of public interest. Biosecurity was the first area to be selected for review and several biosecurity projects were evaluated.

Seven independent consultancies were commissioned by individual RDCs to undertake the evaluations.

Results
The 36 hero projects were estimated to generate returns of $10.5 billion from a $265 million investment by the RDCs and a $200 million contribution from other funding partners. RDCs initiated and managed all 36 projects.

Benefits estimated at $685.7 million (present value terms, 2007) from the 32 randomly selected projects resulted in a simple average benefit-cost ratio (BCR) of 11 to 1 after a period of 25 years.

A range of significant social and environmental benefits also were identified. These were distributed broadly to the Australian community.

January 2010 Report: Impact of Investment in Research and Development by the Rural Research and Development Corporations

Method
The framework for cross-RDC impact assessment set up in 2007 was intended to be an annual reporting process. The 2009 evaluation (January 2010 report) followed a similar methodology but emphasis focused on the random sampling component and did not include a repeat of the hero project component included in the 2008 report (though some specific investment clusters were described as case studies of various benefit types).

The goal of this second cross-RDC evaluation was to report on representative random sampling of project clusters from each RDC to build a pool of consistent cost-benefit analysis studies (CBAs) that could be used to provide an indication of the range and trends in returns from the total RDCs investments over a three-year period. Randomly selected project clusters were evaluated.

There were 59 project clusters evaluated in 2009 for the January 2010 report. The programs covered a broad range of RDC investments ranging across forestry, meat, fodder crops, dairy systems, soil biology and fisheries resource management. As well as covering a range of industry related topics, the programs also reflected the various stages across a wide spectrum of the innovation cycle within which the RDCs operate.

Results
The 59 individual project clusters evaluated in 2009 represented $676 million in RDC investments. It was noted that one project cluster, Northern Beef Research (an MLA co-investment with the Queensland Department of Employment, Economic Development and Innovation), made up $411 million or approximately 60%, of the total project cluster costs.

The total net present value (NPV) of all project clusters evaluated in 2009 was estimated at $1.9 billion over a 25-year period. Economic benefits included productivity gains, improved market outcomes, and improved quality systems.

The results showed a strong return on investment, with a simple average BCR estimated at 10.5 to 1 after 25 years, which was largely consistent with the simple average BCR results from 2008.

[3] In the context of the 2008 report 'projects' means a group of investments made to produce a particular R&D outcome. This can apply to an individual project or a group of projects with clearly defined innovation outcomes. Future reports refer to project clusters (one or more projects grouped for evaluation purposes) or programs.

The January 2010 report also included a weighted average BCR (weighted by total project cluster cost) to compare with the simple average BCR and help detect biases due to project size. The weighted average BCR for the total project net returns was estimated at 6.04 to 1 after 25 years.

Current, past and potential future cross-RDC evaluation frameworks are discussed in more depth in the Stage 2 report for the CRRDC Cross-RDC Impact Assessment and Performance Reporting Update.

2.5 Evaluation Post-2010

From the beginning of 2011 to the end of 2015 few changes in the evaluation framework were reported. Some RDCs developed specific CBA processes, partly driven by the earlier CRRDC requirements and partly as a means of reporting to industry and assisting with research management and priority setting. In 2011, a third cross-RDC impact assessment report was drafted but never published. An important change in this period was the implementation of Statutory Funding Agreements (SFAs) between the Department of Agriculture and Water Resources (DAWR) and the individual RDCs that require a regular, periodic performance assessment.

Over the current analysis period, 2010 to 2015, some RDCs have continued to draw from the population of clusters earlier defined for the 2008 and 2010 evaluation process, while others have not maintained consistent commitment to ex-post evaluation including CBA. As no aggregation of the RDC evaluations was undertaken over the 2010 to 2015 period, the CRRDC initiated the current cross-RDC aggregation to assess the collective impact of the combined RDC investment in research, development and extension (RD&E) over the 6-year period.

Further information on CRRDC impact assessment initiatives such as the refinement of guidelines and a new Procedures Document during the 2010-2015 period is covered in the Stage 2 report.

3. The Current Assessment

3.1 Engaging Individual RDCs in the Cross-RDC Evaluation Process

A letter from the CRRDC was sent to each of the 15 RDCs on 22 May 2016 by the CRRDC Operations Manager. The letter requested cooperation from the RDCs to submit their economic evaluations effected over the 2010-2015 period to the CRRDC via a DropBox established for this purpose. The letter also sought permission from some RDCs where information was already held by one or more of the three consultancies engaged in the CRRDC evaluation project for those consultancies to use the RDC information they already held for purposes of the impact assessment.

Three members of the evaluation team already held a total of over 170 economic evaluation reports. These were predominantly randomly chosen investments and represented seven RDCs, listed below.

- Grain Research and Development Corporation
- Fisheries Research and Development Corporation
- Rural Industries Research and Development Corporation
- Sugar Research and Development Corporation (SRDC) (now Sugar Research Australia)
- Horticulture Australia (now Horticulture Innovation Australia Limited)
- Grape and Wine Research and Development Corporation (GWRDC) (now Wine Australia)
- Australian Egg Corporation Limited

The consultants had also assisted some of the RDCs to complete the previous templates that were sent with the required information to the CRRDC secretariat in the early years of the 2010 to 2015 period and copies of some of these templates also were held by the consultants.

As a result of several changes within individual RDCs and the CRRDC itself, existing data held by the CRRDC appeared to be in a state that made it difficult for the evaluation team to use; hence the team took the view that all relevant data (economic evaluation reports submitted to the CRRDC between 1 July 2009 and 30 June 2015) needed to be resubmitted as per the letter of 22 May from the CRRDC to the RDCs so that there was no overlap with evaluations included in the previous January 2010 report.

Some difficulty was experienced by some RDCs in uploading information into the DropBox established by the CRRDC. To overcome the difficulties, the evaluation team accepted data submissions from some RDCs in the form of USB drives and email attachments.

3.2 Description of the Stage 1 Template

The evaluation team developed a standard template for data entry that was used to assemble data for the economic evaluation reports that were expected to be received, including those already held by the team. The template was sent to the CRRDC for comment. The standard template was based on improvements to the previous template developed by ACIL Tasman on behalf of the CRRDC and which was used in the 2008 and 2010 CRRDC impact assessment reports. Although the new guidelines for carrying out the economic evaluations were not officially posted until May 2014 (and then only as a draft), some of the changes in the 2014 guidelines (now officially on the CRRDC website) were accommodated in the new template for assembling past evaluation information.

As it was expected that information from most RDCs would follow what had been submitted in 2008 and 2009 from which the CRRDC impact assessment reports (2008 and 2010) were based, the template used for the 2010-2015 period was based on the template that existed in 2009.

The Existing Excel Template and Evaluation Reports (2010)

The existing template was a Microsoft Excel spreadsheet that included columns for reporting quantitative data for each investment. These columns included investment criteria for each investment covering the present value of benefits (PVB), present value of investment costs (PVC), NPV, BCR and Internal Rate of Return (IRR). This set of investment criteria was included for both the total RD&E

Investment (including co-investors) and the investment by the RDC only. The total benefits were attributed to the RDC in proportion to the contribution of investment costs by the RDC. In each case these five investment criteria were reported in five-year step periods up to year 30, with the last year of investment as year 0 as per the CRRDC Impact Assessment Guidelines.

Other information supplied in the Excel reporting template included:

- The name of the project cluster evaluated
- The RDC contact responsible for the evaluation
- The consultant used to conduct the evaluation
- The period of the investment (start year and final year)
- The discount rate used

The evaluation reports were the key source of information from which the qualitative environmental and social benefits were assembled. Where some of these benefits may have been valued, this was identified from the evaluation reports.

Information for the 2010-2015 Assessment

The instructions for evaluation in the 2010-2015 period were assumed to be a continuation of those that pertained at the time of the 2010 report.

Other information components of the template for the 2010-2015 data assembly include:

- The total RD&E investment made by each RDC in each financial year
- The strength of the association of each investment analysed with the six CRRDC Communication Themes - score of 0 (none), 1 (low), 2 (medium) and 3 (high)
- A description of the various environmental and social impacts identified and/or valued across the investments evaluated
- Information on collaborative investments with other RDCs that were available in the evaluation descriptions assembled

Some derived parameters from the input data were automatically generated from the new template. These included:

- Average leverage ratios achieved by the RDC for co-investment
- Total and RDC PVB, PVC and NPV by year and across the six years combined
- The annual expenditure evaluated for each RDC as a percentage of the total RD&E expenditure for that year (by year and RDC)

4. List of evaluations

4.1 The Population

The evaluation team collected economic evaluation reports containing a total of 288 individual evaluations of various RDC investments. The investments evaluated in the submitted reports included single projects, project clusters (two or more projects grouped together for evaluation), and whole RDC programs or sub-programs. For the purpose of this analysis, hereafter in this report all investments that were evaluated and recorded for the 2010-2015 assessment are referred to as project clusters as per the CRRDC methodology.

Data for each cluster was entered into the data collection template by the evaluation team for the 2010-2015 Cross-RDC Impact Assessment. The individual 288 economic evaluations were conducted by at least 10 independent consultancies and represented 13 of the 15 RDCs.

Table 1 illustrates the total number of project cluster evaluations submitted for the 2010-2015 Cross-RDC Impact Assessment by year and by RDC. It is worth noting that, during the assessment period (2010-2015), two of the statutory RDCs merged with other enterprises to become industry owned companies. Evaluation reports submitted from the original statutory RDCs were recorded separately to reports submitted by the new industry owned companies and then aggregated where appropriate.

Table 1: Total Number of Project Cluster Evaluations Submitted

RDC Name	Year (ended 30 June)										Total
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AECL				2	1	3	2				**8**
AMPC											**0**
APL			4	15				12	15		**46**
AWI						5		2			**7**
CRDC	3		3		1						**7**
Dairy Australia			3	4	1						**8**
FRDC			18			8			9		**35**
FWPA					6	3	3		1	4	**17**
GRDC			12	8	3	6	5	4			**38**
Hort. Innovation			7	18	16	7					**48**
Livecorp											**0**
MLA					1	1		2	16		**20**
RIRDC			3	7	9	2	3	1			**25**
SRA								6	4		**10**
SRDC[(a)]				4	4	4					**12**
Wine Australia[(b)]			1	2	1	2	1				**7**
Total	**3**	**0**	**51**	**60**	**43**	**41**	**14**	**27**	**45**	**4**	**288**

(a) SRDC and the Bureau of Sugar Experiment Stations Limited (BSES) merged in 2013 to become SRA.
(b) GWRDC and the Wine Australia Corporation merged in 2013 to become Wine Australia. Includes project clusters for AWRI (funded by GWRDC) during the assessment period.

Appendix 2: Complete List of the 288 Project Cluster Evaluations Submitted and Recorded lists summary details of all 288 evaluation reports including the RDC name, project cluster title, evaluation year, whether the project was randomly chosen or selected by the RDC, and the name of the consultancy that carried out the evaluation.

4.2 Exclusions

For the purpose of the current Cross-RDC Impact Assessment, some of the 288 evaluations had to be excluded from the final population.

Evaluations to be included in the final population were based on the following criteria:

- the evaluation must have been submitted during the assessment period, years ended 30 June 2010 to 2015 (project brief)
- the investment being evaluated must have been randomly chosen (CRRDC methodology requirement)
- the evaluation report had to include data for the total investment, as well as RDC contribution to the total investment, for the project cluster (CRRDC methodology requirement)
- the individual evaluation report needed to include investment criteria results for NPV and BCR at 30-years after the last year of investment as per the CRRDC Impact Assessment Guidelines (CRRDC methodology requirement)

Based on the above criteria, the total population of 288 economic evaluations was reduced to a 'hard cut' population of 167 representing nine of the 15 RDCs.

Of the 121 clusters excluded from the 'hard cut' final population, 52 (43%) were excluded on the basis of the relevant assessment period (49 of the reports submitted were dated in the years 2015/16 and 2016/17, while three were dated 2007/08). A further 36 (30%) clusters were excluded on the basis that they were not randomly selected for evaluation (or the selection method was unknown) and 2 further evaluations (2%) were excluded on the basis that there was no data for the total investment and RDC contribution to investment in the cluster. Finally, another 31 (25%) were excluded due to there being no data for the 30-year BCR and/or NPV. Table 2 shows the number of projects excluded sequentially based on the four criteria listed above.

Table 2: Number of Project Clusters Excluded[(a)] from the Final Population by Assessment Criterion

RDC Name	1. Report falls outside the 2010-2015 time period	2. Cluster was not randomly chosen[(b)]	3. Data missing for Total and/or RDC investment	4. Data missing for BCR and/or NPV at 30-years	Total Excluded
AECL					**0**
AMPC					**0**
APL	15	16		15	**46**
AWI				7	**7**
CRDC	3	1		3	**7**
Dairy Australia			2		**2**
FRDC	9				**9**
FWPA	5				**5**
GRDC		16		2	**18**
Hort. Innovation					**0**
Livecorp					**0**
MLA	16			4	**20**
RIRDC		1			**1**
SRA	4				**4**
SRDC					**0**
Wine Australia		2			**2**
Total Excluded	**52**	**36**	**2**	**31**	**121**
Clusters Remaining in the Population	236	200	198	167	167

(a) The process used to exclude project clusters based on the listed cross-RDC assessment criteria was undertaken sequentially. Therefore, it is possible that a project cluster excluded on the basis of criteria 1, also may have failed on another of the remaining 3 criteria. Project clusters were not investigated for multiple exclusion criteria.

(b) Criteria 2 includes exclusion of project clusters where the method for selecting a cluster for evaluation was unknown or unspecified.

Table 3 describes the final number of project cluster evaluations included in the 'hard cut' population for the 2010-2015 Cross-RDC Impact Assessment by year and by RDC.

Table 3: Number of Project Cluster Evaluations Included in the Hard Cut Population by Year

RDC Name	Year (ended 30 June)						
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
AECL		2	1	3		2	**8**
AMPC							**0**
APL							**0**
AWI							**0**
CRDC							**0**
Dairy Australia	3	2	1				**6**
FRDC	18			8			**26**
FWPA			6	3	3		**12**
GRDC	6	7	1	2	4		**20**
Hort. Innovation	7	18	16	7			**48**
Livecorp							**0**
MLA							**0**
RIRDC	3	6	9	2	3	1	**24**
SRA						6	**6**
SRDC		4	4	4			**12**
Wine Australia	1	2		2			**5**
Total	**38**	**41**	**38**	**31**	**10**	**9**	**167**

5. Impact Assessment Results (2010-2015)

5.1 Economic Evaluation Results

Aggregate Results: Hard Cut Population (167 project clusters)

Investment criteria recorded for each project cluster were reported in the dollar terms of the year that the cluster was evaluated in (for example, investment criteria included in an economic evaluation report submitted in 2011/12 were generally reported in 2011/12 dollar terms). The PVBs, PVCs and NPVs for each project cluster recorded then were updated to 2015/16 dollar terms using the Gross Domestic Product (GDP) Implicit Price Deflator (ABS, 2016) and updated BCRs were derived.

Some of the investment analyses recorded include valuation of social and/or environmental impacts. This was noted in the data collection template. Most environmental and social impacts, however, were not valued due to the difficulties in valuing non-market goods (discussed further in Section 6 below).

The total PVB for the 167 project clusters evaluated and recorded across the 2010 to 2015 period was estimated at $6.3 billion with an aggregate PVC of $1.4 billion, and a NPV for the total 'hard cut' population of approximately $4.9 billion over a 30-year period.

To allow comparison with previous CRRDC impact assessments, the simple average BCR for this population (calculated as the average of the individual 167 project cluster BCRs) was estimated at 6.0 to 1 after 30-years. However, a simple average is often a flawed measure as it is sensitive to any extreme values within the data set, therefore, a weighted average was also estimated. The weighted average was estimated by taking the total PVB across all 167 project clusters ($6.3 billion) and dividing by the total PVC ($1.4 billion) resulting in an estimated average BCR of 4.5 to 1. That is, for every $1 dollar invested, approximately $4.50 is returned after 30-years.

The investment criteria from the aggregate quantitative analysis for the Cross-RDC Impact Assessment (2010-2015) are all highly positive and demonstrate that the investment by the RDCs as a whole has been delivering significant benefits to Australia.

Aggregate Results: Hard Cut Population by Year (167 project clusters)

As no published cross-RDC assessments were carried out between 2010 and 2015, results have been estimated for each year of the period of assessment, 2010 to 2015. Table 4 presents the estimated results for the hard cut population by year in which the analyses were carried out.

Table 4: Aggregate Results by Year - Hard Cut Population

Aggregate Investment Criteria[(a)]	**Year (ended 30 June)**						
	2010	**2011**	**2012**	**2013**	**2014**	**2014**	**Total**
PVB ($m)	2,506.7	936.3	442.4	1,892.9	462.1	84.6	6,325.0
PVC ($m)	450.6	202.7	93.5	404.4	240.3	26.4	1,417.9
NPV ($m)	2,056.2	733.4	348.0	1,488.4	221.8	58.2	4,906.0
Simple Average BCR	6.4	7.4	5.4	3.7	9.2	5.8	6.0
Weighted Average BCR (PVB/PVC)	5.6	4.6	4.7	4.7	1.9	3.2	4.5
Number of Project Clusters Recorded	38	41	38	31	10	9	167

(a) Over a 30-year period

Table 4 shows that, over the course of the assessment period, the number of randomly selected, ex-post economic evaluations being carried out by the RDCs declined sharply and this has impacted the year by year results. This decrease in relevant evaluations means that the results for later years (particularly 2013/14 and 2014/15) are less likely to be representative of the entire RDC portfolio.

Aggregate Results: Other Results

The total RD&E expenditure by all 15 RDCs for the period 1 July 2009 to 30 June 2015 was estimated at just under $3.1 billion (nominal), averaging $514.1 million per year over the six-year period. For the nine RDCs represented in the hard cut population for the Cross-RDC Impact Assessment analysis, the total RD&E expenditure was estimated at $2.3 billion or approximately 74% of the overall total RD&E expenditure for all 15 RDCs. Table 5 outlines the total RD&E expenditure of each of the RDCs for the 2010-2015 assessment period.

Table 5: Total RDC RD&E Expenditure 2009/10 to 2014/15

RDC	Total RD&E Expenditure ($m)							
	2010	2011	2012	2013	2014	2015	Total 2010-15	Annual Average
AECL	2.7	2.2	3.0	4.3	4.3	3.1	19.4	3.2
AMPC	8.7	7.6	8.2	8.0	7.6	8.0	48.1	8.0
APL	8.1	9.1	9.2	9.1	9.6	9.7	54.8	9.1
AWI	24.6	20.8	25.4	31.8	35.8	27.9	166.4	27.7
CRDC	9.4	8.9	12.2	18.9	21.5	22.8	93.7	15.6
Dairy Australia	33.6	33.8	33.0	40.7	38.5	40.2	219.9	36.6
FRDC	28.8	25.5	29.7	25.2	27.4	28.1	164.6	27.4
FWPA	7.0	8.8	7.8	5.4	5.8	6.6	41.5	6.9
GRDC	133.4	141.0	150.8	162.1	165.7	194.1	947.0	157.8
Hort. Innovation	81.3	80.9	84.6	82.8	83.2	81.2	494.0	82.3
Livecorp	0.8	1.2	0.9	0.6	0.6	0.6	4.7	0.8
MLA	66.5	62.5	65.1	67.5	82.1	93.0	436.7	72.8
RIRDC	22.0	28.7	29.5	21.5	22.6	19.9	144.1	24.0
SRA	9.8	17.7	17.7	17.7	19.3	26.8	108.9	18.2
Wine Australia	28.1	25.2	22.5	20.9	22.2	21.9	140.8	23.5
TOTAL	**464.8**	**474.0**	**499.4**	**516.3**	**546.2**	**584.0**	**3,084.7**	**514.1**

The total nominal investment recorded for all 167 project clusters evaluated was estimated at $983 million, with the RDCs' contributions to the total investment estimated at $432 million (across the nine RDCs represented in the hard cut population). This RDC contribution to investment represents approximately 19% of the total RD&E spend by the nine RDCs ($2.3 billion) over the six-year period.

A comparison of the estimated RDC RD&E expenditure in the 167 project clusters ($432 million) against the total estimated investment in the clusters ($983 million) indicates an average leverage ratio of approximately 1.27 to 1, meaning that for every $1 contributed by the RDCs, co-investment partners contributed, on average, $1.27 to the RD&E investment.

Aggregate Results: Investment Criteria Over Time

To give some indication of returns over time, an analysis was carried out to show the aggregate results across the time intervals reported, up to 30-years. This analysis required a further tightening of the population to include only those project cluster evaluations that had reported results for all the 5-year time intervals after the last year of investment in the cluster (i.e. 0, 5, 10, 15, 20, 25, and 30 years). The additional exclusion criteria reduced the total population to 109 project clusters across nine RDCs. Table 6 shows the results of the time interval analysis.

Table 6: Aggregate Investment Criteria Over Time

Investment Criteria	Years after last year of investment						
	0	5	10	15	20	25	30
PVB ($m)	515.0	1,298.3	1,927.7	2,433.0	2,867.5	3,199.3	3,417.1
PVC ($m)	908.7	908.7	908.7	908.7	908.7	908.7	908.7
NPV ($m)	-298.2	454.9	1,111.3	1,532.7	2,042.6	2,292.3	2,507.4
Simple Average BCR	0.6	2.1	3.2	3.9	4.5	4.8	5.1
Weighted Average BCR (PVB/PVC)	0.6	1.4	2.1	2.7	3.2	3.5	3.8

The results shown in Table 6 show that aggregate results across the nine RDCs represented become positive quickly, from just 5 years after the last year of investment.

Aggregate Results: Additional Analyses/Sensitivities

Several additional analyses were carried out on total population based on different sets of exclusion criteria in order to test the robustness of the above results. The analyses included:

25-year results
In the past, impact assessment guidelines have recommended reporting of investment criteria to 25-years after the last year of investment (as opposed to the currently accepted 30-years). An analysis was carried out on a varied set of exclusion criteria such that project cluster evaluations were required to be within the assessment period (1 July 2009 to 30 June 2015), randomly chosen, include data for the total investment in the cluster evaluated as well as data for the RDC contribution to investment in the cluster, and include data for the NPV and BCR at 25-years after the last year of investment.

Inclusion of additional years for aggregate population (2015/16 and 2016/17)
The original, total population of 288 economic evaluation reports submitted for the current Cross-RDC Impact Assessment included many that fell outside the relevant assessment period (2009/10 to 2014/15). As any project clusters evaluated pre-2010 ought to have been captured by the previous CRRDC impact assessment reports (December 2008 and January 2010), an additional analysis was carried out to investigate the impact of any additional evaluations such that the aggregate population included project cluster evaluations that fell within the period 1 July 2009 and 30 June 2017. The evaluations also were randomly chosen, included data for total investment in the cluster evaluated as well as data for the RDC contribution to investment in the cluster, and included data for the NPV and BCR at 30-years after the last year of investment.

Comparison of random population with results of selected population
Some RDCs conducted selected ex-post economic evaluations for other purposes. These evaluations were not included in the final population for aggregation in the current Cross-RDC Impact Assessment due to the potential for bias in the results. An additional analysis was conducted of only those project cluster evaluations that were selected for evaluation by the individual RDC, fell into the relevant assessment period (1 July 2009 to 30 June 2015), included data for total investment in the project cluster and the RDC contribution to investment in the cluster, and included data for the NPV and BCR at 30-years after the last year of investment.

Findings
Results tables for each of the three alternative analyses described above can be found in Appendix 3: Summary Results of Sensitivity Analyses. The BCR for the selectively chosen population was moderately higher, this was expected as some of the selected project clusters evaluated may have been chosen as examples of successful investments by the RDCs. Others may have been selected to assist with decisions on whether or not to continue to invest in the selected area. In general, the results were consistent with the results of the aggregate analysis of the 167 project cluster evaluations shown in Table 4.

5.2 Qualitative Description of Environmental and Social Impacts

Method of aggregation

Qualitative data on environmental and social impacts, where available for each of the 288 individual economic evaluations in the total population, were compiled and entered into the 2016 Cross-RDC Impact Assessment data collection template described in Section 3.2. The data entered were analysed and then grouped into seven environmental impact categories and seven social impact categories based on the frequency of the type of specific impacts identified.

Categories and Findings

Of the 167 project cluster evaluations assessed, 118 reported one or more environmental impacts, and 149 reported one or more social impacts. It should be noted that, where no environmental or social impacts were recorded for a project cluster, it may be due to reporting inconsistencies rather than an absence of any impact. For example, it could be that a triple bottom line reporting framework was not used. This aspect of reporting was beyond the scope of this assessment to investigate further.

Table 7 shows the seven environmental impact categories and the number of project clusters that reported each type of impact for the 167 clusters in the hard cut population.

Table 7: Frequency of Reporting of Environmental Impact Categories

Environmental Impact	**Number of Clusters that Reported Impacts for each Environmental Impact Category**
Reduced usage and/or impact of pesticides	36
Improved water use efficiency	14
Reduced nutrient export off-farm and/or improved water quality	29
Reduced greenhouse gas emissions and/or improved air quality	17
Improvement in soil health and/or sustainability (e.g. increased soil carbon, reduced erosion, etc.)	14
Improved sustainability of natural ecosystems (including improved biodiversity)	29
Other/Miscellaneous environmental impacts	43

Table 8 shows the seven social impact categories and the number of project clusters that reported each type of impact for the 167 clusters in the hard cut population.

Table 8: Frequency of Reporting of Social Impact Categories

Social Impact	**Number of Clusters that Reported Impacts for each Social Impact Category**
Improved human health and safety	60
Increase scientific, research and/or leadership capacity	66
Community spillovers (e.g. improved community well-being as a result of increased farmer incomes)	51
Reduced public costs (e.g. increased efficiency of government resources)	12
Improved animal welfare	12
Improved quality of human life and/or recreational utility	12
Other/Miscellaneous social impacts	33

6. Public benefits

Public benefits are usually considered synonymous with environmental and social benefits but can also include the spillovers of productivity gains to other sectors of the Australian economy. The environmental and social benefits that have been reported in Table 7 and Table 8 cover the major public benefits from the RDC investment.

The Australian Government investment in the RDCs is not solely to address the delivery of public benefits as there are also elements of market failure used to justify Government funding of RD&E.

With regard to public benefits, of interest to Government is the concept of additionality. How does the Government funding increase the delivery of public benefits, given that some environmental and social benefits would have been delivered anyway as spillovers from productivity oriented research? Ex-post evaluations cannot address this issue meaningfully so it is beyond the scope of this report, and is not further discussed here.

Valuing Public Benefits

While identification of the public (social and environmental) benefits presents some challenges, quantification is even more difficult as measurement of the benefit can be problematic.

In the absence of market prices, methods to elicit willingness to pay (WTP) values for social and environmental benefits are available. These methods fall into two principal groups: revealed and stated preference methods.

Revealed preference methods use observed behaviour of individuals to estimate values for a benefit. Two common approaches are hedonic pricing and the travel cost method. An example of hedonic pricing may be an observed retail market premium of, for example, ethical foods as a measure of society's value for such foods. Travel cost methods rely on analyses of the travel costs incurred by people in pursuing a particular interest, such as visiting a place of natural beauty or other characteristics. Such measures are more often linked to environmental benefits rather than social benefits.

Stated preference methods elicit WTP estimates directly from consumers and are based on what people say rather than on observed behaviour. Variations include contingent valuation and choice modelling.

Contingent valuation involves asking respondents direct questions on what they would be willing to pay for a good or service. Choice modelling involves a series of questions, each which asks respondents to choose their preferred option from several alternatives. Each option contains a standard set of attributes and is differentiated from other options by allowing levels of attributes to vary systematically.

Revealed preference methods should be preferred over stated preference methods due to their greater proximity to actual behaviour; however, revealed preference methods usually rely on market information or observed costs and these are not always available or relevant for some valuations. Stated preference methods can have greater relevance in rural RD&E valuations than revealed preference methods.

Benefit transfer is the process of transferring a willingness to pay value derived from an existing study or studies to another like situation. This can be a hazardous process due to significant differences in the original and new situations, unclear reporting of the original study, and incorrect interpretation in transfer. Despite its shortcomings, benefit transfer is commonly practiced. This is because there may not be any highly relevant studies carried out or available to the analyst when needed (some are embedded in the grey literature), the high cost of carrying out a new WTP study, or a judgement that an approximate value will be sufficient.

It is suggested that the CRRDC and RDCs consider undertaking a body of work to develop more detailed guidelines to standardise the approach to valuation of public benefits for key impact categories (for example, water quality) to supplement the CRRDC Impact Assessment Guidelines.

7. Alignment with CRRDC Communication Themes

Introduction

As an additional component of the CRRDC Cross-RDC Impact Assessment and Performance Reporting Update, the evaluation team was asked to engage with the CRRDC communications team in order to provide some potentially useful input into the CRRDC's Stakeholder Engagement and Communications Strategy (2015-2017) that is currently being rolled out.

The Strategy includes communication around six central themes:

1. Farmgate returns: smarter farming drives improved productivity and profitability, on and off-farm
2. Leverage investment: co-investment and collaboration bring scale, capability and greater impact
3. Innovation, industry good: innovation and practice improvement drive cross-sector gains
4. Market access, international competitiveness: market intelligence and market access power demand for Australian food and fibre
5. Value for money, efficiency: return on funds invested underpins research and development programs
6. Employment, vibrant communities: new skills and changed practices deliver jobs and boost regional capacity

Approach

The Stage 1 impact assessment aimed to provide some sources of potential case studies for each of the six themes using a subjective assessment (backed, in some cases, with quantitative results) of the alignment of the outcomes and impacts of each individual project cluster with the themes.

The subjective scoring system assigned each project cluster a 0 (no alignment with theme), 1 (low alignment), 2 (medium alignment), or 3 (high degree of alignment) against each of the six communications themes. It was envisaged that clusters with a rating of 3 may be further investigated by the communications team as a source of case studies for that theme.

Findings

Table 9 to Table ***14*** list the project clusters (from the full population of 288) that were subjectively assessed as having a high degree of alignment (score of 3) with each of the six communications themes described previously. The full list of clusters with scores for each theme can be found in Appendix 4: Subjective Assessment of Alignment of Each Project Cluster to the Six CRRDC Communication Themes (Total 288 Project Clusters).

Table 9: Project Clusters Assessed as having a High Degree of Alignment with Communication Theme 1 - Farmgate Returns

RDC name	**Name of Project Cluster**	**Report Submitted (Year ended 30 June)**
AECL	Energy Usage and Efficiency	2014/15
APL	Project Muscle: APL 2200	2009/10
	Food Safety	2009/10
	Lysine Requirements	2014/15
	Physi-Trace	2014/15
	Group Demonstration Award (GDA) - Lactation Pens	2014/15
AWI	On-farm - Evergraze	2012/13
	On-farm - Lifetime Ewe	2012/13

CRDC	Soils Research	2007/08
Dairy Australia	MAADI	2011/12
FRDC	Abalone, YTK, Oysters	2015/16
	Management	2015/16
	Genetics	2015/16
FWPA	On Board Computers	2012/13
	Construction Practices	2013/14
GRDC	Wheat Breeding	2009/10
	MCVP ph. 2 & 3	2013/14
	MCVP ph. 2,3 & 4	2014/15
	National Mungbean improvement Program 2004-2016	2014/15
	National Mungbean improvement Program	2010/11
	Molecular Markers	2009/10
	Sorghum Pre-breeding	2012/13
HAL	Apple - Breeding and Biotechnology	2012/13
	Citrus - Biosecurity and Market Access	2009/10
	Citrus - Breeding and Biotechnology	2009/10
	Citrus - Crop Production	2009/10
	Citrus - Plant Health	2009/10
	Citrus - Postharvest and Quality	2009/10
	Dried Fruit - Breeding and Biotech (grape, prune, apricot)	2010/11
	Dried Fruit - Crop Production (grape, prune, apricot)	2010/11
	Macadamia - Technology	2010/11
	Macadamia - Varietal Improvement	2010/11
	Mushroom - Communication and Extension	2010/11
	Mushroom - Human Health	2010/11
	Onion - Extension and Communication	2009/10
	Onion - Market and Supply chain	2009/10
	Strawberry - Breeding and Biotechnology	2012/13
	Table Grapes - Biosecurity and Market Access	2010/11
	Table Grapes - Industry Development Services	2010/11
	Table Grapes - Plant Health	2010/11
MLA	Product Integrity	2015/16
	Market Access	2015/16
	Eating Quality	2015/16
	On-farm Productivity	2015/16
	Market Information	2015/16
	Feedlots	2015/16
	Goat Industry	2015/16
RIRDC	Rice (Varietal Improvement)	2010/11
	Fodder Crops	2013/14
	Tea Tree - SCCP	2010/11
SRA	Harvesting Best Practice	2014/15
SRDC	Disease Management	2010/11
Wine Australia	Wine - Microbiology	2013/14

	Wine - Problem Solving Capability	2011/12
	Grapes & Wine - Yeasts	2012/13

Table 10: Project Clusters Assessed as having a High Degree of Alignment with Communication Theme 2 – Leverage Investment[(a)]

RDC name	Name of Project Cluster	Report Submitted (Year ended 30 June)
APL	PigPass NVD	2010/11
	Life Cycle Analyses	2010/11
	Bungowannah Virus	2010/11
	Lysine Requirements	2014/15
	Group Demonstration Award (GDA) - Lactation Pens	2014/15
	Postgrad Scholarship	2015/16
	Finisher Performance	2015/16
Dairy Australia	NCDEA	2009/10
	Systems Management	2009/10
FRDC	Workshops and Conferences	2009/10
FWPA	LiDAR	2016/17
GRDC	ACPFG	2013/14
MLA	Off-farm Productivity	2015/16
	Eating Quality	2012/13
RIRDC	Chalkbrood Control	2011/12
	Equine Amnionitis and Foetal Loss	2010/11
	Fodder Crops	2013/14
	Methane Recovery	2011/12

(a) Project clusters were scored according to their individual estimated leverage ratios. Ratios equal to 0 received a 0, ratios greater than 0 but less than or equal to 1.5 received a 1, ratios greater than 1.5 but less than 3 received a 2, and ratios greater than 3 received a score of 3.

Table 11: Project Clusters Assessed as having a High Degree of Alignment with Communication Theme 3 – Innovation, Industry Good

RDC name	Name of Project Cluster	Report Submitted (Year ended 30 June)
AECL	Energy Usage and Efficiency	2014/15
Dairy Australia	NCDEA	2009/10
FRDC	Extension and Adoption	2012/13
FWPA	LiDAR	2016/17
GRDC	Soil Biology Initiative II	2014/15
	Soil Biology (Themes 1-3)	2009/10
	ACPFG	2013/14
HAL	Apple - Breeding and Biotechnology	2012/13
	Dried Fruit - Industry Development (grape, prune, apricot)	2010/11
MLA	New Products	2015/16
	Market Information	2015/16
RIRDC	Child Safety	2011/12
	Farm Safety Studies	2011/12

	SSF - Future Directions	2011/12
Wine Australia	Grapes & Wine - Yeasts	2012/13

Table 12: Project Clusters Assessed as having a High Degree of Alignment with Communication Theme 4 – Market Access, International Competitiveness

RDC name	Name of Project Cluster	Report Submitted (Year ended 30 June)
HAL	Citrus - Biosecurity and Market Access	2009/10
	Table Grapes - Biosecurity and Market Access	2010/11
MLA	Market Access	2014/15
	Product Integrity	2015/16
	Market Access	2015/16
	Livestock Exports	2015/16
RIRDC	Fodder Crops	2013/14

Table 13: Project Clusters Assessed as having a High Degree of Alignment with Communication Theme 5 – Value for Money, Efficiency[(a)]

RDC name	Name of Project Cluster	Report Submitted (Year ended 30 June)
Dairy Australia	Cowtime Extension	2009/10
	MAADI	2011/12
	NCDEA	2009/10
	Systems Management	2009/10
FRDC	MPAs and Spatial	2009/10
FWPA	Construction Practices	2013/14
	Recycled Products	2013/14
GRDC	National Mungbean Improvement Program	2010/11
	Grain Storage	2009/10
	Minor Use Chemicals	2010/11
HAL	Mushroom - Communication and Extension	2010/11
	Onion - Market and Supply Chain	2009/10
	Persimmon - Irradiation for Market Access	2011/12
MLA	Market Access	2015/16
	Livestock Exports	2015/16
	Eating Quality	2015/16
RIRDC	Fodder Crops	2013/14
	Simulation Exercise	2011/12
	Tea Tree - SCCP	2010/11
SRA	Harvesting Best Practice	2014/15
SRDC	Disease Management	2010/11

(a) Project clusters were scored according to their individual BCRs. BCRs less than or equal to 1 received a 0, BCRs greater than 1 but less than or equal to 4 received a 1, BCRs greater than 4 but less than 12 received a 2, and BCRs greater than 12 received a score of 3.

Table 14: Project Clusters Assessed as having a Moderate Degree[(a)] of Alignment with Communication Theme 6 – Employment, Vibrant Communities

RDC name	Name of Project Cluster	Report Submitted (Year ended 30 June)
FRDC	Workforce Development	2012/13
GRDC	Partners in Grain	2011/12
	Scholarships	2011/12

(a) No project clusters received a score of 3 (high degree of alignment) with communication Theme 6 (Employment). The project clusters identified in the table above received a score of 2 (medium alignment).

8. Issues Identified and Implications for Future Cross-RDC Impact Assessment

Lack of Continuing Commitment to the CRRDC Evaluation Approach

Over the current analysis period, 2010 to 2015, it is understood that some of the RDCs continued to draw clusters for evaluation from the population of clusters earlier defined for the 2008 and 2010 CRRDC evaluation process, while others have not maintained consistent commitment to ex-post evaluation including CBA. Evidence in Table 3 and Table 4 shows that the number of relevant, ex-post economic evaluations carried out by the RDCs declined dramatically after 2013.

A partial explanation for this drop off in ex-post evaluation may be that the formal process to select the random project clusters for each RDC to have evaluated was discontinued around 2011-2012 (originally undertaken by ACIL Tasman for the impact assessment reports published in 2008 and 2010). At this time (2011-12), the CRRDC commenced to revise the procedures and guidelines for impact assessment. However, the drafting and feedback process during this revision process were protracted and meant there was some uncertainty about economic evaluation requirements. Once published, the new CRRDC Impact Assessment Procedures and Guidelines were not taken up by the RDCs.

There has also been some structural change within the RDCs since 2012 with two of the RDCs transitioning from statutory RDCs to industry owned.

Going forward, if the CRRDC intends to continue with regular cross-RDC impact assessment reporting and wants the results to be comparable over time, it will require the cooperation of all the RDCs and for them to commit to an ongoing standard evaluation process in order to achieve meaningful, representative results across the whole of the RDC portfolio.

Inconsistent Evaluation Reporting

A major difficulty encountered during the data entry for the 288 individual project cluster evaluations submitted for the 2010-2015 Cross-RDC Impact Assessment was the inconsistency of reporting between RDCs and between consultancies engaged to carry out the evaluations.

Neglect of adhering to a standardised process
Some economic evaluation reports reported only the NPV for a project cluster and did not include BCRs. The benefit-cost ratio was considered a key measure of the impact of the RDCs and has been a key focus point of previous cross-RDC impact assessments.

As shown in Table 2, at least 31 project clusters were excluded from the population for the current assessment as a result of missing data for the BCR and/or NPV at 30-years from the last year of investment. If all data had been supplied this would have increased the number of evaluations.

Similarly, many evaluation reports failed to report against rolling time frames (i.e. did not include results at intervals between the last year of investment and some final point in the future). This limited the population available for an analysis of cross-RDC impact over time.

The minimum expectations for the reporting are covered in the CRRDC Impact Assessment Guidelines. The guidelines state that summary measures of total project cluster results should be presented, expressed as NPV, BCR, modified internal rate of return (MIRR) and IRR. The guidelines also assert that, at a minimum, time-frames including current, 5, 10, 20 and 30 year NPV horizons will be adopted. It is suggested that the guidelines should explicitly state reporting at 5,10,15, 20, 25 and 30-year time periods.

Inconsistent estimation of investment costs
The current CRRDC Impact Assessment Guidelines state:

> *"The costs of adopting or implementing a new technology or other innovation may be incorporated into the assessment either as an additional element in the estimation of costs of the R&D project, or by deducting them from the net returns realised by industry from adoption of the innovation."*

These alternative treatments of adoption and implementation costs in the guidelines means that there is some inconsistency between the project cluster evaluations in terms of how the PVC has been calculated. While not affecting the NPVs, this choice may have had an impact on the results for the BCRs in the aggregate analyses.

It is suggested that the CRRDC revisit the Impact Assessment Guidelines and standardise the preferred process for the treatment of additional costs for the estimation of the PVC for an evaluation.

Data on co-investment
The vast majority of project cluster evaluation reports included data for the total investment by all partners in the project cluster and the particular RDC's contribution to the investment in the cluster. The co-investment portion of the total investment was generally only reported as 'investment by others/other investment', lacking detail about the individual co-investment partners and their specific investment contributions.

Sources of co-investment (e.g. industry or state Government departments) and specific leverage ratios are of some interest to the Australian Government (and to the CRRDC) and may be useful in decisions regarding allocation of future funding given the role of Government.

The CRRDC Impact Assessment Guidelines (Appendix 2 of the Guidelines) presents the CRRDC Impact Assessment Reporting Template. The template specifically mentions that, for financial and in-kind investments in R&D projects, the report should identify participating institutions, collaborators, and other investors, and detail the year-on-year, cash and in-kind, contributions by each participant.

It appears that this process may be carried out for project level economic evaluations, but is not well reported in evaluations at the project cluster level (more than one project). In some cases, too much detail, particularly if a large number of other investors contributed or the cluster contains a large number of projects, may be unnecessary and detract from the overall purpose of the project cluster evaluation; however, particularly for project cluster evaluations where other Government investment is involved or where more than one RDC has collaborated, this detail should be included in project cluster economic evaluation reporting.

Loss of Corporate Memory

As significant and largely independent, dynamic organisations, each of the RDCs have experienced varying degrees of personnel turnover in the past six years. As a result, there appears to be an issue with loss of corporate memory regarding ex-post evaluation. Almost none of the current senior management across all 15 RDCs were involved in the previous two cross-RDC impact assessments (December 2008 and January 2010). The same applies to senior management at the CRRDC itself.

Consequently, the individual RDCs need constant reminding of previous and existing processes due to personnel turnover which may inhibit effective cross-RDC impact assessment and the ability of such assessments to be compared over time.

Lack of Emphasis on, and Limited Reporting of, Cross-RDC Collaborative Investments

Of the 288 project cluster evaluations submitted and recorded by the evaluation team, only nine were identified as being collaborative investments between two or more RDCs and only three of the nine met the criteria to be included in the hard cut population for the 2010-2015 impact assessment.

A workshop was held on July 22nd, 2016 with a selection of key RDC personnel and the CRRDC evaluation working group. Feedback at the workshop indicated that there may have been other collaborative investments but that these may not be clearly identified within the reports or that they had not been formally evaluated.

In the future, it is suggested that cross-RDC collaboration needs to be assessed and reported separately (as was done in the December 2008 CRRDC impact assessment report). Any future evaluation framework needs to have protocols in place to ensure that cross-RDC collaborative investments are evaluated outside of the populations of clusters and projects funded directly by each RDC.

9. Conclusion

The total nominal investment recorded for all 167 project clusters assessed (the hard cut population) was estimated at $983 million, with the RDCs' contributions to the total investment estimated at $432 million (across the nine RDCs represented in the hard cut population). The RDC contribution to the investment represents approximately 19% of the total RD&E expenditure of the nine RDCs ($2.3 billion) over the six-year period.

A comparison of the estimated RDC RD&E expenditure in the 167 project clusters ($432 million) against the total estimated investment in the clusters ($983 million) indicates an average leverage ratio of approximately 1.27 to 1, meaning that for every $1 contributed by the RDCs, co-investment partners contributed, on average, $1.27 to the RD&E investment.

The total PVB for the 167 project clusters evaluated and recorded across the 2010 to 2015 period was estimated at $6.3 billion (in 2015/16 dollar terms) with an aggregate PVC of $1.4 billion, and a NPV for the total 'hard cut' population of approximately $4.9 billion over a 30-year period.

To allow comparison with previous CRRDC impact assessments, the simple average BCR for this population was estimated at 6.0 to 1 after 30-years. However, a simple average is often a flawed measure as it is sensitive to any extreme values within the data set, therefore, a weighted average was also estimated. The weighted average was estimated using the aggregate PVB ($6.3 billion) and PVC ($1.4 billion) resulting in an estimated BCR of 4.5 to 1. That is, for every $1 dollar invested, approximately $4.50 is returned after 30-years.

Several additional analyses were carried out on total population based on different sets of exclusion criteria in order to test the robustness of the above results. In general, the additional results generated were informative and were consistent with the results of the basic aggregate analysis of the 167 project cluster evaluations.

Information on environmental and social impacts for each project cluster evaluated was also recorded in the data collection template. Qualitative data were summarised and analysed and the impacts were then grouped into seven environmental impact categories and seven social impact categories based on the frequency of the type of specific impacts identified. Of the 167 project cluster evaluations assessed, 118 reported one or more environmental impacts, and 149 reported one or more social impacts.

The cross-RDC impact assessment process for 2010-2015 identified some issues to be considered for future assessments. These include a lack of continuing commitment to the evaluation process, inconsistent evaluation reporting (this includes neglect of adherence to a standardised process and ambiguous definitions within the guidelines), absence of specific data on co-investment, loss of corporate memory, and deficient reporting of cross-RDC collaborative investments.

Overall, the results of the 2010-2015 Cross-RDC Impact Assessment are highly positive. The results demonstrate that the investment by the RDCs as a whole has been delivering significant benefits to Australia.

Reference List

Australian Bureau of Statistics (2016), *5206.0 – Australian National Accounts: National Income, Expenditure and Product, Mar 2016,* Table 5. Expenditure on Gross Domestic Product (GDP), Implicit price deflators

Council of Rural Research and Development Corporations (2016), *About the Rural RDCs*, http://www.ruralrdc.com.au/about-the-rrdcs/#top, accessed: 18th July, 2016

Council of Rural Research and Development Corporations (2014), *CRRDC Impact Assessment Guidelines,* Version 1 – May 2014, Canberra

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Council of Rural Research and Development Corporations Chairs (2010), *Impact of Investment in Research and Development by the Rural Research and Development Corporations - Year 2 Results,* January 2010, Canberra

Council of Rural Research and Development Corporations Chairs (2008), *Measuring economic, environmental and social returns from Rural Research and Development Corporations' investment*, December 2008, Canberra

Appendices

Appendix 1: List of all 15 Current RDCs with Web Page Links

- Grains Research and Development Corporation - https://grdc.com.au/
- Horticulture Innovation Australia Limited - http://horticulture.com.au/
- Meat and Livestock Australia - http://www.mla.com.au/
- Dairy Australia - http://www.dairyaustralia.com.au/
- Australian Wool Innovation - http://www.wool.com/
- Fisheries Research and Development Corporation - http://frdc.com.au/Pages/home.aspx
- Rural Industries Research and Development Corporation - http://www.rirdc.gov.au/
- Wine Australia - http://www.wineaustralia.com/
- Sugar Research Australia - http://www.sugarresearch.com.au/
- Cotton Research and Development Corporation - http://www.crdc.com.au/
- Australian Pork Limited (APL) - http://australianpork.com.au/
- Australian Meat Processor Corporation (AMPC) - http://www.ampc.com.au/
- Forest and Wood Products Australia (FWPA) - http://www.fwpa.com.au/
- Australian Egg Corporation Limited (AECL) - https://www.aecl.org/
- Livecorp - http://www.livecorp.com.au/

Appendix 2: Complete List of the 288 Project Cluster Evaluations Submitted and Recorded

RDC name	Name of Project Cluster Evaluated[a]	Report Submitted (year ended 30 June)	Random (R) or Selected (S) Project Cluster[b]	Analyst /Consultant [b]
AECL	Egg Washing	2012/13	R	AgEconPlus
	Energy Usage and Efficiency	2014/15	R	AgEconPlus
	Environment	2010/11	R	AgEconPlus
	Farm Euthanasia	2012/13	R	AgEconPlus
	Flock Health	2011/12	R	AgEconPlus
	Human Health and Nutrition	2014/15	R	AgEconPlus
	Laying Hen Welfare	2010/11	R	AgEconPlus
	Sex Determination	2012/13	R	AgEconPlus
APL	Target 25	2010/11	R	IDA economics
	Chilling Systems	2010/11	R	IDA economics
	ProHand	2010/11	R	IDA economics
	NCPITE	2010/11	R	IDA economics
	AUSPIG Support	2010/11	R	IDA economics
	Physi-Trace III	2010/11	R	IDA economics
	Value Chain Mapping	2010/11	R	IDA economics
	Studying Animal Welfare	2010/11	R	IDA economics
	Group Housing During Gestation	2010/11	R	IDA economics
	PigPass NVD	2010/11	R	IDA economics
	NEGP	2010/11	R	IDA economics
	Compliance	2010/11	R	IDA economics
	Life Cycle Analyses	2010/11	R	IDA economics
	PCR Tests for M. Hyponeumonia	2010/11	R	IDA economics
	Bungowannah Virus	2010/11	R	IDA economics
	Project Muscle: APL 2200	2009/10	S	IDA economics
	PigPass Physi-Trace	2009/10	S	IDA economics
	Myocarditis	2009/10	S	IDA economics
	Food Safety	2009/10	S	IDA economics
	PigBal Model - Stage 2	2014/15	NS	NS
	Spent Eco-Shelter Bedding	2014/15	NS	NS
	Lysine Requirements	2014/15	NS	NS
	Physi-Trace	2014/15	NS	NS
	Stock Handling	2014/15	NS	NS
	Benchmarking Pig Welfare	2014/15	NS	NS
	Animal Health Emergencies	2014/15	NS	NS
	PRRS Virus	2014/15	NS	NS
	Concept Plan Audit Frequency for Meat	2014/15	NS	NS
	Selection Criteria	2014/15	NS	NS

	Review of APIQ Free Range Standards	2014/15	NS	NS
	Group Demonstration Award (GDA) - Lactation Pens	2014/15	NS	NS
	Postgrad Scholarship	2015/16	S	IDA economics
	Welfare Indices	2015/16	S	IDA economics
	Porcine Epidemic	2015/16	S	IDA economics
	Dietary Requirements	2015/16	S	IDA economics
	Finisher Performance	2015/16	S	IDA economics
	Education Resources	2015/16	S	IDA economics
	Nutrient Mapping	2015/16	S	IDA economics
	Environmental BMP Resources	2015/16	S	IDA economics
	Data Collection	2015/16	S	IDA economics
	Review of standards	2015/16	S	IDA economics
	Development of Guidelines	2015/16	S	IDA economics
	Sludge Management	2015/16	S	IDA economics
	Toxoplasmosis	2015/16	S	IDA economics
	Export Benchmarks	2015/16	S	IDA economics
	Physi-Trace Implementation	2015/16	S	IDA economics
AWI	On-farm - Evergraze	2012/13	R	BDA Group
	On-farm - Wild Dog	2012/13	R	BDA Group
	On-farm - Lifetime Ewe	2012/13	R	BDA Group
	On-farm - Extension Networks	2012/13	R	BDA Group
	On-farm - Shearer Training	2014/15	R	BDA Group
	On-farm - Genetics, Genomics	2014/15	R	BDA Group
	Off-farm - Merino Touch	2012/13	R	BDA Group
CRDC	Water Use	2009/10	R	BDA group
	Extension Team	2009/10	R	BDA group
	Fibre Quality	2009/10	R	BDA group
	WINCOTT	2007/08	R	BDA group
	Soils Research	2007/08	R	BDA group
	Fibre Classification	2007/08	R	BDA group
	Cotton Catchment Communities CRC	2011/12	NS	David Vere & Fiona Scott
Dairy Australia	Cowtime Extension	2009/10	R	BDA Group
	Dairy Innovation Australia	2010/11	R	BDA Group
	Grains2Milk	2010/11	R	BDA Group
	MAADI	2011/12	R	BDA Group
	NCDEA	2009/10	R	BDA Group
	Systems Management	2009/10	R	BDA Group
	Plant Breeding	2010/11	R	BDA Group
	Future Decision Support	2010/11	R	BDA Group
FRDC	Abalone Aquaculture	2009/10	R	Agtrans Research
	Animal Health and Pests	2009/10	R	Agtrans Research
	Aquaculture Technology - Environmental	2009/10	R	Agtrans Research
	Biosecurity and Health (Salmon and SBT)	2012/13	R	Agtrans Research

	Diet Development	2009/10	R	Agtrans Research
	Ecologically Sustainable Development	2009/10	R	Agtrans Research
	Enhancing Wild Catch Fisheries	2009/10	R	Agtrans Research
	Environ. Impacts	2009/10	R	Agtrans Research
	Extension and Adoption	2012/13	R	Agtrans Research
	Food Safety	2009/10	R	Agtrans Research
	Habitat and Ecosystem Protection (A)	2012/13	R	Agtrans Research
	Habitat and Ecosystem Protection (B)	2012/13	R	Agtrans Research
	Innovation Skills (part A)	2012/13	R	Agtrans Research
	Innovation Skills (part B)	2012/13	R	Agtrans Research
	Leadership Development	2012/13	R	Agtrans Research
	Market Development & Trade Access	2009/10	R	Agtrans Research
	MPAs and Spatial	2009/10	R	Agtrans Research
	Population Dynamics - AFMA	2009/10	R	Agtrans Research
	Abalone, YTK, Oysters	2015/16	R	Agtrans Research
	Management	2015/16	R	Agtrans Research
	Governance and Regulatory Systems	2015/16	R	Agtrans Research
	Resource Access & Allocation	2015/16	R	Agtrans Research
	Enhancement, Nutrition and Health	2015/16	R	Agtrans Research
	Genetics	2015/16	R	Agtrans Research
	Systems & Production	2015/16	R	Agtrans Research
	Profitability	2015/16	R	Agtrans Research
	Consumers, Products and Markets (part A)	2015/16	R	Agtrans Research
	Population Dynamics - NSW	2009/10	R	Agtrans Research
	Population Dynamics - Tropical	2009/10	R	Agtrans Research
	Salmon Aquaculture	2009/10	R	Agtrans Research
	SBT Aquaculture	2009/10	R	Agtrans Research
	Strategic Planning	2009/10	R	Agtrans Research
	Workforce Development	2012/13	R	Agtrans Research
	Workplace Health and Safety	2009/10	R	Agtrans Research
	Workshops and Conferences	2009/10	R	Agtrans Research
FWPA	Exotic Pine Plantations	2011/12	R	URS
	Myrtle Rust	2011/12	R	URS
	MOE & MOR Assessments	2011/12	R	URS
	Quality Tests	2011/12	R	URS
	Roof Environments	2011/12	R	URS
	Sound Resistance	2011/12	R	URS
	LiDAR	2016/17	R	CIE
	e-Cambium	2016/17	R	CIE
	Case Studies	2016/17	R	CIE
	Cant-Opti	2016/17	R	CIE
	Generic Marketing	2015/16	S	CIE
	On Board Computers	2012/13	R	Ross McLeod
	Preservative Treatment	2012/13	R	Ross McLeod
	Formaldehyde	2012/13	R	Ross McLeod

	Construction Practices	2013/14	R	Ross McLeod
	Recycled Products	2013/14	R	Ross McLeod
	Molecular Breeding	2013/14	R	Ross McLeod
GRDC	Agronomy	2009/10	S	Agtrans Research
	Summer Coarse Grains Breeding	2009/10	S	Agtrans Research
	Wheat Breeding	2009/10	S	Agtrans Research
	Barley Breeding Australia	2012/13	S	Agtrans Research
	Soil Biology Initiative II	2014/15	S	Agtrans Research
	National Chickpea Breeding Program	2012/13	S	Agtrans Research
	Climate Champion Program	2012/13	S	Agtrans Research
	Lentil Breeding Program	2012/13	S	Agtrans Research
	Lupin Breeding	2011/12	S	Agtrans Research
	MCVP ph. 2 & 3	2013/14	S	Agtrans Research, Barry White
	MCVP ph. 2,3 & 4	2014/15	S	Agtrans Research, Barry White
	National Mungbean Improvement Program 2004-2016	2014/15	S	Agtrans Research
	National Mungbean Improvement Program	2010/11	S	Agtrans Research
	Partners in Grain	2011/12	S	Agtrans Research
	Soil Biology (Themes 1-3)	2009/10	S	Agtrans Research
	Triticale Breeding	2014/15	S	Agtrans Research & AgEconPlus
	ACPFG	2013/14	R	Agtrans Research & Tracy Henderson
	Capacity Building	2009/10	R	Agtrans Research
	Dual Purpose Wheat Breeding	2013/14	R	Agtrans Research
	FACE	2013/14	R	Agtrans Research and Mary Ann Franco-Dixon
	Future Farm Industries	2010/11	R	Agtrans Research
	Grain Research Updates	2010/11	R	Agtrans Research
	Grain Storage	2009/10	R	Agtrans Research
	Harrington Seed Destructor	2010/11	R	Agtrans Research
	Crop Nutrition	2009/10	R	Agtrans Research
	Managing Mycotoxins in Maize	2009/10	R	Agtrans Research
	Minor Use Chemicals	2010/11	R	Agtrans Research & Barry White
	Molecular Markers	2009/10	R	Agtrans Research
	MPCN II	2012/13	R	Agtrans Research
	National Invertebrate Pest Initiative	2010/11	R	Agtrans Research & Barry White
	National Variety Trials	2010/11	R	Agtrans Research & Barry White
	Oilseeds Breeding	2009/10	R	Agtrans Research
	Premium Grains	2009/10	R	Agtrans Research
	Scholarships	2011/12	R	Agtrans Research
	Sorghum Pre-breeding	2012/13	R	Agtrans Research
	Water Use Efficiency	2013/14	R	Agtrans Research
	Weeds	2009/10	R	Agtrans Research

	WVCS	2010/11	R	Agtrans Research
HAL	Almond - Biosecurity and Market Access	2010/11	R	AgEconPlus
	Almond - Environment	2010/11	R	AgEconPlus
	Almond - Industry Development	2010/11	R	AgEconPlus
	Apple - Biosecurity and Market Access	2012/13	R	AgEconPlus
	Apple - Breeding and Biotechnology	2012/13	R	AgEconPlus
	Apple - Crop Production and Environment	2012/13	R	AgEconPlus
	Apple - Market Development	2012/13	R	AgEconPlus
	Apple - Plant Health	2012/13	R	AgEconPlus
	Banana - Biosecurity and Market Access	2011/12	R	AgEconPlus
	Banana - Breeding and Biotechnology	2011/12	R	AgEconPlus
	Banana - Crop Production and Environment	2011/12	R	AgEconPlus
	Banana - Post harvest, QA and Food Safety	2011/12	R	AgEconPlus
	Cherry - Quality, Market Development & Workplace Safety	2011/12	R	AgEconPlus
	Chestnut - Nut Rot Biology and Management	2011/12	R	AgEconPlus
	Citrus - Biosecurity and Market Access	2009/10	R	AgEconPlus
	Citrus - Breeding and Biotechnology	2009/10	R	AgEconPlus
	Citrus - Crop Production	2009/10	R	AgEconPlus
	Citrus - Plant Health	2009/10	R	AgEconPlus
	Citrus - Postharvest and Quality	2009/10	R	AgEconPlus
	Custard Apple - New Tree Training System	2011/12	R	AgEconPlus
	Dried Fruit - Breeding and Biotech (Grape, Prune, Apricot)	2010/11	R	AgEconPlus
	Dried Fruit - Crop Production (Grape, Prune, Apricot)	2010/11	R	AgEconPlus
	Dried Fruit - Industry Development (Grape, Prune, Apricot)	2010/11	R	AgEconPlus
	Lychee - Plant Health	2011/12	R	AgEconPlus
	Macadamia - Crop Protection	2010/11	R	AgEconPlus
	Macadamia - Market Research	2010/11	R	AgEconPlus
	Macadamia - Produce Handling and Quality	2010/11	R	AgEconPlus
	Macadamia - Technology	2010/11	R	AgEconPlus
	Macadamia - Varietal Improvement	2010/11	R	AgEconPlus
	Mango - Industry Development	2012/13	R	AgEconPlus
	Mushroom - Communication and Extension	2010/11	R	AgEconPlus
	Mushroom - Human Health	2010/11	R	AgEconPlus
	Mushroom - Human Health and Nutrition	2010/11	R	AgEconPlus
	Onion - Extension and Communication	2009/10	R	AgEconPlus
	Onion - Market and Supply Chain	2009/10	R	AgEconPlus
	Papaya - Genetic Improvement	2011/12	R	AgEconPlus
	Passionfruit - Genetic Improvement for Disease	2011/12	R	AgEconPlus
	Persimmon - Irradiation for Market Access	2011/12	R	AgEconPlus
	Pineapple - Phytophthora Management	2011/12	R	AgEconPlus
	Strawberry - Breeding and Biotechnology	2012/13	R	AgEconPlus
	Summerfruit - Breeding and Biotechnology	2011/12	R	AgEconPlus

	Summerfruit - Industry Development	2011/12	R	AgEconPlus
	Summerfruit - Plant Health	2011/12	R	AgEconPlus
	Summerfruit - Post Harvest and QA	2011/12	R	AgEconPlus
	Table Grapes - Biosecurity and Market Access	2010/11	R	AgEconPlus
	Table Grapes - Consumer Research and Market Analysis	2010/11	R	AgEconPlus
	Table Grapes - Industry Development Services	2010/11	R	AgEconPlus
	Table Grapes - Plant Health	2010/11	R	AgEconPlus
MLA	Market Access	2014/15	R	CIE
	Genetics and Genomics	2014/15	R	IDA Economics
	Product Integrity	2015/16	R	CIE
	Market Access	2015/16	R	CIE
	Livestock Exports	2015/16	R	CIE
	Eating Quality	2015/16	R	CIE
	New Products	2015/16	R	CIE
	Export Beef Marketing	2015/16	R	CIE
	Export Sheepmeat Marketing	2015/16	R	CIE
	On-farm Productivity	2015/16	R	CIE
	Off-farm Productivity	2015/16	R	CIE
	Market Information	2015/16	R	CIE
	Animal Health	2015/16	R	CIE
	Feedlots	2015/16	R	CIE
	Goat Industry	2015/16	R	CIE
	On-farm Environment	2015/16	R	CIE
	Off-farm Environment	2015/16	R	CIE
	Animal Welfare	2015/16	R	CIE
	Eating Quality	2012/13	R	CIE
	New Products	2011/12	R	GHD
RIRDC	Agave	2011/12	R	Agtrans Research
	Bioenergy	2011/12	R	Agtrans Research
	Chalkbrood Control	2011/12	R	Agtrans Research
	Rice (Varietal Improvement)	2010/11	S	Agtrans Research
	Child Safety	2011/12	R	Agtrans Research
	Equine Amnionitis and Foetal Loss	2010/11	R	Agtrans Research
	Essential Oils	2012/13	R	Agtrans Research
	Ethical Foods	2009/10	R	Agtrans Research
	Farm Safety Studies	2011/12	R	Agtrans Research
	Fodder Crops	2013/14	R	Agtrans Research
	Global Challenges	2013/14	R	Agtrans Research
	Horse and Rider Health and Safety	2010/11	R	Agtrans Research
	Horses (2015)	2014/15	R	Agtrans Research
	Methane Recovery	2011/12	R	Agtrans Research
	Pasture Seeds	2012/13	R	Agtrans Research
	Rhodococcus equi.	2010/11	R	Agtrans Research
	Simulation Exercise	2011/12	R	Agtrans Research

	SSF - Future Directions	2011/12	R	Agtrans Research
	Tasmanian Floral Database	2011/12	R	Agtrans Research
	Tea Tree – Biofilm	2010/11	R	Agtrans Research
	Tea Tree - Breeding & Cloning	2010/11	R	Agtrans Research
	Tea Tree – SCCP	2010/11	R	Agtrans Research
	Transparency	2009/10	R	Agtrans Research
	Transport/Neutrality	2009/10	R	Agtrans Research
	Wildflowers & Native Plants	2013/14	R	Agtrans research
SRA	Climate Forecasting to Improve Nitrogen Management	2015/16	R	Agtrans Research
	Remote Sensing for Canegrub Management	2015/16	R	Agtrans Research
	Solving the Yellow Canopy Syndrome	2015/16	R	Agtrans Research
	Utilising Total Biomass	2015/16	R	Agtrans Research
	Best Practice IWM	2014/15	R	Agtrans Research
	Biomass Accumulation	2014/15	R	Agtrans Research
	Exotic Threats	2014/15	R	Agtrans Research
	Harvesting Best Practice	2014/15	R	Agtrans Research
	NFS: Appropriate Nutrient Management	2014/15	R	Agtrans Research
	Precision Agriculture	2014/15	R	Agtrans Research
SRDC	Climate Variability and Climate Change	2011/12	R	Agtrans Research
	Diagnostic Technologies for Genetic Screening	2012/13	R	Agtrans Research
	Disease Management	2010/11	R	Agtrans Research
	Enhancing Cost-Efficiency in Milling Systems: Juice Extraction and Whole of System	2012/13	R	Agtrans Research
	Enhancing Cost-Efficiency in Milling Systems: Juice Processing	2012/13	R	Agtrans Research
	Improved Capability for Leadership	2012/13	R	Agtrans Research
	Integrated Farming Systems to Improve Productivity	2011/12	R	Agtrans Research
	Rotation Crops	2010/11	R	Agtrans Research
	Soil Resources and Nutrients	2011/12	R	Agtrans Research
	Value Adding	2010/11	R	Agtrans Research
	Value Chain	2010/11	R	Agtrans Research
	Water Sustainability	2011/12	R	Agtrans Research
Wine Australia	Grapes & Wine - Wastewater Management	2012/13	R	EconSearch
	Grapes & Wine - Yeasts	2012/13	R	EconSearch
	Vine Health - Other Disease	2010/11	R	EconSearch
	Vine Health - Powdery Mildew	2010/11	R	EconSearch
	Vine Physiology - Nutrient Management	2009/10	R	EconSearch
	Wine - Microbiology	2013/14	S	EconSearch
	Wine - Problem Solving Capability	2011/12	S	EconSearch

(a) Some project cluster titles are abbreviated for ease of data entry at the time of recording.
(b) NS: Not Specified.

Appendix 3: Summary Results of Sensitivity Analyses

The following section detail the results of the various sensitivity analyses that were carried out for the Cross-RDC Impact Assessment (discussed in Section 5.1) in order to test the robustness of the reported results.

25-year results
An analysis was carried out on a varied set of exclusion criteria such that project cluster evaluations were required to be within the assessment period (1 July 2009 to 30 June 2015), randomly chosen, include data for the total investment in the cluster evaluated as well as data for the RDC contribution to investment in the cluster, and include data for the NPV and BCR at 25-years after the last year of investment.

Project Clusters in Revised '25-year' Population: 115
RDCs Represented: 10

Investment Criteria	Value
PVB ($m)	6,782.1
PVC ($m)	1,423.0
NPV ($m)	5,360.8
Simple Average BCR	5.1
Weighted Average BCR (PVB/PVC)	4.8

Inclusion of additional years for aggregate population (2015/16 and 2016/17)
An analysis was carried out to investigate the impact of any additional evaluations such that the aggregate population included project cluster evaluations that fell within the period 1 July 2009 and 30 June 2017. The evaluations also were randomly chosen, included data for total investment in the cluster evaluated as well as data for the RDC contribution to investment in the cluster, and included data for the NPV and BCR at 30-years after the last year of investment.

Project Clusters in Revised 'Addition Years' Population: 199
RDCs Represented: 10

Investment Criteria	Value
PVB ($m)	12,801.2
PVC ($m)	2,500.2
NPV ($m)	10,313.1
Simple Average BCR	5.9
Weighted Average BCR (PVB/PVC)	5.1

Comparison of random population with results of selected population
An analysis was conducted of only those project cluster evaluations that were selected for evaluation by the individual RDC, fell into the relevant assessment period (1 July 2009 to 30 June 2015), included data for total investment in the project cluster and the RDC contribution to investment in the cluster, and included data for the NPV and BCR at 30-years after the last year of investment.

Project Clusters in Revised 'Selected' Population: 18
RDCs Represented: 3

Investment Criteria	Value
PVB ($m)	2,914.6
PVC ($m)	472.6
NPV ($m)	2,204.9
Simple Average BCR	5.3
Weighted Average BCR (PVB/PVC)	6.2

The table below shows the results of the original analysis of the 167 project cluster and the three additional sensitivity analyses described above for comparison.

Criteria	Original Hard Cut Analysis	Use of 25-year BCR/NPV	Inclusion of Extra Two Years	Selected Clusters
Clusters in Population	167	115	199	18
RDCs Represented	9	10	10	3
PVB	6,325.0	6,782.1	12,801.2	2,914.6
PVC	1,417.9	1,423.0	2,500.2	472.6
NPV	4,906.0	5,360.8	10,313.1	2,204.9
Simple Average BCR	6.0	5.1	5.9	5.3
Weighted Average BCR (PVB/PVC)	4.5	4.8	5.1	6.2

Appendix 4: Subjective Assessment of Alignment of Each Project Cluster to the Six CRRDC Communication Themes (Total 288 Project Clusters)[(a)(b)]

RDC name	Name of Project Cluster Evaluated	Report Submitted (year ended 30 June)	Farmgate returns	Leverage investment	Innovation, industry good	Market access, international competitiveness	Value for money, efficiency	Employment
AECL	Egg Washing	2012/13	2	1	1	0	2	0
	Energy Usage and Efficiency	2014/15	3	0	3	0	2	0
	Environment	2010/11	0	1	1	0	1	0
	Farm Euthanasia	2012/13	1	2	2	0	1	0
	Flock Health	2011/12	2	0	0	0	2	0
	Human Health and Nutrition	2014/15	2	1	2	0	2	0
	Laying Hen Welfare	2010/11	1	1	1	0	2	0
	Sex Determination	2012/13	0	1	1	0	1	0
APL	Target 25	2010/11	n/a	1	n/a	n/a	n/a	n/a
	Chilling Systems	2010/11	n/a	0	n/a	n/a	n/a	n/a
	ProHand	2010/11	n/a	1	n/a	n/a	n/a	n/a
	NCPITE	2010/11	n/a	1	n/a	n/a	n/a	n/a
	AUSPIG Support	2010/11	n/a	0	n/a	n/a	n/a	n/a
	Physi-Trace III	2010/11	n/a	1	n/a	n/a	n/a	n/a
	Value Chain Mapping	2010/11	n/a	1	n/a	n/a	n/a	n/a
	Studying Animal Welfare	2010/11	n/a	1	n/a	n/a	n/a	n/a
	Group Housing During Gestation	2010/11	n/a	2	n/a	n/a	n/a	n/a
	PigPass NVD	2010/11	n/a	3	n/a	n/a	n/a	n/a
	NEGP	2010/11	n/a	0	n/a	n/a	n/a	n/a
	Compliance	2010/11	n/a	0	n/a	n/a	n/a	n/a
	Life Cycle Analyses	2010/11	n/a	3	n/a	n/a	n/a	n/a
	PCR Tests for M. Hyponeumonia	2010/11	n/a	2	n/a	n/a	n/a	n/a

	Bungowannah Virus	2010/11	n/a	3	n/a	n/a	n/a	n/a
	Project Muscle: APL 2200	2009/10	3	0	2	1	n/a	0
	PigPass Physi-Trace	2009/10	2	0	1	1	n/a	0
	Myocarditis	2009/10	1	2	1	0	n/a	0
	Food Safety	2009/10	3	1	2	2	n/a	0
	PigBal Model - Stage 2	2014/15	2	2	0	1	n/a	0
	Spent Eco-Shelter Bedding	2014/15	1	1	1	0	n/a	0
	Lysine Requirements	2014/15	3	3	2	0	n/a	0
	Physi-Trace	2014/15	3	1	1	1	n/a	0
	Stock Handling	2014/15	1	1	0	0	n/a	0
	Benchmarking Pig Welfare	2014/15	0	1	0	1	n/a	0
	Animal Health Emergencies	2014/15	0	1	0	1	n/a	0
	PRRS Virus	2014/15	1	0	1	1	n/a	0
	Concept Plan Audit Frequency for Meat	2014/15	1	0	2	2	n/a	0
	Selection Criteria	2014/15	2	2	1	1	n/a	0
	Review of APIQ Free Range Standards	2014/15	2	0	0	2	n/a	0
	Group Demonstration Award (GDA) - Lactation Pens	2014/15	3	3	2	0	n/a	0
	Postgrad Scholarship	2015/16	1	3	2	1	0	1
	Welfare Indices	2015/16	0	1	0	0	0	1
	Porcine Epidemic	2015/16	2	0	1	1	0	0
	Dietary Requirements	2015/16	1	1	0	0	0	0
	Finisher Performance	2015/16	1	3	0	0	0	0
	Education Resources	2015/16	1	0	0	1	0	0
	Nutrient Mapping	2015/16	0	0	1	1	0	0
	Environmental BMP Resources	2015/16	2	0	1	2	0	0
	Data Collection	2015/16	2	1	1	2	0	0
	Review of standards	2015/16	2	0	1	2	0	0

	Development of Guidelines	2015/16	2	1	1	2	0	0
	Sludge Management	2015/16	2	0	1	0	0	0
	Toxoplasmosis	2015/16	0	0	1	1	0	0
	Export Benchmarks	2015/16	1	1	2	2	0	0
	Physi-Trace Implementation	2015/16	1	0	1	2	0	0
AWI	On-farm - Evergraze	2012/13	3	2	1	0	n/a	0
	On-farm - Wild Dog	2012/13	2	2	1	1	n/a	1
	On-farm - Lifetime Ewe	2012/13	3	1	1	0	n/a	0
	On-farm - Extension Networks	2012/13	1	2	2	0	n/a	0
	On-farm - Shearer Training	2014/15	2	0	1	0	n/a	0
	On-farm - Genetics, Genomics	2014/15	0	0	1	0	n/a	0
	Off-farm - Merino Touch	2012/13	2	0	1	0	n/a	0
CRDC	Water Use	2009/10	1	2	1	0	n/a	0
	Extension Team	2009/10	1	2	2	0	n/a	1
	Fibre Quality	2009/10	0	1	1	1	n/a	0
	WINCOTT	2007/08	0	0	2	0	n/a	1
	Soils Research	2007/08	3	0	2	1	n/a	0
	Fibre Classification	2007/08	n/a	0	n/a	n/a	n/a	n/a
	Cotton Catchment Communities CRC	2011/12	n/a	0	n/a	n/a	n/a	n/a
Dairy Australia	Cowtime Extension	2009/10	1	1	1	0	3	0
	Dairy Innovation Australia	2010/11	1	2	2	0	1	0
	Grains2Milk	2010/11	1	1	1	0	1	0
	MAADI	2011/12	3	2	2	0	3	0
	NCDEA	2009/10	0	3	3	0	3	0
	Systems Management	2009/10	2	3	2	1	3	0
	Plant Breeding	2010/11	0	0	2	0	0	0
	Future Decision Support	2010/11	0	0	1	0	0	0

FRDC	Abalone Aquaculture	2009/10	2	1	2	1	2	0
	Animal Health and Pests	2009/10	1	2	1	0	1	0
	Aquaculture Technology - Environmental	2009/10	1	2	1	1	1	1
	Biosecurity and Health (Salmon and SBT)	2012/13	1	2	1	0	1	0
	Diet Development	2009/10	2	2	1	1	1	0
	Ecologically Sustainable Development	2009/10	2	1	1	1	2	1
	Enhancing Wild Catch Fisheries	2009/10	1	2	1	1	1	1
	Environ. Impacts	2009/10	1	2	2	1	1	0
	Extension and Adoption	2012/13	2	1	3	1	1	1
	Food Safety	2009/10	1	1	1	1	2	0
	Habitat and Ecosystem Protection (A)	2012/13	2	2	1	1	1	0
	Habitat and Ecosystem Protection (B)	2012/13	1	2	1	1	1	0
	Innovation Skills (part A)	2012/13	1	2	1	0	1	1
	Innovation Skills (part B)	2012/13	1	1	1	0	2	1
	Leadership Development	2012/13	2	1	1		1	1
	Market Development & Trade Access	2009/10	1	1	1	2	1	1
	MPAs and Spatial	2009/10	1	2	1	0	3	1
	Population Dynamics - AFMA	2009/10	1	1	1	0	2	1
	Abalone, YTK, Oysters	2015/16	3	1	1	1	1	0
	Management	2015/16	3	1	2	1	1	0
	Governance and Regulatory Systems	2015/16	2	2	2	0	1	1
	Resource Access & Allocation	2015/16	2	1	1	0	1	1
	Enhancement, Nutrition and Health	2015/16	2	2	1	1	1	0
	Genetics	2015/16	3	2	2	0	1	0
	Systems & Production	2015/16	2	2	2	1	1	1
	Profitability	2015/16	2	1	1	1	1	0
	Consumers, Products and Markets (part A)	2015/16	2	1	1	2	1	0

	Population Dynamics - NSW	2009/10	1	2	1	0	1	0
	Population Dynamics - Tropical	2009/10	1	2	1	0	2	0
	Salmon Aquaculture	2009/10	2	1	1	1	2	1
	SBT Aquaculture	2009/10	2	2	2	2	2	1
	Strategic Planning	2009/10	1	1	1	1	1	0
	Workforce Development	2012/13	2	2	1	0	1	2
	Workplace Health and Safety	2009/10	1	1	1	1	2	0
	Workshops and Conferences	2009/10	1	3	1	0	1	0
FWPA	Exotic Pine Plantations	2011/12	1	1	1	2	0	0
	Myrtle Rust	2011/12	1	1	2	2	0	0
	MOE & MOR Assessments	2011/12	1	1	0	1	0	0
	Quality Tests	2011/12	0	1	1	0	0	0
	Roof Environments	2011/12	2	2	2	1	0	0
	Sound Resistance	2011/12	0	1	2	2	0	0
	LiDAR	2016/17	1	3	3	0	0	0
	e-Cambium	2016/17	1	1	2	1	2	0
	Case Studies	2016/17	1	1	0	1	0	0
	Cant-Opti	2016/17	1	0	2	1	0	0
	Generic Marketing	2015/16	n/a	0	n/a	n/a	0	n/a
	On Board Computers	2012/13	3	1	2	1	2	0
	Preservative Treatment	2012/13	1	2	1	0	1	0
	Formaldehyde	2012/13	1	1	1	1	1	0
	Construction Practices	2013/14	3	1	2	1	3	0
	Recycled Products	2013/14	1	2	1	1	3	1
	Molecular Breeding	2013/14	2	2	2	0	2	0
GRDC	Agronomy	2009/10	2	2	1	0	1	0
	Summer Coarse Grains Breeding	2009/10	1	2	1	0	1	0

	Wheat Breeding	2009/10	3	2	2	2	2	0
	Barley Breeding Australia	2012/13	2	1	1	1	1	0
	Soil Biology Initiative II	2014/15	2	1	3	1	1	0
	National Chickpea Breeding Program	2012/13	2	1	2	1	1	0
	Climate Champion Program	2012/13	1	1	2	1	1	1
	Lentil Breeding Program	2012/13	2	1	2	1	1	0
	Lupin Breeding	2011/12	2	2	2	1	1	0
	MCVP ph. 2 & 3	2013/14	3	1	2	1	2	0
	MCVP ph. 2,3 & 4	2014/15	3	1	2	1	2	0
	National Mungbean Improvement Program 2004-2016	2014/15	3	1	2	1	2	0
	National Mungbean Improvement Program	2010/11	3	2	2	1	3	0
	Partners in Grain	2011/12	1	1	2	0	1	2
	Soil Biology (Themes 1-3)	2009/10	2	1	3	1	2	0
	Triticale Breeding	2014/15	1	2	1	1	1	0
	ACPFG	2013/14	2	3	3	1	1	1
	Capacity Building	2009/10	1	1	1	1	2	1
	Dual Purpose Wheat Breeding	2013/14	1	1	1	0	1	0
	FACE	2013/14	1	2	2	0	1	0
	Future Farm Industries	2010/11	1	2	2	1	1	1
	Grain Research Updates	2010/11	1	1	2	1	1	0
	Grain Storage	2009/10	1	2	1	2	3	0
	Harrington Seed Destructor	2010/11	1	1	2	1	2	1
	Crop Nutrition	2009/10	2	1	2	1	n/a	1
	Managing Mycotoxins in Maize	2009/10	1	2	1	1	1	0
	Minor Use Chemicals	2010/11	2	1	1	1	3	0
	Molecular Markers	2009/10	3	1	2	1	2	0
	MPCN II	2012/13	2	2	1	1	2	0

	National Invertebrate Pest Initiative	2010/11	1	1	2	1	1	0
	National Variety Trials	2010/11	1	0	1	1	1	0
	Oilseeds Breeding	2009/10	2	2	1	0	2	0
	Premium Grains	2009/10	2	1	2	1	2	0
	Scholarships	2011/12	0	0	2	0	2	2
	Sorghum Pre-breeding	2012/13	3	2	2	1	2	0
	Water Use Efficiency	2013/14	2	1	1	0	1	0
	Weeds	2009/10	2	1	1	1	n/a	0
	WVCS	2010/11	n/a	0	n/a	n/a	2	n/a
HAL	Almond - Biosecurity and Market Access	2010/11	2	1	1	0	2	0
	Almond - Environment	2010/11	2	0	1	0	2	0
	Almond - Industry Development	2010/11	2	0	0	0	2	0
	Apple - Biosecurity and Market Access	2012/13	2	1	1	0	2	0
	Apple - Breeding and Biotechnology	2012/13	3	1	3	0	1	0
	Apple - Crop Production and Environment	2012/13	2	1	2	0	2	0
	Apple - Market Development	2012/13	1	0	1	0	1	0
	Apple - Plant Health	2012/13	2	1	2	0	1	0
	Banana - Biosecurity and Market Access	2011/12	2	1	1	0	2	0
	Banana - Breeding and Biotechnology	2011/12	2	2	1	0	2	0
	Banana - Crop Production and Environment	2011/12	1	1	1	0	1	0
	Banana - Post harvest, QA and Food Safety	2011/12	1	1	1	0	2	0
	Cherry - Quality, Market Development & Workplace Safety	2011/12	2	0	0	0	2	0
	Chestnut - Nut Rot Biology and Management	2011/12	2	1	2	0	2	0
	Citrus - Biosecurity and Market Access	2009/10	3	1	1	3	1	0
	Citrus - Breeding and Biotechnology	2009/10	3	1	0	1	1	0
	Citrus - Crop Production	2009/10	3	1	2	1	1	0
	Citrus - Plant Health	2009/10	3	0	2	2	1	0

	Citrus - Postharvest and Quality	2009/10	3	0	2	2	2	0
	Custard Apple - New Tree Training System	2011/12	2	1	1	0	2	0
	Dried Fruit - Breeding and Biotech (Grape, Prune, Apricot)	2010/11	3	1	2	0	2	0
	Dried Fruit - Crop Production (Grape, Prune, Apricot)	2010/11	3	1	2	0	2	0
	Dried Fruit - Industry Development (Grape, Prune, Apricot)	2010/11	2	1	3	0	1	0
	Lychee - Plant Health	2011/12	1	2	2	0	2	0
	Macadamia - Crop Protection	2010/11	2	1	2	1	2	0
	Macadamia - Market Research	2010/11	2	0	2	0	2	0
	Macadamia - Produce Handling and Quality	2010/11	1	2	1	0	2	0
	Macadamia - Technology	2010/11	3	1	0	0	1	0
	Macadamia - Varietal Improvement	2010/11	3	1	1	0	1	0
	Mango - Industry Development	2012/13	2	0	2	0	2	0
	Mushroom - Communication and Extension	2010/11	3	0	1	0	3	0
	Mushroom - Human Health	2010/11	3	0	1	0	2	0
	Mushroom - Human Health and Nutrition	2010/11	2	0	1	0	2	0
	Onion - Extension and Communication	2009/10	3	0	1	0	1	0
	Onion - Market and Supply Chain	2009/10	3	1	2	2	3	0
	Papaya - Genetic Improvement	2011/12	2	1	1	0	1	0
	Passionfruit - Genetic Improvement for Disease	2011/12	2	1	1	0	2	0
	Persimmon - Irradiation for Market Access	2011/12	2	2	1	0	3	0
	Pineapple - Phytophthora Management	2011/12	1	2	1	0	2	0
	Strawberry - Breeding and Biotechnology	2012/13	3	1	1	0	2	0
	Summerfruit - Breeding and Biotechnology	2011/12	1	1	1	0	2	0
	Summerfruit - Industry Development	2011/12	1	1	0	0	1	0
	Summerfruit - Plant Health	2011/12	2	1	1	0	1	0
	Summerfruit - Post Harvest and QA	2011/12	2	1	1	2	2	0

	Table Grapes - Biosecurity and Market Access	2010/11	3	2	2	3	2	0
	Table Grapes - Consumer Research and Market Analysis	2010/11	2	1	1	0	2	0
	Table Grapes - Industry Development Services	2010/11	3	1	2	1	1	1
	Table Grapes - Plant Health	2010/11	3	1	2	2	2	0
MLA	Market Access	2014/15	2	0	2	3	n/a	0
	Genetics and Genomics	2014/15	1	2	2	0	n/a	0
	Product Integrity	2015/16	3	1	2	3	2	0
	Market Access	2015/16	3	0	1	3	3	0
	Livestock Exports	2015/16	2	0	1	3	3	0
	Eating Quality	2015/16	3	1	1	0	3	0
	New Products	2015/16	2	1	3	0	1	0
	Export Beef Marketing	2015/16	2	1	1	0	2	0
	Export Sheepmeat Marketing	2015/16	2	1	1	0	1	0
	On-farm Productivity	2015/16	3	1	2	0	1	0
	Off-farm Productivity	2015/16	1	3	2	0	2	0
	Market Information	2015/16	3	1	3	0	2	0
	Animal Health	2015/16	2	1	2	0	2	0
	Feedlots	2015/16	3	1	2	0	2	0
	Goat Industry	2015/16	3	0	1	0	1	0
	On-farm Environment	2015/16	1	0	1	0	2	0
	Off-farm Environment	2015/16	0	1	1	1	1	1
	Animal Welfare	2015/16	1	1	1	1	2	0
	Eating Quality	2012/13	2	3	2	0	n/a	0
	New Products	2011/12	2	0	2	0	n/a	0
RIRDC	Agave	2011/12	1	2	2	0	1	1
	Bioenergy	2011/12	1	0	2	0	2	1
	Chalkbrood Control	2011/12	1	3	1	0	1	0

	Rice (Varietal Improvement)	2010/11	3	1	1	1	2	0
	Child Safety	2011/12	0	0	3	0	1	0
	Equine Amnionitis and Foetal Loss	2010/11	1	3	1	0	2	0
	Essential Oils	2012/13	2	2	1	2	1	1
	Ethical Foods	2009/10	1	0	1	1	1	1
	Farm Safety Studies	2011/12	0	1	3	0	2	0
	Fodder Crops	2013/14	3	3	1	3	3	0
	Global Challenges	2013/14	1	1	1	2	1	1
	Horse and Rider Health and Safety	2010/11	0	1	2	0	1	0
	Horses (2015)	2014/15	0	1	2	2	1	0
	Methane Recovery	2011/12	2	3	1	0	1	0
	Pasture Seeds	2012/13	1	2	1	0	1	0
	Rhodococcus equi	2010/11	1	1	2	1	1	0
	Simulation Exercise	2011/12	1	2	0	0	3	0
	SSF - Future Directions	2011/12	0	1	3	0	2	1
	Tasmanian Floral Database	2011/12	1	0	0	0	1	1
	Tea Tree – Biofilm	2010/11	1	1	2	0	1	0
	Tea Tree - Breeding & Cloning	2010/11	2	1	2	1	2	0
	Tea Tree – SCCP	2010/11	3	1	1	2	3	0
	Transparency	2009/10	1	0	0	2	1	0
	Transport/Neutrality	2009/10	1	0	1	1	1	0
	Wildflowers & Native Plants	2013/14	1	2	2	2	1	0
SRA	Climate Forecasting to Improve Nitrogen Management	2015/16	1	0	1	0	2	0
	Remote Sensing for Canegrub Management	2015/16	1	0	1	0	1	0
	Solving the Yellow Canopy Syndrome	2015/16	2	0	2	1	2	0
	Utilising Total Biomass	2015/16	0	1	1	0	0	0
	Best Practice IWM	2014/15	2	1	1	1	1	0

	Biomass Accumulation	2014/15	0	1	1	0	0	0
	Exotic Threats	2014/15	1	1	2	1	1	0
	Harvesting Best Practice	2014/15	3	1	2	1	3	0
	NFS: Appropriate Nutrient Management	2014/15	2	1	1	0	1	0
	Precision Agriculture	2014/15	2	1	1	1	1	1
SRDC	Climate Variability and Climate Change	2011/12	2	1	1	0	1	1
	Diagnostic Technologies for Genetic Screening	2012/13	1	1	1	0	1	0
	Disease Management	2010/11	3	1	2	2	3	1
	Enhancing Cost-Efficiency in Milling Systems: Juice Extraction and Whole of System	2012/13	1	1	2	1	1	1
	Enhancing Cost-Efficiency in Milling Systems: Juice Processing	2012/13	1	1	2	1	1	1
	Improved Capability for Leadership	2012/13	1	1	2	0	1	1
	Integrated Farming Systems to Improve Productivity	2011/12	1	2	1	0	1	1
	Rotation Crops	2010/11	2	1	2	1	2	1
	Soil Resources and Nutrients	2011/12	2	1	1	0	2	1
	Value Adding	2010/11	1	1	1	0	1	0
	Value Chain	2010/11	2	1	2	1	1	1
	Water Sustainability	2011/12	1	2	2	0	1	1
Wine Australia	Grapes & Wine - Wastewater Management	2012/13	1	0	2	0	1	0
	Grapes & Wine - Yeasts	2012/13	3	1	3	1	2	0
	Vine Health - Other Disease	2010/11	1	1	1	0	1	0
	Vine Health - Powdery Mildew	2010/11	2	1	2	1	0	0
	Vine Physiology - Nutrient Management	2009/10	1	2	1	1	2	0
	Wine - Microbiology	2013/14	3	1	2	1	2	0
	Wine - Problem Solving Capability	2011/12	3	1	2	0	0	0

(a) Cells highlighted in green indicate the where clusters have received the maximum subjective rating against one of the CRRDC communication themes.

(b) n/a: not available