



**The Environment Institute  
University of Adelaide**

**Strengthening Basin Communities Program  
Planning Component Consultancy SBC033A.1/2**

**Outcomes of Stakeholder Engagement**

**MILESTONE 2 REPORT**

**29 August 2011**





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This report summarises the results of the community engagement process undertaken through to November 2010 for the *Strengthening Basin Communities Program Planning Component Consultancy SBC033A.1/2*. The conclusions drawn in this report may not be representative of the views of all members of the Consultation Reference Panel (CRP), however, it is the view of the authors that they do represent the views of the majority of CRP members.

Siebenritt, M.A. and Sharley, T. (2010). Outcomes of Stakeholder Engagement. Milestone 2 Report. A report prepared by SARDI Climate applications for the Environment Institute, The University of Adelaide, as part of the Strengthening Basin Communities Program Planning Component Consultancy SBC033A.1/2.



## EXECUTIVE SUMMARY

The South Australian Murray-Darling Basin is one of the state's most productive regional areas, sustaining major irrigation and dryland farming areas as well as industries like tourism and manufacturing. However, recent years have seen some of the lowest water availability on record for businesses and communities reliant on the Murray. This has combined with low rainfall years in surrounding dryland farming areas and caused major impacts on the wellbeing of people living in the region and impacts on the environment and economy.

These conditions may be a pre-cursor of what is to come. Climate change forecasts suggest that the region will trend toward hotter and drier conditions on average over the next 20-60 years and inflows to the state from the River Murray will be reduced. Recognition of the impact of low rainfall and hotter temperatures over the past decade on the SA MDB means that the time is right to consider how to adapt to the forecast impacts of climate change.

This consideration should not be delayed by the assumption that climate change is declining as drought pressure eases such as in the coming season. It will be important therefore to develop user friendly information that differentiates between climate change scenarios and short term drought.

Eleven Councils within the SA Murray-Darling Basin Natural Resources Management Region established two consortia and attracted Federal funding through the Strengthening Basin Communities (SBC) Program – Planning Component to deliver a series of plans to assess the impact anticipated climate change will have on communities, their local water dependant industries, urban water resources management, development plan policy and other strategic planning documents for Local Government. These plans will identify opportunities to adapt to the anticipated climate, and in particular, living with less water. The “Impact Assessment, Adaptation and Emerging Opportunities” Project is the overarching parent project for both consortia.

The Environment Institute at the University of Adelaide and its team was appointed to undertake the overarching project and has four deliverables:

- Climate change scenarios - Make recommendations on the scenario(s) and associated projected climatic conditions to be applied to the parent and broader projects.
- Climate Change Impact Assessment Report - The report will assess the impact of recently experienced (i.e. the extended drought) and predicted climate conditions on each Council, their communities, community assets and services.



- Adaptation and Emerging Opportunities Plan - Opportunities will be identified for each partner Council and their community to address the predicted impacts of climate change.
- Horticultural/Rural Lands Review – This will identify and describe the horticultural/rural land affected by the current drought that may be affected by forecast climate change impacts and then develop potential model statutory planning policy.

This report is a requirement of Milestone 2 of the parent project and presents the a summary of the outcomes of the stakeholder engagement process.

The key messages arising from each of the three Milestone 2 reports are as follows:

1. Climate Change Scenarios :

- The study region like the rest of Southern Australia is expected to be warmer (high confidence) and drier (lower confidence). By 2030 the region shows a warming of between 0.5 to 1.3 degrees C with the mid range model showing 0.8 degrees. At 2030 the range in warming is due to different models and is not very sensitive to the emission scenarios. By 2070 there is a greater influence of emission scenarios (whether greenhouse gases are greatly increased or stabilised). Under medium emission scenarios the projected warming is 1.8 degrees with a range or 1.3 to 2.8 degrees.
- The most likely future is a drier future, but there is considerable uncertainty between models and considerable debate within the scientific community on the appropriate level of confidence to place on projected drying compared to the projected warming.

2. Outcomes of Stakeholder Engagement:

- There is widespread awareness about the general concept of climate change, which is understood as a phenomenon that will drive warmer temperatures and lower rainfall across the SA MDB.
- There is recognition that extreme weather events are the most difficult to plan for and therefore provide the most difficult and most costly management challenges. This will be a key consideration of planning for climate change.
- There is a consistent view that irrigation and dryland farming will be the industries impacted the most by warmer and drier conditions under future climate change. This will have flow on impacts to the community and Councils.
- There is a widespread need for communities and industries to engage in planning and implementing an integrated approach to climate change across the whole region.
- Adaptation can best be achieved by a leadership model with capacity to foster connections between all levels of Government and the ability to evaluate a wide range of existing and alternative industries.



- Leadership elements will include a long term commitment and presence in the region, development of credible information resources and support to enable industries and communities to make decisions with confidence.
3. Opportunities Discussion Paper:
- There is evidence that adaptation to climate change and seasonal variability is already happening in South Australian Murray-Darling Basin. Selecting new crop varieties and changes to road maintenance are two examples.
  - One avenue for adaptation is to move toward a low carbon economy. There are some issues to consider with respect to low carbon economies such as: (1) Carbon pollution is increasingly taxed or traded across the world, (2) Fossil resources for agriculture and energy production, which are primary sources of carbon pollution, are becoming more scarce (3) Peak production of phosphorus is projected for 2040-2050, peak oil for between now and 2015, peak coal for between now and 2048, and peak natural gas for 2030, (4) beyond peak production, competition will drive resource prices higher until alternatives become feasible.
  - In developing strategy and actions for adapting to the effects of climate change, Local Government can consider vulnerability and risk management frameworks, community perspectives and existing climate change adaptation initiatives including the Local Government Association Mutual Liability Scheme (LGAMLS).

More detailed key findings for the Outcomes of Stakeholder Engagement Report are presented in the *Key findings* on the following pages.



## KEY FINDINGS

### Climate change scenarios

- There is widespread awareness about the general concept of climate change, which is understood as a phenomenon that will drive warmer temperatures and lower rainfall.
- The media has been pivotal to initially raising awareness about climate change, which people have linked with their own local observations about recent extreme hot and dry conditions along with low Murray inflows.
- Further awareness raising about climate change will face a number of challenges, including building trust in information sources, clearly communicating the uncertainty in future climate predictions and the heavy reliance on local observations during recent harsh drought conditions as evidence of climate change.

### Climate Change Impacts

- There is a strong and consistent view that irrigation and dryland farming will be the industries most impacted by warmer and drier conditions under future climate change.
- This creates a sense of urgency and recognition of the need for the community to adapt.
- Reduced agricultural production across the region could impact the regional economy through job losses and reductions in the value of farming land. Council rates are calculated based upon land values and hence a Council's income may be impacted upon.
- The longer that adaptation is delayed, the more vulnerable the community is likely to feel.

### Adapting to climate change

- Adapting with certainty — There was unanimous support for credible information, funding and research to underpin adaptation strategies.
- Recent adaptation – There are several examples of adaptation in primary industries that have enabled survival in recent difficult times, however, there is currently no evidence of a climate change strategy or plan acting across the region or within a regional body or industry group.
- Urgency of adaptation – There is sense of urgency to prepare for climate change and a sense of uncertainty in how to go about it. There is a strong indication that the current primary production mix across the region can adapt to a low emissions future, but not to a medium emissions future. Inability to adapt could be created by delayed action that makes the cost of adaptation unaffordable when the circumstances arise.
- Capacity to adapt — There is no guarantee that irrigators that stop farming will remain in the district. The capacity of irrigators to adapt not only involves changes in agronomic practices and crop selection, but will depend on financial viability and wealth and financial incentives. Dryland farmers are less likely to leave the district indicating that long term adaptation to droughts and uncertainty have increased resilience to climate change, and given them greater capacity to adapt further.
- Adaptation priorities –Because primary production shapes the community and its economy it is reasonable to place greater emphasis on evaluating the current primary production systems first.



- Whole of region adaptation - There is a widespread need for industries and communities to engage in planning and implementing an integrated approach to climate change across the region.
- Critical mass - There is a strong parallel between the historical need to adapt to salinity (in the 1970s) and the urgency to adapt to climate change — whereby both issues require collective action and a whole of community and industry approach for it to succeed. The SA MDB community has already adapted to the past challenge of salinity and this should serve as a case study for the response to climate change.
- Leadership - Adaptation can best be achieved by a leadership model with capacity to link all levels of Government and the ability to evaluate a wide range of existing and alternative industries. Leadership elements will include a long term commitment and presence in the region to assist the region to adapt with confidence.

The following quotes from interviews and discussions with Consultation Reference Panel (CRP) members summarise the challenge and the opportunity presented by climate change. Local Government, the community and industry needs to choose which of these best describes the future it wants.

- *“Contracting communities, unsustainable towns and challenge in retaining essential services”*
- *“Educated, innovative and imaginative community with diversity as its strength”*



## 1 INTRODUCTION

### 1.1 THE PROJECT

The *Climate Change impact assessment, adaptation and emerging opportunities for the SA Murray-Darling region* (CCAP) project is the umbrella project in a suite of 21 projects being undertaken as part of the Strengthening Basin Communities (SBC) program funded by the Australian Government. The funding was provided to eleven councils within the South Australian Murray-Darling Basin (MDB) Natural Resources Management Region<sup>1</sup> to undertake this work:

Findings from the project will assist the region to plan for a climate change driven future with less water through addressing risk and its implications and identifying options for adaptation (including emerging industries and associated socio demographic patterns).

The key deliverables for the project are:

- 1) Climate Change Scenarios;
- 2) Climate Change Impact Assessment Report;
- 3) Adaptation and Emerging Opportunities Plan; and
- 4) Horticultural/Rural Lands Review.

### 1.2 THE CONSULTATION PROCESS

The project has two core methodologies, being (1) technical research and assessment based on review of the published literature and additional analysis and (2) collation of input from key stakeholders to ensure that the outcomes of the project are informed by the views, opinions and local knowledge of the communities and industries within the South Australian MDB.

The community is being engaged through discussions, interviews and input from a Consultation Reference Panel (CRP) combined with broader community consultation. Terms of Reference for the CRP are at Attachment A.

Consultation has also been undertaken through additional meetings including:

- SBC Steering Committee meetings, which provide an opportunity to explore the awareness and perceived impacts and opportunities of climate change with senior Local Government representatives (15 April 2010; 2 July 2010);
- briefing of SBC Integrated Water Management Plan consultants (1 September 2010); and
- Local Government planners forum (10 November 2010).

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<sup>1</sup> Berri Barmera Council, Regional Council of Goyder, District Council of Karoonda East Murray, District Council of Loxton Waikerie, Renmark Paringa Council, Southern Mallee District Council, Alexandrina Council, The Coorong District Council, Mid Murray Council, District Council of Mount Barker, Rural City of Murray Bridge





The following people were involved with the CRP<sup>2</sup>:

- Mr Tom Avery - Director Infrastructure Services, District Council of Loxton Waikerie
- Mr Ben Brown - Industry Liaison Manager, The Almond Board of Australia, Berri
- Mr Jason Fullston - Cereal, sheep and agroforestry (Cosproh), via Karoonda
- Mr Graham Gates - Coorong Local Action Plan Project Officer, Coorong District Council, Meningie
- Mr Humphrey Howie – Fruit grower, Fat Goose Fruits, Renmark
- Mr Chris Koolmatrie - Aboriginal NRM Project Officer, SA MDB NRM Board, Berri
- Mr George Lovegrove - Project Manager, Regional Development Australia, Murraylands and Riverland
- Mr Neil Martinson, Mayor of Renmark Paringa District Council
- Mr Gavin McMahan, CEO of Central Irrigation Trust, Barmera
- Mr Damien Moloney, CEO of Murray Bridge District Council
- Mr Bruce Munday – Grazier, Eastern Mt. Lofty Ranges
- Mrs Joanne Pfeiffer – Dairy farmer and member of the South Australian Murray-Darling Basin Natural Resources Management Board, Murray Bridge
- Mr Paul Rudiger - Cereal and sheep farmer, via Loxton
- Mr Phil Sims – Dried fruit grower, Renmark
- Mr Tim Smythe - Industry Development Officer, Riverland Wine Industry Development Corporation, Berri
- Mr Neville Styan – General Manager, Infrastructure Planning & Development, Alexandrina Council
- Mr Derek Walker, Raukkan Community Council

### 1.3 PURPOSE AND STRUCTURE OF THIS PAPER

This paper addresses one of the three deliverables for the second milestone of the Climate Change Adaptation Project, which is a paper on the key outcomes of stakeholder engagement for the project to date.

During the course of the project CRP input has been received in three ways:

- **Survey #1 – Introductory survey** (September 2010) – CRP members were given no reading material prior to the survey which was conducted in person with either 1 or 2 members of the project team taking 1-1.5 hours per interview. The aim of this survey was to understand ingoing awareness;
- **Survey #2 – Conditioned responses** (October 2010) – CRP members were given two documents for background reading prior to conducting an online survey. The documents were the Milestone 1 report from the project team and the summary of survey #1. The purpose of this survey was to further explore issues raised during the first survey after having provided the CRP members with more information about

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<sup>2</sup> This report summarises the results of the community engagement process undertaken through to November 2010 for the Strengthening Basin Communities Program Planning Component Consultancy SBC033A.1/2. The conclusions drawn in this report may not be representative of the views of all members of the Consultation Reference Panel (CRP), however, it is the view of the authors that they do represent the views of the majority of CRP members.



the potential impacts of climate change as well as adaptation measures and opportunities; and

- **Meeting of the CRP** (November 2010) – The purpose of the meeting was to provide an opportunity to further explore specific issues that had been raised in either survey 1 or 2, but in a group format which provided the opportunity for discussion and exchange of views amongst CRP members.

This paper summarises feedback from both surveys and the group meeting of the CRP as follows:

- Section 2 – Adaptation and Emerging Opportunities;
- Section 3 – Climate Change Scenarios; and
- Section 4 – Perceived impacts of climate change

The summary of surveys 1 and 2 and the notes from the CRP meeting are provided in a compendium report titled “Summary of surveys, interviews and focus group data collected from the Consultation Reference Panel for the Strengthening Basin Communities Program, Planning Component Consultancy SBC033A.1/2”.

As this project continues, the information collected through the consultation process will be used to inform and shape the *Social and Economic Impact Assessment* and the *Adaptation and Emerging Opportunities Plan*.



## 2 ADAPTING TO CLIMATE CHANGE

### 2.1 ADAPTING WITH CERTAINTY

Whilst there are several examples of adaptation within Local Government and primary industry which appear to be linked to climate change, in reality the changes were more likely a reaction to drought, economic circumstances, market conditions, low commodity pricing, water pricing and water restrictions, and threats to human health and safety. At this point in time, climate change is probably not the primary reason given by community and industry representatives for adaptive behaviour, and that is why adaptation is not widespread across all sectors within the community — including primary and non-primary industries, individuals and Local Government.

It is reasonable to conclude that adaptive measures are not driven by a conscious climate change strategy nor a specific climate change policy or program. Recent adaptive measures have been forced upon the community and therefore people may not be acting in the best interests of the region's future or their own. Ad hoc action now may simply be delaying the point of no return or the cause of an unnecessary and costly adjustment in the future.

However, there is a strong sense of what needs to be done by industries in the short term, but there are limited resources and no framework in which to develop a strategy. All members of the CRP saw the need for more information, funding and research to support adaptation in the short term.

Clearly there is a need for an information driven multi-faceted regional approach that would create certainty and support early adoption of adaptive measures.

### 2.2 RECENT ADAPTATION

Several examples of adaptation in primary industries are consistent with the sort of changes that will build resilience into primary industries and rural communities. These include:

- using less water or using water more efficiently;
- adopting new crop varieties with greater resistance to salinity and drought;
- selecting varieties suited to a warmer climate.

Many of these changes have spawned responses that may enable survival in future difficult times, such as:

- collective farming in the dryland region;
- changes to reduce irrigation water use during water restrictions;
- new wine grape varieties suited to hotter weather;
- conversion to organic farming to reduce chemical inputs and win new markets;
- developing new crops more tolerant to salt and low water availability (e.g. dates);  
and
- developing agro forestry to generate income from an anticipated Emissions Trading Scheme.



However, there is currently no evidence of a climate change strategy or plan acting across the region or within a regional body or industry group.

Most of the examples of adaptation are localised or individual examples and not part of a widespread and collective action, although they do provide an opportunity to evaluate the suitability for more widespread adaptation. There is however a risk that alternative crops with increased resilience to climate change, may struggle to become established without industry support or critical volumes that may not cope with the demands of their new markets.

Hence, alternative crops will require important consideration of industry support and vulnerability to market fluctuations.

### 2.3 URGENCY OF ADAPTATION

Community responses indicated that a majority (80%) believed they were adaptive to the current drought and a low emissions future under climate change, whereas only 20% believed they could adapt to a medium emissions future because of the likely consequences of changing to an alternative industry.

Hence, there is a strong indication that the current primary production mix across the region may not be adaptable to a medium emissions future, which could be due to lack of skills and knowledge or unaffordable cost of doing so when the circumstances arise.

The greatest risk at this early point in the discovery of climate change and its consequences will be to delay planning and implementation of short, medium and long term strategies to adapt. The longer the delay in adaptation, the harder it will be to adapt. Credible information and support services, combined with catalytic policies (e.g. Emissions Trading Scheme) will be key to an early start.

Adaptation is clearly urgent now before the impacts of a medium and high emissions future are felt.

### 2.4 CAPACITY TO ADAPT

The reference panel outlined several key needs for Local Government and primary industry to develop the capacity to adapt to climate change. Foremost amongst these needs is credible information and development of information resources.

Other needs include :

- Funding and resources
- Research and evaluation
- Skill development and training; and
- Incentives and ongoing support.



Within the primary industry sector financial viability and economic circumstances will also determine the individual and industry capacity to adapt. For example, the climate change impacts for the irrigation industry include potential reduction in volume of water available for irrigation and an overall decline in the irrigated agricultural footprint. This can be responded to in the short term by a change in crop type to lower water use varieties or in the medium to longer term alternate crop types. There is no guarantee that irrigators that stop farming will remain in the district. The capacity to adapt not only involves changes in agronomic practices and crop selection, but will depend on financial viability and wealth, and financial incentives that could be created by the implementation of a carbon tax and an emissions trading scheme.

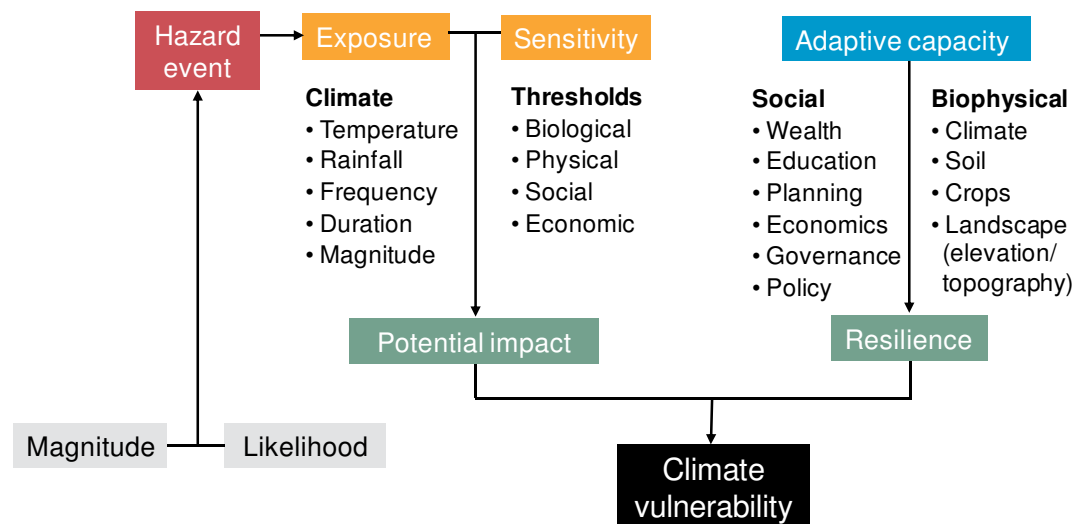
The impacts for the dryland farming sector include potential reduction in yields if rainfall declines, which could be responded to in the short term by growing different varieties or alternate crops. If the country becomes more marginal it is still farmable, but there might be a shift to more pastoral activities. Dryland farmers are less likely to leave the district indicating that long term adaptation to droughts and uncertainty have increased resilience to climate change, and given them greater capacity to adapt further. In the case of the dryland farming sector, an emissions trading scheme and a carbon tax could be the catalyst for large scale agro-forestry developments that generate farm income opportunities, biodiversity benefits and improved land values.

## 2.5 ADAPTATION PRIORITIES

The community and the economy of the region have always been dependent on primary production and hence any threat to primary production systems must be a priority.

Community responses were overwhelmingly in favour (100% of responses) of general adaptation in our primary production systems, without being specific about change within or to new systems. There was also strong support for the need for the community to adapt and for regional infrastructure to be adapted, indicating the need for an integrated approach to climate change.

Because primary production shapes the community it is reasonable to place greater emphasis on reviewing the current primary production systems including their sensitivity (ie coping range) and their vulnerability using a model such as Figure 1.



**Figure 1. Vulnerability framework (adapted from Preston *et al.* 2009, Adger 2006 and Turner 2003)**

Feedback indicated adaptation is likely to be greatest within existing industries because of the available expertise in these areas. A review of primary production systems could help determine the best mix of current primary industries in the region and the guidelines for evaluating alternative primary industries — leading to greater confidence in adapting to alternative primary industries.

Hence, if primary producers were to adopt alternative agricultural systems (e.g. transition from grapes to quandongs) in the medium to long term – significant resources will need to be invested in the region in the short term to create and support new industries.

The reference panel also placed emphasis on reviewing the suitability of non-primary industries such as tourism, health and retirement, education and the alternatives within these sectors because some forms of agriculture may disappear and non-primary industries will be required to play a larger role in maintaining and growing the economy.

## 2.6 WHOLE OF REGION ADAPTATION

Only 62.5% of CRP responses indicated the community has a short term strategy to climate change and 50% of responses indicate the presence of a long term strategy. Considering the leadership roles and capacity of the CRP members, it could be expected that these percentages are lower in the wider community.

Further, the CRP responses indicate that there is limited discussion amongst primary producers and between primary producers and industry bodies regarding alternative industries, indicating that regional communities and industries are not fully engaged in how they can best adapt to climate change.

There is a widespread need for communities and industries to engage in planning and implementing an integrated approach to climate change across the whole region, such that



all primary and non-primary industries are involved in an evaluation and alternative regional industries are considered too.

This approach would provide a foundation for the wider community and Local Government to consider their response and responsibilities to climate change, and form the framework for whole of region adaptation.

## 2.7 CRITICAL MASS

Adaptation to climate change whether conscious or not, has commenced in the region without easily accessible relevant information nor evidence of a clear and integrated strategy for adaptation. While individuals have started to act, there is no evidence of institutional leadership and programs to support this change – and nor is there evidence of the appropriateness of the change.

For example, in the 1970's there were a small number of irrigators in the region trying to adapt their irrigation systems to reduce the impacts of salinity and drainage on their crops. In general, irrigation in the region was inefficient and salinity problems were caused by over-irrigation. Irrigators had been conditioned by a lack of knowledge of soils and water holding capacity – and believed that more irrigation was beneficial to leach salts, whereas in fact it was creating water tables that mobilised salts into the crop root-zone which caused the problem.

In the 1980's an increase in irrigation research and extension efforts resulted in the awakening of the need to adopt improved irrigation practices — created by a massive effort to educate irrigators (research trials, field days, seminars, one on one extension, talks to industry groups, consultancy services) about the benefits of improved irrigation and how to adapt. Key messages and support to reduce irrigation costs and improve fruit quality were strong motivators for change because of the economic benefits.

Over a period of 20 years the region with the highest salinity irrigation water in the Murray Darling Basin became the most efficient irrigation region due to the critical mass that supported adaptation to salinity over a long period.

Leadership from within the State Government resulted in numerous State and Federal Government partnerships in research and extension that increased the capacity of irrigators to make change.

There is a strong parallel between the need to adapt to salinity and the urgency to adapt to climate change — whereby a whole of community and industry approach will be required for success

## 2.8 LEADERSHIP

If the region and its primary industries are to adapt with certainty to climate change it would be logical to assume that businesses, industry groups and institutions like the Department of



Primary Industries would take the lead in supporting industry reform within the region, as it did with the irrigation salinity issue in the 1970s, '80s and '90s.

However, there are other aspects of adaptation that will require evaluation of alternative industries as well as existing primary industries, and thus primary industry will not be the only consideration. In addition, all future industry evaluations must also consider the effects on the environment, the community and consequences for Local Government – given its responsibility to interpret the Development Act and other legislation.

An ideal leadership model will require capacity to foster connections between all levels of Government and the ability to engage the community in evaluating a range of existing and alternative industries.

Key elements of this leadership suggested by the community include:

- Acquisition of funding to sustain support efforts across industry and Local Government;
- Credible information and awareness about all aspects of climate change, using local examples;
- Research and evaluation of suitability of existing and alternative industries;
- Skills and development training across Local Government and industry.

The CRP recommended an alliance between Councils, Regional Development Australia, NRM Boards and industry groups which could form the foundations for regional leadership.

A strong component of this leadership will be long term presence and commitment in the region to secure funding that will achieve:

- demonstrated economic benefits and incentives for large scale reforms;
- an educated and aware community;
- a confident and capable community.

## 2.9 RECOMMENDATIONS AND WAY FORWARD

The SA MDB Region has the opportunity to capitalise on a medium to high level of awareness of climate change amongst community leaders, and the early adaptation work within the primary industry sector that appears relevant to the consequences of climate change. This early start can be the catalyst for urgent evaluation of the vulnerability of existing and alternative primary industries.

A regional leadership body must be established to support climate change reforms across all industries and Local Government — such that a long term program is integrated and enables widespread adaptation across the region.

The priorities of such a leadership body should include climate change adaptation plans which outline new and alternative industry opportunities and costs, and consequences for Local Government.





Such leadership involves the provision of credible information and awareness, research and evaluation, skills and development training and should become the culture of a community that understands and embraces climate change. Economic incentives will be an important accelerator of adaptation.

Continued involvement of the community through a vehicle like the CRP or similar will be critical in any long term climate change adaptation strategy.

The CRP articulated several key points relevant to adaptation which should be maintained as a guide when reviewing adaptation priorities and progress in future. In addition to leadership and critical mass support — each of these points is considered important in achieving widespread adaptation in the short term. Key points included:

- Establish credible information resources about the impacts of climate change using regional examples and industry relevant information;
- Develop information resources that differentiate between climate change scenarios and short term drought;
- Evaluate suitability of new and alternative industries using existing climate change vulnerability models like the example in Figure 1;
- Evaluate transition processes and consequences of changing land uses across a range of existing and alternative primary industries, for example :
  - Grapes to grapes (different varieties);
  - Grapes to almonds (currently more profitable);
  - Grapes to olives (hardier alternative);
  - Grapes to dates (salt tolerant, low water use);
  - Grapes to natives (naturally resilient, low water use, barriers to competition);
  - Grapes to climate controlled crops (glasshouse);
  - Wheat and sheep to wheat and sheep (different farming methods);
  - Wheat and sheep to different cereals (hardier alternative);
  - Cereals to agroforestry (emerging carbon market);
  - Cropping to pastoralism (hardier alternative); and
  - Sheep to kangaroos (naturally resilient , high protein alternative).
- Understand motivators of adaptation including risks, threats, opportunities and incentives;
- Integrate business planning support into adaptation plans at the property and industry/regional scale;
- Identify and evaluate emerging industry opportunities around carbon policy and participation in the carbon market.

The CRP made the following suggestions in response to the alternative industries that community and the government should consider given the likelihood of a water constrained future.

- More and better agricultural use of native plants and animals



- Alternative energy sources and alternative power generation
- Tourism and ecotourism
- Food production and research/trials of new or improved plant species
- Water efficiency technology
- Higher value crops, more water efficient crops
- Solar power generation, solar farming
- Community composting and mulching facilities
- Community gardens and markets
- Education on planning for climate change
- Appropriate building design
- More comprehensive recycling facilities
- Carbon farming (potential to improve soil health by increasing organic C)
- Attract industry by offering clean energy.
- Properly constructed (eco friendly) retirement dwellings.

Further, the CRP suggested several large scale social infrastructure projects (minimum investment \$200 m) for further discussion. These projects could help demonstrate the urgency of adaptation and/or provide more certainty about response options that will stimulate all industries to participate in the adaptation process. These suggestions include:

- Biomass power generation;
- Large scale solar farms and solar power collectives (i.e. many homes generating power and storing it at a single point for later distribution);
- Regional recycling facilities and waste management strategies;
- Eco-tourism developments that achieve improved personal health, carbon neutral accommodation and interpretive experiences;
- Create a home for the endangered species of the world (i.e. Monarto) to protect global gene pools;
- Regional authenticity developments combining food, wine and the environment; and
- One million hectares of agro forestry development through the Mallee where 30% to 40% of farms are revegetated to create income for farmers through carbon trading, biodiversity credits and increased local rainfall.

In recent times, the emergence of new industries and changes within existing industries has been led by individual resourcefulness with low levels of support from the State government. If adaptation is to be immediate and based on certainty, the State Government must support an integrated regional adaptation model and show leadership in advocating for funding and the establishment of a carbon market – so that new economic opportunities will stimulate new industry development in the region.

The CRP favoured Local Government and industry bodies as the primary source of information about land use change, as these groups are constantly interpreting the Development Act and observing trends and community acceptance.



### 3 COMMUNITY UNDERSTANDING OF CLIMATE CHANGE

Using the CRP as representatives of community and business across the SA MDB NRM Region, there is clearly strong awareness of climate change as a general concept amongst the consultation reference group and it is understood by most as relating to warmer temperatures and drier conditions.

The media has clearly played an important role in raising awareness of climate change as an issue, however, it has been the past decade of low rainfall and low River Murray flows that have convinced many that climate change is a real threat. There are practical examples that people cite, including:

- cancellation of country tennis matches when temperatures exceeded 38°C in October;
- sun burnt fruit in orchards;
- complete fire ban on 31 August 2008; and
- vine pull and citrus pull “in your face”.

However, there was a view that awareness can be raised further and could be done through strategies such as:

- encouraging elected members and staff to attend credible courses;
- regular reporting on industry responses to climate change (because industry shapes the community); and
- discussions at schools.

Continuing to raise awareness about climate change, which is essential to building support for adaptation actions, will face at least three major challenges. First is the issue of where the community can obtain credible information from. Trust is clearly an important issue in this regard. While community members may trust individual scientists this does not always extend to that person’s institution and there is a view that some research institutions may be chasing climate change research money. A notable exception is the Bureau of Meteorology, which clearly has a strong reputation for providing reliable data.

Second, is the fact that much of the information people cite as evidence of climate change is drawn from local observations. What is striking about this is that there is still conjecture as to how much of the recent drought can be attributed to climate change. Instead many climate scientists, as well as a small number of members from the CRP, place more weight in the projects of global climate models that project climate factors based on increases in atmospheric CO<sub>2</sub>. The implication is that a trend away from extreme drought conditions like those experienced recently may impact on support for climate change initiatives.

Third, is the challenge of communicating uncertainty and variability as a key element of climate change projections. Much of the uncertainty is a result of there being no single, best model to project future climate. Instead there are 15 models used by scientists<sup>3</sup> to predict future climate each producing a different result for various climate factors like temperature.

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<sup>3</sup> The IPCC uses 15 global climate models to generate climate projections for 2030 and 2070.



This variation in prediction about future possible climates appears to be understood by many CRP members, but without explanation risks being interpreted by the broader community as uncertainty in whether human induced change is occurring at all rather than informing people about the range of outcomes for various climate factors. Communication of climate science also needs to deal more specifically with the pace of climate change and the pace of human induced versus natural change.

#### **4 VIEWS ON THE POTENTIAL IMPACTS OF CLIMATE CHANGE**

There was a strong and consistent view that the industries most likely to be impacted by climate change in the SA MDB NRM Region would be irrigation and dryland farming. This was spurred by a feeling of the majority of growers that their farming enterprises were vulnerable to the current drought and future climate change. The type and severity of change will be influenced by the rate and magnitude of change in climate factors like rainfall and temperature.

On one hand, temperature rises in the short term will shorten ripening periods and compress harvest times for irrigators leading to increased demand for labour, fruit storage and support services. On the other hand, long term reductions in the availability of water combined with higher temperatures were seen as being drivers of a reduction in the total area under irrigation in the SA MDB and a change to an alternative land use.

The impact on dryland farming will be that traditional cropping land becomes more marginal, resulting in lower production with current crops or a switch to new crop types and in some areas a shift toward pastoralism. This will also mean that for farming to be viable growers may need to amalgamate 2-3 properties.

The CRP responses suggest that the irrigation community will be more severely impacted in both the short term and long term than the dryland farming community.

The combined, regional impact of warmer and drier conditions on dryland farming and irrigation could be two fold. First, it may result in a general decline in economic activity that will impact the whole community through job losses, causing people to leave the district which will put pressure on the economic viability of regional towns. This is illustrated in the Coorong District Council where decline in the dairy industry because of reduced allocations in recent drought years caused a reduction in pupil numbers by one-third at some local schools. Second, reduced farm output whether as a result of reduced area under irrigation or the increasing marginalisation of dryland farming areas could reduce the value of farms .

The reduction in profitability of industry is a key impact because it reduces the ability for adaptation, and may lead to business and community collapse. The results indicate that the impacts are all encompassing — social, environmental and economic — and therefore incentives and support services must be provided to ensure the transition to sustainable agricultures and communities.



The impacts of climate change on human well being were also discussed by the CRP. The community is all too familiar with the physical and mental impacts of warmer temperatures on health, and the financial strain caused by low allocations and low rainfall. Given this, climate change impacts may range from interruption to recreational and social activities through to increased demand for health services. A major risk is that some parts of the region struggle to maintain the critical mass for essential services if action is not taken to offset short to medium term impacts.

The combined results of interviews, surveys and discussions about the impact of climate change suggest a general sense of urgency and recognition of the need for the community to adapt.



## **ATTACHMENT A - TERMS OF REFERENCE FOR THE CONSULTATION REFERENCE PANEL**

### **1. TITLE**

Climate Change Adaptation Project Consultation Reference Panel (CCAP CRP).

### **2. PURPOSE**

To provide a consultative forum to support and guide the community engagement and consultation process being implemented as part of the Climate Change Adaptation Project.

### **3. BACKGROUND**

The University of Adelaide's Environment Institute has been appointed as the consultant to implement the Climate Change impact assessment, adaptation and emerging opportunities for the SA Murray-Darling region" or more commonly referred to as the "Climate Change Adaptation Project" (CCAP). This is the umbrella project for some 21 other projects that are being funded through the Strengthening Basin Communities (SBC) Program for South Australian Murray-Darling Basin Councils.

External funding for the SBC program is being provided from the Federal Government's Department of the Environment, Water, Heritage and the Arts (DEWHA). The South Australian program is being overseen by a SBC Steering Committee, with representation from each of the 11 program partner councils and the SA MDB NRM Board.

The Environment Institute is the lead consultant and is supported by other organisations including the CSIRO, the South Australian Research and Development Institute (SARDI) and the Australian Institute for Social Research.

The key deliverables for the 20 month long project are:

- Establishment of Climate Change Scenarios to inform all 21 projects under SBC in SA Program;
- Climate Change Impact Assessment Report;
- Adaptation and Emerging Opportunities Plan; and
- Horticultural/Rural Lands Review.

The project team wants to ensure that this project is well informed by the views of the community, which is being achieved as follows:

- community engagement through establishment of a consultation reference panel;
- community consultation mostly through a series of interviews and surveys;
- community information sessions by way of public meetings.

### **4. FUNCTIONS**

The functions of the Consultation Reference Panel are to:

1. Advise on who to involve from within the broader community as part of the overall engagement and consultation strategy;
2. Review the project team's deliverables before they are submitted to the SBC Program Steering Committee with a view to ensuring they accurately cover the views expressed by the community during the consultation process;



3. Provide input reflecting the views of the respective sector that they represent;
4. Comment on the project methodology, including:
  - a. how to present information on climate change scenarios, adaptation and planning ideas to the broader community; and
  - b. which indicators to consider within the climate change impact assessment.
5. Advise on the approach to communicating the key messages and outcomes of the study to the broader community.

A governance model is provided in Figure A.1.

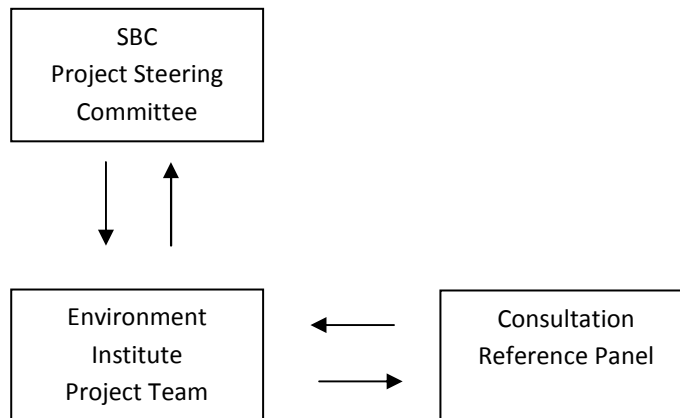


Figure A.1. Governance model for the project. Consultation Reference Panel provides consultation advice to the Environment Institute Project Team, who is then responsible for providing milestone deliverables to the SBC Project Steering Committee. The Reference Panel has no reporting responsibilities to the SBC Project Steering Committee and is not a formal sub-committee of the SBC Project Steering Committee.

## 5. MEMBERSHIP AND CHAIRPERSON

The membership of the Consultation Reference Panel will have a balance of skills and experience from Local Government, business, the community, dryland farming and irrigation and the South Australian Murray-Darling Basin Natural Resources Management Board. The Panel will also include a number of industry representatives with knowledge of the Murray-Darling Basin and its issues.

## 6. FREQUENCY OF MEETINGS AND DURATION OF THE PROJECT

The Panel will be engaged via a series of one on one interviews as well as periodic group meetings. It is expected that there will be no more than 4 group meetings during the life of the project. The first interview will be held in August and the first face to face meeting in late October to early November. In accordance with the DEWHA milestone deliverables, the greatest requirement for consultation is from June to November 2011.

## 7. REMUNERATION

There is no remuneration available for participation in this Consultation Reference Panel. All costs, such as time and travel, are to be covered by each member's organisation, as an in-kind contribution to the project.

## 8. PROJECT BRANDING AND PUBLIC RELATIONS



The Panel will abide by DEWHA's media, branding and public relations protocol. Should any media, branding or public relations be required, the Panel will in the first instance seek advice from the SA MDB NRM Board via the SBC Program Manager or the Senior Policy Officer (Local Government).

#### **9. LIFE OF THE REFERENCE PANEL**

The Consultation Reference Panel has a designated "life" that will continue until the final Milestone report has been submitted to DEWHA and prospectively a few months beyond this, should any follow up be required. The likely timing of this will be early 2012.

Following this time the Reference Panel will disband.