



# An Economic Analysis of GRDC Investment in the Climate Champion Program



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## Executive Summary

The investment in the Climate Champion initiative funds and supports farmers to take a role in improving communication with other Australian farmers on climate risk management. The investment, a component of the Managing Climate Variability Program (MCVP), is expected to produce a number of benefits some of which have been valued in this analysis. The total investment of \$1.09m (present value terms) has been estimated to produce total gross benefits of \$3.14m (present value terms) providing a net present value of \$2.05m, a benefit-cost ratio of 2.89 to 1 (over 30 years, using a 5% discount rate) and an internal rate of return of 79%.

The Climate Champion Program (CCP) began in 2009 and currently funds 34 participants; 15 funded by MCVP, 15 by GRDC and 4 by Meat and Livestock Australia (MLA). (MLA numbers include a vacancy currently being filled). The average annual investment in each champion of about \$8,000 covers their training, media support, and an honorarium recognising their time input. Empowering enthusiastic farmers to take a prominent role in communication recognises that other farmers are generally recognised as the main source of information for farmers undertaking practice change. The Program operates in an environment where there are conflicting and contentious views on climate change and where there has been a decade of exceptional climate variability. The Program has given high priority to media activity to create awareness of how farmers are taking practical steps to adapt to climate risks. A recent "Meet the Press" was a highlight. There has been less focus on activities related to climate change mitigation, a response by the participants in CCP to what was seen as limited relevant information and demand.

The evaluation relied on a questionnaire completed by the participants in CCP to determine how they carried out their role and to provide information on their focus and impact. The participants typically had a high local or industry profile. They were in demand to present on their experiences, particularly using their farm as a case study, and for their capacity to promote credible sources of information including the latest research. They were also in demand from a wide range of organisations to obtain feedback on their various activities. Their priorities were diverse. They generally concentrated on adding value to practices such as no-till which were already widely adopted. Using seasonal forecasts for example was seen as an opportunity to change planting decisions or manage grazing pressure, and in the process develop capacity to adapt to climate change.

The questionnaire included priority targets for their activities. "Farmer groups" was the one most nominated. The participants in CCP concentrated their effort on demonstrations, field days and workshops.

It was recognised in the evaluation that there were numerous programs promoting improved climate risk management, the point of difference in this case being the role played by farmers in communicating with farmers. As an example of the challenge to build on what is already being achieved, a survey showed that in 2011, 81 percent of Victorian farmers were aware of ENSO as a climate driver and agreed it affects their local district seasonal rainfall.

There are a diverse range of industries and regions represented by the 34 participants in CCP. Recognising the difficulties in estimating benefits from a novel

extension-type program that had only been in progress for a short time, the adoption and benefit assumptions were considered in the context of other past evaluations, particularly of MCVP. Using the coverage of the GRDC Southern Region as a base, the overall Program was estimated to have about 40 percent national coverage. Adoption of up to one percent of the coverage was assumed. Benefits were reduced to one half of that assumed for a previous evaluation of MCVP.

Benefits from the CCP were assumed to decline following completion of the current investment. The assumption, a key one as shown by a sensitivity analysis, was that there would be limited enduring increase in farmer capacity to independently respond to the changing opportunities for managing seasonal risks. Further, the 34 CCP participants themselves are unlikely to be able to sustain their own skill base, capacity and influence much beyond 2013 without additional resources.

A focus on estimating impacts from the perspective of the potential beneficiaries would have been desirable but was beyond the scope of this evaluation. Aspects warranting better information include the place of the Climate Champions Program within the diverse sources of information of varying credibility used by farmers, and particularly given the inherent complexities and the varied perceptions on climate variability and change. Given the limitations on the information used to assess benefits, the evaluation can only provide information with low confidence. It follows that the evaluation can provide little guidance on the merits or otherwise to this approach to improved climate risk management. More positively the Program has developed the participants as an important source of case studies to raise awareness of practical approaches being taken to respond to climate variability and adapt to climate change. To that extent, the approach should be viewed as a valuable complement to approaches promoting the science in isolation from its application.

A summary of the benefits from the current investment is shown in the following table.

<b>Levy Paying Industries</b>	<b>Spillovers</b>		
	<b>Other Industries</b>	<b>Public</b>	<b>Foreign</b>
<u>Economic benefits</u>			
Productivity gains by farmers resulting in higher average profits	Some productivity gains	Improved research resource efficiency	
Improved research resource efficiency			
<u>Environmental benefits</u>			
Greater adoption of farm practices that improve farm environmental sustainability	Some environmental sustainability improvements	Improved environmental sustainability	
<u>Social benefits</u>			
Improved industry viability due to greater industry preparedness and capacity to adapt to climate change		Improved community viability and stability due to greater preparedness by farmers	

# 1. Introduction

The Climate Champion Program (CCP) is part of the Managing Climate Variability Program (MCVP). The MCVP is a joint program of the current partners, DAFF, GRDC, MLA, RIRDC, and SRDC. The MCVP aim is to help farmers and natural resource managers manage the risks and exploit the opportunities afforded by Australia's variable and changing climate by:

- improving forecasting accuracy, lead-time and ease of use
- providing tools and services for managing climate risk
- getting more farmers managing their climate risk.

GRDC manages CCP through a part time Coordinator. The GRDC took over the management of the program in mid 2009 after the demise of Land and Water Australia at the end of June 2009. The Communication Strategy of MCVP is also managed by GRDC.

There are some differences in emphasis between MCVP and GRDC in relation to climate change mitigation aspects. MCVP places more emphasis on managing climate risk, in particular climate variability as a key aspect of adapting to climate change. This evaluation did not undertake any disaggregation to take these differences into consideration, but did survey participants on their activities in relation to climate change.

The CCP funds 34 primary producers interested in managing climate variability and climate change. The participants in the Program are expected to extend knowledge of climate impacts and climate research and increase adoption of tools and practices for improved management of climate. This objective of the Initiative is in line with the objectives of the GRDC Climate Change Communication Strategy.

The GRDC Communications Strategy includes four sub-strategies other than the Climate Champions Initiative. These other strategies include:

- A knowledge audit whereby climate research projects are reviewed and a 2 page plain English summary is written.
- Adviser partnerships where extension, agribusinesses and consultants are invited to share climate information with growers and researchers.
- Advocacy to promote GRDC climate research to decision makers.
- Monitoring and evaluation where the campaign is evaluated regularly to make sure it is achieving its objectives and where there is an end of campaign evaluation of strategies.

The CCP integrates these strategies by providing access to research findings, linking participants with researchers and advisers, providing feedback to fact sheets and research tools and in monitoring and evaluation of communication strategies.

The specific objectives of the CCP are:

- To raise awareness and knowledge about the impacts of climate on regions and farm businesses
- To integrate and disseminate knowledge from relevant climate research
- To increase adoption of practices and tools for better managing climate

In all there are currently 34 Climate Champion positions. These are funded in three ways:

- 15 funded by MCVP
- 15 funded by GRDC
- 4 funded by Meat and Livestock Australia (MLA)

## 2. Description of Project Investment

The first investment that was instrumental in establishing the initiative (hereafter termed the Climate Champion Program, the Program or CCP), can be traced back to the GRDC's Issues Based Communication Campaign (2009) where Econnect Communication was charged with the development of a communication strategy for GRDC activities relating to climate adaptation and mitigation (Project ECO00002). The cost of the strategy development was \$17,250 (Kylie Paulsen, pers. comm., 2012), of which the CCP made up only one of 5 major overall strategies (Jenni Metcalfe, pers. comm., 2012).

The next investment was Project ECO00003 which was concerned with the implementation of the climate communication strategy, a part of which was associated with the CCP. The CCP component involved selecting the initial 15 champions, writing profiles and case studies for the selected champions, media and skills training for the champions, liaison, media releases, regional briefings, and a launch and induction workshop in Canberra (Sarah Cole, pers. comm., 2012). These activities were funded to the extent of \$199,450 and covered the period from July 2009 to December 2010.

Because the CCP was seen to be operating successfully, further funding was allocated with GRDC Board approval to extend the program for two years to December 2012 (ECO00005).

During this period of GRDC funding, the wider MCVP (now managed by GRDC) funded a Managing Climate Variability Communication Plan from July 2010 to June 2013 (MCVP00014). A component of the implementation of this plan was dedicated to an expanded CCP, with a further 15 climate champions selected and drawn from a range of industries supported by the MCVP (and including some who also produce grains). In a separate contribution, MLA funded a further four meat producers as champions, bringing the total number of climate champion positions to 34. Applicants are currently being sought to fill a vacancy which will be for a MLA position in northern Australia.

Previous to MCVP00014, MCVP funded some activity regarding the establishment of their Climate Champion program in 2009-2010 (MCVP Phase 2). This was funded as part of the Econnect Communication support for MCVP Phase 2 and covered nominations, induction workshops, case studies, payments to the participants in the Program, media articles etc.

The project funding included management of the national network of participants by Econnect, as well as payments to the participants, communication support, workshops and media activity. A summary of the Climate Champion sources of funding by GRDC, MCVP and MLA is provided in Table 1.

Table 1: Funding Sources for Climate Champion Program

<b>Investment Code</b>	<b>Service</b>
ECO 00002	Development of Issues Based Communication Campaign: Climate Champion component of Climate Communication Campaign Strategy
ECO 00003	Climate Champion component of the Implementation of the Climate Communication Campaign Strategy
ECO 00005	Management of the GRDC Climate Champion Program in conjunction with the MCVP Climate Champion Program
MCVP2	Component of MCVP Communication strategy 2009-2010
MCVP00014	Component of Development and Implementation of Managing Climate Variability Communication Plan and Budget including MLA added funding

Table 2 provides estimates of the annual funding of CCP by financial year.

Table 2: Project Investment in the Climate Champion Program

<b>Investment code</b>	<b>Year ended 30 June</b>				<b>Total</b>
	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	
ECO00002	17,250	0	0	0	17,250
ECO00003 (a)	132,967	66,483	0	0	199,450
ECO00005 (b)	0	85,000	170,000	85,000	340,000
MCVP2 (c)	78,437	0	0	0	78,437
MCVP00014 (d)	0	124,000	124,000	124,000	372,000
MLA	0	32,000	32,000	32,000	96,000
<b>Total</b>	<b>228,654</b>	<b>307,483</b>	<b>326,000</b>	<b>241,000</b>	<b>1,103,137</b>

(a) The GRDC CCP initial implementation budget of \$199,450 was funded from the GRDC Climate Change Communication Strategy from July 2009 to December 2010, a period of 18 months. The twelve month period to June 2010 is therefore taken as 2/3 of this amount with 1/3 taken for the year ended 30<sup>th</sup> June 2011.

(b) Year ended June 2013 funded only to December 2012.

(c) As budgets included other items not related to CCP funding, the CCP component was estimated as 25% of \$63,700 plus 100% of \$38,000 plus 25% of \$98,050.

### CCP Participants

Table 3 provides details of the participants in CCP including their affiliation in terms of R&D Corporation or Program funding.

Table 3: The Participants in CCP

<b>Name</b>	<b>Main Commodities</b>	<b>Affiliation (GRDC Region if GRDC funded, or whether MCVP or MLA)</b>	<b>Location</b>
1. Andrew Carmichael, NSW	Grains	Southern	Coolamon
2. Anthony Gordon, NSW	Grains	Southern	Forbes

<b>Name</b>	<b>Main Commodities</b>	<b>Affiliation (GRDC Region if GRDC funded, or whether MCVP or MLA)</b>	<b>Location</b>
3. Bill Hunt, NSW	Grains & sheep	Southern	Bordertown
4. Bill Yates, NSW	Grains & grazing	Northern	Garah
5. Bruce Saxton, Vic	Grains & beef	Southern	Corryong
6. Colin Dunne, Qld	Grains & beef	MCVP	Capricornia
7. David Bruer, SA	Grape and Wine	MCVP	Strathalbyn
8. David Cattanach, NSW	Grains	Southern	Darlington Point
9. David Drage, Vic	Grains & sheep	Southern	Warracknabeal
10. David Smith, Vic	Grains & sheep	Southern	Birchip
11. Fleur Grieve, WA	Grains	Western	Ajana
12. Jennifer Hawkins, NSW	Grains (rice) and sheep (lambs)	MCVP	Finley
13. John Ive, NSW	Beef and sheep	MCVP	Southern Tablelands
14. John Scotney, WA	Grains & sheep	Western	Dandaragan
15. Kryteen McElroy, SA	Grains, grapes & livestock	MCVP	Padthaway
16. Kym Fromm, SA	Grains & sheep	Southern	Orroroo
17. Leslie & Alice Roberts, NSW	Beef	MLA	Dyers Crossing
18. Linton Brimblecombe, Qld	Grains & horticulture	MCVP	Lockyer Valley
19. Lynne Strong, NSW	Dairy	MCVP	Illawarra
20. Mark & Andrea Hannemann, SA	Grains, legumes & sheep	MCVP	Cleve
21. Matthew Pitt, Tas	Beef, sheep & essential oils	MCVP	Hamilton
22. Michael Waring, Qld	Sugar	MCVP	Ingham
23. Paul Miller, SA, Vic & WA	Grapes & horticulture	MCVP	Boort and Yarra Valley
24. Pele Cannon, NSW	Bees	MCVP	Urila
25. Peter Holding, NSW	Winter crops & wool lambs	MCVP	Harden
26. Peter Horwood, WA	Grains and livestock	Western	West Mingenew
27. Peter Whip, Qld	Beef	MLA	Longreach
28. Robert Quirk, NSW	Beef & sugarcane	MCVP	Tweed River
29. Royce Taylor, WA	Grains &	Western	Lake Grace

Name	Main Commodities	Affiliation (GRDC Region if GRDC funded, or whether MCVP or MLA)	Location
	sheep		
30. Sam Hamilton, NSW	Beef & sheep	MLA	Rylstone
31. Simon Wallwork, WA	Grains & cattle	Western	Corrigin
32. Susan Carn, SA	Grains & sheep	MCVP	Flinders Ranges
33. Susan Findlay Tickner, Vic	Grains	Southern	Wimmera and Balmoral
34. Vacancy	Beef	MLA	

### 3. Activities and Outputs

A summary of the actual (to date) and expected activities and outputs from the CCP is reported in Tables 4 and 5.

Table 4: Summary of Actual and Expected Outputs (Econnect)

<b>Actual and Expected Outputs</b>
<p><u>Activities and Outputs (Econnect)</u></p> <ol style="list-style-type: none"> <li>1. Selection of the 16 GRDC sponsored Climate Champion participants.</li> <li>2. Management of national network of Climate Champion participants including financial payments to them.</li> <li>3. Econnect Communication personnel visited the farm of each CCP participant.</li> <li>4. Interviews were held with each and footages and photographs of their farming systems and farm practices were taken. The associated information on each participant was used for media purposes and for case studies on the climate kelpie web site. <a href="http://www.climatekelpie.com.au/ask-a-farmer/climate-champion-program">http://www.climatekelpie.com.au/ask-a-farmer/climate-champion-program</a></li> <li>5. Regional workshops with the participants were conducted by Econnect to assist the participants with presentation and media skills.</li> <li>6. An online social networking site was developed for the use of the participants.</li> <li>7. Econnect personnel have continually communicated with the participants to monitor their activities and give assistance with presentations and media work.</li> <li>8. Econnect created and maintained strategic links with industry experts and government departments' staff and ministers.</li> <li>9. Econnect produced banners and posters to promote the Climate Champion Program.</li> </ol>

Table 5: Summary of Examples of Participant Activities and Outputs

<b>Articles for the media</b>	<ul style="list-style-type: none"> <li>• Rural newspaper interview on the Drought Pilot Program.</li> <li>• Prepared a newspaper article that goes to 3,000 rural mail boxes.</li> <li>• An interview with ABC Country Hour's on water harvesting.</li> <li>• Prepared a rural newspaper article "Champion of Change".</li> <li>• Prepared a newspaper article "Climate Champion Bounces Back".</li> <li>• Prepared a newspaper article on Eureka Awards and the Climate Champion program.</li> <li>• Contributed to a climate change adaptation article for rangeland management.</li> </ul>
<b>Field days and Study tours</b>	<ul style="list-style-type: none"> <li>• Conducted field days on various topics including production techniques for drier climate, weather pattern changes and weather charts interpretation.</li> <li>• Hosted over 344 people for farm and water harvesting tours.</li> <li>• Conducted a Study Tour on farming systems and innovation.</li> <li>• Attended a Field day and ran the CCP stand.</li> </ul>
<b>Bureau of Meteorology (BOM) feedback</b>	<ul style="list-style-type: none"> <li>• Discussed BOMs' view on Climate Change with a BOM researcher.</li> <li>• Met with a BOM employee to discuss web design and professional forecasts.</li> <li>• Completed Bureau of Meteorology's survey on the Seasonal Climate Outlook and ENSO Wrap-up reporting and distributed survey.</li> <li>• Attended Landcare meeting with guest speaker from BOM.</li> </ul>
<b>Grazing Management</b>	<ul style="list-style-type: none"> <li>• Advised of pasture model limitations when used with expected climate change conditions.</li> <li>• Published an article titled "<i>Soil moisture under climate change</i>" in the Grassland Society of NSW Newsletter.</li> <li>• Presented to 30 amateur beekeepers on how climate change will affect honeybees and the Honey Industry in Australia.</li> <li>• Presented on "Adaptive capacity of our farm during the last drought".</li> </ul>
<b>Carbon Farming Initiative</b>	<ul style="list-style-type: none"> <li>• Attended a carbon farming initiative (CFI) briefing in Canberra.</li> <li>• Attended an AWI meeting on the role of sheep in the carbon cycle.</li> <li>• Presentation on <i>The ins and outs of Carbon</i>.</li> <li>• Conducted a workshop on Carbon Farming.</li> <li>• Shared information on the potential positive economic outcomes of carbon sequestration.</li> </ul>
<b>Grain Industry</b>	<ul style="list-style-type: none"> <li>• Attended a No-till Farmers Conference and networked with farmers.</li> <li>• Attended a GRDC Panel field day.</li> <li>• Attended GRDC Panel Advisory Group meeting.</li> <li>• Attended AGM of Conservation Agriculture &amp; No-till Farming.</li> </ul>
<b>Networking (General)</b>	<ul style="list-style-type: none"> <li>• Promoted the CCP and Climate Kelpie at a local Area Network.</li> <li>• Attended a Landcare NSW meeting on 29<sup>th</sup> November 2010.</li> <li>• Attended an Agricultural Excellence Annual State Forum.</li> <li>• Promoted the CCP to the MacKillop Farm Management Group.</li> </ul>
<b>Adapting to Climate Change</b>	<ul style="list-style-type: none"> <li>• Attended a workshop on approaches to climate risk management.</li> <li>• Attended workshops in the Murray Darling Basin area to promote discussion on the effects of climate change on their resource base.</li> <li>• Conference on improving resilience of farming communities.</li> <li>• Attended a Webinar titled "Adaptation to Climate Change-How is it different to normal?"</li> <li>• Attended a "Regional Climate Change Vulnerability Assessment" and discussed adaptation requirements for different sectors.</li> <li>• Gave a presentation on "Irrigation in a Changing Climate" and also spoke on ABC's Rural Radio.</li> <li>• ABARE Regional Conference on managing climate change.</li> </ul>

In summary, the principal actual and expected outputs from this investment were a series of contacts with primary producers and others through a range of forums including:

- meetings and networking with other farmers and Landcare groups
- attendance at workshops and field days
- conducted field days and farm walks
- discussions with researchers
- participation in study tours
- advisory group meetings
- presentations at conferences
- published articles in newspapers and newsletters and produced brochures
- discussions with politicians
- attendance at CFI briefings
- attendance at meetings of industry groups
- interviews with newspapers and ABC Country Hour

## 4. Outcomes

A summary of the expected outcomes from the investment is presented in Table 6.

Table 6: Summary of Expected Outcomes

<b>Expected Outcomes</b>
<p><b>FARM LEVEL</b></p> <ul style="list-style-type: none"> <li>• An increased use of weekly and seasonal weather forecasts in decision making by grain producers.</li> <li>• Improved decision making on variety choice (early, late maturing with regard to frost), time of planting, nitrogen use, storage capacity, marketing decisions etc.</li> <li>• Improved decisions leading to reduced replanting costs, increased yields, improved grain quality, reduced storage spoilage etc.</li> <li>• Increased awareness of the CCP and the Climate Kelpie website which are reliable sources of information on climate impacts, climate research and climate adoption tools to help improve climate management.</li> <li>• Increased interaction between participants and industry stakeholders including growers, consultants and government personnel, among others.</li> <li>• Improved pest management by producers.</li> <li>• Improved and more efficient water harvesting and use by farmers.</li> <li>• Increased awareness of carbon sequestration and therefore more preparedness to utilise any arising opportunities from the CFI.</li> <li>• Increased adaptive capacity to drier climate.</li> <li>• Increased awareness of climate change impacts on honeybees and the honey industry.</li> <li>• Better construction of internal electric fencing to facilitate rotational grazing with better pasture utilisation by stock.</li> <li>• Increased awareness of and better use of mineral fertilisers (e.g. molybdenum trioxide), compost and compost tea for pasture improvement.</li> <li>• More informed decisions that will help farmers to better respond to climate change risks.</li> </ul> <p><b>SCIENTIFIC LEVEL</b></p>

<b>Expected Outcomes</b>
<ul style="list-style-type: none"> <li>• Increased focus by those involved in climate variability research on issues and decisions confronted by farmers.</li> <li>• Greater attention given to the development of information and decision aids that are useful and usable by farmers.</li> </ul>

In summary, the principal outcome from this investment is a higher number of farmers benefiting from improved management of climate variability and climate change.

## 5. Benefits

### Overview of Benefits

An overview of benefits in a triple bottom line categorisation is shown in Table 7.

Table 7: Categories of Benefits from the Investment

<b>Levy Paying Industries</b>	<b>Spillovers</b>		
	<b>Other Industries</b>	<b>Public</b>	<b>Foreign</b>
<u>Economic benefits</u>			
Productivity gains by farmers resulting in higher average profits	Some productivity gains	Improved research resource efficiency	
Improved research resource efficiency			
<u>Environmental benefits</u>			
Greater adoption of farm practices that improve farm environmental sustainability	Some environmental sustainability improvements	Improved environmental sustainability	
<u>Social benefits</u>			
Improved industry viability due to greater industry preparedness and capacity to adapt to climate change		Improved community viability and stability due to greater preparedness by farmers	

### Public versus Private Benefits

The benefits identified from the investment are predominantly private benefits, namely benefits to farmers belonging to those industries that are supporting the MCVP. There will have been some small public benefits potentially produced, mainly environmental in nature from changes to practices that interact negatively with climate variability.

### Benefits to other Primary Industries

Private spillover benefits are likely to be captured also by farmers from industries not supporting the MCVP.

### Distribution of Benefits along Supply Chains

Some of the potential benefits from more profitable production of commodities will be shared along the supply chain with processors and consumers.

### Benefits Overseas

Industries in overseas countries or overseas consumers are unlikely to benefit.

### Match with National Priorities

The Australian Government's national and rural R&D priorities are reproduced in Table 8.

Table 8: Current National and Rural R&D Research Priorities

Australian Government	
National Research Priorities	Rural Research Priorities
1. An environmentally sustainable Australia	1. Productivity and adding value
2. Promoting and maintaining good health	2. Supply chain and markets
3. Frontier technologies for building and transforming Australian industries	3. Natural resource management
4. Safeguarding Australia	4. Climate variability and climate change
	5. Biosecurity
	<i>Supporting the priorities:</i>
	1. Innovation skills
	2. Technology

The investment addresses National Priority 1. Rural Research Priorities 1, 3 and 4 are all addressed by the investment

### Additionality and Marginality

The investment in this project was targeted principally towards benefits to farmers. The investment would have been regarded as a medium priority by levy payers. In the event that public funding was restricted, it is likely that the project would have still been funded by GRDC at some level, assuming the MCVP and a levy system was still in place. Some of the limited public spillovers that have been identified would therefore still have been delivered.

If no public funding at all had been available, it is likely that the investment would have been curtailed to less than 50% of what GRDC actually funded. This would have been associated most likely with a significantly reduced rate of adoption. Further detail is presented in Table 10.

Table 10: Potential Response to Reduced Public Funding

1. What priority were the projects in this cluster when funded?	Medium
2. Would industry have funded this cluster if less public funding were available?	Yes, but with a lesser amount

3. To what extent would industry have funded this cluster if only industry funds were available and no public funds?	Less than 50% of that actually funded
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## 6. Pathway to Adoption

The Program’s objective relevant to adoption is:

- To increase adoption of practices and tools for better managing climate

The objective corresponds to a more general one of improving climate risk management - an objective shared in some respects with several other programs operated by various agencies. The key difference is the lead role that farmers have in the Climate Champions Program compared with most other programs. As the GRDC Farmer Survey reported (IPSOS 2010) “The most common source of information for growers regarding farming practice change is their peers, other growers at 18%”. It could be expected that in addition to other pathways there would also be autonomous adoption by farmers building on the research undertaken over the last two decades into improved climate risk management.

The Program has given priority to developing the participants in the CCP through a range of training activities to enhance their capacity as facilitators of practice change. Through development of their skills they could be expected to be empowered to be more effective in working with other farmers and providers of information to farmers. This approach contrasts to more traditional top down linear pathways or direct farmer involvement in research.

In this section and the following section on benefits, the separate contribution made by the Program will need to be estimated. Examples of other activities include the National Adaptation Mitigation Initiative (GRDC 2010) and the expansion of extension services to Victorian farmers to include climate risk management. A 2011 survey of Victorian farmers showed an increase to 25 percent, up from 17 percent in 2009, in the proportion of Victorian farmers receiving climate information from the Victorian DPI (Anderson et al 2012). The Victorian Department has also developed the capacity of existing industry programs to more effectively incorporate climate risk management. Developing this existing pathway recognises that there is a wide range of existing technologies such as no-till that help farmers adapt to climate variability and change. In addition with the increasing proliferation of delivery channels there will be a diverse range of approaches available to the CCP participants. But in general they will be adding value to existing technologies.

The exceptional range of activities and outputs from the Program has been outlined in previous sections. The scope included from interacting with individual farmers in their district and industry to a recent national audience on “Meet the Press”.

The pathways to adoption developed by the Program result directly from the activities of the participants in CCP together with the range of communication and support activities undertaken by Econnect. For example, there were 186 media items over a 12-month period since March 2010— an average of one item every two days. The Climate Kelpie website has a wide range of information on climate risk management and includes interviews with participants in CCP. In the six months to 30 June 2011, 5,384 visitors looked at 13,725 pages on Climate Kelpie (GRDC 2011).

This investment through its regional and industry coverage potentially has national scope. In addition much of the communications activity is delivered through national media and through industry-wide media such as “Ground Cover” for the grain industry. The participants in CCP clearly are an efficient way for regional and national media to source farmer content and case studies on a wide range of climate topics.

### Survey of Activities of CCP Participants

The 33 current participants in the Program were emailed a questionnaire to provide a basis for further defining the pathways to adoption and also for estimating benefits as detailed in the following section. Participants were given a choice of a telephone interview as an alternative. There were 27 respondents in the time available – a favourable response rate considering that May is a busy period on-farm, particularly for grain farmers.

The targets for activities undertaken by the participants were assessed through their ranking of their top five priorities for the 14 potential targets in Table 11. The ranking of targets was in terms of their estimates of proportions of their time allocation to the Program. The results show that “farmers in groups” was the highest ranked target priority followed by “individual farmers”.

Table 11: Ranking of Target Audiences  
(from the top five rankings made by the participants in CCP of their time allocations)

<b>Top five ranked</b> (in descending order)	<b>Next five ranked</b> (in descending order)	<b>Others</b> (in descending order)
<ul style="list-style-type: none"> <li>• Farmers (members of groups)</li> <li>• Farmers (individual basis)</li> <li>• Farmers in general</li> <li>• NRM groups</li> <li>• Advisers/Consultants</li> </ul>	<ul style="list-style-type: none"> <li>• Researchers</li> <li>• Mixed audience</li> <li>• Policy developers (industry, government)</li> <li>• Schools and other education</li> <li>• Extension personnel</li> </ul>	<ul style="list-style-type: none"> <li>• Politicians</li> <li>• Urban consumers</li> <li>• Womens groups</li> <li>• Other</li> </ul>

In response to a question on the preferred sources of information on climate risk management for farmers in their area, demonstrations including field days ranked highest followed by information from their farm advisers and extension officers. Short workshops were also well ranked. Other sources such as the Climate Kelpie website and publications were not highly rated. In response to a question on which source was seen as most useful in their role, the “demonstrations” source was mentioned more than twice as often as any other source.

As would be expected the results are consistent with those from the GRDC Grower Survey (IPSOS 2010) on the influence of various sources in motivating change on-farm. The Grower Survey stated *“Local contacts and support networks (agronomists, other growers, etc) are the most trusted sources of information and advice, and are highly influential in growers’ farm management decisions”*. For that survey, grower groups, field days, rural weeklies and leading growers in their district were all mentioned as influential (from a prompted list) by 90 or more percent of growers. The Climate Champion selection criteria included leadership aspects. The GRDC Survey did ask how many growers had heard of the Climate Champion

Program. Only 12 percent had, but the survey was conducted soon after the CCP launch.

**Climate risk management activities**

A further question in the survey identified the focus of their activities in the Program in terms of various aspects of climate risk management. As shown in Table 12, in terms of single issues adaptation to climate change was a clear priority followed by seasonal forecasts and activities relating to their development of skills to carry out their role.

Table 12: Focus of Activities by participants in CCP  
(by their estimated time allocation)

<b>Focus of Climate Champion Activities (in terms of time allocation)</b>	<b>Number of Respondents ranking highest</b>
Various combinations of forecasts	8
Climate change - adaptation	8
Weather forecasts	5
Seasonal climate forecasts	3
General skills development	3
Climate change – mitigation	0
Multi-week forecasts*	0
Total Respondents	27

\*As listed in Climate Kelpie but excluding the experimental forecasts under development for POAMA by the Bureau of Meteorology

There is some overlap between topics such as “Seasonal Forecasts” and “Adaptation to Climate Change”. Responses indicated that many of the respondents saw better management of climate variability by taking account of seasonal forecasts as one of the favoured ways to respond to a changing climate. There is an inherent assumption that seasonal forecasts are taking into account the changing climate. In the evaluation of MCVP (Agtrans Research and AGECE Consulting, 2007) an allowance was made for a possible decline in skill of statistical forecasts together with a perception that skill had declined. Adaptation also includes a wide range of other practices relating for example to improved management of soil moisture by no-till or improved pasture management through more flexible stocking strategies.

Potential confusion on the drivers of practice change is a further factor to consider. The overlap between adapting to climate change and managing climate variability is also evident in responses to the GRDC Grower Survey (IPSOS). Of the 60 percent who have adopted new practices to manage climate variability or climate change, the top three practices are:

- Stubble retention (19 percent)
- No till cropping (14 percent)
- Plant / sow crop earlier /later /around weather conditions / soil moisture (13 percent).

As shown by Llewellyn and D’Emden (2010), the adoption of no-till is as high as 90 percent of farmers in some regions and at a plateau. Reduced fuel and labour costs, soil conservation and moisture retention are the most commonly stated reasons for adoption of no-till by farmers in Australia. These practices have been increasingly adopted, in some cases over several decades, in response to a wide range of factors often somewhat separable from climate risk management. Any increases in benefits over the last more variable decade would have often been seen as a bonus.

The topics that are emphasised by the participants in CCP will also determine the preferred pathways that need to be followed to increase awareness and adoption of relevant practices. For example, the promotion of seasonal forecasts may involve

familiarising farmers with the Climate Kelpie website or field scale demonstrations of how to implement more flexible cropping or grazing systems.

In response to a question on "How do farmers in your area prefer to get information to assist with climate risk management?", the preferred ways were by demonstrations. "From their farm advisers or extension officers" and from "demonstrations and short workshops" also ranked highly. In response to which source was seen as most useful for them to promote in their Climate Champion role, over half nominated "demonstrations and short workshops".

In summary, the survey information shows that the Climate Champion Program has used a diverse range of topics and pathways to adoption relevant to climate risk management. The Program is in general concentrating on the various sources that growers see as having most influence in motivating change on-farm. In particular, using farmers themselves as the pathway for other farmers to access information is recognised as generally highly effective and is the point of difference for the Program. However without data from farmers benefiting from the activities of the participants in CCP, the extent to which the activities are driven more by the varied interests of the participants in CCP or by the demand from potential users is not clear.

## 7. Measurement of Benefits

In this section, estimates will be made of the benefits to be measured together with an outline of other benefits where measurement was not feasible. As further discussed in the following, benefits from mitigating climate change were not assessed. The identification of the benefits accruing to the Climate Champion Program needs to take into account benefits from the many other investments contributing to improved climate risk management. The number of farmers potentially benefitting from the program also needs to be identified in terms of the extent of national coverage being achieved by the CCP. The table at the end of this section summarises assumptions made.

In common with various approaches to extension and technology transfer, quantitative evaluation is exceptionally difficult for programs of this nature. Diffusion of information is via multiple pathways and it is usually not possible to attribute practice change to specific activities. The estimates of benefits in this evaluation are made more difficult because the approach is novel and the Program only began in late 2009 and was not launched until March 2010. Subjective estimates of low confidence will be made of the possible benefits, but on their own they will not be a reliable guide to the merits of the CCP approach to improved climate risk management.

### **Benefits measured**

In accordance with previous evaluations, the main benefits to be measured are the increased profits to farmers that can be attributed to activities of the CCP leading to improved climate risk management. The assessment will need to take into account benefits that should be attributed to other investments that are contributing to improved climate risk management.

### **Benefits not measured**

Improved climate risk management also contributes to environmental and social benefits, for example from reduced erosion and nutrient loss, and through improved drought management. The potential to reduce or at least have greater control over income variability is an important aspect that also has likely community benefits. Increased capacity of the participants in CCP and of farmers influenced by the program is also relevant. The participants in the CCP have benefited through improved understanding and development of skills. The questionnaire listed five statements requesting which was closest to their view of the likely benefits being achieved in their area from the CCP. About one half selected:  
*"Being part of the Program has made a big difference to my understanding of the opportunities to improve climate risk management and in being able to share that with farmers and researchers in my industry."*

There are also expectations that the Program will contribute to the development of R&D priorities from better stakeholder feedback. The survey requested examples and most respondents were able to provide specific examples. Many examples were on feedback to the BOM on various aspects of forecasts. The network of CCP participants is already seen by other organisations as an important avenue for efficient and credible consulting with various stakeholders. However, the benefits from more effective consultation on priorities are likely to be more longer term and have not been evaluated in the context of other avenues for consultation.

### **Climate change mitigation benefits**

The initial selection criteria as reflected in advertisements for GRDC-appointed participants, focussed on both climate change and variability. For later MCVF appointees the focus was more general on climate variability but in the context of adapting to a changing climate (Beverley Henry, pers. comm., 2012).

As discussed in the previous section, some practice changes are seen as managing climate variability and also as helping adapt to climate change. For the practices in question relating for example to aspects of no-till or to grazing management the distinction will not be material. Benefits are typically increased profitability in the short term. For mitigation, benefits are longer term and more uncertain. No participants nominated mitigation as their highest priority in terms of time allocation to CCP activities. Whilst a clear majority of the participants in CCP recognised that climate change was already a real threat to their own farm business, they assessed that on average only 38 percent of the farmers in their area and industry saw that climate change was already a threat or would be. The GRDC Grower Survey reported that 39 percent agree that climate change is posing a real threat to farm business. In the GRDC Survey, for the Southern Region where there is a concentration of participants in CCP only 19 percent agreed that climate change is already a threat.

The questionnaire included "What do you consider to be the main factors limiting responses by farmers in your area and industry to reduce greenhouse gas emissions". Frequent responses included:

- *a perceived lack of benefit*
- *the small scale of Australia compared to China, India etc., and seen as a political football*
- *no acceptance it is CO<sub>2</sub>, and*
- *what we do makes no difference!*

Taking into account the above factors, benefits from mitigation were not specifically considered in the benefits quantified.

### **The counterfactual (the benefits without CCP)**

There has been a rapid expansion in other climate-related investments during the last decade. Widespread and prolonged droughts and increasing concern in relation to climate change have been the major drivers. This evaluation will also need to be consistent in its methodology with evaluations of benefits from previous investments in MCVF (Agtrans Research and AGECE Consulting, 2007). Investments since then (<http://www.managingclimate.gov.au/>) include a priority on improving the skill of forecasts over a wider range from multi-week to seasonal together with allocations to support forecasting products for Australian agriculture, and improved adoption of climate risk management on farm through the Climate Kelpie website for example.

For simplicity, the benefits will be evaluated on the basis of benefits additional to the counterfactual.

### **Where CCP makes a difference in terms of coverage**

The Program has coverage at two levels. These are the wide range of items featuring the participants in CCP which have appeared regularly in a range of media with either an industry focus or a more general audience. The media activity clearly has an initial key role in increasing awareness of the Program and giving it high credibility. Media activity is also the catalyst to generate opportunities for follow up activities by the participants in CCP. These are often targeted at more local audiences and concentrating on local issues.

In terms of regions and industries, the GRDC Southern Region has the highest concentration (9 of 15 GRDC sponsored in the total of 34) of participants in CCP. An approximate measure of national coverage relative to that of grains in the Southern Region can be made using a Gross Value of Production per participants in CCP (GVP/CC). The assumption being made is that the effectiveness of the Program for other regions and industries will be reduced by the lower density of participants in CCP .

The GRDC Southern Region has averaged 46 percent of the area of the national area of grains (from 2000-2001 to 2008-09, (PISC 2011)). For the average GVP of Australian grain of \$10,600m (2009-10 and 2010-11, GRDC (2011)) , each of the participants in CCP in the GRDC Southern Region could potentially have coverage of farms producing \$540m in their locality ( $\$10,600m \times 46\% / 9$ ). On that basis, the more local activities of the 33 current Climate Champions would have achieved a national coverage of about 40 percent ( $\$540m \times 33 / \$44,000m$ ), given the GVP of Australian agriculture of about \$44,000m (GVP data from ABS (2011)). On that basis, and given there are 134,000 farms (agricultural establishments as defined, ABARES (2011)), the average coverage for each participants in CCP 1,640, albeit based on a definition which includes a high proportion of sub-commercial farms.

The coverage can be put in an industry perspective. The ratio of 1,640 can be compared with industry level data for GRDC (2011) with some 21,000 farms defined as having more than 100 ha grain. The industry is serviced by 75.7 fte public sector extension staff (full time equivalents, from PISC 2011). Private sector agronomists are likely to contribute considerably more given half of commercial grain farmers use private sector paid agronomists. The grain industry ratio is therefore likely to be less

than 100 farms/ extension or adviser. So only a modest local impact could be expected from the part-time role of participants in CCP in terms of practice change, even if they are significantly more effective in stimulating practice change on a fte basis.

### **Where CCP makes a difference in terms of adoption**

In addition to questions in the previous section relating to pathways to adoption, respondents to the questionnaire were asked to nominate where the Program was making a difference for local farmers and industries. The difference was as defined qualitatively by a number of potential program aims. The aim relating to "raising awareness" was ranked highest followed closely by "increasing adoption including attention to adopt". In terms of where the Program would make the greatest difference, eight respondents gave their highest score to "Raising awareness" compared to only four for the next three. The respondents were then asked to nominate which aim provided the most potential return for effort in terms of contribution to the benefits from the current CCP. About three quarters nominated either "Raising awareness" or "Increased adoption". This suggests that adoption was unlikely to be rapid and would need to be developed gradually as skills developed and building on a range of activities to raise awareness as the first step.

Ideally if resources allowed, it would have been of further value if the opinions on likely adoption from the participants in CCP was supplemented by information from farmers generally and in areas where participants in the CCP were located. In the previous section it was shown that the Climate Champions have given priority to working with farmers, particularly through farmer groups. As Table 11 showed, they have concentrated their effort on demonstrations, field days and workshops. Information was also sought on specific practice changes and the extent to which the Program had raised awareness and the intention to adopt. As would be expected from the diversity of participants and industries, there was a wide variety of practices. Given the high proportion of grain growers, practices relating to zero-till, moisture management and early sowing were mentioned by several. Livestock farmers mentioned maintaining ground cover and sustainable stocking with more flexible stocking strategies.

### **The context for evaluating the Climate Champion Program**

These examples of practice changes promoted by particular participants in CCP are similar to those featured in the previous evaluation of MCVP. In that evaluation a range of studies around Australia were reviewed to arrive at some typical benefits from adopting seasonal climate forecasts, the focus of the MCVP since its inception in 2002/03.

CVAP, the forerunner to the MCVP, began in 1992 as part of the National Drought Program. Seasonal forecasts had only recently been developed and promoted. Adoption was relatively rapid up to the point where about half of Australian farmers were taking them into account. The proportion was higher for cotton and sugarcane industries where forecast skill was considered to be higher. However, the skill level of forecasts was generally perceived as low, static, variable regionally and from year to year, or even declining due to climate change.

For the Bureau seasonal forecasts, the Annual Report (BOM 2011) stated:

- Rainfall forecasts assessed alone over the whole year attained their highest skill level in 2010–11 since seasonal outlooks commenced in the 1990s, with a 'per cent correct' statistic over Australia of 63 percent, and

- The seasonal outlook for rainfall issued for November-January 2010–11 was the most skilful individual seasonal outlook issued by the Bureau of Meteorology since at least 2000 as measured by the 'per cent correct' statistic at 90 percent.

While MCVP broadened the scope of users through applications and improved geographical coverage, the static or variable forecast skill level was considered to have slowed the rate of adoption. The level of investment by CVAP and MCVP over the two decades has been of the order of one million dollars annually with matching funding from research providers of a similar amount.

Rainfall experience particularly over the last decade has also had a role in changing beliefs and behaviours in relation to climate change and use of seasonal forecasting. Extremes of drought then floods related to a near record La Niña were features. The GRDC survey (IPSOS 2010) reported that "Nationally, growers were significantly more likely to mention the drought as a motivator of farming practice change over the past 2 years, when compared to 2008 results (56% vs.40%)".

From the Victorian survey and despite the exceptional forecast skill in 2010-11, the use of the BOM Seasonal Climate Outlook actually declined from 74.6 percent of farmers in 2009 to 64.1 percent in 2011. In contrast over the same period, the percentage of Victorian farmers aware of ENSO as a climate driver and agreeing it affects their local district seasonal rainfall was up from 68 to 81. The extent to which recent experience of drought and flood can change attitudes is further demonstrated by the increased lack of concern with climate change impacts. The proportion of Victorian farmers agreeing with the statement "I do not take climate change into account when thinking about my future" increased from 31.5 to 37.9 percent from 2009 to 2011.

### **Benefits/farm**

Participants in CCP were asked in the questionnaire to nominate their priority areas they were focussing on. As summarised in Table 12, the two main responses were adaptation to climate change and use of various forecasts from short term weather to seasonal. A subsequent question sought more specific information on practice changes being promoted by the participants. One half of respondents nominated practice change relating to areas such as no till, stubble management and timing of operations as areas they were promoting often in ways integrated with improved use of seasonal forecasts. These are all management functions where further gains can be hard to come by. They can involve a number of marginal practice changes, where adoption is already at a high level, and where there are numerous other pathways to adoption from the many agencies involved. For example as shown previously in Victoria, the proportion of farmers aware of ENSO as a climate driver and agreeing it affects their local district seasonal rainfall was now up to 81 percent.

The MCVP evaluation reviewed a number of studies in a range of industries and regions on the value of seasonal forecasts. The conclusion was the same as for a previous evaluation of the predecessor to MCVP that an increase in NVFP (net value of farm production) of the order of 10 percent was achievable.

The CCP questionnaire included questions on the main factors limiting improved climate risk management. Responses to separate questions on climate variability and adapting to climate change overlapped in their coverage. Typical comments included:

- *they are adapting at a high rate, but there is not a recognition of the driver*
- *market acceptance of need to change varieties (grape)*
- *attitude that variability has always been manageable, belief it's a cycle*
- *lack of trust - misinformation on ENSO in the media*
- *farmers don't like to be challenged in relation to current farming practices*
- *the difference between climate variability and climate change*
- *advisers and consultants not interested in understanding issues (only short term profit)*
- *risk of making changes on top of run of bad years*

The responses confirm that achieving further practice change relating to climate risk management is not going to be as straightforward as for example adopting a new product that can be readily trialled to demonstrate its superiority and where little new knowledge is required. Whilst the role of participants in CCP is likely to be more one of demonstrating their approach as a case study or facilitating access to information sources, their role can be considered complex. There is a strong emphasis on training to equip them for their role. This assessment has not considered aspects such as how other farmers perceive their credibility and the effectiveness of support services to enable the participants in CCP to carry out their role. These would be matters for a more detailed assessment.

Taking into account the various factors discussed that operate to limit demand, a benefit of 5 percent of NFVP per farm adopting is assumed for those influenced by the CCP.

### **Adoption Rate**

The questionnaire began with a general question on expectations in terms of the extent of influence of the Program in their industry. Modal responses were for "Increased awareness of climate risk management" of 40 percent and "Increased intention to do a practice change relevant to their region" of 10 percent. The Program has generated a high level of media activity as reported previously so a high level in terms of awareness is achievable. A subsequent question sought details on specific practice changes being promoted by the participants in CCP. The modal response in terms of percent of farmers in their area and industry intending to adopt as an outcome of CCP activities was the same at 10 percent, and more specifically being achieved by 2015. The rate of the order of 2-3 percent annually would be expected to be an optimistic one.

There are four aspects particularly relevant to adoption in this context:

1. Adoption of climate risk management tools based on statistical seasonal forecasting can be expected to be slowing as assumed in the MCVP evaluation.
2. The Program only began in 2009-10 so given the early concentration on training, it would have had little impact until the 2011-12 financial year. For winter cropping the benefit would be from a winter crop planted mid-2011. This might appear to be rapid adoption. However the emphasis is on adding value or facilitating access to existing information and technologies where there is already a high level of awareness.
3. The earlier MCVP evaluation assumed an increased adoption nationally from 50 percent to 55 percent over the five years to 2008 from an investment of \$15m. Although MCVP concentrated on research, there were many projects with a strong communication and extension emphasis, including major projects in Victoria and Western Australia. In addition, research projects had communication activities that would have led to increased adoption. The Climate Champion Program investment is

only \$1.1m in total making it difficult to achieve critical mass even though MCVP was going on at the same time so the CCP did not have to fund any research.

4. The benefits assumed are only half those assumed for the earlier MCVP evaluation so a lower demand-driven rate of adoption is warranted for consistency.

As calculated previously, adoption for this evaluation is based on the 40 percent of farms assumed to be covered by the geographic and industry spread. On that basis, the participant /farm ratio was 1,640. Taking into account the above, adoption is assumed to peak at 1 percent in 2013 and reduce to zero by 2016. The peak rate assumed is equivalent to 16 farms (1% of 1640) per participant in terms of practice changes attributable to their activities. The rate can be compared with the annual expenditure/participant of about \$8,000.

The adoption and related benefit assumptions are based on the investment ending in 2013. The benefit stream could continue to some extent for those farmers assumed to have adopted as a result of activities of participants in CCP. The benefit stream provides a base for further extension /communication investments to build on as is often assumed for investments where there is no depreciation in the technology or the knowledge to apply it. The issue comes down to the extent to which the Program has been active for long enough to develop skills through the training activities, build credibility and momentum, and to sustain capacity.

Because the evaluation assumes no further funding beyond 2013, there has only been a limited period to develop a presence and to develop the capacity of farmers to undertake their own independent climate risk management without the CCP. Apart from the farmers influenced by the CCP not likely to be able to sustain capacity, the 34 CCP participants themselves are unlikely to be able to sustain their own skill base, capacity and influence much beyond 2013 without additional resources.

Over the last decade there has been a broadening of media reports on climate variability and climate change. Whereas a decade ago the emphasis was on El Niño and La Niña influences, now there are a greater range and complexity of influences each also with their varying value regionally and over the year. There is also uncertainty on the current impacts of climate change. Capacity to assess more diverse and complex information would need to have been developed to maintain adoption. In the case of participants in CCP with much of the adoption likely to be based on ad hoc local contact and where demand is influenced by the nature of the season, it seems probable that the initial level of adoption and benefits achieved would decline in the absence of ongoing support.

The need for new skills for example resulting from the possible shift in emphasis from use of statistical forecasts to greater reliance on coupled model forecasts such as POAMA is another factor that may drive a decline post 2013 without additional investment (POAMA is the Bureau of Meteorology's experimental global climate model for Australia).

### **Summary of Assumptions**

A summary of the key assumptions made is shown in Table 13.

Table 13: Summary of Assumptions

Variable	Assumption	Source
<b><i>With the Investment (Benefits estimated additional to those accruing without the investment)</i></b>		
Climate Champion Participants Southern region	9	From Table 3
National	33	Current number (one vacancy)
GVP/CC (Southern Grain Region)	\$540 m	PISC (2011) Areas of grain and average GVP grain 2009-10 and 2010-11 (GRDC 2011)
Effective National Coverage achieved by CCP participants (at Southern Grain rate)	40%	GVP for 33 CCP participants as a proportion of GVP Agriculture (ABARES 2011)
Coverage/ CCP participant (No. of farms)	1,640	National Coverage (%) x No. of Agricultural Establishments (ABARES 2011) per CCP participant
Benefits Benefits/Farm (% of NVFP)	5%	Agtrans - about one half of rate used in previous MCVF evaluation. See text for detail.
Benefits/Farm	\$3,250	At 5% of per farm NVFP based on National NVFP (average 2009-10 and 2010-11) and No. of establishments in 2009-10 (ABARES 2011)
Adoption/Benefit Pattern (% of Coverage/ CCP participant) 2011 (Year to 30 June)	0	Agtrans - rates are additional to rates already being achieved from existing programs targeting practices related to climate risk management. The last year of funding for the investment evaluated is 2012-13.
2012	¼	
2013	1	
2014	½	
2015	¼	
2016	0	
Benefit years in relation to adoption years	As for adoption	Agtrans
Year of final benefit attributed to this investment	2015	Agtrans

## Results

All past costs and benefits were expressed in 2010/11 dollar terms using the CPI. All benefits after 2010/11 were expressed in 2010/11 dollar terms. All costs and benefits were discounted to 2010/11 using a discount rate of 5%. The base run used the best estimates of each variable, notwithstanding a high level of uncertainty for many of the estimates. All analyses ran for the length of the investment period plus 30 years from the last year of investment (2012/13).

Investment criteria were estimated for both total investment (MCVP plus GRDC) and for the GRDC investment alone (See Table 2). Each set of investment criteria were estimated for different periods of benefits. The investment criteria were all positive as reported in Tables 14 and 15. Benefits exceeded costs up to year 0 (last year of investment) as benefits commenced before the last year of investment. The internal rate of return was high due to the short period between investment costs and benefits.

Table 14: Investment Criteria for Total Investment and Total Benefits for Each Benefit Period  
(discount rate 5%)

Criterion	Years since last year of investment						
	0	5	10	15	20	25	30
Present value of benefits (\$m)	2.01	3.14	3.14	3.14	3.14	3.14	3.14
Present value of costs (\$m)	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Net present value (\$m)	0.93	2.05	2.05	2.05	2.05	2.05	2.05
Benefit-cost Ratio	1.86	2.89	2.89	2.89	2.89	2.89	2.89
Internal rate of return (%)	58	79	79	79	79	79	79

Table 15: Investment Criteria for GRDC Investment and Benefits to GRDC for Each Benefit Period  
(discount rate 5%)

Criterion	Years since last year of investment						
	0	5	10	15	20	25	30
Present value of benefits (\$m)	1.02	1.58	1.58	1.58	1.58	1.58	1.58
Present value of costs (\$m)	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Net present value (\$m)	0.47	1.04	1.04	1.04	1.04	1.04	1.04
Benefit-cost Ratio	1.86	2.89	2.89	2.89	2.89	2.89	2.89
Internal rate of return (%)	58	79	79	79	79	79	79

There was only one source of benefits valued in the analysis so no analysis is provided for the various possible sources of benefits. The available data did not

warrant any disaggregation. Separate analyses for example for the GRDC supported participants compared with those supported by the MCVF and MLA were not feasible.

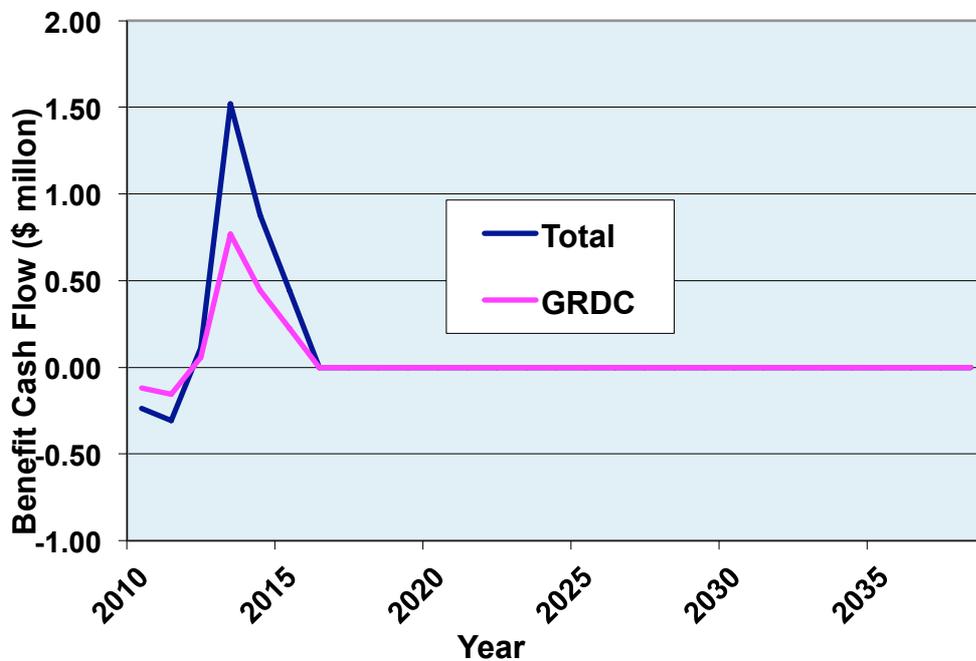
The quantified benefits are allocated to the Rural Research Priorities as expressed in Table 16.

Table 16: Allocation of Quantified Benefits to Rural Research Priorities

Rural Research Priority	Allocation
4 Climate variability and climate change	100%

The annual net benefit cash flows for both total investment and GRDC investment for the 30 year period from the year of last investment are shown in Figure 1.

Figure 1: Annual Net Benefit Cash Flow



**Sensitivity Analyses**

Sensitivity analyses were carried out on key variables and results are reported in Tables 17 and 18. The sensitivity analyses were performed on the GRDC investment results using a 5% discount rate with benefits taken over the life of the investment plus 30 years from the year of last investment. All other parameters were held at their base values.

Table 17 shows the sensitivity of the investment criteria to changes in the discount rate. There is limited sensitivity because there is only a short lag from the investment to the short period over which benefits were assumed to accrue.

Table 17: Sensitivity of Investment Criteria to Discount Rate  
(GRDC investment, 30 years)

Criterion	Discount Rate		
	0%	5% (Base)	10%
Present value of benefits (\$m)	1.78	1.58	1.42
Present value of costs (\$m)	0.56	0.55	0.54
Net present value (\$m)	1.22	1.04	0.88
Benefit cost ratio	3.17	2.89	2.65

Table 18 shows the sensitivity of the investment criteria to changes in the assumptions regarding adoption and maintenance of the benefit stream after the investment has concluded.

Table 18: Sensitivity of Investment Criteria to Changes in Adoption and Level and Maintenance of Benefits  
(GRDC investment, 5% discount rate, 30 years)

Criterion	Pessimistic*: Benefits and Adoption Rate halved	Most likely: Base Case	Optimistic**: Benefits maintained to year 30
Present value of benefits (\$m)	0.40	1.58	13.41
Present value of costs (\$m)	0.55	0.55	0.55
Net present value (\$m)	-0.15	1.04	12.86
Benefit cost ratio	0.72	2.89	24.46
Internal rate of return (%)	Negative	79	107

Note: \*Benefits/farm adopting reduced from 5% to 2.5%

\*\*The maximum adoption of 1% reached in 2013 as in Table 13, maintained for the 30 years since year of last investment.

As shown in Table 18 the analysis is sensitive to assumptions relating to adoption. Several arguments were advanced earlier in this Section to support a decline in the benefits after the conclusion of the investment period. The decline assumed that the Program had not had a big impact on the capacity of those who had adopted to independently sustain the benefit. Greater confidence in the merits of the investment would require further information on capacity development and on the perspective of farmers considered to be benefiting from the Program.

## 8. Confidence Rating

The results produced are highly dependent on the assumptions made, many of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes.

A confidence rating based on these two factors has been given to the results of the investment analysis (Table 19). The rating categories used are High, Medium and Low, where:

- High: denotes a good coverage of benefits or reasonable confidence in the assumptions made
- Medium: denotes only a reasonable coverage of benefits or some uncertainties in assumptions made
- Low: denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 19: Confidence in Analysis of the Investment in the CCP

Coverage of Benefits	Confidence in Assumptions
Medium	Low

## 9. Conclusions and Lessons Learned

The current investment in the CCP began in 2009-10 and will conclude in 2012-13. The investment aimed at improving climate risk management has a number of novel features which create difficulties for evaluating current and potential benefits. The Program has selected 34 farmers to take on the role of helping communicate to other farmers' practices leading to improved climate risk management. In common with extension-type projects attribution is problematic because of the diffuse sources of information available to farmers. The benefits quantified were assumed to be from adding value to existing practices such as no till.

Increased adoption beginning in 2011-12 was based on increased profitability from practice change. Other benefits such as environmental sustainability or capacity to contribute to more effective research investment were not explicitly valued. The total investment of \$1.09m (present value terms) has been estimated to produce total gross benefits of \$3.14m (present value terms) providing a net present value of \$2.05m, a benefit-cost ratio of 2.89 to 1 (over 30 years, using a 5% discount rate) and an internal rate of return of 79%.

There have been 34 participants in CCP funded with an average annual investment of about \$8,000 to cover their training, media support, and an honorarium recognising their time input. The Program has given high priority to media activity to create awareness of how farmers are taking practical steps to adapt to climate change. There has been varied focus on activities related to mitigation, a response to what was seen as limited demand from farmers.

The evaluation relied on a questionnaire completed by the participants in CCP to provide information on their focus and impact. The participants were selected on criteria including their local and industry profile so they have been well placed to present on the Program to a diverse range of audiences. The Program relies on the initiatives of the participants, the credibility they develop, and on the interest they create in their experiences.

Given limited data on impacts, benefits were assessed conservatively and in the context of benefits attributable to other programs with similar aims related to climate risk management.

The benefits that were quantified were assumed to be maintained for only a short time beyond the period of funding. This was because there has only been a limited period to develop a presence and to develop the capacity of farmers to undertake their own independent climate risk management without the CCP. Farmers are likely to increasingly need to independently assess value, for example of various seasonal forecasts in varying seasons.

The judgement was made also that the participants in the CCP operating on a part time basis on topics that are inherently complex would be less able to develop understanding and capacity and therefore their influence would dissipate without further training and investment. However, the participants in the CCP have clearly developed more general leadership qualities which will be of value in terms of greater industry preparedness and capacity to adapt to climate change.

This evaluation did not have the scope to directly assess the incremental impact of the Program on farmers generally or impacts leading to other possible benefits such as improved feedback to researchers. This would have been desirable given the inherent complexities and the varied perceptions on climate variability and change. The evaluation results are therefore held with low confidence due to the lack of evidence supporting the key assumptions. The evaluation is not a useful guide to the relative merits of this approach versus other communication /extension investments in the climate variability area. However, the Program has clearly taken an important first step by creating an increased level of awareness. This has been accomplished by highlighting practical approaches the participants in CCP are taking to manage climate variability and adapt to climate change.

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