Community impacts of the Guide to the proposed Murray-Darling Basin Plan

Volume 6. Regional Analysis – Queensland

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Report prepared for the Murray-Darling Basin Authority

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Community impacts of the proposed Murray-Darling Basin Plan

Preface

This report is Volume 6 in a suite of documents that has been prepared by the EBC consortium on the potential community impacts of the proposals in the Guide to the Murray-Darling Basin Plan.

The MDBA commissioned the consortium to assess the potential community impacts of the proposals in the Guide. The primary objective was to understand the impacts on local, small-scale, human issues and costs during the short and medium term. A key aim was to consult with communities to understand how they would be impacted by proposals in the Guide.

A round of key informant interviews was completed early in 2011, covering 48 social catchments, 80 local government areas and 119 towns and regional centres. The discussions involved nearly 700 people from across the full range of sectors and employment groups. Additional economic analysis was undertaken to supplement and inform the outcomes of the community interviews.

The outcome of the project is reported in nine volumes:

- Volume 1: An Executive Summary - provides an overview and condensed report on the core outcomes of the project;
- Volume 2: Methodology - sets out the framework and analytical methodology for the study;
- Volume 3: Community Impact - provides a comprehensive report on the breadth of the issues raised in the Community Impact program. This includes the identification of a number of significant issues which are material for the roll-out of the draft Basin Plan;
- Volume 4: Informing Choices - takes the key issues from Volume 3 and provides further analysis and assessment of the issues to help provide information to optimise decisions on the development and implementation of the draft plan at least cost to the community;
- Volume 5: Regional analysis: Southern Connected Basin Overview;
- Volume 6: Regional analysis Queensland - provides detailed reports on the key findings from the community engagement process at a regional scale. They focus on the short to medium term impacts of the proposals in the Guide on industries and communities at the local level;
- Volume 7: Regional analysis New South Wales;
- Volume 8: Regional analysis Victoria; and
- Volume 9: Regional analysis South Australia.
1 Introduction

1.1 About this study

This study was commissioned by the Murray-Darling Basin Authority to assess the potential impacts of the proposals in the *Guide to the proposed Basin Plan* on local, small-scale, human issues and costs during the short and medium term.

The project was delivered using a suite of tools including community interviews, data analysis and economic modelling. These complementary approaches provided a robust basis for the assessment.

The community impact assessment was targeted at ‘social catchments’. This is a level of social grouping that reflects community identity and local economic interaction and enabled the study to capture impacts that occurred at a small scale. Around 50 such social catchments were selected across the Basin, mostly centred on towns that are at the heart of regional communities.

A comprehensive interview program was undertaken throughout the Basin early in 2011, with almost 700 interviews with key informants in nearly 50 social catchments. These semi-structured interviews obtained and assessed the potential impact of the *Guide* on farmers, businesses and communities within each social catchment. The impact assessment was structured to take account of the wider factors impacting on regional communities to identify the additional impacts that the *Guide* would have, over and above an agreed baseline.

The interviews used lines of enquiry that explored the current context, responses to the *Guide*, the baseline (a dynamic baseline, if there were no Basin Plan), the impacts of buyback and irrigation modernisation to date, and the impacts of future buyback and/or modernisation to meet the scenarios set out in the *Guide*. There were four groups of interviewees, with four tailored lines of enquiry, so that impacts could be traced from farmers, through the farm value chain (including processors), and into the community with a focus on businesses and services (Figure 1-1).
The relative impact of the Guide proposals at a local level depended on the scale of the proposed change, the mechanisms by which compensated environmental water recovery occurred, and the inherent capacity of the communities in social catchment to adjust. The capacity of communities to adapt to compensated environmental water recovery depended on two attributes: ‘size’, with a threshold at a figure around 10,000 people; and ‘dependency on irrigated agriculture’, with a threshold at around 15% of total employment in agricultural related sectors.

Using these two criteria allows the multiple social catchments across the Basin to be analysed within four major categories (Figure 1-2):

- **Category 1**: Small towns that are highly dependent on irrigated agriculture and are often geographically isolated, such as Warren and Collarenebri. These smaller communities are often subject to wider economic and demographic forces that are driving a decline in their size and vitality.
Reductions in water availability could increase the speed and extent of these changes for those communities;

- **Category 2**: Small diverse towns such as Stanthorpe that combine high-value irrigation with tourism and other sectors. They are insulated to some extent from the impacts of reduced water availability;

- **Category 3**: Larger towns that are highly dependent on irrigated agriculture, such as Dalby. These centres are robust with current diversion limits but would be highly exposed to proposed reductions in water availability; and

- **Category 4**: Large, diverse growing regional centres, such as Toowoomba that have a breadth of activity and employment. These are relatively insulated from reductions in water availability in the region.

The relative vulnerability of towns across the Basin as a whole is shown in Figure 1-3.

It is very important to recognise that relative vulnerability does not necessarily mean that towns will be more negatively impacted by the forthcoming Basin Plan. Other factors are also important; in particular, the relative exposure of towns to the proposed changes is critical. Not all vulnerable towns will necessarily face significant reductions in irrigation activity under the Basin Plan. A number of factors, in turn, affect exposure – these include the extent of the change from the current to the proposed sustainable diversion limit; the types of water entitlement sought by the Commonwealth; the mode of procurement (e.g. buy-back vs. modernisation); etc. Some of these key policy settings that affect exposure are discussed in Volume 4 of this study.
Figure 1-3. Social catchments in the Murray-Darling Basin, showing relative vulnerability of towns to reduced irrigation.
1.2 About these regional reports

These regional reports set out in detail the analysis and findings of this study for each Basin region, by State.

This report presents the EBC consortium’s findings for the Queensland regions – the Moonie, Condamine-Balonne, Warrego and Border Rivers. The Paroo was not part of the community impacts study due to its lack of connectivity to the broader basin. However, Cunnamulla, the focal social catchment for the Warrego, is also a major centre servicing the Paroo.

The findings set out in this report should be construed as the consortium’s professional judgment, except for where the context makes it clear that it is not our judgment (e.g. in some cases, anecdote that could not be substantiated is clearly expressed as being the opinion of those who communicated it). Our judgment is based upon interviews with community members, economic modelling, published literature and our professional experience.

This section summarises the subsequent sections of this report for the social catchments covered by the broader project covering the Queensland catchments of the Murray Darling Basin include the catchments of the Condamine-Balonne, Warrego and Moonie and the Border Rivers. It should be noted that the Paroo was not part of the community impacts study due to its lack of connectivity to the broader basin.1

It should be noted that the balance of analysis in this report is skewed to the Lower Balonne area within the Condamine and Balonne catchment, followed by Border Rivers. The rationale for the focus is simple. Our analysis has found that those areas are likely to be the major focus for much of the Australian Government’s efforts in buying back water entitlements to enhance environmental flow outcomes.

Please note that, from a socio-economic perspective, it is inappropriate to consider separately the communities of the NSW and Queensland parts of the Border Rivers. Social catchments straddle the border, as does the town of Mungindi; services and businesses service both people within their own state and those who live just across the border. Accordingly, this social catchment report considers the region a whole, and is presented in both the Queensland and New South Wales volumes of this study.

The days allocated to regional interviews, and to analysis and report preparation, for each region differed depending on the expected exposure of each region to potential irrigation impacts of the Basin Plan. Accordingly, the number of people interviewed and the time spent in report writing was greater for the Riverland than the Lower Murray.

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1 It should be noted that Cunnamulla (part of Warrego Catchment) is also the principal regional centre for the Paroo catchment.
These regional reports do not present the results, or our detailed analysis of, the additional ABARES modelling commissioned for this study; for that material the interested reader is referred to Volume 4. The Volumes of this study are:

- Volume 1: Executive Summary
- Volume 2: Methodology
- Volume 3: Community Impacts
- Volume 4: Informing choices
- Volume 5: Regional analysis: Southern Connected Basin Overview
- Volume 6: Regional analysis Queensland
- Volume 7: Regional analysis New South Wales
- Volume 8: Regional analysis Victoria
- Volume 9: Regional analysis South Australia

The interview program and analysis for each region in this study was undertaken by a two-person team that comprised a Team Leader and Number Two. The Team Leaders (and, in many cases, the Number Twos) have many years’ experience working and, for some, living in their regions. This expertise was combined with extensive professional experience in water and/or agriculture and meant that the Team Leaders were able to test and thoroughly analyse the material gained through our program. The consortium’s findings across the Basin as a whole then were collectively analysed and synthesised.

The Team Leaders were the lead authors of these regional profiles, which were then reviewed by the consortium and MDBA.

The Team Leaders for Queensland were Jim Binney of Marsden Jacob Associates, assisted by Adrian Kennelly of RMCG (Condamine-Balonne, Warrego and Moonie) and Tim Cummins of Tim Cummins and Associates, assisted by Jencie McRobert of RMCG (Border Rivers).

1.3 ‘Bridging the Gap in the Murray-Darling Basin’

The Australian Government has made a commitment that farmers' water rights will not be affected by the Basin Plan. It will ensure this by "bridging the gap" between current diversions and any final sustainable diversion limits in the Murray-Darling Basin Plan through water savings generated by infrastructure investments and
voluntary water purchase. An annual average of over 700 GL of water had already been recovered for the environment through these measures.²

The major elements of the Commonwealth's ten-year Water for the Future program commence in 2008 are:³

- $3.1 billion for purchase of water entitlements for the environment (Restoring the Balance in the Murray-Darling Basin Program); and
- $5.8 billion for infrastructure improvements to improve water use efficiency (Sustainable Rural Water Use and Infrastructure Program), some of which is not within the Basin.

Under the Sustainable Rural Water Use and Infrastructure program, the Australian Government has agreed in principle to provide close to $3.7 billion for significant state-based water infrastructure and reform projects in South Australia, New South Wales, Victoria, Queensland and the ACT, subject to a due diligence assessment of the social, economic, environmental, financial and technical aspects of the projects.⁴

Other elements of the Sustainable Rural Water Use and Infrastructure program include investment in the Menindee Lakes, and the Private Irrigation Infrastructure Operators Program (PIIOP) in New South Wales. The PIIOP aims to acquire water entitlements resulting from water savings generated by the implementation of eligible projects to improve the efficiency and productivity of water use and management, both off and on-farm, by private irrigation infrastructure operators, and which also secure a sustainable future for irrigation communities.

As regards water buyback, the $3.1 billion Restoring the Balance in the Basin program aims to acquire water entitlements from willing sellers that represents value for money, and use the water allocated to them for the environment. This water will be used to improve the health of the Basin's rivers, wetlands and floodplains.

Up to February 2010, expenditure on the buyback component was $1,079 million, and expenditure on water infrastructure for irrigation and other primary industry purposes was $465 million.⁵ This means that significant investment remains to be made under these two programs, contributing towards the ‘bridging the gap’ commitment. Budgeted expenditure is set out in Table 1–1.

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The extent of any additional necessary investment in these or other programs to meet the requirements of the Basin Plan is not yet clear.

Table 1–1. Budgeted expenditure for Australian Government buyback and modernisation (at 2010).6

<table>
<thead>
<tr>
<th>Financial year</th>
<th>Buyback (Restoring the Balance budgeted expenditure revised ($ million))</th>
<th>Modernisation (SRWUI, as shown in 2010–11 Budget ($ million))</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-08</td>
<td>45.5</td>
<td>-</td>
</tr>
<tr>
<td>2008-09</td>
<td>432.5</td>
<td>-</td>
</tr>
<tr>
<td>2009-10</td>
<td>1,237.8</td>
<td>230</td>
</tr>
<tr>
<td>2010-11</td>
<td>254.4</td>
<td>706</td>
</tr>
<tr>
<td>2011-12</td>
<td>249.5</td>
<td>868</td>
</tr>
<tr>
<td>2012-13</td>
<td>510.5</td>
<td>900</td>
</tr>
<tr>
<td>2013-14</td>
<td>n/a</td>
<td>732</td>
</tr>
<tr>
<td>2013-14 to 2016-17</td>
<td>369.8</td>
<td>-</td>
</tr>
</tbody>
</table>

2 Condamine Balonne

2.1 Overview

For explanation of conclusions summarised in this Summary Overview, please refer to the appropriate subsequent section of this report. Please note that this report is not a regional profile, but rather, is a report on the base case and potential impacts of proposed reductions in irrigation water availability. It draws on previously-published regional profiles to which the interested reader is referred.7

It should be noted that the balance of analysis in this report is skewed to the Lower Balonne area within the Condamine and Balonne catchment. The rationale for the focus is that our analysis has found that that area is likely to be the major focus for much of the Australian Government’s efforts in buying back water entitlements to enhance environmental flow outcomes. In addition, it is that area that potentially has lower economic and social resilience to change than most of the areas within the Queensland component of the Murray Darling Basin.

2.1.1 Social Catchments8

This region includes the social catchments of Dalby, Dirranbandi, St George, Toowoomba and Warwick in the Condamine Balonne, Cunnamulla in the Warrego and Thallon in the Moonie. Within the Condamine Balonne:

- The Lower Balonne social catchments include St George and Dirranbandi and which are located in the Lower Balonne catchment, approximately 500 km west of Brisbane. These social catchments can be classified as category 1, small, highly dependent towns. Dalby is an important regional service centre for the western Darling Downs and south-west Queensland, located 209 km west of Brisbane. Farmers make most of their regular supplies and small equipment purchases in their local towns (St George, Cunnamulla, etc.), however they would access more major equipment and professional services in Dalby.9 Thus, Dalby would be presently classified as a category 3 town, i.e. large and highly dependent.

- Toowoomba is a major regional city of 100,288 people located 126 km west of Brisbane on the Great Dividing Range. As a large regional city with a diversified economy, it is classified as a category 4 town, i.e. large and more economically diverse.

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8 Please refer to section 2.2.1 for more information and explanation
9 Roma is a larger town in the social catchment and is an important centre
Warwick is an important regional service centre for the southern Darling Downs, located 159 km south-west of Brisbane on the main inland route to Sydney and Melbourne. Warwick is classified as a category 4 town, i.e. large and more economically diverse.

A snapshot of the geography, population, socioeconomic status and economy of these social catchments is presented in Table 2-1. Whilst the original source of the data is reported in the footnotes, all ABS and DEEWR data was generated using the website of Queensland Regional Profiles, Office of Economic and Statistical Research, Queensland Treasury.

Table 2-1. Snapshot of the social catchments

<table>
<thead>
<tr>
<th></th>
<th>Balonne</th>
<th>Dalby</th>
<th>Toowoomba</th>
<th>Warwick</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Geography</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance from Brisbane</td>
<td>512 km</td>
<td>209 km</td>
<td>126 km</td>
<td>159 km</td>
</tr>
<tr>
<td>Annual rainfall</td>
<td>517 mm</td>
<td>676 mm</td>
<td>944 mm</td>
<td>710 mm</td>
</tr>
<tr>
<td>Average July max. temp.</td>
<td>19.0 °C</td>
<td>31.8 °C</td>
<td>16.3 °C</td>
<td>17.8 °C</td>
</tr>
<tr>
<td>Average Dec max. temp.</td>
<td>34.3 °C</td>
<td>18.7 °C</td>
<td>27.5 °C</td>
<td>30.2 °C</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimate as at 30 June 2010</td>
<td>4,847</td>
<td>11,097</td>
<td>100,288</td>
<td>12,561</td>
</tr>
<tr>
<td>Average annual growth rate 2005-2010</td>
<td>-0.7%</td>
<td>1.5%</td>
<td>1.1%</td>
<td>1.3%</td>
</tr>
<tr>
<td>% of population under 25 years</td>
<td>36.2%</td>
<td>38.1%</td>
<td>36.7%</td>
<td>35.0%</td>
</tr>
<tr>
<td>% of population between 25-64 years</td>
<td>52.5%</td>
<td>50.0%</td>
<td>47.9%</td>
<td>47.0%</td>
</tr>
<tr>
<td>% of population over 64 years</td>
<td>11.3%</td>
<td>11.8%</td>
<td>15.4%</td>
<td>17.9%</td>
</tr>
<tr>
<td>% of population that are indigenous</td>
<td>14.9%</td>
<td>6.1%</td>
<td>3.2%</td>
<td>3.8%</td>
</tr>
<tr>
<td><strong>Socio-economic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEIFA – most disadvantaged quintile</td>
<td>38.9%</td>
<td>25.6%</td>
<td>24.8%</td>
<td>48.8%</td>
</tr>
<tr>
<td>SEIFA – least disadvantaged quintile</td>
<td>4.1%</td>
<td>0.0%</td>
<td>13.4%</td>
<td>0.0%</td>
</tr>
<tr>
<td>% of population earning &lt;$400 per week</td>
<td>37.0%</td>
<td>40.6%</td>
<td>43.9%</td>
<td>49.2%</td>
</tr>
<tr>
<td>Unemployment rate – September 2010</td>
<td>5.7%</td>
<td>4.2%</td>
<td>4.3%</td>
<td>5.2%</td>
</tr>
<tr>
<td><strong>Economy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross Regional Product</td>
<td>$324M</td>
<td>$435M</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Value of agricultural production</td>
<td>$221M</td>
<td>$0.4M</td>
<td>$0.9M</td>
<td>$2.9M</td>
</tr>
<tr>
<td>% employed in agriculture</td>
<td>36.1%</td>
<td>5.0%</td>
<td>2.1%</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

10 Source: Bureau of Meteorology
11 Source: ABS, Regional Population Growth, Australia, 2009-10, cat. No. 3218.0 – preliminary estimates as at 30 June 2010
12 Source: ABS, Population by Age and Sex, regions of Australia, 2009, cat. No. 3235.0 – preliminary estimates as at 30 June 2009
13 Source: ABS, Census of Population and Housing, Indigenous Profile – I02 – 2006 data
14 Source: ABS, Census of Population and Housing: Socioeconomic Indexes for Areas (SEIFA), Australia – data only, 2006, cat. No. 2033.0.55.001
15 Source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B16
16 Source: DEEWR, Small Area Labour Markets Australia, various editions
17 Gross regional Product is defined as the market value of all final goods and services produced within the statistical local area in 2005-06
18 Source: ABS, Agricultural Commodities, Australia, 2005-06, cat. No. 7125.0
19 Source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B42
2.1.2 Irrigation in the region

The Condamine-Balonne catchment of the MDB is made up of a number of different water supply schemes (WSS), which are supplemented irrigation systems, and water management areas (WMA), which are unsupplemented. Irrigators generally divert water from natural water courses in unsupplemented areas. Water entitlements available for irrigation in the Condamine-Balonne catchment are structured significantly differently to the majority of the MDB. Of the 544,000 ML of minimal volume, 79.6% is unsupplemented. This water is essentially accessed via harvesting of river flows. In addition to the volumes of water accessed by irrigators through the WSS and WMA, there are also significant volumes of water accessed via overland flow. Although those water resources are outside the scope of any government purchase programs.

2.1.3 Agriculture in the region

Agriculture in the Queensland catchments was predominantly based on the extensive grazing industries prior to irrigation development. The higher rainfall areas of the eastern part of the region supported higher intensity grazing, whilst the country west of St George is part of the broader pastoral zone of the Australian interior. In between, the Darling Downs have always supported a thriving broad acre cropping industry. Cotton has become the dominant agricultural industry since the broader development of irrigation in the 1990s.

2.1.4 Impact of the drought

The impacts of drought on the most susceptible social catchments were:

- The drought led to a substantial population decline in Dirranbandi. Dirranbandi had a population of approximately 1,100 people at the pinnacle of the development of the cotton industry in the mid 1990s. It is now 414.

- Balonne Shire staff reported during the consultation that 300 families left St George during the drought. There was also a change in the population structure with an increase in lower income, more welfare dependent, older people and higher proportion of indigenous people, as more mobile people left.

2.1.5 Baseline

The population of the smaller social catchments in the west of the region are projected to decline or, at best, remain stable if the current diversion limits for irrigation were left unchanged.

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20 Please refer to section 2.3 and 2.4 for more information and explanation
21 Please refer to section 2.7 for more information and explanation
22 Please refer to section 2.8 for more information and explanation
The climate is highly variable with subsequent highly variable and unpredictable river flows. Those consulted described it as a “feast or famine” environment. Climate change scenarios project that the “feast” and “famines” may become more extreme.

The baseline for irrigated agriculture indicates very significant variability dependent on water availability. In effect, irrigation has been established (and runs relatively efficiently) on a model that is built around a few very good years in each climate cycle making farming viable. In effect, analysing averages is pointless and provides little insight to policy development or implementation.

2.1.6 Impact of reduced water availability

The potential impacts of water availability are significantly dictated by the mechanisms used to recover water and the locations where that water is more likely to be purchased. Our analysis has found that a buyback program is likely to result in buybacks and hence impacts being highly concentrated in the Lower Balonne (St George and Dirranbandi social catchments).

This concentration of impacts is essentially because water in that region provides the highest environmental benefits to key identified environmental assets at a lower cost to the Commonwealth budget.

Our analysis and consultation also indicates that the Lower Balonne is relatively more reliant on irrigated agriculture than most of the Condamine-Balonne and the other catchments covered in this report. In short, the best place for the Commonwealth to purchase water based on value for money objectives (the Lower Balonne), is possibly the worst place if they wish to minimise negative economic and social impacts in regional communities.

Of the two current buyback options currently in operation in across the region, the tender has a lower cost to the Commonwealth budget, but will almost certainly reduce irrigated agriculture production in the region (as only a fraction of the proceeds from water sales will be investment in irrigated agriculture productivity investments). The Healthy Headwaters program is likely to have a neutral impact on regional production.

Potential impacts focussed in the Lower Balonne

Analysis and consultation has concluded that the negative economic and social impacts of current buybacks or buybacks sufficient to meet the SDLs will be limited as there would only be very limited water for irrigation anyway. Rather the impacts are that production would be significantly constrained in the better years – the

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23 Please refer to section 2.9 for more information and explanation. In addition, the potential social and economic impacts of different policy settings including buyback policy, modernization policy, etc. is discussed in Volume 4 of this study – accordingly it is not repeated here, but the interested reader is referred to that volume for detailed discussion of conclusions that are summarized in this regional report.
production that is required to make farming viable. This is shown in the figure below where we have simulated impacts over the past 11 years production.

![Figure 2-1. Simulated impact on cotton production with and without buybacks in the Lower Balonne (using 2000-2011 production as a basis for comparison).](image)

2.1.7 Community resilience and adaptive capacity

The community of the western half of the region have relatively low resilience to cope with material reductions in water availability, as producers are already struggling with relatively high debt levels, limited access to capital and very limited commercial opportunities for diversification within agriculture.

Dirranbandi is the most vulnerable community in the region, given the fact it is already a hotspot for buybacks and has relatively low levels of resilience. There is significant concern amongst the community that permanently reduced diversion limits would lock in a permanent drought and lead to a further decline in community services that would eventually lead to the permanent demise of Dirranbandi.

St George is larger than Dirranbandi and acts as a regional service centre for the lower Balonne, however it is highly reliant on the cotton industry also, but horticulture, dry land farming, tourism and government services are all important to its economy. The Balonne Shire Council has major concerns that their ability to maintain current services will be compromised when demand for their services increase, yet the costs for delivering those services will need to be shared across a diminishing population and rate base.

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24 MJA and RMCG analysis.
25 Please refer to section 2.10 for more information and explanation.
2.1.8 Minimisation of impacts

Assuming the basic premise that water entitlements will be purchased from irrigators either directly through programs such as Restoring the Balance, or through water use efficiency programs such as Healthy Headwaters, achieving environmental water objectives in the region presents a ‘wicked’ policy problem. This is because of complex interdependencies, and the fact that solving one problem (e.g. value for money buybacks) is likely to create significant other problems (some communities at risk). There are a number of key points to note:

- Basing purchases on pure value for money criteria will result in focusing almost exclusively in the Lower Balonne region, as this area generally has the lowest opportunity cost on a $/ML basis and the environmental gains from those purchases are likely to be relatively higher.

- The Lower Balonne is relatively more susceptible to shocks from water purchases as the economies of social catchments such as St George and Dirranbandi are very narrowly based within limited opportunity for diversification or substitution of economic activity. In addition, those communities tend to have less social resilience due to their demographic makeup and other key factors underpinning resilience.

- The eastern regions of the Condamine-Balonne will tend to offer relatively lower value for money for environmental water purchases, in regions that have a greater capacity to absorb shocks.

In short, the best place for the Commonwealth to purchase water based on value for money objectives (the Lower Balonne), is possibly the worst place if they wish to minimise negative economic and social impacts in regional communities.

This creates a real need for careful and deliberative policy implementation that recognises both the local and regional consequences of water buybacks. Some of the key issues for consideration in implementing the Restoring the Balance Program in the region are:

- Because of the significant variation across the region, a top-down approach to water management that does not recognise the intra-regional variation is more likely to result in sub-optimal outcomes and potentially perverse policy outcomes.

- There is a difference in costs of securing water for the environment through buybacks and WUE programs and this creates a need to assess trade-offs between the efficiency of buybacks and the economic and social impacts at a relative localised scale. However, this cost differential could potentially be reduced through astute changes to WUE programs. This has the potential to

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26 Please refer to section 2.11 for more information and explanation.
reduce the trade-offs between narrow and broader policy objectives for the Commonwealth.

- It may be worthwhile considering a buyback strategy that focuses heavily on the licensed diversion conditions as well as entitlement volumes and price. In addition, temporary trades warrant further consideration. This could potentially enable achieving environmental objectives (e.g. at Narran Lakes) at a significantly lower opportunity cost, as well as have a lower economic and social impact on local communities.

- Given the resources to be applied in implementing the MDB Plan and the potential impacts, it would be prudent to identify, analyse and (potentially) remove any remaining impediments to the efficient implementation of the MDB Plan.

- There are likely to be opportunities for enhancing the outcomes from the MDB Plan and implementation measures such as the Restoring the Balance Program through utilising the data and knowledge accumulated through the development and implementation of the ROPs that have already been developed.

2.2 Background

2.2.1 Introduction to region and social catchments

This chapter includes the catchments of the Condamine-Balonne, Moonie and Warrego. The Paroo was not part of the community impacts study due to its lack of connectivity to the broader basin. However, Cunnamulla, the focal social catchment for the Warrego is also a major centre servicing the Paroo.

This region includes the social catchments of Dalby, Dirranbandi, St George, and Toowoomba, and Warwick (refer to Figure 5-1).
Figure 2-2. Map of the Condamine-Balonne social catchments, showing categories of towns.27

27 Source: EBC consortium
Limited socio-economic and demographic data is available for the social catchments of Dirranbandi (Condamine Balonne), St George (Condamine Balonne) and Thallon (Moonie), as they are all part of the same statistical local area (Balonne). Thus, they are reported here as Balonne. However, relevant local data is reported where available and the differences in the vulnerability and response of these three social catchments are reported, elsewhere in the report, when significant.

2.2.2 Social Catchments

The Balonne social catchments include St George, Dirranbandi and part of Thallon, which are all located in the lower Balonne catchment, approximately 500 km west of Brisbane.

The total population of the Balonne Shire was estimated at 4,847 people as at 30 June 2010. Of this total population, it is estimated that St George has a population of 2,527, Dirranbandi 414 and the Thallon locality 176. The population of the Shire declined at an average annual rate of 0.7% between 2005 and 2010. It was estimated by the local government personnel consulted that the town of Dirranbandi has declined significantly since the beginning of the 2000's partially as a result of the drought. However, this is probably just expedited an underlying declining population trend that has been occurring in recent decades.

A high proportion (14.9%) of the population are indigenous and 38.9% of the total population are within the most disadvantaged quintile of the SEIFA index. The unemployment rate of 5.7% is low, however 37% of the workforce earn less than $400 per week and there is a high rate of non participation, especially amongst the indigenous community.

Agriculture is the largest sector of the local economy, employing 36.1% of the workforce. Cotton, horticulture, cereal production and grazing are the main enterprises. The growth of horticulture has been limited to the capacity to irrigate during low river flows, however cotton is a “feast or famine” enterprise with the area sown highly dependent on river flows. Thus, the irrigation sector of these social catchments provided very little buffer against the impact of the drought.

Dirranbandi, in particular, is a “cotton town” and its viability and sustainability as a town is largely dependant on cotton production and thus, the river diversions, which the irrigators utilise.

Thus, all three of these social catchments can be classified as category 1, small, highly dependent towns.

2.2.3 Dalby Social Catchment

Dalby is an important regional service centre for the western Darling Downs and south-west Queensland, located 209 km west of Brisbane. Farmers make most of their regular supplies and small equipment purchases in their local towns (St George, Cunnamulla, etc.), however they often access more major equipment and professional services in Dalby. Thus, Dalby has a thriving agricultural service industry.

Dalby has a population of 11,097, which has been growing at an average annual rate of 1.5% since 2005. Its unemployment rate is low at 4.2% and 25.6% of the population are within the most disadvantaged quintile of the SEIFA index.
The Gross Regional Product of the town is $435M and only 5% of the workforce is directly employed in agriculture. However, significantly more people are employed in industries that service agriculture. Thus, whilst Dalby has a more diversified economic base than the smaller towns further west, it is still vulnerable to the fortunes of agriculture.

The floods of January 2010 had a significant negative impact on the economic well being of the town and the recovery from this event has slowed its growth, however the diversified nature of its economy and the potential for it to become a major service centre for the coal-seam gas industry indicate potential for continued growth.

Despite this potential, Dalby presently would be classified as a category 3 town, i.e. large and highly dependent.

2.2.4 Toowoomba Social Catchment

Toowoomba is a major regional city of 100,288 people located 126 km west of Brisbane on the Great Dividing Range. It has its own industry base and acts as a major service centre for much of inland southern Queensland.

Toowoomba's population has been growing at an average annual rate of 1.1% since 2005 and has relatively high youth (<25 years = 36.7%) and older (>64 years = 15.4%) population because of the extensive range of services available, especially education and health.

Unemployment is low at 4.3% and 24.8% of the population are within the most disadvantaged quintile of the SEIFA index.

Only 2.1% of the workforce is directly employed in agriculture, however there is a significant agricultural service sector within Toowoomba. However, unlike Dalby, this sector would still be a relatively small component of the overall economy of Toowoomba.

As a large regional city with a diversified economy, Toowoomba is classified as a category 4 town, i.e., large and more economically diverse.

2.2.5 Warwick Social Catchment

Warwick is an important regional service centre for the southern Darling Downs, located 159 km south-west of Brisbane on the main inland route to Sydney and Melbourne. As such, it has leveraged its strategic position to become a major wholesale logistics, retail and transport centre.

Warwick has a population of 12,561 and has been growing at an average annual rate of 1.3% since 2005. It has a high proportion of its population over the age of 64 years and almost half the population (48.8%) are in the most disadvantaged quintile of the SEIFA index. This is despite low unemployment of 5.2%. Thus, the high level of disadvantage reflects the high proportion (49.2%) of the population that earn less than $400 per week.

This data reflects the type of industry that is prevalent in Warwick and the low cost of real estate, despite its close proximity to Brisbane.

Like Dalby, Warwick has a significant agricultural service industry, but for a much smaller agricultural catchment. This, combined with the presence of major wholesale logistics, retail
and transport industries, has resulted in Warwick having a much more diverse and resilient economy.

Thus, Warwick is classified as a category 4 town, i.e., large and more economically diverse.

2.3 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 5-2.

Figure 2-3. Current diversion limits. The Condamine-Balonne is the fifth largest diverter in the Basin.28

The Condamine-Balonne catchment of the MDB is made up of a number of different water supply schemes (WSS), which are supplemented irrigation systems, and water management areas (WMA), which are unsupplemented. Irrigators generally divert water from natural water courses in unsupplemented areas. Figure 2-4 shows the location of the major urban centres and WSS in the catchment.

Water entitlements available for irrigation in the Condamine and Balonne catchment are structured significantly differently to the majority of the MDB. Of the 544,000 ML of minimal volume, 79.6% is unsupplemented. This water is essentially accessed via harvesting of river flows. In addition to the volumes of water accessed by irrigators through the WSS and WMA, there are also significant volumes of water accessed via overland flow. Although those water resources are outside the scope

of any government purchase programs. An overview of the WSS and WMA is presented in Table 2-1.
Figure 2-4. Condamine-Balonne catchment and supplemented water supply schemes.\textsuperscript{29}

\textsuperscript{29} Source: Condamine-Balonne Resource Operations Plan.
Table 2-2. Key summary of WSS and WMA in the Condamine Balonne (excluding overland flow).  

<table>
<thead>
<tr>
<th>Irrigation region (&amp; associated social catchment)</th>
<th>Entitlements (nominal volumes) (‘000 ML)</th>
<th>Average water holding (ML)</th>
<th>Key features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supplemented schemes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Upper Condamine WSS (Warwick)                     | 27.9                                     | 279                       | - Major infrastructure is Leslie Dam (capacity 106,200ML) and a series of seven weirs.  
- Water is used for a wide variety of crops ranging from irrigated fodder through to vegetables. |
| Chinchilla Weir WSS (Chinchilla)                  | 2.5                                      | 73                        | - Major infrastructure is the Chinchilla weir (capacity 9,780ML).  
- Water is used for a wide range of crops including irrigated fodder, grapes, grains and some limited cotton irrigation. |
| Maranoa River WSS (Mitchell)                      | 0.8                                      | 160                       | - Infrastructure is the Neil Turner Weir (capacity 1,470ML).  
- Irrigation is a subsidiary use of water from the weir (primary use is as a supply for the township of Mitchell). |
| St George WSS (St George)                         | 79.8                                     | 376                       | - Major infrastructure is Beardmore Dam (effective storage capacity approx. 71,700 ML).  
- St George WSS includes a network service via a channel system supplied from the Beardmore Dam.  
- Primary crop is cotton. Modest and expanding areas of horticulture (primarily table grapes, melons and some vegetables) under production. |
| **Unsupplemented systems**                        |                                          |                           |              |
| Upper Condamine WMA (several from south of Warwick to south-east of Chinchilla) | 58.7                                     | 295                       | - Water sharing rules for water allocations to take unsupplemented water located in the Upper Condamine Water Management Area (incorporates 7 management zones).  
- Announcement period used for water harvesting (no temporal discretion for irrigators), but multiyear accounting water sharing rules provide some flexibility between years.  
- Virtually no on-farm storages.  
- Water is used for a wide variety of crops ranging from irrigated fodder through to vegetables. |
| Condamine & Balonne WMA (several including Chinchilla, Surat & Mitchell) | 36.5                                     | 363                       | - Water sharing rules for water allocations to take unsupplemented water located in the Condamine and Balonne Water Management Area.  
- Multiple rules relating to water announcements including flow conditions, announcement periods, volumetric limits.  
- Multiple broad acre crops, but cotton dominates. |
| Condamine & Balonne Tributaries WMA               | 63.3                                     | 156                       | - Water sharing rules for water allocations to take unsupplemented water located in the WMA (several management zones).  
- Multiple rules relating to water announcements including flow conditions, announcement periods, volumetric limits.  
- Multiple broad acre crops, but cotton dominates. |
| Lower Balonne WMA (St George & Dirranbandi)      | 274.0                                    | 4,459                     | - Water sharing rules for water allocations to take unsupplemented water located in the Lower Balonne WMA (several management zones).  
- Multiple rules relating to water announcements including flow conditions, announcement periods, volumetric limits.  
- Water is diverted into private on-farm storages (usually very large ring tanks) with total storage estimated at approximately 1.1 million ML. These irrigators cover all water supply infrastructure capital and operating costs themselves.  
- Primary crop is cotton. |

Thus, the key points to note with respect to water management arrangements include:

- Water available to irrigators is determined through the Condamine-Balonne Resource Operations Plan, which was established in 2008 and subsequently amended in 2010.

- In each WSS or WMA, single irrigators typically hold multiple allocations.

- Within most schemes there are multiple classes of water allocations (e.g. high class A; high class B; medium class; and risk class B). Different water sharing rules apply to the different classes of water allocations. In effect, this has a major bearing on the circumstances and frequency at which irrigators can access their various allocations and the economic value of those allocations.

- In each WSS or WMA, the water actually available to irrigators is determined through a process of announced allocations. While current announced allocations are generally 100% across the Condamine-Balonne catchment, during the drought announced allocations were rarely near the full nominal entitlement. In addition, in some schemes there are also temporal restrictions on when irrigators can actually access their allocations, which can have a negative impact on the economic value of allocations, particularly where water availability and crop requirements do not coincide.

- In effect, there is a complex array of factors that will determine the effective benefits of water to irrigators, and while the principles of water management are broadly consistent across the Condamine-Balonne catchment, the local circumstances that determine the announced allocation system mean comparisons between different WSS and WMA should be treated with care.

2.4 Key agricultural industries

2.4.1 Gross value of agricultural production

Agriculture in the Queensland catchments was predominantly based on the extensive grazing industries and dryland cropping prior to irrigation development. The higher rainfall areas of the eastern part of the region supported higher intensity grazing, whilst the country west of St George is part of the broader pastoral zone of the Australian interior. In between, the Darling Downs have always supported a thriving broad acre cropping industry. Cotton has become the dominant agricultural industry since the broader development of irrigation in the 1990s.

The gross value of agricultural production (GVAP) by industry in the region and compared to that of the whole of the Murray Darling Basin for 2005/06 is presented in Table 2-3.
Table 2-3. Gross Value of Agricultural Production by industry, 2005/06.  

<table>
<thead>
<tr>
<th>Industry</th>
<th>Region GVAP ($million) 2005/06</th>
<th>% of region</th>
<th>Basin GVAP ($million) 2005/06</th>
<th>% of Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td>16.8</td>
<td>3.3%</td>
<td>185.1</td>
<td>9.1%</td>
</tr>
<tr>
<td>Cotton</td>
<td>227.6</td>
<td>45.2%</td>
<td>1,293.2</td>
<td>17.6%</td>
</tr>
<tr>
<td>Dairy</td>
<td>19.4</td>
<td>3.9%</td>
<td>910.2</td>
<td>2.1%</td>
</tr>
<tr>
<td>Fruit &amp; Nuts</td>
<td>3.0</td>
<td>0.6%</td>
<td>1,008.6</td>
<td>0.3%</td>
</tr>
<tr>
<td>Grapes</td>
<td>3.5</td>
<td>0.7%</td>
<td>713.7</td>
<td>0.5%</td>
</tr>
<tr>
<td>Hay</td>
<td>9.2</td>
<td>1.8%</td>
<td>171.5</td>
<td>5.4%</td>
</tr>
<tr>
<td>Meat Cattle</td>
<td>169.1</td>
<td>33.6%</td>
<td>611.4</td>
<td>27.7%</td>
</tr>
<tr>
<td>Other broadacre</td>
<td>3.0</td>
<td>0.6%</td>
<td>41.1</td>
<td>7.3%</td>
</tr>
<tr>
<td>Rice</td>
<td>0.0</td>
<td>0.0%</td>
<td>475.9</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sheep</td>
<td>1.5</td>
<td>0.3%</td>
<td>154.6</td>
<td>1.0%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>50.3</td>
<td>10.0%</td>
<td>657.1</td>
<td>7.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>503.4</strong></td>
<td><strong>6,222.4</strong></td>
<td></td>
<td><strong>8.1%</strong></td>
</tr>
</tbody>
</table>

The data presented in Table 2-3 shows that:

- The GVAP of the region represents 8.1% ($503.4 M) of the Basin’s GVAP ($6,222.4 M).
- Cotton produced 45.2% of $227.6 million worth of the regions GVAP of $503.4 million.
- This cotton production represented 17.6% of the value of cotton produced in the Basin.
- Meat cattle remain a significant industry as $169.1 million or 33.6% of the GVAP.
- This cattle production represented 27.7% of the value of beef production in the Basin.
- Vegetables are a small, but significant industry at $50.3 million, or 10.0% of the region’s GVAP and 7.7% of the value of vegetable production in the Basin.

It is important to recognise that the figures presented in Table 2-3 are drought levels of production. It has been estimated that the value of cotton production in the Basin in 2005/06 was approximately 35% lower than 2000/01. If this reduction were extrapolated to the Queensland catchments, the value of cotton production would be approximately $350 million. Thus, cotton and the irrigation water that feeds it are central to the agricultural value of the region.

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2.4.2 Cotton production

As a general rule, the area of cotton produced is roughly in proportion to the volume of water available. Across the Condamine-Balonne both dryland and irrigated cotton is grown. After a prolonged period of drought, solid rainfall during the past two summers has significantly increased the area of cotton under production in the Condamine-Balonne (although the floods have impacted to a greater extent on the Darling Downs, than in the Lower Balonne region).

Interviews revealed that the irrigated cotton crop in the current year is expected to top 100,000 ha, of which in excess of 80% will be in the Lower Balonne. This has the potential to produce in excess of 600,000 bales, if yields are maintained. However, it should be noted that the current levels of production are the highest in approximately a decade. At the height of the drought, irrigated production was less than 20% of current values.

A substantial turnaround in cotton production has also occurred in the Moonie. Interviews indicated that average water use is around 6-7ML/ha when water is available. Employment on farms also varies in line with water available and plantings. A broad rule of thumb is that for every additional 400 ha under a cotton crop an additional job is created.

Because of the highly variable availability of water in the Queensland cotton production regions, the business structure (including debt) of many cotton farms is essentially structured around a heavy reliance on a few good years in each decade to make the business viable in the long-term. The recent drought created significant pressures on cotton irrigators, as cash flow was often negligible. For many the drought also occurred almost immediately after many entered more debt in the late 1990s to expand production areas and increase storages.

The short-term outlook for the cotton sector is very positive, largely because of the significant volumes of water already in farm storages (many farms currently have two years supply) and available throughout supplemented irrigation systems, and because of the relatively high cotton price. However, the area under plantation will continue to vary widely depending on water availability.

2.4.3 Beef

The beef industry is the second most significant agricultural industry in the region. Grazing is the dominant land use of the river flood plain and pastoral country in the south and west of the region.

The most recent data available estimates that there are 462 people employed in the livestock industries (cattle and other) in the Balonne Shire alone. The value of

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livestock slaughterings was $77.9 million and the number of cattle counted in Balonne Shire in 2006 was 144,077\(^{34}\).

The drought has severely reduced the number of cattle carried in the region, however with the finish of the drought it would be expected that cattle numbers would rebuild and if the availability of irrigation water were reduced, beef production would become a more significant industry, replacing irrigated cotton and cereal production.

2.4.4 Horticulture

Horticulture is a relatively small, but significant industry in the region. Whilst the GVAP of horticulture is only $50.3 million or 10% of the region’s GVAP, it accounts for significant seasonal employment, which is critical to the viability of the small towns in the region.

For example, three table grape producers located at Cunnamulla, using approximately 2.6 GL per annum, employ 150 casual workers for three months at harvest time\(^{35}\). This expands the town’s population by almost 15%. Most importantly, this occurs during the quietest period for tourist visitors, thus maintaining demand for goods and services in the town all the year round. Similarly, it has been estimated that St George’s population increases by approximately 500 people (or 20%) during harvest\(^{36}\).

There are 21 different crops grown in the Balonne Shire alone, including a wide range of vegetables, fruit and cut flowers. The main horticultural crops grown in the region are table grapes (incl. a small proportion of wine grapes), melons (rockmelons, watermelons, honeydew), pumpkins and onions\(^{37}\).

Similarly, there is also a significant variation in horticulture crops in the eastern end of the region (e.g. around Warwick) where favourable climatic conditions and excellent access to the key markets in South East Queensland. Some producers in the Warwick region see the area as the next Lockyer Valley (the food bowl for South East Queensland).

2.4.5 Grain

The grain industry in the region includes wheat, sorghum, other cereals and oilseed production. Whilst the data presented in Table 2-3 for the drought year of 2005/06 shows that the GVAP of cereal production was only $16.8 million or 3.3% of the region’s GVAP, grain production is a significant industry in the region.

In was estimated in 2007 that there was approximately 150,000 hectares planted to wheat in the Balonne Shire alone, returning a value of $32 million with all other
cereal crops accounting for approximately 30,000 hectares. Thus, the drought year production figures reported in Table 2-3 are well below the contribution grain makes to the regional economy in non drought years.

### 2.4.6 Intensive livestock

The southern downs part of the region (Warwick) has long been a favored area for feedlot production of beef. The region is well located for transport and distribution, as well as access to grain growing areas for feed and meat processing plants. The ABS statistics for 2006/07 show that 70% of the cattle (472,747 head) sold in the region in 2006/07 originated from a feedlot.

The region is also a major producer of eggs and pork and increasingly poultry, as south-east Queensland becomes increasingly urbanised. The value of pork, eggs and poultry produced in the region in 2006/07 is presented in Table 2-4.

**Table 2-4. Value of pork, eggs and poultry, 2006/07.**

<table>
<thead>
<tr>
<th></th>
<th>Pork</th>
<th>Eggs</th>
<th>Poultry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>$98.7 M</td>
<td>$70.5 M</td>
<td>$4.0 M</td>
</tr>
<tr>
<td>Queensland</td>
<td>$237.0 M</td>
<td>$93.0 M</td>
<td>$240.0 M</td>
</tr>
<tr>
<td>% of QLD</td>
<td>42%</td>
<td>76%</td>
<td>2%</td>
</tr>
</tbody>
</table>

The data presented shows that 42% of the State’s pork and 76% of the State’s eggs are produced in the region, supporting the notion that the region is a major area for intensive livestock production.

### 2.5 Key other industries

#### 2.5.1 Context

There is a diverse range of industries across the region, especially in the larger more diverse centres such as Toowoomba. However, this section focuses on those that are prevalent outside of these larger centres and are critical to the smaller, less diverse social catchments within the region. These other industries include cotton ginning, agricultural supplies, government services, tourism, transport logistics, and energy and mining.

#### 2.5.2 Cotton ginning

There are several cotton gins in the Condamine-Balonne including Dalby, Cecil Plains, St George, Beardmore and Dirranbandi. Collectively these gins have a processing capacity in excess of 550,000 bales, although this can be increased by extending the season when necessary.

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39 ABS (2008), Agricultural Commodities: Small area data, Australia, 2006/07.
40 ABS (2008), Agricultural Commodities: Small area data, Australia, 2006/07.
Until this current year, all gins had significant excess capacity throughout the drought and had been running well below full production and employment. In some seasons, some gins were not used for processing, but were essentially mothballed waiting for a turnaround in the cotton sector. During the drought, there was also intensive competition between gins to secure throughput, often resulting in gins trading away any meaningful margins in order to secure sufficient throughput to cover overhead costs.

The gins tend to have a fixed labour component of 6-8 staff (e.g. managers and clerical staff), with a casual staffing component during operations, often in excess of six times the fixed labour components. During the processing season, gins are often significant regional providers of employment. However, often some roles do need to be filled by more skilled workers that are effectively imported from other regions for the processing period.

Because of the capital-intensive nature of the gins, their fixed costs are considerable and covering those fixed costs proved problematic in the height of the drought. The commercial viability of the gins is highly reliant on the levels of utilisation. During the drought, some gins would have been struggling to cover cash costs, let alone cover refurbishment and depreciation requirements or provide any return in capital for their owners.

The outlook for the gins is highly dependent on the outlook for the cotton producers. Any significant downturn in cotton production due to the SDLs would translate directly into lower levels of gin utilisation and subsequently an impact on the asset values for the gins.

2.5.3 Agricultural supplies

Our earlier work for the MDBA found that 75% of annual farm operating expenditure occurs in towns and regional centres within 50 kilometres of the farm gate. Other available information and consultation generally shows that irrigated enterprises, such as cotton and table grapes result in far higher expenditure than non-irrigated enterprises, such as wheat and cattle, whilst the difference between cattle in the pastoral zone and table grapes (i.e. Cunnamulla) is extreme. Thus, the agricultural supplies businesses that service irrigated agriculture in the smaller social catchments are significant businesses that are entirely dependent on economic performance of the industries they serve.

There is a hierarchy of towns for agricultural supplies within the region. This can best be explained via a commonly used example of equipment purchases provided by a number of those farmers consulted.

- Frequently purchased small-scale equipment, such as a chainsaw, and small quantities of farm inputs (chemicals and fertilizer), possibly required at short notice, are purchased locally, e.g. Dirranbandi or Cunnamulla.
• Regularly purchased, medium-scale equipment, such as a quad bike, or even a ute, and regular planned purchases of farm inputs are purchased at smaller regional service centres, e.g. St George.

• Irregularly purchased, large-scale equipment, such as a new harvester and purchases of technology (computers, GPS, etc.) or professional services are usually purchased at a major regional centre, such as Dalby or Toowoomba, where they are more price competitive and a wider range of professional support services are available.

2.5.4 Government services

The government service sector is a major employer in the region. Government services refer to the ANZSIC industries:

• Public administration and safety.

• Health care and social assistance.

• Education and training.

• Arts and recreation services.

The percentage of the workforce employed in each of these industries is presented in Table 2-5 by social catchment.

Table 2-5. Percentage of the workforce employed in government services in 2006.41

<table>
<thead>
<tr>
<th>Social Catchment</th>
<th>Public administration and safety</th>
<th>Health care and social assistance</th>
<th>Education and training</th>
<th>Arts and recreation services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balonne</td>
<td>5.0%</td>
<td>7.2%</td>
<td>7.6%</td>
<td>0.4%</td>
<td>20.2%</td>
</tr>
<tr>
<td>Dalby</td>
<td>5.6%</td>
<td>7.7%</td>
<td>8.3%</td>
<td>0.8%</td>
<td>22.4%</td>
</tr>
<tr>
<td>Toowoomba</td>
<td>7.1%</td>
<td>10.6%</td>
<td>13.5%</td>
<td>1.0%</td>
<td>32.2%</td>
</tr>
<tr>
<td>Warwick</td>
<td>6.8%</td>
<td>8.9%</td>
<td>9.5%</td>
<td>0.7%</td>
<td>25.9%</td>
</tr>
<tr>
<td>QLD</td>
<td>6.7%</td>
<td>7.6%</td>
<td>10.2%</td>
<td>1.3%</td>
<td>25.8%</td>
</tr>
</tbody>
</table>

The data shows that government services are a significant employer in the region, with a range of 20.2% of the workforce employed in this sector in Balonne to 32.2% in Toowoomba. This compares with the state average for Queensland of 25.8%.

Toowoomba has a large percentage employed in this sector because of its size and catchment area, whilst Cunnamulla has an even higher percentage employed in this sector because of its distance from Toowoomba and other major service centres.

41 Source: ABS, Census of Population and Housing, 2006
2.5.5 Tourism

Tourism is a small, but growing industry in the region. The eastern part of the region (Toowoomba and Warwick) is on the main inland route between Brisbane and Sydney, and the western part of the region has the Great Inland Way (the inland tourist route from Sydney to Cairns), Adventure Way (Brisbane to Adelaide) and the Mitchell Highway (Sydney to Mt Isa and the Northern Territory). These latter routes are popular routes for the growing number of “grey nomads”, or older domestic tourists from the southern capitals of Adelaide, Melbourne, Canberra and Sydney.

The region offers visitors an authentic bush cultural heritage experience, indigenous and pastoral. It has been estimated that the town of St George hosts approximately 100,000 visitors per year travelling through or coming to special events, business tourism and family.

The impact of tourism on the local economy is largely described within the economic statistics related to food and accommodation services and retail. These sectors employ 18.2% of the workforce in the region. It has been reported that these two sectors are growing in the Balonne Shire despite the economic downturn in the region.

2.5.6 Transport logistics

Transport logistics is a significant industry throughout the region because of its relative isolation and the long distances over which product and inputs must be transported.

Warwick has a particularly large transport logistics industry (6.8% of the workforce compared with the Queensland state average of 5.1%) because of its strategic location on the main inland route between Sydney and Brisbane and its proximity to Brisbane port. The location of the Big W warehouse and transport hub at Warwick has initiated the development of complementary industries around freight, freight handling and truck servicing and repairs.

2.5.7 Energy and mining

Energy and mining have traditionally been relatively small industries in the region concentrated in the Surat Basin. However, the current coal production of around 5 million tonnes per annum could increase fourfold in the next 10 years.

In addition, exploration and exploitation of coal-seam gas offers much potential and has driven a mini boom in employment in the industry recently, especially in the Dalby area.

42 Hailey, L (2009), “Township Marketing Plan – St George”
43 ABS, Census of Population and Housing, 2006, Basic Community Profile – B42.
45 ABS, Census of Population and Housing, 2006, Basic Community Profile – B42.
There are extensive undeveloped thermal coal and coal seam gas deposits in the Surat Basin in the northern part of the region. Production is currently modest, but is anticipated to grow to within 2,000 and 4,000 terajoules per day within 10 years.\textsuperscript{46} There development is linked to proposals for development of the Gladstone export facilities for liquefied natural gas. Electricity generation, carbon dioxide sequestration, coal gasification and gas to liquid conversions have all been flagged as potential development opportunities for these resources\textsuperscript{47}.

While the developments pose potential environmental risks, pressures on regional infrastructure and services and have already created land use conflicts in some areas, there are also potential opportunities from the beneficial reuse of wastewater created during the coal seam gas production process (once water has been treated and dosed to meet environmental requirements).

2.6 Water Management, Government Purchases and Drought

2.6.1 Water management

Water management in Condamine and Balonne is managed via the Condamine-Balonne Water Resource Plan (2004) (the WRP), and the Resource Operations Plan (ROP). The underlying fundamental basis for water management under the ROP is to ensure sufficient environmental flows in each of the management zones across the Condamine-Balonne. For this reason, the management is largely based around ‘rules-based’ announced allocations that attempt to match available water with environmental needs.

The rules that underpin management of the ROP are based on analysis and modelling at a localised scale and have been developed through a long period of consultation with the community. While the process in developing the ROP has proved to be technically complex and stressful for the community, the outcomes are largely accepted by all parties.

The development of the ROP has already resulted in significant cutbacks in consumptive water availability in some part of the catchment, particularly in the Upper Condamine and the Lower Balonne.

Analysis undertaken by the State for the ROP and by industry/community groups, and the general consensus of stakeholders, is that much of the Condamine-Balonne catchment is less developed than other catchments. In many areas, the water is largely undeveloped (e.g. around Surat). A stylised depiction of average flows at various points along the Condamine and Balonne rivers is shown in Figure 2-5.

\textsuperscript{46} Queensland Government (2010), Draft Surat Basin regional Planning Framework

\textsuperscript{47} Queensland Government (2009), “Maranoa-Balonne Regional Plan
This has implications for the Australian Government’s Restoring the Balance program (i.e. the buyback), as any water purchased in the upper reaches of the catchment (e.g. around Killarney or Chinchilla) would have a low probability of providing a material improvement to environmental flows in the Lower Balonne Floodplain or the Narran Lakes.

Similarly, consultation has questioned the likelihood of material environmental benefits to key environmental assets that would be derived through purchases in the Warrego catchment particularly, and to a lesser extent the Moonie.

### 2.6.2 Water procurement

Water procurement in the Condamine-Balonne is less advanced than in much of the MDB. The two key initiatives for water procurement are through the restoring the Balance buybacks and through the Healthy Headwaters Program.

**Tender mechanism**

Under the tender mechanism landholders voluntarily sell part or all of an entitlement to the Commonwealth. Under this program landholders effectively compete to sell their water to the Commonwealth and successful tenderers are selected on the basis of value for money in terms of the environmental benefits of water covered in irrigators’ bids. There are no direct controls over the use of the funds received for the sale of water. However, there is some anecdotal evidence to suggest that some participants have been under some pressure from financiers to sell entitlements to reduce their debt to more sustainable levels.

As at May 2011, four rounds of the tender had been undertaken - three completed (total budget spend of around $17-18M) and the final round ($40M budget) had closed in April. The first three rounds of the tender have secured an estimated 12,000+ML for the environment, with an average price for the three rounds of around $1,450/ML.

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48 Source: Consultation with DERM and stakeholders.
Based on the prevailing process for the previous rounds of the tender and the available budget, it would be reasonable to expect that the fourth round (just closed) could result in a further 25-30,000 ML being secured for the environment. However, consultation undertaken in March and April 2011 indicates that irrigators may have raised their price expectations in the short to medium term based on the very high cotton price (current and short-term forecasts). Essentially the opportunity cost of selling water has increased significantly and irrigators are looking to cash in on the current favourable water availability and market conditions to retire debt and invest (both in farming and other asset classes).

It would be reasonable to assume that tender prices will be higher over the next couple of years and irrigators will be less inclined to participate in the market.

**Healthy Headwaters Water Use Efficiency Program**

The other major initiative is the Healthy Headwaters Water Use Efficiency Program. The Program is designed to achieve water savings through co-investments by the Commonwealth and irrigators in on-farm water saving technologies in the Queensland MDB. The Program also uses a reverse tender approach, but irrigators compete to voluntarily give up some of their entitlements in exchange for the co-investment in WUE infrastructure. Again successful tenderers are selected based on the value for money for water returned to the environment. The major points of difference between this Program and the tender are:

- Commonwealth funds are essentially tied to funding infrastructure.
- Because most participants are essentially substituting WUE savings for entitlements given up, production levels in the region should be maintained. This significantly reduces the likelihood of negative economic and social impacts in the region.

At the time this report was written, the first round of the Healthy Headwaters Program had almost been completed (i.e. final contracts were being negotiated with successful irrigators). Available information indicates that approximately 8,000 ML would be returned to the environment, for a Commonwealth investment of approximately $25M. As expected, the cost per ML for this program provides lower value for money when assessed against a narrow ($/ML) policy objective. However, the price premium paid for water needs to be assessed against the fact that regional economies will be maintained, or even enhanced by the program.49

### 2.6.3 Progress towards environmental water targets

The progress to date in achieving the sustainable diversion limits outlined in the *Guide to the proposed Basin Plan* has been relatively modest in the Condamine-Balonne, reflecting the more recent nature of investment and the absolute level of funds committed to date.

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49 MJA, 2010, Socio-economic impact assessment of the first round of the Healthy HeadWaters Program
However, if you assume that the price paid for the fourth round of the tender and the remainder of the Healthy Headwaters Program are similar to those paid in earlier rounds of each program (a bold assumption), existing allocation could return between 70-75,000 ML to the environment, which is approximately 35-40% of the lower end of the reduction in current diversion limits from water courses outlined in the Guide to the proposed Basin Plan (i.e. 29% reduction under the 3,000GL MDB-wide target).

2.7 Impact of the drought

2.7.1 Cotton growers

Cotton growers believe the floods saved them, as they now have enough water in storage of next year’s crop and the price outlook for cotton is positive. Thus, they believe this year and the next year look promising for their industry and businesses. However, debt levels are high as they borrowed significant sums to develop their businesses 10 years ago and have not had the chance to pay the debt back yet. Thus, their initial focus will be on debt reduction.

2.7.2 Horticulturalists

Horticulturalists who relied on regulated supplies from storages had to cut back their production by up to 50% to deal with the low allocations. However, those who had their own storages survived quite well, as the river flooded every 2-3 years and they could capture enough to irrigate some of their plantings every year.

2.7.3 Dirranbandi and Thallon

The drought led to a substantial population decline in Dirranbandi. Dirranbandi had a population of approximately 1,100 people at the pinnacle of the development of the cotton industry in the mid 1990s. It is now 414.

Prior to the drought most inputs were bought locally in Dirranbandi, with larger pieces of equipment, professional services, or large volume purchases coming from St George. Now most is from St George with larger purchases coming from Dalby and Toowoomba.

There has been a continuous trend in business closures over the longer term that was accelerated by the drought. The result for businesses in the town include:

- The Westpac bank closed.
- There is now only one stock and station agent where there were three.
- The railway has closed.
- The clothing store has closed.
- There is only one food store, where there were two.

- 50% of the remaining businesses in town are currently for sale.

The impact on the structure of the population has been that a lot of the young people have left and been replaced by older people who are more reliant on welfare. Thus, not only has the population declined, but also the proportion of working age. Thus, there are less volunteers for community activities and greater demand for social services. Finally, the remaining population have less disposable income and the proportional reduction in local expenditure exceeds the level of population decline.

### 2.7.4 St George

Balonne Shire staff reported during the consultation that 300 families left St George during the drought. There was also a change in the population structure with an increase in lower income, more welfare dependent, older people and higher proportion of indigenous people, as more mobile people left.

Drought led to a dramatic decrease in business in town, with many shops closing. The last two seasons have helped the towns recovery, however the recent floods have impacted heavily on those who could not do any business for two months.

Many employers retrenched staff to stay in business, with the Shire staff decreasing from 110 to 80 people and one of the machinery businesses reporting that it reduced its staff from 20 to 12.

Whilst many of the businesses have started to re-employ and the town is recovering from the drought, those consulted believe the town is on a tipping point. They believe the current good seasons will help stabilise it, but that the proposed reductions in irrigation availability will push it into permanent drought that will lead to accelerated population decline.

### 2.8 Baseline – the future without policy change

#### 2.8.1 Introduction

The “baseline” is a description of the expected future for the region into the future, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

#### 2.8.2 Population

The projected population by local government area in 2031, compared to the actual population in 2006 and the average annual growth rate over the 25 year are presented in Table 2-6.
Table 2-6. Projected population by local government area in 2031, compared to 2006.50

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>2006</th>
<th>2031</th>
<th>Average annual growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balonne Shire</td>
<td>4,927</td>
<td>5,051</td>
<td>0.1%</td>
</tr>
<tr>
<td>Southern Downs RC</td>
<td>33,589</td>
<td>43,795</td>
<td>1.1%</td>
</tr>
<tr>
<td>Toowoomba RC</td>
<td>151,297</td>
<td>228,461</td>
<td>1.7%</td>
</tr>
<tr>
<td>Western Downs RC</td>
<td>30,118</td>
<td>36,793</td>
<td>0.8%</td>
</tr>
<tr>
<td>QLD MDBA Region</td>
<td>221,994</td>
<td>316,030</td>
<td>1.4%</td>
</tr>
<tr>
<td>% of Queensland</td>
<td>5.4%</td>
<td>5.0%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

The data shows that:

- The population will grow by an average annual rate of 1.4% compared to the Queensland state average of 1.7%.

- Thus, the proportion of the Queensland population living within the region will decrease from 5.4% to 5.0%.

- The regional council areas of Southern Downs, Western Downs and Toowoomba, which accommodate the vast majority of the region’s population are projected to grow.

- The population of Balonne Shire will remain steady.

Thus, the population of the smaller social catchments in the west of the region are projected to decline or, at best, remain stable if the current diversion limits for irrigation were left unchanged.

The median age of the population by local government area for 2006, compared to 2031 is presented in Table 2-7.

Table 2-7. Median age by local government area for 2006 and 2031.51

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>2006</th>
<th>2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balonne Shire</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>Southern Downs RC</td>
<td>40</td>
<td>48</td>
</tr>
<tr>
<td>Toowoomba RC</td>
<td>36</td>
<td>42</td>
</tr>
<tr>
<td>Western Downs RC</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>Queensland</td>
<td>36</td>
<td>41</td>
</tr>
</tbody>
</table>

The data shows that:

---

50 Queensland Department of Infrastructure and Planning (2008), “Queensland’s future population”, Appendix C
51 Queensland Department of Infrastructure and Planning (2008), “Queensland’s future population”, Appendix G
• The median age in Queensland was 36 in 2006 and is projected to increase by 5 years to 41 by 2031.

• Toowoomba and Western Downs have a similar median age to the State in 2006 and 2031.

• Balonne is well below, and Southern Downs are well above the State in 2006.

• Although the median age in Balonne will have increased by one year, it is projected to be far younger (6 years compared to 2 years in 2006) than the State median in 2031.

• Similarly, the median age in Southern Downs will be far older (7 years compared to 4 years in 2006) than the State median in 2031.

Therefore, the population is projected to age within Toowoomba and Western Downs at the same rate as the rest of the State. However, the disparity in age structure between Balonne (younger) and Southern Downs (older) is projected to exacerbate.

2.8.3 Climate change

The climate of the Queensland part of the Basin is highly variable with subsequent highly variable and unpredictable river flows. Those consulted described it as a "feast or famine" environment.

The CSIRO sustainable yield forecast for 2020 suggests a decline in surface water availability is more likely in the south of the Basin, than the north. It also states that significant increases are also possible in the north. Thus, highly variable and unpredictable flows are forecast to continue. However, the relative impact of climate change on surface water use would be much greater in dry years. The CSIRO forecasts that under the extreme 2030 climate diversions in the driest years would fall by over 20% in the Condamine-Balonne52.

Thus, it is possible that the "feast" and "famines" may become more extreme.

2.8.4 Water policy

Water allocations and availability in the Condamine-Balonne region has already experienced significant changes, as a result of the introduction of the state-based Resource Operations Plans. Opportunities for irrigation efficiency measures are largely limited to storage deepening and there has been little, if any, Commonwealth buyback of water entitlements.

Those consulted believe that there are limited economic opportunities for further efficiency measures and that there will be little interest in Commonwealth buyback, as water supplies for cotton growers are assured for the next two seasons and the

current and immediate future outlook for cotton prices is strong. As one cotton grower stated, “there would be a lot more willing sellers if cotton was at $300/bale.”

Thus, current water policy other than the proposed new sustainable diversion limits is expected to have little impact on the availability of irrigation water in the region.

2.8.5 Dirranbandi

Local key informants estimate the area of cotton in 2010/11 at 80,000 hectares and expect production of 450,000 bales. This will be the first “full acres” production since 2003.

Therefore, it is expected that the sector will return to pre-drought conditions. Thus, cotton growers will have 2-3 year good years now, where production, employment, and other key economic indicators will increase, then quieten down again when the dry seasons return.

The major difference in the future will be that businesses will not return to a social catchment such as Dirranbandi. Cotton growers have made a structural shift in their purchasing behaviour and the social infrastructure is no longer in place to support the town. Thus, it is now much more difficult to attract people to live in Dirranbandi.

2.8.6 St George

Despite the floods, the last two years of rainfall has rebuilt confidence in the town. The pastoralists are experiencing their best season in decades and irrigators (cotton and horticulture) have sufficient stored water for the next two seasons. Thus, the key driver of the local economy, agriculture, has a degree of certainty about it future short-term productive capacity.

As a result, much of the population that left the town during the drought has returned and many shops have re-opened, often as different businesses. The town’s population will continue to ebb and flow within the official projections because they largely service the irrigators, whose fortunes are also expected to continue to ebb and flow in the future.

One change that will bring some more permanent growth to the area is the decoupling of water from land. It is expected that horticulturalists in the area will look to trade water and this will facilitate growth of the industry. However, this growth will be limited by market demand, thus it will be incremental, slow growth.

2.8.7 Dalby, Toowoomba & Warwick

Dalby, Toowoomba and Warwick are all expected to continue to grow, as per the projections in Table 2-6. The key economic drivers of these centres are more diversified than the other centres and less dependent on agriculture. Thus, their well-being will be largely driven by broader economic and demographic changes.
2.9 Impacts of Reduced Water Availability

2.9.1 Introduction

This section outlines some of the potential impacts of constrained water availability attributable to the implementation of the SDLs, including through key policy initiatives such as Restoring the Balance. Information presented in the section has been sourced from multiple sources including formal and informal data sources, and through the outcomes of consultation with stakeholders throughout the catchments.

2.9.2 Current Diversions, and Guide proposals

The Current Diversion Limit and the 4000 GL and 3000 GL scenarios outlined in the Guide are shown below.

Table 5-3. It is assumed there will be a mix of different reliabilities of water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.

### Table 2-8. Current diversion limit and ‘Guide’ proposals. 53

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL</th>
<th>Guide reduction in entitlements before modernisation &amp; before buy back</th>
<th>Modernisation ‘bridging the gap’ on and off farm, to 2010</th>
<th>Buy-back to date</th>
<th>Guide reduction in remaining entitlements after modernisation and after existing purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condamine-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balonne</td>
<td>4000</td>
<td>706</td>
<td>272</td>
<td>39%</td>
<td>Supplemented (tradeable only) 48 GL 47% GL 13</td>
<td>-</td>
<td>35 GL 34%</td>
</tr>
<tr>
<td></td>
<td>4000</td>
<td></td>
<td></td>
<td></td>
<td>Unsupplemented (tradeable only) 176 GL 41% GL -</td>
<td>-</td>
<td>176 GL 41%</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>706</td>
<td>203</td>
<td>29%</td>
<td>Supplemented (tradeable only) 36 GL 35% GL 13</td>
<td>-</td>
<td>23 GL 23%</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td></td>
<td></td>
<td></td>
<td>Unsupplemented (tradeable only) 131 GL 30% GL -</td>
<td>-</td>
<td>131 GL 30%</td>
</tr>
</tbody>
</table>

2.9.3 Determining where the impacts will occur

In implementing the MDB Plan, given current policy knowledge, it needs to be assumed that it is the Government’s intention to continue to recover water for the

---

53 Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.
55 Yield-unweighted entitlements, pro-rata based on use
56 Yield-unweighted entitlements. Source: MJA 2010
57 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.
58 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.
59 not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement
environment through voluntary market mechanisms such as the Restoring the Balance tenders and the Healthy Headwaters Water Use Efficiency Program (see section 1.3). Both of these programs have been designed around the principle of value (cost effectiveness) for money for the Commonwealth where:

- **Environmental benefits.** The environmental benefits of any ML of water purchased are measured in physical terms based on the contribution of that ML to enhancing the condition and resilience of key environmental assets. The environmental benefits of each ML of water purchased are not uniform across the catchments and purchase mechanisms are specifically designed to target water that provide cost effective environmental benefits. This is particularly the case where the key environmental assets (Lower Balonne Floodplain and the Narran Lakes) are most connected to the Lower Balonne area. In effect, water purchased in the upper Condamine or Paroo provides relatively less environmental benefits, as those systems have been assessed to be in relatively better ecological condition.\(^60\)

- **Costs of purchase.** The costs are based on the payment made to the irrigator. Because both purchase mechanisms use competitive market pressures to reduce costs to the Government (as purchaser), and irrigators will not sell their water for less than its market value (a function of agronomic opportunities and commodity markets), it is only logical to assume that successful sellers (irrigators) are likely to be those with lower economic margins from a ML of water. Available information from across the catchment indicates that the relatively higher value water is used for horticulture (grapes, vegetables), some water for irrigated fodder has relatively high values due to its importance in intensive livestock industries, while cotton (even under current prices) and other irrigated broader crops have relatively lower values. In summary, horticulture irrigators are less likely to either sell or be successful under a competitive market-based buyback program.

- **Water purchased.** Water purchased will be the water with the highest ratio of benefits (measured in physical terms) to costs (measured in financial terms). It is possible to qualitatively predict where the bulk of the purchases are more likely to occur, and hence, where (regions/social catchments) economic and social impacts will be concentrated using this basic logic, building on the information outlined in this report and insight from the consultation undertaken.

This is shown in Figure 2-6, where relative environmental benefits for the key environmental assets are shown on the X-axis and relative costs of water are shown on the Y-axis. Regions/social catchments towards the bottom right side of the graph are more likely to participate in the buyback mechanisms and be impacted by the MDB Plan.

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The key points to note are:

- purchases and hence the economic and social impacts are likely to be highly concentrated in the Lower Balonne region (St George and Dirranbandi social catchments, and perhaps to a lesser extent Thallon);  

- while there may be some interest in selling around Warwick and Dalby (potentially from some broad acre irrigators with limited opportunities to diversify into horticulture or intensive animal industries), the environmental benefits of any purchases in those regions will be largely local and would contribute little to enhancing the Lower Balonne Floodplain or the Narran Lakes.

The analysis indicates that buybacks and hence economic and social impacts are likely to be highly concentrated in the Lower Balonne (around St George and Dirranbandi). Hence, this region is the main focus for the assessment of impacts. The analysis also is consistent with the outcomes of consultation across the region.

Discussions with DERM and previous analysis of WUE opportunities indicates that there are opportunities and potential for WUE across much of the broader

---

61 MJA & RMCG analysis
62 Note: These findings indicate a more concentrated pattern of purchases than some of the internal analysis undertaken by DERM. This is primarily because we have analysed the issues with a greater emphasis on potential cost effectiveness criteria.
catchment, although there are significant financial, technical, attitudinal and institutional constraints to investment in WUE.  

2.9.4 Water Sales to Government and SDLs

In this analysis and through our consultation we have assumed that the SDLs will be achieved through voluntary buybacks (see section 1.3).

2.9.5 Lower Balonne – the identified hotspot for buybacks

The progress to date in achieving the sustainable diversion limits outlined in the Guide to the proposed Basin Plan has been relatively modest in the Condamine-Balonne, reflecting the more recent nature of investment and the absolute level of funds committed to date.

However, if it is assumed that prices paid for the fourth round of the tenders and the remainder of the Healthy Headwaters Program are similar to those paid in earlier rounds of each program (a bold assumption, noting that the Healthy Headwaters program is not a buyback program, but an irrigation modernisation program that returns a share of water savings to the environment, i.e., the program has multiple goals), existing financial allocations could return around 77,000 ML to the environment, which is approximately 39% of the lower end of the reduction in current diversion limits from water courses outlined in the Guide to the proposed Basin Plan (under the 3,000GL MDB-wide target).

Table 2-9. Estimated water sales, potential sales and SDL target.

<table>
<thead>
<tr>
<th>Program</th>
<th>Water to environment (ML)</th>
<th>Cumulative water to environment (ML)</th>
<th>Cumulative % of SDL (3,000GL scenario)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current progress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenders (rounds 1-3)</td>
<td>12,000</td>
<td>12,000</td>
<td>6%</td>
</tr>
<tr>
<td>Healthy Headwaters (round 1)</td>
<td>8,000</td>
<td>20,000</td>
<td>10%</td>
</tr>
<tr>
<td>Committed resourcing*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender (round 4)</td>
<td>28,000</td>
<td>48,000</td>
<td>24%</td>
</tr>
<tr>
<td>Healthy headwaters (rest of budget)</td>
<td>29,000</td>
<td>77,000</td>
<td>39%</td>
</tr>
</tbody>
</table>

Even under the most optimistic assumptions of the cost effectiveness of subsequent rounds of the tender and Healthy Headwaters, the existing resourcing for buybacks would fall in excess of 120,000ML short of the target. If you assume the prices from

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64 Source: MJA analysis

65 Assumes the budget of the current tender is fully utilised and that the full Healthy Headwaters budget is exhausted in future rounds.
previous tenders can be achieved, the additional resources to meet the targets in the *Guide to the proposed Basin Plan* are likely to be at least a further $180M.\(^6\)

### 2.9.6 Water recovery – potential direct impacts on irrigation and processing

Because of the likely focus of buybacks in the Lower Balonne, the impacts outlined in this section will occur primarily in the Lower Balonne (St George and Dirranbandi). Therefore this section focuses on the impacts in the Lower Balonne.

In addition, there may be similar types of impacts in areas around Thallon (the Moonie catchment) that are focussed in irrigate cotton and other broadacre crops (although the scale of impacts will be an order of magnitude smaller).

When attempting to assess the economic and social impacts, it is also important to firstly identify the likely impacts of the alternative buyback options on regional production and investment as those impacts will be the driver of broader regional impacts. This is summarised in Table 2-10.

**Table 2-10. Differences in impacts between tender mechanism and water use efficiency.**\(^6\)

<table>
<thead>
<tr>
<th>Program / mechanism type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenders</td>
<td>• Proceeds of tender paid to irrigator (more flexible).(^) • Anecdotal evidence suggests much of proceeds would be used to retire debt or invest outside region and that little of the proceeds to be reinvested into the farming enterprise. • Buybacks via the tender are likely to reduce irrigated agricultural production, with land use transferred to dry land farming (e.g. sheep, dry land cropping etc.).</td>
</tr>
<tr>
<td>Healthy Headwaters WUE program</td>
<td>• Proceeds invested into WUE infrastructure (limited flexibility). • Analysis of bids to date and consultation with participants indicates bids have been structured to at least maintain existing production levels with less water.(^6) • Initial establishment phase of projects creates positive economic activity and ongoing work in maintaining assets.</td>
</tr>
</tbody>
</table>

The key point of difference between the two approaches is that the tender process is likely to result in reductions in irrigation activity, while the WUE process is likely to at least maintain existing production levels and the flow on economic activity through the value chain.

If we assume that the Healthy Headwaters program will have a neutral impact on regional production and that none of the proceeds of the tender mechanism are voluntarily reinvested into water use efficiency, then it is possible to develop an approximate estimate of the impact on production from the tender buybacks. This would be based on the proportional reduction in water being applied to water used and associated cotton produced.

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\(^6\) This assumes a price per ML of $1,450. Obviously, the future resourcing requirements are highly influenced by average process received through future programs. For example, if future tender prices are $2,200 ML, future resourcing required would be over $290M.

\(^6\) MJA, 2010, Socio-economic impact assessment of the first round of the Healthy HeadWaters Program
Figure 2-7 shows an estimate of cotton production in the Lower Balonne for the period 2000-2011\textsuperscript{69} including:

- A business as usual scenario (without any buybacks) as a baseline.

- The potential reduction in production from the recent buybacks and potential impacts of round 4 of the tenders (applying average prices from previous tenders to current budgeted tenders).

- The impacts of the SDL targets in the \textit{Guide to the proposed Basin Plan} (the targets for the Condamine-Balonne attributable to the 3,000GL and 4,000GL basin-wide SDL targets).

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure2-7.png}
\caption{Simulated impact on cotton production with and without buybacks (using 2000-2011 production as a basis for comparison).\textsuperscript{70}}
\end{figure}

\textsuperscript{69} This is based on estimates developed by the CRC Cotton, and from information provided by industry for the current crop. This analysis has assumed crop water requirements (ML/bale) and yields are held constant and represent industry standards (advised during consultation and confirmed by previous research). See: Baillie, C., Baillie, J., Davis, R., Scobie, M., Wigginton, D., Schmidt, E., Muller, B. and Watts, P. (2010). An Appraisal to Identify and Detail Technology for Improving Water Use Efficiency in Irrigation in the Queensland Murray Darling Basin, A report for the Department of Environment and Resource Management, USQ, NCEA Publication 1003720/2, Toowoomba.

\textsuperscript{70} MJA and RMCG analysis
The key points to note are:

- There is significant ‘natural’ variability in production reflecting the high variability in water availability even without any policy intervention. Therefore, analysis of average impacts provides little insight to policy and planning.

- Consistent with discussions with irrigators and gin operators, the business model being adopted is specifically to cope with this ‘natural’ variability. Businesses are designed around a relatively small number of very productive years during the climate cycle to justify commercial production over the longer term (including covering fixed costs such as interest payments and covering cash flow deficits during years were production is lower).

- In absolute terms, the impacts on production will be greater in the years following high flow events. In effect, constant proportional reductions in years where water availability was very low anyway have a lower impact on business viability. The real impact on farm and gin commercial viability is likely to be the constrained production in the good years that are necessary to make operations viable over the longer term. The impacts of buybacks in low flow years are significantly lower in low flow years because the irrigators would not have been able to access water anyway.

- The analysis indicates that:
  
  - The recent and already committed resourcing for buybacks would reduce regional cotton production by around 1,500 bales in the lowest production year, but by as much as 26,000 bales in the current year (also likely to be the best year over the time period analysed).
  
  - Achieving the Condamine-Balonne’s contribution to the 3,000GL basin-wide SDL, would reduce regional cotton production by around 6,000 bales in the lowest production year, but by as much as 105,000 bales in the current year.
  
  - Achieving the Condamine-Balonne’s contribution to the 4,000GL basin-wide SDL, would reduce regional cotton production by around 9,000 bales in the lowest production year, but by as much as 170,000 bales in the current year

- The constraints on productivity would also likely trigger an evaluation of the need for three gins in the Lower Balonne (i.e. St George, Beardmore and Dirranbandi gins). Under the 3,000GL SDL scenario, the case for continuing to own and operate all three gins is questionable, even in the high production years. Under the 4,000GL SDL scenario, there is virtually no economic sense in retaining three gins in the Lower Balonne.
2.9.7 Other potential economic impacts

There are also a number of other potential economic impacts that have been identified through the consultation and analysis undertaken in developing this report. These are likely to be negligible based on the current buybacks, but would likely become material under either the 3,000GL or 4,000GL SDL targets. These have not been quantified, but include:

- **Local flow on impacts.** Flow on impacts through the Balonne economy from reduced spending and population decline (particularly retail trade and services in St George).

- **Regional flow on impacts.** Flow-on impacts in the broader Condamine-Balonne economy in Dalby and Toowoomba, as the need for larger capital equipment purchases (e.g. tractors) declines.

- **Permanent intra-regional concentration of economic activity.** The drought resulted in a consolidation of suppliers/services to larger centres in the Condamine-Balonne (to achieve minimum threshold scales). In effect, during the drought, much of the economic activity that would have normally occurred in Dirranbandi either ceased altogether or shifted to St George. Similarly, some economic activity also shifted from St George to Dalby and Toowoomba. Ultimately, economic activity decreased significantly in the Lower Balonne during the drought, and the economic leakage to other regions increased. Achieving the SDL targets is likely to permanently ‘lock in’ the intra-regional concentration and economic leakage that resulted from the drought.

- **Asset value write-downs.** Lower cash flow and profits from commercial assets across the Lower Balonne as a result of SDL-induced reductions in turnover are likely to result in permanent write-downs of asset values (e.g. gins).

- **Stymied and postponed investment.** Consultation has indicated that the SDLs will have indirect impacts on investment in the Lower Balonne. For example, buybacks are likely to push up the price of traded water and postpone/slow incremental growth of sectors such as horticulture (as water inputs become more expensive and investment viability thresholds are higher).

- **Local government finances.** Balonne Shire has indicated that meeting the SDL targets could significantly impacts on their budget through reductions in rates revenue (irrigation land generates more revenue than dry land and losses in absolute number of rateable properties) and also increasing demand on social services (e.g. partial funding of the rural transactions centre in Dirranbandi). In addition, they have a concern that any material decline in population will significantly impact the cost effectiveness of delivering current service standards.
2.9.8 Water sales – potential impacts on irrigation-related employment

Direct employment impacts are also likely to be heavily concentrated in the Lower Balonne.

Consultation with irrigators and industry indicated that employment buybacks would primarily impact on casual and seasonal employees. For irrigators, this included labour related to direct irrigation practices (e.g. operating syphons). Using the potential impacts on production outlined in Section 2.9.6 and industry labour input averages\(^\text{71}\) it is possible to estimate a range for potential direct job losses in the irrigation sector.

The range of potential direct employment impacts and comments regarding flow on employment impacts (not quantified) is shown in Table 2-11. The employment reductions will vary depending on the underlying production environment (poor vs. good production year) and will be more pronounced in good production years through less employment opportunities.

While the impacts of the existing buybacks are negligible, achieving the SDL targets could be relatively significant. Using the outcomes of our modelling and based on census employment data, we estimate that in a good production year, direct employment in agriculture could be 6% to 8% lower than it would be under a business as usual scenario (3,000GL and 4,000GL SDL targets respectively).

In addition, under the 4,000GL scenario, it is relatively likely that up to 10 permanent gin staff would lose their jobs, as one gin would not be required, even in a good production year.

\(^{71}\) Industry sources indicate an employment ration of one person per 400 hectares under irrigated cotton.
<table>
<thead>
<tr>
<th>Simulation</th>
<th>Potential employment and employment impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business as usual</td>
<td>• No loss of employment.</td>
</tr>
<tr>
<td></td>
<td>• Significant variation in farm casual workforce directly on farm of between 10 (water constrained years) through to 200 in very good years.</td>
</tr>
<tr>
<td></td>
<td>• Permanent staff contingency across all regional gins of approximately 20 (almost immune to seasonal fluctuations).</td>
</tr>
<tr>
<td></td>
<td>• Seasonal/contract cotton harvesting and ginning, largely determined by crop size and duration of harvest/ginning season.</td>
</tr>
<tr>
<td></td>
<td>• Transport contractors, largely determined by size of crop.</td>
</tr>
<tr>
<td></td>
<td>• Agribusiness supply. Some limited variation depending on size of crop.</td>
</tr>
<tr>
<td>Current purchases</td>
<td>• Negligible reduction in on-farm casual workforce of up to 10 full time equivalent employees (FTEs), depending on the size of the regional crop.</td>
</tr>
<tr>
<td></td>
<td>• No impact on permanent gin staff.</td>
</tr>
<tr>
<td></td>
<td>• Reduction in overall seasonal/contract labour requirements for harvesting and ginning of up to 6% of relevant labour requirements in highest production years.</td>
</tr>
<tr>
<td></td>
<td>• Up to a 6% reduction on transport labour requirements (potentially split between local and non-locals depending on operator’s usual place of residence).</td>
</tr>
<tr>
<td></td>
<td>• No material impact on agribusiness supply.</td>
</tr>
<tr>
<td>3,000GL guide SDL target</td>
<td>• Negligible reduction in on-farm casual workforce of between 5 and 50 full time equivalent employees (FTEs), depending on the size of the regional crop.</td>
</tr>
<tr>
<td></td>
<td>• No impact on permanent gin staff.</td>
</tr>
<tr>
<td></td>
<td>• Reduction in overall seasonal/contract labour requirements for harvesting and ginning up to 25% of relevant labour requirements in highest production years. Gins may opt for fewer staff, but a longer employment period.</td>
</tr>
<tr>
<td></td>
<td>• Up to a 25% reduction on transport staff labour requirements (potentially split between local and non-locals depending on operator’s usual place of residence).</td>
</tr>
<tr>
<td></td>
<td>• Lower likelihood of full time and permanent job opportunities in agribusiness supply sector.</td>
</tr>
<tr>
<td>4,000GL guide SDL target</td>
<td>• Negligible reduction in on-farm casual workforce of between 5 and 70 full time equivalent employees (FTEs), depending on the size of the regional crop.</td>
</tr>
<tr>
<td></td>
<td>• Likely loss of 6-10 permanent gin staff on back of closure of one gin.</td>
</tr>
<tr>
<td></td>
<td>• Reduction in overall seasonal/contract labour requirements for harvesting and ginning up to 33% of relevant labour requirements in highest production years. Gins may opt for fewer staff, but a longer employment period.</td>
</tr>
<tr>
<td></td>
<td>• Up to a 33% reduction on transport staff labour requirements (potentially split between local and non-locals depending on operator’s usual place of residence).</td>
</tr>
<tr>
<td></td>
<td>• Lower likelihood of full time and permanent job opportunities in agribusiness supply sector.</td>
</tr>
</tbody>
</table>

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72 MJA and RMCG analysis
2.9.9 Other potential social impacts

There are also a number of other potential social impacts that have been identified during the consultation. While those impacts are unlikely to be material for the existing buybacks, they may be material for achieving the SDLs. Identified impacts include:

- **Job losses triggering population movement.** Experience from the drought indicates that many families left the region due to a lack of employment opportunities. SDL induced job losses will be likely to result in declines in population. Census data indicates a high prevalence of single income families in the region and an average household size of 2.6 persons (non-Indigenous households). Under a worst-case scenario, the 4,000GL SDL could trigger population declines in the order of 150-200 people (around 4% of the Balonne Shire population).73

- **Social service viability thresholds.** There was also significant concern in the region that population losses could result in either a concentration of social services in larger centres (e.g. loss of health services and government offices in Dirranbandi and town being services out of St George), or losses in local services altogether.

- **Mental health and associated social issues.** Consultation also revealed an increase in mental health and associated social issues during the drought. There is significant concern that the implementation of the SDLs may result in a step-wise increase the risk of mental health, crime and other associated problems.

- **Sense of community identity.** Another intangible social issue could be the loss of community identity as the fortunes of the cotton industry decline.

2.10 Community Resilience and Adaptive Capacity74

2.10.1 Regional vulnerability

The western half of the region (St George, Dirranbandi) is highly reliant on agriculture with approximately one third of all jobs directly in agriculture. Toowoomba, Warwick and Dalby are less reliant, as they have larger, more diverse economies. However each of them, especially Dalby, has a significant agricultural service industry that is reliant on the agriculture of the region.

Cotton is by far the single largest agricultural industry in the region, especially in the western half, and it is highly reliant on the availability of irrigation water for production. There are limited economic opportunities for increasing water use

73 This assumes that each direct job lost triggers an average sized family to leave the region.
74 Adapted and updated from Guide to the proposed Basin Plan, Technical Background Part III - Lower Balonne community profile
efficiency beyond storage deepening, as most irrigation water is diverted from rivers or overland flows into private storages during flood flows.

Therefore, a reduction in diversion limits will result in limited investment in water use efficiency and a major reduction in the area of cotton produced. This reduction will have a direct flow-on impact on cotton gins, agricultural supplies and the supporting business and community services in the towns that service the industry.

Opportunities for diversification into irrigation crops that have lower water use are limited, as other regions already have a competitive advantage in those crops. Therefore, a reduction in diversion limits will lead to irrigated cotton being substituted with dry land grain and beef production.

As one cotton grower commented, “SDL mean we will have a permanent drought.”

2.10.2 Regional water dependence

The lack of diversity in the economy of the western half of the region indicates that the community is highly dependent on irrigated agriculture both directly and indirectly as a major source of economic activity and employment.

Crops account for approximately 60% of agricultural production. Analysis by Price Waterhouse Coopers in 2000 for the Condamine-Balonne region concluded that direct and indirect employment was around 25.5 jobs per thousand hectares of irrigated agriculture, compared with 3 jobs per thousand hectares in dry land farming. Thus, the employment intensity of irrigated agriculture in the region is 8.4 times that of dry land farming.

2.10.3 Community resilience and adaptive capacity

Overview

The community of the western half of the region have relatively low resilience to cope with material reductions in water availability, as producers are already struggling with relatively high debt levels, limited access to capital and very limited commercial opportunities for diversification within agriculture. Cotton growers are looking forward to at least a couple of good years to provide them with the opportunity to repay debt and consolidate their businesses before another dry period commences.

This area is still recovering from the drought and two major flood events, which isolated some communities for up to two months. The impact of the floods on some businesses within the towns has been almost as great as the drought, as it stopped business altogether for six months, after investment in drought recovery and has reduced visitor numbers substantially in subsequent months.

SEIFA data (refer to Table 2-1) shows that the proportion of the population that are in the most disadvantaged quintile is almost twice the Queensland state average.
Unemployment is relatively low, but anecdotal information indicates that underemployment is quite high. In addition, recorded unemployment has remained relatively low in recent years as outward migration has continued as people seek opportunities elsewhere. The end result is that the proportion of the remaining population is older, less mobile, less skilled, and more welfare dependent.

The community of the eastern half of the region, centred around Dalby, Toowoomba and Warwick has greater resilience and adaptive capacity. The economies of these communities are much more diversified and less reliant on irrigated agriculture. Thus, their ability to adapt is greater.

**Dirranbandi**

Dirranbandi is the most vulnerable community in the region. It is a small community that is highly dependent on the cotton industry. The recent drought has already resulted in population decline of almost a half in the past decade. This has already resulted in a decline in community services and a much larger proportion of the population being welfare dependent. There is significant concern amongst the community that permanently reduced diversion limits would lock in a permanent drought and lead to a further decline in community services that would eventually lead to the death of Dirranbandi.

**St George**

St George is larger than Dirranbandi and acts as a regional service centre for the lower Balonne, however with a population of 2,527 it is still a small town. It is highly reliant on the cotton industry also, but horticulture, dry land farming, tourism and government services are all important to its economy.

Despite two successive flood years that have isolated the town for long periods of time, businesses in the town are recovering from the drought and the population is returning to pre drought levels. Thus, the community is resilient. However, like Dirranbandi, a permanent reduction in diversion limits would result in a return to “drought-like” conditions for the town, as the town has little adaptive capacity due to its limited options.

The Balonne Shire Council has major concerns that their ability to maintain current services will be compromised when demand for their services increase, yet the costs for delivering those services will need to be shared across a diminishing population and rate base.

**Dalby**

Dalby is a major larger centre (population of 11,097) than Dirranbandi, St George and Cunnamulla, but it is still vulnerable to a permanent reduction in diversion limits due to the significant agricultural service sector that is located there. Dalby is the major regional service centre for much of south-western Queensland, where many
farmers would make their major equipment purchases and seek professional support services.

However, Dalby is far more resilient than the other communities and has greater adaptive capacity because of its size and diversified economy. The growth of the coal-seam gas industry and its associated employment has the potential to offset any impacts on the agricultural service industry within the town.

**Toowoomba and Warwick**

Toowoomba and Warwick are large, diversified economies that are highly resilient and have considerable adaptive capacity. Whilst a permanent reduction in diversion limits would severely impact the irrigators located near these towns and reduce the scale of the agricultural service sector within them, the scale and diversity of the other industries within these towns would largely buffer the impact.

### 2.11 Minimisation of Impacts

Minimisation of impacts is discussed in Volume 4 of this study. The following section focuses on key impact minimisation issues raised in interviews and subsequent analysis for the Condamine Balonne, Warrego and Moonie catchments.

#### 2.11.1 Overview

Assuming the basic premise that water entitlements will be purchased from irrigators either directly through programs such as Restoring the Balance, or through water use efficiency programs such as Healthy Headwaters, achieving environmental water objectives in the region presents a ‘wicked’ policy problem. This is because of complex interdependencies, and the fact that solving one problem (e.g. value for money buybacks) is likely to create significant other problems (some communities at risk). There are a number of key points to note:

- Basing purchases on pure value for money criteria will result in focusing almost exclusively in the Lower Balonne region, as this area generally has the lowest opportunity cost on a $/ML basis and the environmental gains from those purchases are likely to be relatively higher.

- The Lower Balonne is relatively more susceptible to shocks from water purchases as the economies of social catchments such as St George and Dirranbandi (and potentially Thallon) are very narrowly based within limited opportunity for diversification or substitution of economic activity. In addition, those communities tend to have less social resilience due to their demographic makeup and other key factors underpinning resilience.

- The eastern regions of the Condamine-Balonne catchment will tend to offer relatively lower value for money for environmental water purchases. In addition, areas such as Warwick Dalby and Toowoomba are has significantly more capacity to absorb any likely shocks from voluntary buybacks.
Cunnamulla, on the other hand, only has very limited capacity to absorb any shocks attributable to buybacks.

In short, the best place for the Commonwealth to purchase water based on value for money objectives (the Lower Balonne), is possibly the worst place if they wish to minimise negative economic and social impacts in regional communities.

This creates a real need for careful and deliberative policy implementation that recognises both the local and regional consequences of water buybacks. This section outlines some of the key issues for consideration in implementing the restoring the Balance Program in the Condamine Balonne.

2.11.2 The need to recognise intra-regional variation and local circumstances

The Condamine-Balonne catchment is a large catchment with (often) significant diversity in climate, agronomic conditions, the structure and resilience of district economies, and the resilience of local communities. As a broad generalisation, districts to the east of the Condamine-Balonne:

- Tend to be relatively less reliant on the fortunes of irrigated agriculture, particularly communities that have relatively diversified economies (such as Toowoomba, Dalby and Warwick).

- Have relatively greater opportunities to diversify into higher value agricultural production (e.g. horticulture, intensive livestock), largely due to superior access to high value markets.

- The environmental benefits of water from the eastern regions of the catchment are likely to provide relatively lower environmental benefits to target environmental assets (e.g. Lower Balonne Floodplain and the Narran Lakes).

The south-west region of the Condamine-Balonne (i.e. the Lower Balonne system) is distinctively different from the eastern districts, despite cotton being a major crop across the whole catchment, specifically:

- The Lower Balonne is significantly more reliant on irrigated agriculture, and reductions in water availability would have relatively greater negative economic and social impacts.

- The region is less resilient to change due to the economic and demographic makeup of the region. There are also only limited opportunities for diversification or substitution of economic activities without substantial structural adjustment interventions.

- Even with the Lower Balonne there is significant variation between the social catchments of St George and Dirranbandi. While St George suffered during the recent drought, the local economy is recovering rapidly on the back of recent rain and the significant turnaround of the cotton industry. St George
should capture a large proportion of the benefits from the current recovery in the cotton sector. Conversely, while cotton production around Dirranbandi is now very substantial, the local economy is very ‘leaky’ and most of the gains from the turnaround will accrue to St George and further afield. In effect, the drought created a structural shift in the composition of the economy and the community in Dirranbandi, from which it is unlikely to recover to the pre-drought conditions.

In the Warrego, the bulk of the irrigated agriculture is focussed around Cunnamulla. There is significant variation in the value of irrigated agriculture, with a small volume of very high value horticulture irrigation in the WSS, while in the WMA, values from irrigated agriculture are significantly lower.

Irrigated agriculture in the Moonie is highly concentrated on cotton. However, because of the potential for system losses, buybacks in many sub-regions of the Moonie may not deliver cost-effective improvements in key environmental assets.

Because of the significant variation across the regions covered in this report, top-down approaches to water management that do not recognise the intra-regional variation are more likely to result in sub-optimal outcomes and potentially perverse policy outcomes.

2.11.3 Buyback vs. water use efficiency (relative cost differences)

The choice of policy tool under the broader Water for the Future Program can have a significant impact on the economic efficiency and impacts of the Program.

There is a general consensus in the policy community that direct buybacks of entitlements are a more cost effective means for the Commonwealth to secure water for the environment than water use efficiency (WUE). However, WUE will tend to have a lower economic and social impact on local communities, as production and investment remains in the region.

In effect, the Commonwealth is faced with a trade-off between a relatively narrow policy objective (maximise environmental water purchased from a given budget) and a broader set of objectives that consider regional economic and social impacts. While reconciling these trade-offs is beyond the scope of this report, it is instructive to examine the potential price of the trade-off between narrow and broader policy objectives. To date, approximately 12GL of water has been purchased by various rounds of the Restoring the Balance program, at average price of around $1,450 ML.

The most comparable WUE program is the Healthy Headwater Water Use Efficiency Program, which is currently finalising the first round of proposal from irrigators. Analysis of proposals for that program undertaken by Marsden Jacob Associates indicated that the ‘price premium’ for water returned to the environment.

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75 MJA, 2010, Socio-economic impact assessment of the first round of the Healthy Headwaters Program
compared to a straight buyback through the Restoring the Balance Program was approximately 20% for the more cost effective WUE options (e.g. deepening storages), but could be significantly higher for some other WUE options.

Further analysis of the causes of the price premiums found that most of the price premium could be explained by depreciating the nature of the WUE assets that would ultimately need refurbishment/replacement that were being traded for what was perceived as a perpetual water entitlement. In effect, even a 25 year economic life for capital such as a centre pivot would explain around 20% of a price difference between prices for environmental water under the Restoring the Balance Program and the Healthy Headwaters Water Use Efficiency Program. Consultation undertaken in the current study has reconfirmed this finding.

In addition, there are also a number of other explanations for the price premium that would need to be paid through WUE programs including:

- Higher transaction costs to irrigators in terms of technical irrigation design, calculating WUE savings that could be traded for WUE infrastructure etc.

- Price risk for irrigation infrastructure and earthworks. Irrigators were required to absorb the price risk for WUE infrastructure and earthworks proposed in their bids. Because of the potential for sharp price rises due to supply constraints, irrigators tended to incorporate an infrastructure and earthworks price premium in their proposals.

- Technology risk. There was also a degree of technology risk involved with respect to actual WUE savings that would actually be achieved.

- Policy risk. Continued uncertainty in the policy environment also resulted in some including a premium in the proposals.

There are a number of options that could be pursued to effectively reduce the risks to irrigators from participating in WUE programs that are likely to reduce the difference in the relative costs of WUE programs and buyback programs.

In summary, there is a difference in costs of securing water for the environment through buybacks and WUE programs and this creates a need to assess trade-offs between the efficiency of buybacks and the economic and social impacts at a relative localised scale. However, this cost differential could potentially be reduced through astute changes to WUE programs. This has the potential to reduce the trade-offs between narrow and broader policy objectives for the Commonwealth.

2.11.4 Optimising buyback

Only a relatively small proportion of irrigation water in the regions covered by this report is in supplemented systems. This creates additional challenges for the CEWH as it limits the options for managing environmental water in storages and releasing it for environmental assets when needed. In effect, when water is
purchased in much of the region, what is actually purchased is an entitlement that can only be accessed under certain flow conditions (i.e. the licensed diversion). A single entitlement may have multiple rules under the licensed diversion that will dictate the circumstances under which an entitlement can be used, and consequently the environmental benefits achieved through purchasing all or part of that entitlement. In effect, a purchase of entitlements from an irrigator is purchase of a ‘vertical slice’ of a number of ‘take rules’ for licensed diversions and those take rules have a profound impact on the potential environmental benefits of the water purchased. This is shown in Figure 2-8, using data from one management zone the Lower Balonne. The green bar represents a typical purchase of entitlements.

An alternative approach could be to essentially purchase property rights for water that are based on both volumes and ‘take rules’ (i.e. the licensed diversion). This may provide an opportunity to better measure and targeting potential environmental benefits from water purchased. For example, in the figure below for two similar sized licensed diversions:

- **Licensed diversion A.** Buying the licensed diversion A, would provide a less frequent benefit for the local environment as it would not be possible for the irrigator to access that water under the rules of the ROP. However, because of the higher flow conditions of the river that would prevail when the water could be accessed, it is likely to provide benefits to environmental assets that are a longer distance from the point of purchase (e.g. the Narran Lakes).

- **Licensed diversion B.** Under low flow conditions, this licensed diversion would provide more frequent (but localised) benefits (e.g. to the Lower Balonne Floodplain), but benefits for environmental assets further from the point of purchase may be negligible due to system losses. Under higher flow conditions, benefits would also accrue to environmental assets further downstream.
As can be seen, the purchase of licensed diversion A or B would result in significantly different environmental benefits. In addition, the opportunity cost of each of the diversions will also differ considerably. Diversion B with a higher frequency of access will have a significantly higher value to an irrigator that values reliability very highly (e.g. for table grapes).

This has a major bearing on the purchase strategy of the Commonwealth, where they have the option to buy different packages of licensed diversions depending on:

- Local vs. distant environmental assets being targeted.
- The variance in opportunity cost.

Discussions with DERM indicate that appropriate institutional, administrative and compliance arrangements could be developed relatively easily to allow for a more targeted buyback based on an irrigators' licensed diversion at particular flow rates (potentially greater opportunities for environmental water management).

Figure 2-8. Alternative buyback options.\textsuperscript{76}

\textsuperscript{76} Source: MJA based on data supplied by DERM.
In addition, the CEWH could also potentially achieve significant environmental gains through the use of temporary trades. Several irrigators indicated they may be more likely to enter a temporary trade with the CEWH at this stage. This option warrants further investigation as it may provide further opportunities for enhancing the timing of environmental flows and would reduce the negative economic impacts of constraints on water from crops when the environmental requirements may be relatively low (e.g. in circumstances where flow is high).

It may be worthwhile considering a buyback strategy that focuses heavily on the licensed diversion conditions as well as entitlement volumes and price. In addition, temporary trades warrant further consideration. This could potentially enable achieving environmental objectives (such as beneficial water at Narran Lakes) at a significantly lower opportunity cost, as well as have a lower economic and social impact on local communities.

2.11.5 Overcoming other impediments to efficient implementation of the MDB Plan

There are also a number of other impediments to achieving the objectives of the MDB Plan at the lowest economic and social costs to the community that were identified through the consultation undertaken for this project.

There are still a number of institutional constraints in some parts of the region that may constrain some options, such as constraints on water trading (temporary or permanent) in some regions. This can effectively reduce incentives for water use efficiency or hinder structural adjustment within regions (such as the consolidation of smaller entitlements into larger commercially viable operations).

In addition, in some regions, stakeholders raised the problem of institutional constraints on establishing on-farm storages for their existing entitlements. This effectively means their application of water to land is dictated by release timetables implemented by the State. This often means water is applied at sub-optimal times for crop requirements.

There are information gaps that undermine the efficient implementation of structural reform. These gaps are in two principal forms:

- A lack of technical information on the effectiveness and performance of both environmental management (often questioned by stakeholders) and potential solutions (such as WUE, or alternative buyback options).

- A lack of production, economic and market intelligence across most of the region. Despite the actions of this consultancy, the level of data (particularly time series data) on production of key agricultural commodities at a local scale is patchy at best. This makes prioritisation and targeting for buybacks difficult for the Commonwealth. In addition, the information limitations, are also likely to constrain commercial crop and investment choices by irrigators and businesses along the supply chain.
Given the resources to be applied in implementing the MDB Plan and the potential impacts, it would be prudent to identify, analyse and (potentially) remove any remaining impediments to the efficient implementation of the MDB Plan.

2.11.6 Localised science, knowledge and consultation to improve future variants of the MDB Plan

The development of the various ROPs in place across the region required several years of technical assessments and consultation from the local to regional scale to develop. The ROPs resulted in reductions in water available to irrigators and a process of ongoing monitoring and evaluation of the condition of the catchment. While the process used for each ROP and its findings have been complex and difficult for the State and stakeholders, there would appear to be a reasonable degree of acceptance and ownership of the outcomes of the ROP.

In addition, with respect to the Condamine Balonne ROP, organisations such as Healthy Rivers have invested >$1M in science to understand and monitor the condition of the Lower Balonne in the past 5-10 years. The State-based WRP and ROP (due for review in 2014) process is seen by the stakeholders as a much more robust approach than that adopted for the MDB’s Guide to the proposed Basin Plan.

Consultation undertaken for this project across the region found a strong preference across the community of relevant stakeholders for more localised approaches, both in terms of identifying the environmental benefits of environmental water, but also the use of more regionally specific management approaches to ensure environmental gains are achieved at the lowest economic and social cost to the community.

In addition, there are likely to be opportunities to further enhance the development of future variants of the MDB Plan through further meaningful dialogue to ensure officers with the responsibility for developing the MDB Plan can maximise benefits from local information and knowledge.

There are likely to be opportunities for enhancing the outcomes from the MDB Plan and implementation measures such as the Restoring the Balance Program through utilising the data and knowledge accumulated through the development and implementation of the ROPs. In addition, the consultation process raised a number of areas that could be enhanced in future planning processes, including:

- More meaningful dialogue and two-way consultation with stakeholder groups in the regional areas to enhance acceptance and ownership of the planning process by stakeholders.

- Greater recognition of local knowledge and data in planning processes.

- Greater input of stakeholders in program design to ensure appropriate levels of participation.
• Regular and transparent monitoring, evaluation and reporting of progress in MDB Plan implementation and any subsequent (expected) changes in the environmental condition of the MDB and key environmental assets.
3 Warrego

For explanation of conclusions summarised in this summary Overview, please refer to the appropriate subsequent section of this report. Please note that this report is not a regional profile, but rather, is a report on the base case and potential impacts of proposed reductions in irrigation water availability. It draws on previously-published regional profiles to which the interested reader is referred.\footnote{Please refer to profiles prepared by the ABS (2009) and Marsden Jacob Associates, RMCG, EBC, DBM Consultants, Australian National University, McLeod, G; Cummins, T. (2010). Available for each region at http://thebasinplan.mdba.gov.au/bpkid/}

3.1 Overview

While the Warrego is a large catchment in geographical terms, the region is sparsely populated and irrigated agriculture is not a major industry by the standards of the MDB.

Therefore, this Overview is deliberately brief, and only draws out those circumstances in which the Warrego differs from the adjacent Condamine-Balonne.

Within the Warrego, we have concentrated our analysis on the town of Cunnamulla, which is the major regional centre and also serves as a major centre for the Paroo catchment.

A snapshot of the geography, population, socioeconomic status and economy of this social catchment is presented in Table 2-1. Whilst the original source of the data is reported in the footnotes, all ABS and DEEWR data was generated using the website of Queensland Regional Profiles, Office of Economic and Statistical Research, Queensland Treasury.
Table 3-1. Snapshot of the social catchments.

<table>
<thead>
<tr>
<th>Geography</th>
<th>Cunnamulla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from Brisbane</td>
<td>806 km</td>
</tr>
<tr>
<td>Annual rainfall</td>
<td>377 mm</td>
</tr>
<tr>
<td>Average July max. temp.</td>
<td>18.7 C</td>
</tr>
<tr>
<td>Average Dec max. temp.</td>
<td>35.2 C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Population</th>
<th>Cunnamulla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate as at 30 June 2010</td>
<td>1,951</td>
</tr>
<tr>
<td>Average annual growth rate 2005-2010</td>
<td>-1.5%</td>
</tr>
<tr>
<td>% of population under 25 years</td>
<td>31.7%</td>
</tr>
<tr>
<td>% of population between 25-64 years</td>
<td>53.4%</td>
</tr>
<tr>
<td>% of population over 64 years</td>
<td>14.9%</td>
</tr>
<tr>
<td>% of population that are indigenous</td>
<td>27.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socio-economic</th>
<th>Cunnamulla</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEIFA – most disadvantaged quintile</td>
<td>76.8%</td>
</tr>
<tr>
<td>SEIFA – least disadvantaged quintile</td>
<td>3.5%</td>
</tr>
<tr>
<td>% of population earning &lt;$400 per week</td>
<td>51.8%</td>
</tr>
<tr>
<td>Unemployment rate – September 2010</td>
<td>8.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Economy</th>
<th>Cunnamulla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Regional Product</td>
<td>$108M</td>
</tr>
<tr>
<td>Value of agricultural production</td>
<td>$34.5M</td>
</tr>
<tr>
<td>% employed in agriculture</td>
<td>31.9%</td>
</tr>
</tbody>
</table>

Cunnamulla is located 806 km west of Brisbane on the Warrego River. The total population of the Shire of Paroo is 1,951, of which 1,217 live within the town of Cunnamulla. The town is located within the pastoral zone with an annual average rainfall of 377 mm.

This social catchment has experienced population decline of 1.7% per annum between 2005 and 2010, and continues to experience high levels of youth migration out of the area, which is evident from the low proportion of the population under 25 years of age (31.7%) and the high proportion over 64 years of age (14.9%).

More than one quarter of the population (27.6%) are indigenous and 76.8% of the total population are within the most disadvantaged quintile of the SEIFA index, with more than half (51.8%) of the workforce earning less than $400 per week.

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78 Source: Bureau of Meteorology
79 Source: ABS, Regional Population Growth, Australia, 2009-10, cat. No. 3218.0 – preliminary estimates as at 30 June 2010
80 Source: ABS, Population by Age and Sex, regions of Australia, 2009, cat. No. 3235.0 – preliminary estimates as at 30 June 2009
81 Source: ABS, Census of Population and Housing, Indigenous Profile – I02 – 2006 data
82 Source: ABS, Census of Population and Housing: Socioeconomic Indexes for Areas (SEIFA), Australia – data only, 2006, cat. No. 2033.0.55.001
83 Source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B16
84 Source: DEEWR, Small Area Labour Markets Australia, various editions
85 Gross regional Product is defined as the market value of all final goods and services produced within the statistical local area in 2005-06
86 Source: ABS, Agricultural Commodities, Australia, 2005-06, cat. No. 7125.0
87 Source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B42
The economy is relatively small (GRP = $108M) and highly dependent on agriculture (predominantly pastoral grazing), which employs 31.9% of the workforce. Tourism is an important contributor to the local economy, as Cunnamulla is located on the inland route to Longreach, Mt Isa and the Northern Territory.

Thus, Cunnamulla is most definitely a category 1 town, i.e., small and highly dependent.

3.1.1 Social Catchments

Within the Warrego catchment, the principle focus social catchment is Cunnamulla. Cunnamulla is located 806 km west of Brisbane on the Warrego River. The total population of the Shire of Paroo is 1,951, of which 1,217 live within the town of Cunnamulla.

3.1.2 Irrigation in the region

Water entitlements in the Warrego total approximately 45GL and over 94% are in unsupplemented WMAs.

3.1.3 Agriculture in the region

Agriculture in the Queensland catchments was predominantly based on the extensive grazing industries prior to irrigation development. The higher rainfall areas of the eastern part of the region supported higher intensity grazing, whilst the country west of St George is part of the broader pastoral zone of the Australian interior. In between, the Darling Downs have always supported a thriving broad acre cropping industry. Cotton has become the dominant agricultural industry since the broader development of irrigation in the 1990s.

3.1.4 Impact of the drought

The drought was particularly hard on the pastoral sector around Cunnamulla where many farmers were forced to destock.

Horticulturalists who relied on regulated supplies from storages had to cut back their production by up to 50% to deal with the low allocations. However, those who also had their own storages survived quite well, as the river flooded every 2-3 years and they could capture enough to irrigate some of their plantings every year.

3.1.5 Baseline

The climate is highly variable with subsequent highly variable and unpredictable river flows. Those consulted described it as a “feast or famine” environment.

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88 Please refer to section 2.2.1 for more information and explanation
89 Please refer to section 2.3 and 2.4 and for more information and explanation
90 Please refer to section 2.7 for more information and explanation
91 Please refer to section 2.8 for more information and explanation
Climate change scenarios project that the “feast” and “famines” may become more extreme.

The baseline for irrigated agriculture indicates very significant variability dependent on water availability. In effect, irrigation has been established (and runs relatively efficiently) on a model that is built around a few very good years in each climate cycle making farming viable. In effect, analysing averages is pointless and provides little insight to policy development or implementation.

3.1.6 Impact of reduced water availability

Our analysis and consultation also indicates that the Lower Balonne is relatively more reliant on irrigated agriculture than most of the Condamine-Balonne and the other catchments covered in this report.

3.1.7 Community resilience and adaptive capacity

Cunnamulla is largely reliant on the pastoral industry and tourism. However, irrigated horticulture plays a vital role in buffering the impact of drought on the pastoral industry and complementing the demand for goods and services of the tourism industry. A permanent reduction in diversion limits would seriously threaten the viability of the town.

3.2 Background

3.2.1 Introduction to region and social catchments

The Paroo was not part of the community impacts study due to its lack of connectivity to the broader basin. However, Cunnamulla, the focal social catchment for the Warrego is also a major centre servicing the Paroo.

This region includes the social catchments of Cunnamulla, and part of Paroo and Bourke (Figure 3-1).

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92 Please refer to section 2.9 for more information and explanation. In addition, the potential social and economic impacts of different policy settings including buyback policy, modernization policy, etc. is discussed in Volume 4 of this study – accordingly it is not repeated here, but the interested reader is referred to that volume for detailed discussion of conclusions that are summarized in this regional report.

93 Please refer to section 2.10 for more information and explanation.
Figure 3-1. Map of the Warrego social catchments, showing categories of towns.

Source: EBC consortium
Limited socio-economic and demographic data is available for the social catchments of Dirranbandi (Condamine Balonne), St George (Condamine Balonne) and Thallon (Moonie), as they are all part of the same statistical local area (Balonne). Thus, they are reported here as Balonne. However, relevant local data is reported where available and the differences in the vulnerability and response of these three social catchments are reported, elsewhere in the report, when significant.

3.3 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 3-2.

![Figure 3-2. Current diversion limits. The Warrego is the fifth smallest irrigation region diverter in the Basin.](Image)

3.3.1 Warrego Catchment

A brief overview of the Warrego system is outlined below. Key points to note include:

- There is only a very limited supplemented irrigation in the Warrego (the Cunnamulla WSS) which accounts for approximately 6% of the nominal volumes in the catchment.

- The remainder of the water is unsupplemented, and operates under similar management arrangements to unsupplemented water in the Condamine Balonne.

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• Surface water use is almost entirely influenced by the seasonal rainfall patterns that dictate runoff and stream flow. Data for the period 1993 to 2005 indicated that use varied from a low of around 2,000 ML to a maximum of 11,000 ML.

Table 3-2. Key summary of WMA in the Warrego catchment (excluding overland flow and groundwater).  

<table>
<thead>
<tr>
<th>Irrigation region (&amp; associated social catchment)</th>
<th>Entitlements (nominal volumes) ('000 ML)</th>
<th>Average water holding (ML)</th>
<th>Key features</th>
</tr>
</thead>
</table>
| Warrego Cunnamulla WSS                           | 2.6                                   | 97                          | • Supplemented water diversion in this valley is limited to a small water supply scheme based on a 4,770 ML weir on the Warrego River at Cunnamulla.  
• While average holding is <100ML, holdings are dominated by a small number of larger holdings primarily used for table grape production |
| Upper and Lower Warrego WMAs                     | 40.0                                  | 975                         | • Water sharing rules for water allocations to take unsupplemented water located in the WMA (14 management zones).  
• Multiple rules relating to water announcements including flow conditions, announcement periods, volumetric limits.  
• Multiple broad acre crops (many opportunistic).  
• The majority of holdings are concentrated under the ownership of 4-5 entities around Cunnamulla.  
• Irrigation use of this unsupplemented water has varied considerably in recent years due to major reliability problems |

3.4 Key agricultural industries

3.4.1 Gross value of agricultural production

Agriculture in the region was historically and remains predominantly based on the extensive grazing industries. Data on production volumes available is very limited.

The total value of agricultural production in Paroo Shire LGA in 2005–06 was estimated at $34.5 million, 0.4 per cent of the total value of agricultural production in Queensland. This was dominated by livestock slaughtering ($22.8 million), livestock products ($9.2 million) and crops (around $2.4 million).  

In excess of 50% of businesses in the Paroo LGA are in agriculture.

It is important to recognise that the figures presented in the table above are drought levels of production. Hence they are relatively low estimates compared to non-drought periods.

97 Australian Bureau of Statistics, Agricultural Commodities, Australia, 2005-06, cat. no. 7125.0
3.4.2 Horticulture

Horticulture is a relatively small, but significant industry in the region. Whilst the GVAP of horticulture is only a few million dollars, it accounts for significant seasonal employment, which is critical to the viability of Cunnamulla.

Table grape producers located at Cunnamulla, using approximately 2.6 GL per annum, employ 150 casual workers for three months at harvest time. This expands the town’s population by almost 15%.

Most importantly, this occurs during the quietest period for tourist visitors, thus maintaining demand for goods and services in the town all the year round.

3.4.3 Pastoral industries

These industries dominate primary industries. Grazing is the dominant land use in the region.

The drought has severely reduced the herd sizes in the region, however with the finish of the drought it would be expected that herds would rebuild. This will reduce the relative importance of irrigated agriculture to the broader regional economy, but the levels of relative employment per unit of output for pastoral activities are significantly lower for pastoral industries when compared to irrigated agriculture.

3.4.4 Other cropping and irrigation

There is some other irrigated and dryland cropping in the region, often dominated by cotton when water is available. However, although the areas (often only around few hundred hectares), crops and degree of irrigation water applied is highly variable and dependent on water actually available and water announcements by DERM dictating access to irrigation water.

3.5 Key other industries

Cunnamulla serves as an important regional economic and service hub for much of the Warrego catchment as well as the Paroo catchment. While the town is relatively small, it has a number of key industries, including:

- **Agricultural supplies.** There is a modest agricultural supplies business sector (including fuel and distributors) in Cunnamulla service both dryland and irrigated agriculture. These businesses are highly dependent on the fortunes of their agricultural base and are regionally significant. Irrigated agriculture tends to be a relatively major component if the customer base for this sector.

- **Tourism.** Tourism is a small, but growing industry in the region as Cunnamulla forms part of the Great Inland Way (the inland tourist route from Sydney to Cairns), Adventure Way (Brisbane to Adelaide) and the Mitchell

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98 Consultation with Paroo Shire staff, March 2011.
Highway (Sydney to Mt Isa and the Northern Territory). These routes are popular routes for the growing number of “grey nomads”, or older domestic tourists from the southern capitals of Adelaide, Melbourne, Canberra and Sydney. The tourism sector is generally concentrated in the cooler winter months. This concentration of activity in winter is important as the economic activity generated is counter-seasonal to the economic activity generated in town by contract grape pickers.

The government service sector is also a major employer in the region. The percentage of the workforce employed in each of these industries is presented in the table below.

Table 3-3: Percentage of the workforce employed in government services in 2006

<table>
<thead>
<tr>
<th>Social Catchment</th>
<th>Public administration and safety</th>
<th>Health care and social assistance</th>
<th>Education and training</th>
<th>Arts and recreation services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cunnamulla</td>
<td>14.3%</td>
<td>8.8%</td>
<td>11.3%</td>
<td>1.1%</td>
<td>35.5%</td>
</tr>
<tr>
<td>QLD</td>
<td>6.7%</td>
<td>7.6%</td>
<td>10.2%</td>
<td>1.3%</td>
<td>25.8%</td>
</tr>
</tbody>
</table>

The data shows that government services are a significant employer in the region, 35.5% in Cunnamulla, compared with the state average for Queensland of 25.8%. Evidence provided by Paroo Shire Council indicates that their employment levels are also influenced by issues such as drought. Since the drought broke, population levels have increased and this has triggered an increase in demand for local government services. Consequently, employment numbers for the Shire Council have increased approximately 20%.

3.6 Water Management, Government Purchases and Drought

3.6.1 Water management

Water management in Warrego is managed via the Warrego, Paroo, Bullo and Nebine Water Resource Plan (the WRP), and the Resource Operations Plan (ROP). The underlying fundamental basis for water management under the ROP is to ensure sufficient environmental flows in each of the management zones across the catchment. For this reason, the management is largely based around ‘rules-based’ announced allocations that attempt to match available water with environmental needs.

The rules that underpin management of the ROP are based on analysis and modelling at a localised scale and have been developed through a long period of consultation with the community. While the process in developing the ROP has proved to be technically complex and stressful for the community, the outcomes are largely accepted by all parties.

99 Source: ABS, Census of Population and Housing, 2006
Similarly, consultation has questioned the likelihood of material environmental benefits to key environmental assets that would be derived through purchases in the Warrego catchment.

### 3.6.2 Water procurement

Water procurement has not yet commenced in the Warrego, either through tenders, or through WUE programs such as Healthy Headwaters. This partially a reflection of the relatively lower priority placed in the Warrego by the Commonwealth as a target for buybacks.

### 3.6.3 Impact of the drought

The drought was particularly hard on the pastoral sector around Cunnamulla where many farmers were forced to destock.

Horticulturalists who relied on regulated supplies from storages had to cut back their production by up to 50% to deal with the low allocations. However, those who also had their own storages survived quite well, as the river flooded every 2-3 years and they could capture enough to irrigate some of their plantings every year.

**Cunnamulla**

Cunnamulla was also severely impacted by the drought, however, the source of its impacts were different. Those irrigators who divert river flows into their own storages effectively did not have a drought because the Warrego River flooded every 2-3 years and irrigators could store water and still irrigate each year. The net result was that irrigation buffered the community a little bit against the drought.

However, the impact of the drought on the pastoralists, which underpin the majority of the local economy was described as “terrible”. The population decline was substantial, half the shops closed down, and housing and business asset values dropped. It was reported during the consultations that people were depressed and stayed at home, with social functions that normally attract 200 people, only attracting 50 people.

The drought had a significant affect on the rate base of the Paroo Shire with a high percentage of ratepayers being on extended credit. The Shire is the biggest employer in town with 120 currently employed due to rebuild after floods, however employment was below 90 during the drought.

Unlike other very small centres in the north of the MDB like Dirranbandi, Cunnamulla has bounced back after the drought because of its importance as a regional service centre, the growth in tourism and the safety net that the irrigators provided.
3.7 Baseline – the future without policy change

The “baseline” is a description of the expected future for the region into the future, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

3.7.1 Population

The projected population by local government area in 2031, compared to the actual population in 2006 and the average annual growth rate over the 25 year are presented in Table 2-6.

**Table 3-4. Projected population by local government area in 2031, compared to 2006.**

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>2006</th>
<th>2031</th>
<th>Average annual growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paroo Shire</td>
<td>2,063</td>
<td>1,930</td>
<td>-0.3%</td>
</tr>
<tr>
<td>QLD MDBA Region</td>
<td>221,994</td>
<td>316,030</td>
<td>1.4%</td>
</tr>
<tr>
<td>% of Queensland</td>
<td>5.4%</td>
<td>5.0%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

The data shows that:

- The population is expected to decline marginally in the longer run as population continues to concentrate in larger centres further to the east of Cunnamulla.
- The population is expected to increase slowly over much of the rest of the Queensland component of the MDB.
- As a general rule, Cunnamulla is facing a similar population projection as much of western Queensland, particularly areas that are not benefiting from energy and mineral developments.

The median age of the population for 2006, compared to 2031 is presented in the table below.

**Table 3-5. Median age by local government area for 2006 and 2031.**

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>2006</th>
<th>2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paroo Shire</td>
<td>39</td>
<td>44</td>
</tr>
<tr>
<td>Queensland</td>
<td>36</td>
<td>41</td>
</tr>
</tbody>
</table>

The data shows that the population is projected to age within Paroo, at the same rate as the rest of the State, with Paroo remaining as an “older” area.

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100 Queensland Department of Infrastructure and Planning (2008), “Queensland’s future population”, Appendix C
101 Queensland Department of Infrastructure and Planning (2008), “Queensland’s future population”, Appendix G
3.7.2 Climate change

The climate of the Queensland part of the Basin is highly variable with subsequent highly variable and unpredictable river flows. Those consulted described it as a “feast or famine” environment.

The CSIRO sustainable yield forecast for 2020 suggests a decline in surface water availability is more likely in the south of the Basin, than the north. It also states that significant increases are also possible in the north. Thus, highly variable and unpredictable flows are forecast to continue. However, the relative impact of climate change on surface water use would be much greater in dry years\(^\text{102}\).

3.7.3 Water policy

Water allocations and availability in the region has already experienced significant changes, as a result of the introduction of the state-based Resource Operations Plans. Those consulted believe that there are limited economic opportunities for further efficiency measures and that there will be little interest in Commonwealth buyback, as the limited water being used is for perennial high-value crops - table grapes with a key market window at a premium price for quality fresh produce.

3.7.4 Cunnamulla

Cunnamulla is in a similar situation to centres like St George with the population returning and new businesses opening since the drought broke. Cunnamulla’s fortunes are very much tied to variations in the climate and the profitability of pastoralists. The small irrigation industry located in the district helps to buffer the impact of drought on the town. This is expected to continue.

Major opportunities for growth in Cunnamulla are limited by its isolation. However, there is potential for tourism growth, and further development of existing water entitlements if and when some certainty returns to the water market.

3.8 Impacts of Reduced Water Availability

3.8.1 Introduction

This section outlines some of the potential impacts of constrained water availability attributable to the implementation of the SDLs, including through key policy initiatives such as Restoring the Balance. Information presented in the section has been sourced from multiple sources including formal and informal data sources, and through the outcomes of consultation with stakeholders throughout the catchments.

3.8.2 Current Diversions, and Guide proposals

The Current Diversion Limit and the 4000 GL and 3000 GL scenarios outlined in the Guide are shown below (\(^\text{102}\) MJA (2011) Murray Darling Basin Community Impact Assessment Project – General Briefing Paper.)
Table 5-3). It is assumed there will be a mix of different reliabilities of water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.

**Table 3-6. Current diversion limit and ‘Guide’ proposals.**

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL (^{104}) (average)</th>
<th>Guide reduction in entitlements before modernisation &amp; before buy back (^{105})</th>
<th>Modernisation ‘bridging the gap’ on and off farm, to 2010 (^{106})</th>
<th>Buy-back to date (^{107})</th>
<th>Remaining Change</th>
<th>Guide reduction in remaining entitlements after modernisation and after existing purchases (^{108})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GL</td>
<td>GL</td>
<td>GL</td>
<td>GL</td>
<td>GL</td>
<td>GL</td>
<td>GL</td>
</tr>
<tr>
<td>Warrego</td>
<td>BASE CASE</td>
<td>4000</td>
<td>20.2</td>
<td>45%</td>
<td>19</td>
<td>45%</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>MODERNISATION TO DATE</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
<td>GL reduction in entitlements before modernisation &amp; before buy back (^{105})</td>
</tr>
<tr>
<td></td>
<td>TO DATE</td>
<td>3000</td>
<td>45</td>
<td>18</td>
<td>40%</td>
<td>-</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

3.8.3 Determining where the impacts will occur

In implementing the MDB Plan, given current policy knowledge, it needs to be assumed that it is the Government’s intention to continue to recover water for the environment through voluntary market mechanisms such as the Restoring the Balance tenders and the Healthy Headwaters Water Use Efficiency Program (see section 1.3). Both of these programs have been designed around the principal of value (cost effectiveness) for money for the Commonwealth where:

- **Environmental benefits.** The environmental benefits of any ML of water purchased are measured in physical terms based on the contribution of that ML to enhancing the condition and resilience of key environmental assets. The environmental benefits of each ML of water purchased are not uniform across the catchments and purchase mechanisms are specifically designed to target water that provide cost effective environmental benefits. \(^{110}\)

- **Costs of purchase.** The costs are based on the payment made to the irrigator. Because both purchase mechanisms use competitive market pressures to reduce costs to the Government (as purchaser), and irrigators will not sell their water for less than its market value (a function of agronomic opportunities and commodity markets), it is only logical to assume that successful sellers (irrigators) are likely to be those with lower economic

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\(^{103}\) Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.


\(^{105}\) Yield-unweighted entitlements. Source: MJA 2010


\(^{107}\) Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.

\(^{108}\) Source: MJA 2010

\(^{109}\) Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation.

\(^{110}\) Not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement

margins from a ML of water. Available information from across the catchment indicates that the relatively higher value water is used for horticulture (grapes around Cunnamulla) and those irrigators are less likely to be successful sellers and sales would be concentrated in the Upper and Lower Water Management areas. In addition, there are still a number of sleeper and dozer licences in the region that could be sold at relatively low prices (particularly given their relatively low reliability).

- **Water purchased.** Water purchased will be the water with the highest ratio of benefits (measured in physical terms) to costs (measured in financial terms).

The likely sub-regional focus of buybacks is shown in Figure 2-6, where relative environmental benefits for the key environmental assets are shown on the X-axis and relative costs of water are shown on the Y-axis. Regions/social catchments towards the bottom right side of the graph are more likely to participate in the buyback mechanisms and be impacted by the MDB Plan.

**Figure 3-3. Potential regional concentration of buybacks and economic and social impacts.**

Assuming that water purchased in the Lower Warrego WMA would provide a greater likelihood of environmental benefits to the key environmental assets in the MDB, it is reasonable to assume that that area is likely to be the hotspot for buybacks. In addition, the Lower Warrego has the only volumes of entitlements that could meet the requirements of the SDLs. The key points to note are:

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111 MJA & RMCG analysis
Purchases and hence the economic and social impacts are likely to be highly concentrated around the unsupplemented irrigation in Lower Warrego WMA and this area is primarily connected to the Cunnamulla social catchment.

Supplemented irrigation in Cunnamulla is highly concentrated in high value table grapes, while the environmental benefits of buybacks are potentially negligible.

Discussions with DERM and previous analysis of WUE opportunities indicates that there are some opportunities and potential for WUE across much of the broader catchment, although there are significant financial, technical, attitudinal and institutional constraints to investment in WUE. ¹¹²

### 3.9 Water Sales to Government and SDLs

In this analysis and through our consultation we have assumed that the SDLs will be achieved through voluntary buybacks (see section 1.3). The consortium was not able to identify any buybacks that have occurred in the Warrego. However, the Warrego, Paroo, Bulloo and Nebine WRP was amended in November 2008 to grant a water allocation (average annual volume of 8,000 Ml) of unallocated water to the Commonwealth Environmental Water Holder (CEWH).

### 3.10 Water sales – potential direct impacts on irrigation

Because of the likely focus of buybacks in the Lower Warrego, the impacts outlined in this section will likely occur primarily in that area and will impact on the Cunnamulla social catchment. There are a number of scenarios that may play out singularly or in conjunction from water purchases in the Warrego, including:

- **Table grapes.** Irrigators of table grapes will not sell in tender rounds due to their high values. In addition, because they have already constrained production areas to match lower water availability and are already utilising best practice WUE (e.g. drip irrigation, soil moisture testing), participation in WUE programs like Healthy headwaters is also likely to be negligible. The bottom line is that table grape production is unlikely to be impacted.

- **Sales of sleeper and dozer licences.** Consultation undertaken in the region indicated that there was a reasonable number and volume of sleeper and dozer licences. This is reinforced by the fact that CSIRO has estimated that actual use rarely exceeds 10,000 Ml¹¹³, despite the fact volumetric entitlements allow for a current total diversion limit of around 45,000 Ml. To the extent that buybacks can be sourced from sleeper and dozer licences, the impacts on production may be negligible.


• **Other irrigation in the Lower Warrego WMA.** Other irrigation in the region includes a range of broadacre irrigated crops including cotton, fodder etc. Irrigation use has been estimated at anywhere between 2,000 ML and 11,000 ML, over a climate cycle, with a preference to irrigate cotton when conditions allow.\(^{114}\) Because of the variation in water available in the unsupplemented systems and the moratorium on private storages, it is unlikely that unsupplemented irrigators in the Lower Warrego WMA would be able to establish value for money WUE bids for the Healthy Headwaters program as expensive capital improvements would not be sufficiently utilised.

The bottom line from the analysis is that water purchases are likely to be a mix of purchases of sleeper/dozer licenses and active licences in the Lower Warrego WMA (purchased through the tender mechanism). The figure below shows estimated impacts on the range of production over the climate cycle (low production to high production). This assumes cotton is the preferred crop and that purchasers are from active water licences.

Figure 3-4. Potential impacts of buybacks on production (assuming cotton is the preferred crop and purchases are from active water licences).

Key points to note are:

• Similarly to areas such as the Lower Balonne, the impacts of the buybacks are highly dependent on the climate cycle.

• The impacts would be negligible in low-flow conditions as there would be virtually no irrigation (outside table grapes) anyway.

\(^{114}\) CSIRO (2007). Water Availability in the Warrego. A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project
• The key impacts are the constraint on irrigation production in the high-flow conditions.

• While the figure above assumes buybacks are from active licences, the impacts on current production would be negligible if sleeper/dozer licences were purchased (although future growth would be constrained).

3.11 Other economic and social impacts

There are also a number of other economic impacts that have been identified through the consultation and analysis undertaken in developing this report. These are outlined below.

3.11.1 Other economic impacts

Other economic impacts under either the 3,000GL or 4,000GL SDL targets (not quantified), include:

• Local flow on impacts. Flow on impacts through the Cunnamulla economy from reduced spending (particularly agricultural supplies purchased in Cunnamulla and further afield such as St George).

• Regional flow on impacts. Minimal flow-on impacts in the broader regional economy, as the need for larger capital equipment purchases (e.g. tractors) declines.

• Asset value write-downs. Lower cash flow and profits from commercial assets across the region as a result of SDL-induced reductions in turnover are likely to result in minor permanent write-downs of asset values (e.g. fuel distribution infrastructure).

• Local government finances. Paroo Shire has indicated that meeting the SDL targets could impact on their budget through reductions in rates revenue (irrigation land generates more revenue than dry land and losses in absolute number of rateable properties). In addition, they have a concern that any material decline in population will significantly impact the cost effectiveness of delivering current service standards.

3.11.2 Potential employment impacts

The potential employment impacts are also highly reliant on which irrigators sell water under the buyback. Key points to note include:

• Assuming buybacks are concentrated in the Lower Warrego WMA and for broad acre irrigation such as cotton, even under high-flow conditions, losses of seasonal employment are likely to be minimal (i.e. less than 5 FTEs).
• Where buybacks are from table grape irrigators, there could be significant losses in seasonal employment and subsequent flow on job losses in the retail trade and accommodation sectors in Cunnamulla.

Our analysis indicates that buybacks from table grape irrigators are highly unlikely and the impact on jobs is likely to be minimal.

3.11.3 Other social impacts

There are also a number of other social impacts that have been identified during the consultation. While those impacts are unlikely to be material for the existing buybacks, they may be material for achieving the SDLs. Identified impacts include:

• Job losses triggering population movement. Experience from the drought indicates that families left the region due to a lack of employment opportunities. SDL induced job losses will also result in declines in population.

• Social service viability thresholds. There was also significant concern in the region that any population losses could result in a further concentration of social services in larger centres (e.g. loss of health services and government offices in Cunnamulla and the town being services out of larger regional centres such as St George).

• Mental health and associated social issues. Consultation also revealed an increase in mental health and associated social issues during the drought. There is significant concern that the implementation of the SDLs may result in a step-wise increase the risk of mental health, crime and other associated problems.

• Sense of community identity. Another intangible social issue could be the loss of community identity as the fortunes of the cotton industry decline.

It should be noted that the social impacts identified here are largely attributable to job losses and families potentially leaving the community. These impacts are unlikely to be significant *unless*, buybacks result in a significant reduction in irrigated table grape production. However, given the value for money approach being adopted for buybacks, this is likely to result in social impacts being relatively minor.

3.12 Community Resilience and Adaptive Capacity

The region is highly reliant on agriculture with approximately one third of all jobs directly in agriculture. Opportunities for diversification into irrigation crops that have lower water use are limited, as other regions already have a competitive advantage in those crops. In addition, growth rates in markets for high value crops such as table grapes will be constrained by broader population and market growth, largely in the domestic market. Therefore, a reduction in diversion limits will lead to irrigated agriculture being substituted with dry land cropping and pastoral production.
SEIFA data shows that the proportion of the population that are in the most disadvantaged quintile is almost twice the Queensland state average. Unemployment is relatively low, but anecdotal information indicates that underemployment is quite high. In addition, recorded unemployment has remained relatively low in recent years as outward migration has continued as people seek opportunities elsewhere. The end result is that the proportion of the remaining population is older, less mobile, less skilled, and more welfare dependent.

Like St George in the Condamine and Balonne catchment, Cunnamulla is a small town (population of 1,217), but due to its isolation it is also a regional service centre. While it is principally reliant on the pastoral industry and tourism, irrigated horticulture plays a vital role in buffering the impact of drought on the pastoral industry and complementing the demand for goods and services of the tourism industry (i.e. it attracts 150 casual workers to the town during the off-season for tourism).

Paroo Shire Council is concerned about its ability to maintain services should there be a permanent reduction in diversion limits that would lead to the relocation of its irrigated horticultural industry. Such a small, highly dependent community is close to a tipping point, with little adaptive capacity. Thus, a permanent reduction in diversion limits would seriously threaten the viability of the town.

### 3.13 Minimisation of Impacts

Minimisation of impacts is discussed in Volume 4 of this study. Options to minimise impacts are similar to those in the Condamine and Balonne which is covered in detail in that chapter of this report, so we will not repeat them in detail here. These largely relate to:

- Because of the significant variation across the regions covered in this report, top-down approaches to water management that do not recognise the intra-regional variation are more likely to result in sub-optimal outcomes and potentially perverse policy outcomes such as higher than necessary economic and social impacts.

- Careful consideration of the mechanism used to secure water for the environment (i.e. tenders or WUE programs), noting that cost effective WUE opportunities are likely to be very limited.

- The potential to purchase sleeper/dozer licences in the region that are likely to be costs effective from a purchaser’s perspective and are likely to only have negligible economic and social impacts.

- Opportunities to optimise buyback that focuses heavily on the licensed diversion conditions as well as entitlement volumes and price. In addition, temporary trades warrant further consideration.
• Greater focus and use of the significant localised knowledge to determine effective and efficient means to meet the requirements of the SDLs.
4 Moonie

For explanation of conclusions summarised in this summary Overview, please refer to the appropriate subsequent section of this report. Please note that this report is not a regional profile, but rather, is a report on the base case and potential impacts of proposed reductions in irrigation water availability. It draws on previously-published regional profiles to which the interested reader is referred.115

4.1 Overview116

Within the Moonie catchment, the focus social catchment is Thallon. Thallon is situated south of St George on the Carnarvon Highway approximately 570 km west of Brisbane. It is located north of Mungindi (Border Rivers catchment) and east of Dirranbandi. The population at the time of the 2006 census for the town was 172. Thallon is the base for one of the larger grain receival depots in southern Queensland. Grazing of cattle and sheep, wool growing, wild pig harvesting, broadacre farming and irrigated cotton are all industries of the district. Thallon is most definitely a category 1 town, i.e. small and highly dependent.

While the Moonie is a large catchment in geographical terms, the region is sparsely populated and irrigated agriculture is not a major industry by the standards of the MDB.

Therefore, this Overview is deliberately brief, and only draws out those circumstances in which the Warrego differs from the adjacent Condamine-Balonne.

Within the Moonie, we have concentrated out analysis on the town of Thallon, which is small centre with a population of less than 300 built around irrigated cotton and other agricultural activities (such as grains).

Thallon is significantly smaller than nearby Dirranbandi and is also highly reliant on agriculture, including irrigation. It should also be noted that Thallon also has connections to social catchment with the Border Rivers catchment, particularly Mungindi.117

Thallon can be classified as category 1, small, highly dependent towns.

A snapshot of the geography, population, socioeconomic status and economy of this social catchment is presented in the table below. Whilst the original source of the data is reported in the footnotes, all ABS and DEEWR data was generated using the website of Queensland Regional Profiles, Office of Economic and Statistical Research, Queensland Treasury.

116 Please refer to section 2.2.1 for more information and explanation
117 The more north-east irrigation areas of the Moonie catchment will also have significant ties with Goondiwindi (Border Rivers catchment) as a source of regional services and supplies.
Table 4-1. Snapshot of the social catchments.

<table>
<thead>
<tr>
<th>Thallon (part of the Lower Balonne cluster of social catchment)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Geography</strong></td>
</tr>
<tr>
<td>• Distance from Brisbane</td>
</tr>
<tr>
<td>• Annual rainfall(^{118})</td>
</tr>
<tr>
<td>• Average July max. temp.(^{1})</td>
</tr>
<tr>
<td>• Average Dec max. temp.(^{1})</td>
</tr>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td>• Estimate as at 30 June 2010(^{119})</td>
</tr>
<tr>
<td>Thallon</td>
</tr>
<tr>
<td>Balonne Shire statistics:</td>
</tr>
<tr>
<td>• Average annual growth rate 2005-2010(^{2})</td>
</tr>
<tr>
<td>• % of population under 25 years(^{120})</td>
</tr>
<tr>
<td>• % of population between 25-64 years(^{3})</td>
</tr>
<tr>
<td>• % of population over 64 years(^{3})</td>
</tr>
<tr>
<td>• % of population that are indigenous(^{121})</td>
</tr>
<tr>
<td><strong>Socio-economic</strong></td>
</tr>
<tr>
<td>• SEIFA – most disadvantaged quintile (based on Balonne Shire)(^{122})</td>
</tr>
<tr>
<td>• SEIFA – least disadvantaged quintile(^{5})</td>
</tr>
<tr>
<td>• % of population earning &lt;$400 per week(^{123})</td>
</tr>
<tr>
<td>• Unemployment rate – September 2010(^{124})</td>
</tr>
<tr>
<td><strong>Economy</strong></td>
</tr>
<tr>
<td>• Gross Regional Product(^{125})</td>
</tr>
<tr>
<td>• Value of agricultural production(^{126})</td>
</tr>
<tr>
<td>• % employed in agriculture(^{127})</td>
</tr>
</tbody>
</table>

4.1.1 Irrigation in the region\(^{128}\)

In the Moonie, nominal volumes total around 32GL (all unsupplemented).

4.1.2 Agriculture in the region

Agriculture in the Queensland catchments was predominantly based on the extensive grazing industries prior to irrigation development. The higher rainfall areas of the eastern part of the region supported higher intensity grazing, whilst the country west of St George is part of the broader pastoral zone of the Australian

\(^{118}\) Source: Bureau of Meteorology
\(^{119}\) Source: ABS, Regional Population Growth, Australia, 2009-10, cat. No. 3218.0 – preliminary estimates as at 30 June 2010
\(^{120}\) Source: ABS, Population by Age and Sex, regions of Australia, 2009, cat. No. 3235.0 – preliminary estimates as at 30 June 2009
\(^{121}\) Source: ABS, Census of Population and Housing, Indigenous Profile – I02 – 2006 data
\(^{122}\) Source: ABS, Census of Population and Housing: Socioeconomic Indexes for Areas (SEIFA), Australia – data only, 2006, cat. No. 2033.0.55.001
\(^{123}\) Source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B16
\(^{124}\) Source: DEEWR, Small Area Labour Markets Australia, various editions
\(^{125}\) Gross regional Product is defined as the market value of all final goods and services produced within the statistical local area in 2005-06
\(^{126}\) Source: ABS, Agricultural Commodities, Australia, 2005-06, cat. No. 7125.0
\(^{127}\) Source: ABS, Census of Population and Housing, 2006, Basic Community Profile – B42
\(^{128}\) Please refer to section 2.3 and 2.4 and for more information and explanation
interior. In between, the Darling Downs have always supported a thriving broad acre cropping industry. Cotton has become the dominant agricultural industry since the broader development of irrigation in the 1990s.

4.1.3 Impact of the drought

Cotton growers generally believe the past two good summer rainfalls have saved them, as they now have enough water in storage of next year’s crop and the price outlook for cotton is positive. Thus, they believe this year and the next year look promising for their industry and businesses. However, debt levels are high as they borrowed significant sums to develop their businesses 10 years ago and have not had the chance to pay the debt back yet. Thus, there initial focus will be on debt reduction.

The township of Thallon suffered during the drought as production and economic activity declined. While the drought had impacts within the township, much of the impacts occurred in surrounding towns where the bulk of the supplies and services were purchased by irrigators from around Thallon.

4.1.4 Baseline

The population of the smaller social catchments in the west of the region are projected to decline or, at best, remain stable if the current diversion limits for irrigation were left unchanged.

The climate is highly variable with subsequent highly variable and unpredictable river flows. Those consulted described it as a “feast or famine” environment. Climate change scenarios project that the “feast” and “famines” may become more extreme.

The baseline for irrigated agriculture indicates very significant variability dependent on water availability. In effect, irrigation has been established (and runs relatively efficiently) on a model that is built around a few very good years in each climate cycle making farming viable. In effect, analysing averages is pointless and provides little insight to policy development or implementation.

4.1.5 Impact of reduced water availability

The potential impacts of water availability are significantly dictated by the mechanisms used to recover water and the locations where that water is more likely to be purchased. Our analysis has found that a buyback program is likely to result in buybacks and hence impacts being highly concentrated in the Lower Balonne (St

129 Please refer to section 2.7 for more information and explanation
130 Please refer to section 2.8 for more information and explanation
131 Please refer to section 2.9 for more information and explanation. In addition, the potential social and economic impacts of different policy settings including buyback policy, modernization policy, etc. is discussed in Volume 4 of this study – accordingly it is not repeated here, but the interested reader is referred to that volume for detailed discussion of conclusions that are summarized in this regional report.
George and Dirranbandi social catchments). To a lesser extent, there may also be cost effective voluntary buybacks in areas such as around Thallon.

4.1.6 Community resilience and adaptive capacity

Thallon has relatively low levels of resilience and the impacts will be highly dependent on whether the Commonwealth place significant focus of buybacks in the region. To date, there has been negligible focus in the area.

4.2 Background

4.2.1 Introduction to region and social catchments

This region includes the social catchment of Thallon, parts of Mungindi, Dirranbandi and St George (Figure 4-1).

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132 Please refer to section 2.10 for more information and explanation.
Figure 4-1. Map of the Moonie social catchments, showing categories of towns.

Source: EBC consortium
Limited socio-economic and demographic data is available for the social catchments of Dirranbandi (Condamine Balonne), St George (Condamine Balonne) and Thallon (Moonie), as they are all part of the same statistical local area (Balonne). Thus, they are reported here as Balonne. However, relevant local data is reported where available and the differences in the vulnerability and response of these three social catchments are reported, elsewhere in the report, when significant.

4.3 Irrigation in the region

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 4-2.

![Surface water diversions](image)

**Figure 4-2. Current diversion limits. The Moonie is the fourth smallest irrigation region diverter in the Basin.**

4.3.1 Moonie Catchment

A brief overview of the Moonie system is outlined below. Key points to note include:

- All WMAs in the Moonie are unsupplemented systems, also operating under similar management arrangements to unsupplemented water in the Condamine Balonne.

- Surface water use is almost entirely influenced by the seasonal rainfall patterns that dictate runoff and stream flow. Hence, actual water availability and use is highly variable of the climate cycle.

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• Irrigated agriculture in the catchment is primarily centred around Thallon, and closer to St George in the western extremities of the catchment.

Table 4-2. Key summary of WMAs in the Moonie catchment (excluding overland flow and groundwater).

<table>
<thead>
<tr>
<th>Irrigation region (associated social catchment)</th>
<th>Entitlements (nominal volumes) (’000 ML)</th>
<th>Average water holding (ML)</th>
<th>Key features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moonie WMAs</td>
<td>28.7</td>
<td>896</td>
<td>Water sharing rules for water allocations to take unsupplemented water located in the WMA (14 management zones). Multiple rules relating to water announcements including flow conditions, announcement periods, volumetric limits. Dominant irrigation crop is cotton. Pastures for hay is also grown and some cereal crops.</td>
</tr>
</tbody>
</table>

4.4 Key agricultural industries

Land use and industry in the Moonie is mainly primary production. Based on estimated land use:

• The bulk of agriculture is dry land (around 85% of land use). This is predominantly dry land pasture and some areas of dry land cropping (around 190,000 ha).

• While irrigation varies significantly, the area under irrigation is a relatively minor land use.

• Irrigated cotton is typically around 3,000 to 3,500 ha in after high-flow conditions and is negligible following low-flow conditions.

• Irrigated pasture for hay is also a common crop, often exceeding 2,500 ha in wetter years.

• There is a occasional and negligible areas of irrigated cereal crops.

It is the dry land crops that dominate the economy in the catchment. However, irrigation is also relatively important in the localised context around Thallon.

4.4.1 Cotton

As a general rule, the area of cotton produced is roughly in proportion to the volume of water available. Much of the production of cotton in the Moonie has economic links with the Lower Balonne and social catchments in the Border Rivers. After a prolonged period of drought, solid rainfall during the past two summers has significantly increased the area of cotton under production in the region.

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Interviews indicated that the current levels of production are the highest in approximately a decade. Interviews indicated that average water use is around 6-7ML/ha when water is available. Employment on farms also varies in line with water available and plantings. A broad rule of thumb is that for every additional 400 ha under a cotton crop an additional job is created.

Because of the highly variable availability of water in the Queensland cotton production regions, the business structure (including debt) of many cotton farms is essentially structured around a heavy reliance on a few good years in each decade to make the business viable in the long-term.

The short-term outlook for the cotton sector is very positive, largely because of the significant volumes of water already in farm storages (many farms currently have two years supply) and available throughout supplemented irrigation systems, and because of the relatively high cotton price. However, the area under plantation will continue to vary widely depending on water availability.

4.4.2 Other cropping and irrigation

There is some other irrigated and dryland cropping in the region, often dominated by pastures when water is available. However, although the areas (often only around few hundred hectares), crops and degree of irrigation water applied is highly variable and dependent on water actually available and water announcements by DERMin dictating access to irrigation water.

4.4.3 Pastoral industries

These industries dominate primary industries. Grazing is the dominant land use in the region. The drought has severely reduced the herd sizes in the region, however with the finish of the drought it would be expected that herds would rebuild.

4.5 Key other industries

Thallon itself has a limited economic base beyond direct agricultural production, grain storages and associated transport and logistics activities. The township also has a small service sector.

The social catchment of Thallon is largely serviced by surrounding social catchments (e.g. St George).

4.6 Water Management, Government Purchases and Drought

4.6.1 Water management

Water management in Warrego is managed via the Moonie Water Resource Plan (the WRP), and the Resource Operations Plan (ROP). The underlying fundamental basis for water management under the ROP is to ensure sufficient environmental flows in each of the management zones across the catchment. For this reason, the
management is largely based around ‘rules-based’ announced allocations that attempt to match available water with environmental needs.

The rules that underpin management of the ROP are based on analysis and modelling at a localised scale and have been developed through a long period of consultation with the community. While the process in developing the ROP has proved to be technically complex and stressful for the community, the outcomes are largely accepted by all parties.

Similarly, consultation has questioned the likelihood of material environmental benefits to key environmental assets that would be derived through purchases in the Warrego catchment.

4.6.2 Water procurement

Water procurement has not yet commenced in the Moonie, either through tenders, or through WUE programs such as Healthy Headwaters. This partially a reflection of the fact that the Lower Balonne has been the focus for buybacks in the broader region.

4.6.3 Impact of the drought

Cotton growers generally believe the past two good summer rainfalls have saved them, as they now have enough water in storage of next year’s crop and the price outlook for cotton is positive. Thus, they believe this year and the next year look promising for their industry and businesses. However, debt levels are high as they borrowed significant sums to develop their businesses 10 years ago and have not had the chance to pay the debt back yet. Thus, there initial focus will be on debt reduction.

The township of Thallon suffered during the drought as production and economic activity declined. While the drought had impacts within the township, much of the impacts occurred in surrounding towns where the bulk of the supplies and services were purchased by irrigators from around Thallon.

4.7 Baseline – the future without policy change

The “baseline” is a description of the expected future for the region into the future, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic, not static; that is, there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

4.7.1 Population

Population forecasts are not available for areas as small as Thallon. The actual and projected population for the Balonne Shire is presented in the table below.
Table 4.3. Projected population by local government area in 2031, compared to 2006.137

<table>
<thead>
<tr>
<th>Local Government Area</th>
<th>2006</th>
<th>2031</th>
<th>Average annual growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balonne Shire</td>
<td>4,927</td>
<td>5,051</td>
<td>0.1%</td>
</tr>
<tr>
<td>QLD MDBA Region</td>
<td>221,994</td>
<td>316,030</td>
<td>1.4%</td>
</tr>
<tr>
<td>% of Queensland</td>
<td>5.4%</td>
<td>5.0%</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

The data for Balonne Shire indicates that population growth is likely to be negligible. However, based on anecdotal evidence and consultation, within the Balonne Shire, population is likely to continue to concentrate in St George. Therefore, it would not be unreasonable to expect further population decline in Thallon.

4.7.2 Climate change

The climate of the Queensland part of the Basin is highly variable with subsequent highly variable and unpredictable river flows. Those consulted described it as a "feast or famine" environment.

The CSIRO sustainable yield forecast for 2020 suggests a decline in surface water availability is more likely in the south of the Basin, than the north. It also states that significant increases are also possible in the north. Thus, highly variable and unpredictable flows are forecast to continue. However, the relative impact of climate change on surface water use would be much greater in dry years138.

4.7.3 Water policy

Water allocations and availability in the region has already experienced significant changes, as a result of the introduction of the state-based Resource Operations Plans. Those consulted believe that while there are technical opportunities for further WUE measures, very few may be commercially viable and further private investment in WUE is highly unlikely without public co-contributions.

4.8 Impacts of Reduced Water Availability

4.8.1 Introduction

This section outlines some of the potential impacts of constrained water availability attributable to the implementation of the SDLs, including through key policy initiatives such as Restoring the Balance. Information presented in the section has been sourced from multiple sources including formal and informal data sources, and through the outcomes of consultation with stakeholders throughout the catchments.

137 Queensland Department of Infrastructure and Planning (2008), "Queensland’s future population", Appendix C
4.8.2 Current Diversions, and Guide proposals

The Current Diversion Limit and the 4000 GL and 3000 GL scenarios outlined in the Guide are shown below (Table 5-3). It is assumed there will be a mix of different reliabilities of water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.

Proposals from the Guide indicate that between 11,000ML and 13,000 ML would be required to meet the SDL targets under the 4000 GL and 3000 GL scenarios respectively.

Table 4-4. Current diversion limit and ‘Guide’ proposals. 139

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL (average)</th>
<th>Guide reduction in entitlements before modernisation &amp; before buy back 140</th>
<th>Modernisation ’bridging the gap’ on and off farm, to 2010142</th>
<th>Buy-back to date143</th>
<th>Remaining change in remaining entitlements after modernisation and after existing purchases144</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moonie</td>
<td>4000</td>
<td>14</td>
<td>45%</td>
<td>all</td>
<td>GL 45%</td>
<td>GL 13</td>
<td>GL 45%</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>32</td>
<td>37%</td>
<td>all</td>
<td>GL 37%</td>
<td>GL 11</td>
<td>GL 37%</td>
</tr>
</tbody>
</table>

4.8.3 Determining where the impacts will occur

In implementing the MDB Plan, given current policy knowledge, it needs to be assumed that it is the Government’s intention to continue to recover water for the environment through voluntary market mechanisms such as the Restoring the Balance tenders and the Healthy Headwaters Water Use Efficiency Program. Both of these programs have been designed around the principal of value (cost effectiveness) for money for the Commonwealth where:

- **Environmental benefits.** The environmental benefits of any ML of water purchased are measured in physical terms based on the contribution of that ML to enhancing the condition and resilience of key environmental assets. The environmental benefits of each ML of water purchased are not uniform

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139 Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.


141 Yield-unweighted entitlements, pro-rata based on use

142 Yield-unweighted entitlements. Source: MJA 2010


144 Yield-unweighted entitlements. Note this ‘gap’ may also be partially met through on and off-farm irrigation modernisation. not always the same across entitlement type, even if pro rata as other Government purchases have reduced 2010 entitlement.
across the catchments and purchase mechanisms are specifically designed to target water that provide cost effective environmental benefits.\footnote{Davies, PE, Harris, JH, Hillman, TJ & Walker, KF 2008, A report on the ecological health of rivers in the Murray–Darling Basin 2004–2007}{146}

- **Costs of purchase.** The costs are based on the payment made to the irrigator. Because both purchase mechanisms use competitive market pressures to reduce costs to the Government (as purchaser), and irrigators will not sell their water for less than its market value (a function of agronomic opportunities and commodity markets), it is only logical to assume that successful sellers (irrigators) are likely to be those with lower economic margins from a ML of water.

- **Water purchased.** Water purchased will be the water with the highest ratio of benefits (measured in physical terms) to costs (measured in financial terms).

Discussions with DERM and previous analysis of WUE opportunities indicates that there are some opportunities and potential for WUE across much of the broader catchment, although there are significant financial, technical, attitudinal and institutional constraints to investment in WUE.\footnote{Baillie, C., Baillie, J., Davis, R., Scobie, M., Wigginton, D., Schmidt, E., Muller, B. and Watts, P. (2010). An Appraisal to Identify and Detail Technology for Improving Water Use Efficiency in Irrigation in the Queensland Murray Darling Basin, A report for the Department of Environment and Resource Management, USQ, NCEA Publication 1003720/2, Toowoomba.}{147}

The likely sub-regional focus of buybacks is shown in Figure 4-3, where relative environmental benefits for the key environmental assets are shown on the X-axis and relative costs of water are shown on the Y-axis. Regions/social catchments towards the bottom right side of the graph are more likely to participate in the buyback mechanisms and be impacted by the MDB Plan.
Figure 4-3. Potential regional concentration of buybacks and economic and social impacts. 148

Relative cost $/ML

Relative environmental benefit to key environmental assets

MJA & RMCG analysis
The key points to note are:

- Because there is very limited high-margin irrigation in the region and a limited number of irrigated crops grown (dominated by cotton), that likely costs of water purchases across the region may be relatively similar (i.e. there would be limited variation in bid prices under any tender mechanism).

- The dominant driver of the location of water purchases would then default to regions that provide the greatest environmental benefits to key environmental assets and the absolute volumes of water available.

Our qualitative assessment based on these assumptions indicates that water purchases are more likely to be focused around Flinton and Thallon (i.e., a relatively localised region).

4.9 Water Sales to Government and SDLs

In this analysis and through our consultation we have assumed that the SDLs will be achieved through voluntary buybacks. The consortium was not able to identify any buybacks that have already occurred in the Moonie.

4.10 Water sales – potential direct impacts on irrigation

Because of the likely focus of buybacks in the areas identified above, the impacts outlined in this section will likely occur primarily in that areas and will impact on the Thallon and St George (Lower Balonne) social catchments, and potentially Mungindi (Border Rivers). Consultation in the regional revealed that while the composition of irrigation will be determined by water availability, agronomic factors and market conditions, the general preference is for irrigated cotton when possible. Therefore, we have assessed the impacts of achieving the SDLs under the assumption that water purchases have an impact on regional cotton production.

Figure 3-4 shows estimated impacts on the range of production over the climate cycle (low production to high production).

Key points to note are:

- Similarly to areas such as the Lower Balonne, the impacts of the buybacks are highly dependent on the climate cycle.

- The impacts would be negligible in low-flow conditions as there would be virtually no irrigation anyway.

- The key impacts are the constraint on irrigation production in the high-flow conditions where reductions in regional production could be as high as 20-22,000 bales.
4.11 Other economic and social impacts

There are also a number of other economic impacts that have been identified through the consultation and analysis undertaken in developing this report. These are outlined below.

4.11.1 Other economic impacts

Other economic impacts under either the 3,000GL or 4,000GL SDL targets (not quantified), include:

- **Local flow on impacts.** Flow on impacts through the regional economy (particularly agricultural supplies purchased in Cunnamulla and further afield such as St George).

- **Regional flow on impacts.** Minimal flow-on impacts in the broader regional economy, as the need for larger capital equipment purchases (e.g. tractors) declines.

- **Asset value write-downs.** Lower cash flow and profits from commercial assets across the region as a result of SDL-induced reductions in turnover are likely to result in minor permanent write-downs of asset values (e.g. a negligible impact on cotton mill values).

- **Local government finances.** Balonne Shire has indicated that meeting the SDL targets could impact on their budget through reductions in rates revenue (irrigation land generates more revenue than dry land and losses in absolute number of rateable properties). In addition, they have a concern that any material decline in population will significantly impact the cost effectiveness of delivering current service standards.

4.11.2 Potential employment impacts

The potential employment impacts are also highly reliant on which irrigators sell water under the buyback. Assuming buybacks are concentrated in cotton, under high-flow conditions, losses of seasonal employment are likely to be around 5-10 FTEs. Under low-flow conditions, the impact on employment attributable to the SDLs would be negligible.

4.11.3 Other social impacts

There are also a number of other social impacts that have been identified during the consultation. Identified impacts include:

- **Job losses triggering population movement.** Experience from the drought indicates that families left the region due to a lack of employment opportunities. SDL induced job losses will also result in declines in population.
• **Service viability thresholds.** There was also significant concern in the region that any population losses could result in a further concentration of commercial and social services to larger regional centres such as St George.

• **Mental health and associated social issues.** Consultation also revealed an increase in mental health and associated social issues during the drought. There is significant concern that the implementation of the SDLs may result in a step-wise increase the risk of mental health, crime and other associated problems.

• **Sense of community identity.** Another intangible social issue could be the loss of community identify as the fortunes of the cotton industry decline.

### 4.12 Community Resilience and Adaptive Capacity

The region is highly reliant on agriculture with approximately one third of all jobs directly in agriculture. Opportunities for diversification into irrigation crops that have lower water use are limited, as other regions already have a competitive advantage in those crops.

SEIFA data shows that the proportion of the population that are in the most disadvantaged quintile is almost twice the Queensland state average. Unemployment is relatively low, but anecdotal information indicates that underemployment is quite high. In addition, recorded unemployment has remained relatively low in recent years as outward migration has continued as people seek opportunities elsewhere. The end result is that the proportion of the remaining population is older, less mobile, less skilled, and more welfare dependent.

The Shire Council is concerned about its ability to maintain services should there be a permanent reduction in diversion limits that would lead to the relocation of economic activity and population. Such a small, highly dependent community is close to a tipping point, with little adaptive capacity. Thus, a permanent reduction in diversion limits would seriously threaten the viability of the township.

### 4.13 Minimisation of Impacts

Minimisation of impacts is discussed in Volume 4 of this study. Options to minimise impacts are similar to those in the Condamine and Balonne which is covered in detail in that chapter of this report, so we will not repeat them in detail here. These largely relate to:

• Because of the significant across the regions covered in this report, top-down approaches to water management that do not recognise the intra-regional variation are more likely to result in sub-optimal outcomes and potentially perverse policy outcomes such as higher than necessary economic and social impacts.
- Careful consideration of the mechanism used to secure water for the environment (i.e. tenders or WUE programs), noting that cost effective WUE opportunities are likely to be very limited.

- Opportunities to optimise buyback that focuses heavily on the licensed diversion conditions as well as entitlement volumes and price. In addition, temporary trades warrant further consideration.

- Greater focus and use of the significant localised knowledge to determine effective and efficient means to meet the requirements of the SDLs.
5 Border Rivers

5.1 Overview

This section summarises the subsequent sections of this report. For explanation of conclusions summarised in this summary Overview, please refer to the appropriate subsequent section of this report. Please note that this report is not a regional profile, but rather, is a report on the base case and potential impacts of proposed reductions in irrigation water availability. It draws on previously-published regional profiles to which the interested reader is referred.149

5.1.1 Social catchments150

- The main regional centres of Goondiwindi and Stanthorpe have populations of around 5000. Inglewood, Mungindi, Texas, Boggabilla are small towns with between 650 and 1000 residents, servicing both irrigated and dryland farms. Several towns are high risk. Goondiwindi is a category 3 centre (medium with a high dependence on irrigated agriculture). Stanthorpe is category 2 (medium sized, diverse and combining high-value irrigation with tourism and other sectors), and the other towns are category 1 centres, small and all highly dependent on both irrigated and dryland agriculture.

- Some key attributes of three social catchments within the Border Rivers region are outlined in Table 5-1.

Table 5-1. Social catchments in the Border Rivers region.

<table>
<thead>
<tr>
<th>Social catchment</th>
<th>Towns</th>
<th>SC population (estimate)</th>
<th>Risk Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goondiwindi</td>
<td>Goondiwindi</td>
<td>11,000</td>
<td>Medium, high dependence on dryland (cropping and livestock) and irrigated (cotton) agriculture, little diversity beyond a small tourism industry – High risk</td>
</tr>
<tr>
<td></td>
<td>Inglewood</td>
<td></td>
<td>Small, high dependence on both dryland and irrigated agriculture, also the main centre for forest industries – High risk</td>
</tr>
<tr>
<td></td>
<td>Texas</td>
<td></td>
<td>Small, high dependence on both dryland and irrigated agriculture – High risk</td>
</tr>
<tr>
<td></td>
<td>Boggabilla</td>
<td></td>
<td>Small, isolated, high dependence on both dryland and irrigated agriculture, Indigenous people account for 60% of the population – High risk</td>
</tr>
<tr>
<td>Mungindi</td>
<td>Mungindi</td>
<td>1,500</td>
<td>Small, isolated, high dependence on irrigated agriculture – High risk</td>
</tr>
<tr>
<td>Stanthorpe</td>
<td>Stanthorpe</td>
<td>11,000</td>
<td>Medium, moderately diverse and combining high-value irrigation with tourism and other lifestyle or niche sectors – Medium risk</td>
</tr>
<tr>
<td></td>
<td>Ballandean</td>
<td></td>
<td>Small, moderately diverse and combining high-value irrigation with tourism and other lifestyle or niche sectors – Medium risk</td>
</tr>
</tbody>
</table>


150 Please refer to section 5.2.1 for more information and explanation
Primary irrigated production

Irrigation water is used mostly to grow cotton in the western part of the region (from Goondiwindi to Mungindi), lucerne in the middle reaches and to the east around Texas and Inglewood, and fruit and vegetables in the upper catchment areas of the Stanthorpe granite belt.

The vast majority of irrigated production in the Border Rivers is cotton and it is estimated there can be around 100 growers irrigating up to 100,000 ha in a peak production year. Cotton production is highly variable with an average of 400,000 bales grown per annum for the previous decade.

A moderate value chain industry exists with up to five cotton gins operating in the region (depending on seasonal conditions and water availability). Both the number of cotton growers, and the amount sown and harvested, vary each year in accordance with comparative prices and water availability.

The main irrigated crops other than cotton include cereals and fodder crops such as lucerne, grown mostly in the middle reaches. For example, in 2005-06 around Inglewood-Texas there were over 70 agricultural businesses irrigating up to 5,000 ha of mostly lucerne for pasture and hay production and some cereal crops for hay and grain. Horticultural crops grown in the region include olives and stone fruit in the middle reaches (approx.700 ha) and, fruit (mostly apples) and vegetables in the Stanthorpe social catchment area (3,500 ha) in the upper reaches at the top of the valley.

A summary of the main irrigated enterprises in the Border Rivers region is provided in Table 5-2 for 2005-06.

Table 5-2. Irrigated agriculture in the Border Rivers region.

<table>
<thead>
<tr>
<th>Industry</th>
<th>GVAP ($m)</th>
<th>Growers and processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton (Goondiwindi &amp; Mungindi SCs)</td>
<td>unknown</td>
<td>Up to 100,000 ha grown by around 100 businesses, producing up to 700,000 bales: average for previous decade was 400,000 bales</td>
</tr>
<tr>
<td>Irrigated pasture and cereals (Goondiwindi SC – Inglewood/Texas area)</td>
<td>unknown</td>
<td>Approx. 5,000 ha irrigated by more than 70 businesses: comprising lucerne for pasture and hay, and cereals for grain and hay</td>
</tr>
<tr>
<td>Horticulture (Stanthorpe SC only)</td>
<td>$100m 154</td>
<td>Approx. 3,500 ha irrigated by 250 businesses: comprising apples (40%), vegetables (30%), stone fruits (20%) and grapes (&lt; 10%)</td>
</tr>
</tbody>
</table>

151 Please refer to section 5.2.2 for more information and explanation
152 Roth, G 2010, Economic, environmental and social sustainability indicators of the Australian cotton industry, Roth Rural and Regional Pty. Ltd.
153 ABS, Water Use on Australian Farms, 2005-06
154 Horticulture figures based on ABS Small area data 2005-06
155 Sourced from discussions held with Stanthorpe Community Reference Panel, March 2011
5.1.3 Baseline\textsuperscript{156}

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged. The baseline is dynamic and there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

The drought had a significant impact on cotton growing where dramatically reduced water availability meant cotton production was as low as 56,000 bales in 2007-08, down from a peak of 730,000 bales in 2000-01. While the population within the Goondiwindi social catchment has remained relatively stable despite the drought there has been considerable ageing of some of the smaller towns such as Texas and Inglewood. All centres experienced a decline in persons aged between 35 and 44, suggesting some out-migration of working families due to drought.

A summary of the social and economic status of the region in a baseline (or without plan) situation includes:

- Prospects for cotton are good and cotton continues as the dominant irrigated crop i.e. a return to 700,000 bales in high production years
- A strong future is also expected for family based dryland farms with cereal and livestock prices also good as well as continued good prosperity for fruit and vegetable production in the upper reaches
- Five gins are operational; continued productivity and water use efficiency gains in cotton could help fill additional capacity over time
- Technological changes means a continuing shrinking in numbers of unskilled jobs on cotton farms
- Some growth in horticulture could be expected in the middle and upper reaches, but it is constrained by lack of water availability in Stanthorpe. Horticulture would continue to account for only a small part of total water use
- Continuing skilled labour shortage in smaller towns and on farms due to competition for labour from the mining sector and a long standing competitive disadvantage in the skilled labour market
- The town of Goondiwindi would be expected to continue to grow at a modest rate (0.7% per year) and its status as relatively highly employed should be maintained
- A proportion of the skilled workforce who left during the drought and during low cotton production years should return to the region

\textsuperscript{156} Please refer to section 5.3 for more information and explanation
• Health and education services in smaller towns like Mungindi remain under pressure because of the difficulty in attracting new and replacement staff

• Smaller towns continue to contract or struggle to maintain current levels of activity due to a myriad of economic and cultural/lifestyle pressures: Mungindi, Inglewood

• The trend toward an increasing proportion of Aboriginal people in Mungindi would continue.

5.1.4 Impact of reduced water availability\textsuperscript{157}

For the Border Rivers region, the 3000 GL and 4000 GL scenarios outlined in the Guide, assuming that all of the reduction in diversions comes from watercourse diversions, translate to the Commonwealth Government procuring something in the order of approximately 20% (80 GL in long term cap equivalent terms) to 25% (100 GL) of the total water entitlements (399 GL) respectively held by Border Rivers irrigators in 2007.\textsuperscript{158} There has been approximately 2 GL in long-term cap equivalent terms purchased by the Commonwealth Government to date (6 GL of Queensland supplemented water entitlements).

The main impacts on the region of reduced water availability include:

• A reduction in water entitlements would lead to a proportionate reduction in cotton production i.e. from a long term average of 400,000 bales to between 300,000 and 320,000

• Some growth in horticulture in the middle reaches could be expected, but horticulture would continue to account for only a small part of total water use

• In the unlikely event that substantial water was sold out of the upper reaches around Stanthorpe, there would be large impacts on employment and economic activity due to the high labour intensity of horticulture. Both permanent and seasonal workers live in the town and surrounds

• A reduction in irrigated cotton would be partially offset by an increase in dryland production. The transferability of formerly irrigated soils into profitable dryland cropping and grazing enterprises is variable across the region, depending on soil type and rainfall

• There is very limited capacity for cotton farms to transform profitably into large scale vegetable production, for example

\textsuperscript{157} Please refer to section 5.4 for more information and explanation

\textsuperscript{158} The actual percentage varies considerably from one part of this complicated inter-jurisdictional system to another (see Table 5-3). Since most of the water use is around Mungindi, on either side of the border, the headline figures quoted here, and used throughout the report, relate to those main parts of the system.
A slow transition to pressurised irrigation over the long term through normal redevelopment and upgrade could have a small positive impact however modernisation initiatives are not expected to lead to substantial water savings (up to 10 GL)

New technologies to reduce evaporative losses from large on-farm storages would be more fully investigated and adopted if successful

Third party impacts resulting from changes to irrigation infrastructure would be relatively small since that infrastructure is mostly privately owned and managed

All towns in the Border Rivers are highly to moderately dependent on irrigated agriculture (Table 5-1):

- Agriculture accounts for almost 30% of the employed workforce in the Goondiwindi Regional Council area. In relation to Gross Regional Product, agriculture accounts for 17% in Goondiwindi, 37% in Inglewood and 36% in Stanthorpe. Towns with limited diversity in their local economy would experience substantial flow-on effects

- Local cotton processing, for example, would decline in proportion to reduced farm production leading to direct employment impacts

- Flow on impacts would have an effect on the transport, services (engineering, contracting, professional advice etc.) and retail sectors leading to a reduced quality and range of services

- The quality of public health and education services would decline as the region’s population declines which intensifies out-migration of families with school-age children

- Fewer non-Aboriginal people in Mungindi would reinforce other demographic trends

- Further reductions in unskilled jobs and slowing economic activity more generally could worsen Aboriginal social disadvantage.

5.1.5 Community resilience and adaptive capacity

All towns in the Border Rivers are vulnerable to changes in water availability. There is no town larger than 10,000 people and all towns are above the 15% threshold for total employment in agricultural related sectors. All communities within the region recognise the need to diversify business activity to reduce their reliance on irrigated agriculture, but there are few obvious opportunities for this to happen. And what

Please refer to section 5 for more information and explanation
opportunities there may be have longer time horizons than those outlined for buy-back in the *Guide*.

In the long run, a reduction in diversions will broadly translate into a proportionate reduction in cotton plantings reducing employment and reducing expenditure on inputs, much of which is sourced locally from Goondiwindi. Moreover those who have sold/intend to sell water to the Commonwealth are thought likely to retire outside the region taking the proceeds of the sales with them.

Many business owners feel threatened by the *Guide*. One of the smaller and more remote towns, Mungindi, has broadly managed to maintain its basic services over the past two decades. The determination and resolve of the very civic-minded towns people and surrounding farmers has sustained the lifeblood of the community despite the drought and a myriad of other pressures.

- In Stanthorpe at the top of the valley there is a new tertiary trained generation looking to take over intergenerational family farms and many are looking to expand their horticultural enterprises. There is a high level of confidence that Stanthorpe growers will not sell entitlement. The greatest challenge for the Stanthorpe granite belt is securing water supply and the community strongly believes that a reduction in SDL as proposed by the Plan poses a serious threat to food production and delivery for Queensland. Growers want additional in-stream storage for their region to increase water security for the next drought. Stanthorpe irrigators seem confident that they can achieve improved water security to fully develop their high value horticultural enterprises.

### 5.1.6 Minimising impacts

- Growers and other business and community people have numerous ideas for environmental works and measures that would improve the environment in the Border Rivers region without further buy-back of water. Their previous involvement with the development of water sharing plans, and with other community-based natural resource management activities, mean that local irrigators have a good knowledge of water and environmental processes in their valley. They believe the existing plans should be given an opportunity to prove their worth.

- Local people recognise that the development of non-agricultural industries in the region would help to buffer the town's economy against the ups and downs of agriculture however they are adamant that there needs to be an accompanying plan to assist with this type of adjustment.

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160 Please refer to section 5.6 for more information and explanation
5.2 Background

5.2.1 Introduction to region and social catchments

The Border Rivers region, as the name suggests, straddles the border between Queensland and New South Wales. Stanthorpe, situated at the top of the catchment and at high altitude, enjoys close proximity to urban markets and an optimal growing temperature for producing a wide range of horticultural crops during summertime. Goondiwindi, on the Macintyre River in the centre of the region, is one of the larger service centres and is situated on the junction of the Cunningham and Barwon Highways. Mungindi is a border town situated at the bottom of the system on the Barwon River.

Please note that, from a socio-economic perspective, it is inappropriate to consider separately the communities of the NSW and Queensland parts of the Border Rivers. Social catchments straddle the border, as does the town of Mungindi; services and businesses service both people within their own state and those who live just across the border. Accordingly, this social catchment report considers the region a whole, and is presented in both the Queensland and New South Wales volumes of this study.

The total volume of water entitlements shared between NSW and Queensland is 399 GL, in long term cap equivalent terms. The Macintyre-Mungindi region produced an average of 400,000 cotton bales between 2000 and 2008.\(^{161}\) It is the third largest cotton-growing region in Australia.

The Guide to the proposed Basin Plan proposed cuts to diversion limits in the order of 20–25%. A 20% cut would mean an average annual reduction of around 80,000 bales per year; a 25% cut would mean 100,000 bales less. The previously irrigated land would be converted to some form of dryland cropping or grazing. But individually, most farms are too small to be viable dryland enterprises, and most farmers want to generate a return from their existing investments in on-farm water infrastructure.

Three social catchments based around the towns of Goondiwindi, Mungindi and Stanthorpe, are described for the irrigated area of the region (Figure 5-1).

\(^{161}\) Roth, G., 2010, Economic, Environmental and Social Sustainability Indicators of the Australian Cotton Industry, a report for the Cotton Australia, the Cotton Research and Development Corporation and the University of New England.
Figure 5-1. Map of the Border Rivers social catchments, showing categories of towns.\textsuperscript{162}

\textsuperscript{162} Source: EBC consortium
Goondiwindi Social Catchment

- Geographically located in the centre of the region, Goondiwindi is a desirable place to live. Local business people join with the Goondiwindi Regional Council in taking pride in the streetscape and the amenity of the town. Consequently, Goondiwindi has traditionally been able to attract and retain skilled labour. People who moved to the region during the development phase of the irrigation industry have for the most part put down roots; they have become an enduring part of the local community.

- Inglewood, Texas and Boggabilla are smaller towns, which like Goondiwindi are highly dependent on irrigated and dryland agriculture. Texas and Inglewood are former tobacco-growing regions that now produce lucerne, grains, pulses and some olives. Boggabilla, like Goondiwindi, is more associated with cotton.

- Businesses in Inglewood, 100 km east of Goondiwindi were confronting significant issues before the Guide was released. The local economy depends on natural resource and agricultural (irrigated and dryland) industries. The viability of a native hardwood sawmill, which provides approximately 60 full-time jobs, is being tested by changes to State Government arrangements for access to timber. Inglewood has an ageing population and is struggling to maintain a reasonable demographic balance.

- The social catchment developed around dryland agriculture and more recently, since the mid 1970s, around irrigation. Cotton remains the dominant irrigated crop using up to 80% of irrigation water in the valley. It is grown in the mid to lower reaches in rotation with a small amount of cereal crops (wheat, sorghum, maize).

- The impacts of drought and low water allocation have demonstrated that the viability of town businesses and community vibrancy is directly related to irrigation water availability and associated industry prosperity.

Mungindi social catchment

- Geographically located in the western part of the region, Mungindi is a relatively isolated social catchment. It is serviced by the Gwydir’s regional centre Moree to the southeast, but it also has economic links with Goondiwindi.

- Mungindi has broadly managed to maintain its basic services over the past two decades. Fortunately, the development phase of the cotton industry overlapped with the decline of the wool industry (following the collapse of the reserve price scheme).

- Irrigation water is used mostly on cotton in rotation with summer-grown cereals (e.g. wheat, sorghum) and some lucerne growing for fodder production.

- The Mungindi township was badly affected by the drought, which was superimposed on top of the reduced labour requirements springing from the introduction of genetically modified cotton varieties. As a result many skilled and unskilled workers
left town with their families. School enrolments dropped from more than 200 to less than 100 at the local K–12 public school.

- Prior to the release of the Guide, the town looked to be on a stable path to some form of recovery. The redevelopment of one the town's two pubs and the recent establishment of three small businesses in the main street had delivered an air of optimism. The townsfolk were increasingly confident of their ability to retain their one GP and pharmacy.

**Stanthorpe social catchment**

- Positioned at the top of the Basin, Stanthorpe sits at high altitude making it a prime site for growing temperate crops (vegetables, stone fruits, apples and grapes) in a sub-tropical environment. Intergenerational family farms are the norm.

- The horticultural mainstays are apples (40%), vegetables (30%), stone fruits (20%) and grapes (< 10%). The wine industry provides a strong basis for tourism. Other tourism-focussed cottage industries include berries and cheese making. The amenity of the town and its surrounds coupled with its reasonable proximity to Brisbane and the coast mean that it is a popular destination for short stays.

- The horticultural industries are labour intensive. The highest demand for seasonal labour is felt between November and April. Labour (wages and salaries) typically represents 50% of operating expenses in horticultural businesses.

- Its high gross value of agricultural production is generated from a small percentage of the Border Rivers’ water i.e. 20 GL out of a total of almost 400 GL. Production levels and quality are both primarily limited by availability of water.

- Local dryland agriculture is also a substantial industry based around livestock grazing (cattle and sheep). The local abattoirs are also significant employers.

### 5.2.2 Irrigation and key industries

The Border Rivers Catchment covers 49,500 square kilometres, with around half each in NSW and Queensland. The main streams are Dumaresq River, Severn River (Queensland), Tenterfield Creek, Mole River, Bearyd River, Macintyre Brook, Severn River (NSW), Macintyre River Weir River and Barwon River (an extension of the Macintyre which becomes the Darling above Bourke). The catchment has three distinct zones with widely varying topography: tablelands; slopes; and plains. The catchment has summer dominant, highly variable rainfall, resulting in highly variable river flows between seasons.

The current surface water diversion limit for the irrigation valleys of the Basin is shown in Figure 5-2.
Figure 5-2. Current diversion limits. The Border Rivers in Queensland and NSW are the eleventh and twelfth largest diverters in the Basin.  

- At the top of the valley, Stanthorpe’s horticultural industry uses only 5% of water entitlement to produce around $100m of high value fruit and vegetables. The storage capacity of the main public storage is very small which leads to a strongly held view that water availability and reliability are the main factors holding back regional development. The irrigation system is comprised of privately funded infrastructure using water efficient delivery and monitoring systems; all piped. Metering has recently been introduced by State agencies. Growers want additional in-stream storage for their region to increase water security for the next drought. Growers are seeking higher security in droughts and would trade entitlement for improved security.

- As with the other valleys in the northern Basin, irrigators in the lower reaches of the river, where large on-farm storages are viable, rely on a mix of three sources of water to meet their needs. On allocation entitlements (General Security in NSW and Supplemented water allocations in Qld) allow them to order water for delivery from the headwaters dams. Off allocation entitlements (Supplementary access licences in NSW and Unsupplemented water allocations in Qld) provide access to flow events according to the rules in the respective state water plans. These have been coordinated through interstate agreement. Water pumped from the rivers is stored in large on-farm dams. These same dams are used to harvest water from the third

source, overland flows, commonly referred to as floodplain harvesting. Typically this water comes from out-of-bank flows from the rivers during floods rather than water from local rainfall moving across country to the rivers. There is a cap on floodplain harvesting in both states, with infrastructure controls in Qld and a licensing process in NSW.

- Coolmunda Dam on Macintyre Brook was completed in 1968, and Pindari Dam, on the NSW Severn River, in 1969. Initially they serviced the now-defunct tobacco industry around Inglewood and Texas. Glenlyon Dam, on Pike Creek, a tributary of the Dumaresq River, was completed in 1976. Pindari Dam was increased from 37,000 ML to 312,000 ML in 1995 in a joint venture between irrigators and the NSW Government.

- According to the local irrigators’ group, Border Rivers Food and Fibre, once the NSW and Queensland Governments decided not to build any new dams, they strongly encouraged irrigators to develop their own storage capacity on farm with assurances that access to ‘high flows’ was guaranteed. There is a strong sense of grievance in the Border Rivers that this access has been reduced over time, and there is a further sense that the SDLs will be yet another episode in this trend. Confidence has taken a severe battering over the last two decades, and the security of a stable water allocation and access regime, if it is ever achieved, is seen to be a long way off. Publicly owned water storages now account for only half of the total storage capacity on the Border Rivers system, while numerous on-farm ‘ring tanks’ account for the rest.

- The entitlements to harvest water into these on-farm storages have now been converted to tradable water allocations with clearly specified conditions, including:
  - the flow conditions that determine when water may be taken;
  - the rate at which water may be taken;
  - the nominal volume defining each individual’s share of available water; and
  - the volumetric limit that may be taken over a given period.

- These entitlements have been issued in perpetuity as unsupplemented water allocations in Qld, but the conceptually similar supplementary access licences in NSW are subject to change without compensation when the Border Rivers Water Sharing Plan expires in 2014. As such, the value of the NSW assets is less certain. This is a major source of grievance amongst irrigators. There is disbelief that what they view as two apparently equivalent licences on the same river system are so different to each other in legal terms.

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164 The State of Queensland (Department of Natural Resources and Water), 2008, Border Rivers Resource Operations Plan
Irrigated agriculture

- Today, small-scale crops such as grapes, stone fruit, vegetables and apples are grown in the tablelands near Stanthorpe and Tenterfield and mixed cash crops, lucerne and olives are grown on the slopes in the Inglewood and Texas areas, while cotton dominates the plains between Boggabilla and Mungindi. Broad acre irrigated production, principally cotton accounts for more than 80% of the irrigated area even though the first cotton crop was planted on the Macintyre River as recently as 1977. The cotton industry expanded rapidly in the 1980s and early 1990s, but development slowed in the late 1990s as the NSW and Queensland Governments reached a consensus prohibiting further development in this shared system.

The dominant irrigated farming system in the Border Rivers is cotton grown in rotation with various other summer crops such as sorghum, sunflowers, and mungbeans using general security water. The largest operators in the Border Rivers typically have integrated irrigation and dryland enterprises. Winter wheat grown in conjunction with summer sorghum and beef cattle are usually part of the enterprise mix.

The Border Rivers is the third largest cotton-growing region in Australia, with less than 100 growers producing an average of around 400,000 bales (between 2000 and 2008). Production peaked in 2004–05 at over 730,000 bales, but dropped to 56,000 bales in 2007–08 in response to extreme low water availability. Cotton is of major significance to the region with yields approximating three times the world average. Australian cotton is deemed a premium quality product on world markets.\(^{166}\)

A moderate value chain industry exists with up to 5 cotton gins operating in the region (depending on seasonal conditions and water availability). Both the number of cotton growers and the amount sown and harvested varies each year in accordance with comparative prices and water availability.

- Perennial horticulture is the mainstay of irrigated agriculture in the upper most reaches in the granite belt of Stanthorpe and surrounds. Fruit and vegetables are packed on-farm and trucked directly to market or for further processing (usually packaging for supermarkets). Some product is trucked to Warwick for juicing.

Dryland agriculture

Dryland cropping and livestock is profitable in this region depending on the season and commodity prices. Largely due to the heavy clay soils, livestock and cropping enterprises are generally undertaken on separate parts of a farm rather than in rotation.

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\(^{166}\) Roth, G 2010, Economic, environmental and social sustainability indicators of the Australian cotton industry, Roth Rural and Regional Pty. Ltd.
Dryland farming systems in the Border Rivers region are usually mixed or increasingly can be cropping only in response to the need to more fully utilise adoption of larger machinery, new GPS based technologies and no-till sowing systems.

Crops are grown in rotation including winter wheat, barley or chickpeas, for example, including a long fallow followed by sorghum as a summer crop, depending on soil moisture.\(^\text{167}\)

**Other industries**

With Goondiwindi’s economy being so dependent on agriculture the major (non-farm) industry within the region is the supply of services to the irrigated and dryland farming sectors. These include various contracting services (fencing, harvesting, spraying aerial services, earth moving, for example), agricultural consulting services, farm input resellers, grain and other produce wholesalers, and agricultural machinery and repairs.

There is also a range of government and non-government services located within Goondiwindi and Stanthorpe, and to a lesser extent within the smaller towns including Texas, Inglewood, Boggabilla and Mungindi. These include public sector services such as health, education, policing and support services and privately owned businesses, which include the retail sector and the agricultural services sector.

### 5.3 Baseline – the future without policy change

The ‘baseline’ is a description of the expected future for the towns and social catchments over the coming decade, if the current diversion limit for irrigation water were left unchanged.

The baseline is dynamic and there would continue to be variability in factors such as rainfall and commodity prices, and underlying trends would continue.

For example, the dominance of agriculture within the region is likely to remain and there will be ongoing effort at the regional level to diversify into other industries. There has been some decline in the prominence of agriculture as an employer in the region over the past decade signalling some level of achievement in the effort to increase diversity.\(^\text{168}\)

#### 5.3.1 Drought

- The impact of the drought was very significant impact on cotton growing where dramatically reduced water allocations meant cotton production was as low as

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\(^\text{167}\) Department of Primary Industries, 2004, Farming systems in the northern cropping region in NSW: an economic analysis, NSW DPI

56,000 bales in 2007-08 down from a peak of 730,000 bales in 2000-01. One cotton gin was moth-balled during the drought.

- Local primary and high schools were impacted as the cotton and lucerne industries and employment in smaller towns contracted, as occurred in Mungindi and Inglewood for example.

- Population within the Goondiwindi social catchment remained relatively stable between 2001 and 2009 despite the drought. The town of Goondiwindi’s population increased by 18% during this period while smaller centres such as Inglewood experienced a gradual decline. There has been some ageing of the population, especially in towns like Inglewood and Texas, increasing their proportion of people aged 70 and above. All centres experienced a decline in people aged between 35 and 44, suggesting some out-migration of working families due to drought.169

- The number of businesses in the Goondiwindi social catchment remained relatively static between 2004 and 2007 i.e. increased by 14% in the former Inglewood local government area and reduced by 7% in Goondiwindi itself. Figures on business numbers for the more recent low production years from 2008 to 2010 are, however, unavailable.

- Local growing systems in the Stanthorpe region are highly resilient and adapted to low water availability; even so the drought significantly reduced horticultural production. This in turn reduced the demand for goods and services in the town.

The population within the Stanthorpe social catchment increased by 16% between 2001 and 2009, however, most of this increase occurred during the first half of the decade. The number of agricultural businesses remained stable over this period (at just over 500 or over 40% of all businesses) indicating some resilience of Stanthorpe irrigators to drought.

5.3.2 Expected trends in irrigation farming

- Without the Basin Plan, prospects for cotton are good and cotton would continue as the dominant irrigated crop. A return to average climatic conditions would see a return to 700,000 bales at peak production levels at even mid range commodity prices. Cotton prices were high at the time of writing.

Some farm consolidation would continue to occur throughout the region, leading to larger farms and an increased reliance on contract labour and services. This aggregation would occur in an orderly manner enabling property and water entitlement prices to remain stable over time. Technological advances will mean fewer farm employees over time.

Overall farm productivity would be expected to continue to increase as productivity gains are achieved from adoption of research and development findings, improved

169 ABS National Regional Profiles Database 2004 - 2008
management and via gains in increased water use efficiency. Cotton growers have been able to achieve steady improvements in water use efficiency. Technically, more efficient water delivery systems are possible for cotton. Given the reliability of water supply, investment into pressurised systems is considered costly compared with the efficiency gains achieved and only a gradual adoption is expected.

- Post drought, family-based dryland farms should return to profitability with cereal and livestock prices similarly good. Some growth in horticulture could be expected in the middle reaches of the river, but it is constrained by lack of water availability in Stanthorpe. Overall, horticulture would continue to account for only a small part of total water use. A strong recovery in the health of horticultural businesses at the top of the valley is now strongly evident. The positive impacts are yet to flow fully through to the town.

5.3.3 Business and community sectors

- The number of businesses servicing the farm sector would remain stable and the diversity of the retail sector would return to pre-drought levels. The cotton gins would return to full capacity over time. Five gins would be in operation and any additional capacity could be filled over time through water efficiency and other productivity gains.

The range of businesses servicing the farm sector in Goondiwindi and smaller towns would remain stable and some businesses could expand to meet an expected demand from many growers for renewed irrigation infrastructure after a prolonged period of little reinvestment. More diversified business and retail sectors would be expected to rebuild following the drought.

Small towns may continue to contract due to a myriad of economic and cultural/lifestyle pressures (e.g. Inglewood, Mungindi) and will struggle to retain limited services as the farming population slowly reduces.

School populations in Mungindi could stabilise after a dramatic reduction during the drought. There will be further contraction and rationalisation of the smaller primary schools over time at a marginal rate, depending on the retention of families in the district.

A proportion of the skilled workforce who left during the drought may return to the region however, health and education services in the smaller towns remain under pressure from a lack of skilled staff. Rural health services will continue to be inadequate in the smaller towns without further government funding initiatives to attract doctors and other health professionals to rural Australia.
5.4 Impacts of Reduced Water Availability

5.4.1 Current Diversions, and Guide proposals

The Current Diversion Limit and the 4000 GL and 3000 GL scenarios outlined in the Guide are shown below (Table 5-3). It is assumed there will be a mix of different reliabilities of water entitlements procured by Government in order to meet environmental requirements across the range of high and low rainfall years.
Table 5-3. Current diversion limit and 'Guide' proposals.\(^{170}\)

<table>
<thead>
<tr>
<th>Region</th>
<th>Scenario</th>
<th>Current Diversion Limit (CDL)</th>
<th>Guide reduction from CDL to SDL(^{173}) (average)</th>
<th>Guide reduction in entitlements before modernisation &amp; before buy back (^{172})</th>
<th>Modernisation 'bridging the gap' on and off farm, to 2010(^{173})</th>
<th>Buy-back to date (^{174})</th>
<th>Remaining Change Guide reduction in remaining entitlements after modernisation and after existing purchases(^{175})</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW Border Rivers</td>
<td>4000</td>
<td>210</td>
<td>GL GL %</td>
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<td>GL GL %</td>
<td>% of remaining entitlements</td>
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<td>High Security/High Reliability</td>
<td>0 27%</td>
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<td>Regulated river (Conveyance) IC</td>
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<td>General Security/Low Reliability</td>
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<td>5 67</td>
<td>27%</td>
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<td>Supplementary</td>
<td>33 27%</td>
<td>33</td>
<td>27%</td>
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<td></td>
<td>3000</td>
<td>210</td>
<td>GL GL %</td>
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<td>% of remaining entitlements</td>
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<td>High Security/High Reliability</td>
<td>0 21%</td>
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<td>General Security/Low Reliability</td>
<td>56 21%</td>
<td>5 51</td>
<td>19%</td>
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<tr>
<td>Qld Border Rivers</td>
<td>4000</td>
<td>223</td>
<td>GL GL %</td>
<td>GL % GL</td>
<td>GL GL %</td>
<td>GL GL %</td>
<td>% of remaining entitlements</td>
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<td></td>
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<td>Border Rivers Supplemented (tradeable entitlements)</td>
<td>21 25%</td>
<td>4 7</td>
<td>12%</td>
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<td>MacIntyre Brook Supplemented (tradeable only)</td>
<td>6 36%</td>
<td>- -</td>
<td>36%</td>
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<td></td>
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<td>Unsupplemented (tradeable only)</td>
<td>37 25%</td>
<td>- -</td>
<td>25%</td>
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<td>3000</td>
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<td>GL GL %</td>
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<td>Border Rivers Supplemented (tradeable entitlements)</td>
<td>16 20%</td>
<td>4 7</td>
<td>6%</td>
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<td>Unsupplemented (tradeable only)</td>
<td>29 19%</td>
<td>- -</td>
<td>19%</td>
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</tbody>
</table>

\(^{170}\) Source: EBC consortium analysis based on the Guide Appendix C and other cited sources, assuming pro-rata change across all entitlement classes, and consultation with MDBA.
5.4.2 Water management arrangements

Surface water arrangements were formalised with the development of the relevant NSW Water Sharing Plan and Queensland Resource Operation Plan. Table 5-4 provides a summary of the total water entitlements.

Table 5-4. Summary of surface water entitlements.

<table>
<thead>
<tr>
<th>Entitlement class</th>
<th>Nominal volume of entitlements (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qld Supplemented</td>
<td>102</td>
</tr>
<tr>
<td>Qld Unsupplemented (upper reaches)</td>
<td>21</td>
</tr>
<tr>
<td>Qld Unsupplemented (lower reaches)</td>
<td>210</td>
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<tr>
<td>NSW High Security</td>
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<td>NSW General Security</td>
<td>265</td>
</tr>
<tr>
<td>NSW Supplementary</td>
<td>120</td>
</tr>
<tr>
<td>Qld Groundwater</td>
<td>7</td>
</tr>
</tbody>
</table>

5.4.3 Water sales to government and farmer response

For the Border Rivers region, the 3000 GL and 4000 GL scenarios outlined in the Guide, assuming that all of the reduction in diversions comes from watercourse diversions, are outlined in Table 5-3. This translates to the Commonwealth Government procuring something in the order of approximately 20% (80 GL in long term cap equivalent terms) to 25% (100 GL) of the total water entitlements (399 GL) respectively held by Border Rivers irrigators in 2007. There has been approximately 2 GL in long-term cap equivalent terms purchased by the Commonwealth Government to date (6 GL of Queensland supplemented water entitlements).

The purchases have primarily involved voluntary selling by individual irrigation businesses. The individual sales have been spread across the region.

In common with other regions farmers in the Border Rivers have expressed considerable doubt that there will be willing sellers in sufficient numbers to enable the government to purchase its environmental water requirements through voluntary buyback; especially given current cotton prices and outlook. If price and seasonal factors deteriorate then it is expected that there would be more willing sellers. Fears that a compulsory acquisition process would replace voluntary buyback and general uncertainty around future water security are reported by growers and other businesses to be affecting investment in the region.

Modernisation

Water use efficiency (WUE) in terms of cotton produced per megalitre of total water use has been improving steadily. Growers have improved their WUE by 3 – 4% per annum or at least 20% over the past decade as a result of irrigation system enhancements177. There has been gradual adoption of pressurised irrigation in

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177 Roth, G 2010, Economic, environmental and social sustainability indicators of the Australian cotton industry, Roth Rural and Regional Pty. Ltd.
some areas but for many irrigators the reliability of the water supply is too low to justify costly capital investment. Pressurised systems also bring with them the risk of increasing energy costs over time.

There is likely to be a slow transition to pressurised irrigation over the long term through normal redevelopment and upgrade which would have a small positive impact.

5.4.4 Changes to agricultural production

If the sustainable diversion limit is achieved through buyback, those irrigators holding onto their entitlement will keep growing cotton; business as usual. Cotton yields, quality and productivity will continue to improve and terms of trade pressures will continue to grow. Trends in commodity price, input prices and exchange rate will remain as key drivers of the search for economies of scale in farming. Changes in water availability in the region will translate to reduced irrigated area and commensurate reduction in demand for irrigation farming inputs.

Following is a summary of the likely impacts on farm production of reduced water availability for the scenarios proposed within the Guide:

- for the 4000 GL scenario, a 25% reduction in sustainable diversion limit would mean a reduction of around 100,000 cotton bales;
- for the 3000 GL scenario, a 20% reduction in SDL would mean a reduction of around 80,000 bales;
- it is likely that one cotton gin would close;
- Stanthorpe growers don’t believe that significant amounts of water would be sold out of their region. If 25% of the water were sold and this translated to 25% less production then, and given that they are the main suppliers of some crops in the Brisbane market, there could be some increase in horticultural prices, but it is difficult to assess impacts;
- a reduction in irrigated cotton will be partially offset by an increase in dryland production due to the relatively good transferability of formerly irrigated soils into dryland cropping and grazing in parts of the region. Dryland farmland generated from water sales to government will be absorbed into the remaining farm businesses;
- there is very limited capacity for cotton farms to transform profitably into large scale vegetable production, for example;
  - a slow transition to pressurised irrigation over the long term through normal redevelopment and upgrade could have a small positive impact however modernisation initiatives are not expected to lead to substantial water savings;
new technologies to reduce evaporative losses from large on-farm storages would be more fully investigated and adopted if successful;

- a 25% reduction in horticultural production would lead to large impacts on employment and economic activity due to the high labour intensity of horticulture. Both permanent and seasonal workers live in the town and surrounds; and

- third party impacts are relatively small since irrigation infrastructure is mostly privately owned and managed.

When asked if it would make a difference were the Commonwealth to concentrate its purchases on general security licences in NSW and supplemented entitlements in Qld (the entitlements held in public storages) or, supplementary licences in NSW and unsupplemented entitlements in Queensland, (the entitlements that allow water harvesting during high flows), local irrigators responded that it would be worse if the Commonwealth were to concentrate on the entitlements backed by public storages. The water in public storages is the insurance water that helps plan ahead for the next season.

Some aspects of this differentiation are counterintuitive for policy-makers better steeped in the workings of the southern Basin than the north. It is unsurprising that water in storages would be valued more highly than the run of the rivers, but what is, at first, surprising is that a megalitre of entitlement backed up by the storages has a long-term-cap-equivalent value of around 0.3 megalitres whereas the run of the river entitlements have enjoy a ratio of 1:1. In essence the cap equivalent figures reflect the initial over allocation of storage entitlements more than they reflect the stochastic reliability of the entitlement. It might be 0.3, but it is a steady 0.3.

### 5.4.5 Impacts on the local economy and community

All towns in the Border Rivers are highly to moderately dependent on irrigated agriculture (Figure 5-1). This limited diversity in the local economy will mean substantial flow-on effects. The impacts of drought and low water allocation have demonstrated that the viability of town businesses and community vibrancy is directly related to irrigation water availability and associated industry prosperity.

The number of businesses servicing the farm sector in Goondiwindi and Stanthorpe would be reduced and more diversified business and retail sectors would be expected to decline. The business community would reduce the range and quality of services currently available to support the farming sector.

- Agriculture accounts for almost 30% of the employed workforce in the Goondiwindi Regional Council area. In relation to contribution to Gross Regional Product, agriculture accounts for 17% in Goondiwindi, 37% in

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Inglewood and 36% in Stanthorpe.\textsuperscript{179} Towns with limited diversity in their local economy will experience substantial flow-on effects.

A summary of expected impacts include:

- the vibrancy of the horticultural and strongly linked tourism industry in the Stanthorpe region would be dampened by any further constraints on availability of water;
- local cotton processing, for example, will decline in proportion to reduced farm production leading to direct employment impacts;
- flow on impacts will have an effect on the transport, services (engineering, contracting, professional advice etc.) and retail sectors leading to a reduced quality and range of services;
- the quality of public health and education services will decline as the region’s population declines which intensifies out-migration of families with school-age children;
- fewer non-Aboriginal people in Mungindi will reinforce other demographic trends, as discussed in the following section 5 on community resilience and adaptive capacity; and
- further reductions in unskilled jobs and slowing economic activity more generally could worsen Aboriginal social disadvantage.

5.5 Community Resilience and Adaptive Capacity

5.5.1 Overall

All towns in the Border Rivers are vulnerable to changes in water availability. There is no town larger than 10,000 people and it is estimated that all towns are above the 15% threshold for total employment in agricultural related sectors. All communities within the region recognise the need to diversify business activity to reduce their reliance on irrigated agriculture, but there are few obvious opportunities for this to happen. And what opportunities there may be have longer time horizons than those outlined for buy-back in the Guide.

5.5.2 Goondiwindi Social Catchment

Irrigators believe that the uncertainty created by the Guide has increased their borrowing costs. In the long run, a reduction in diversions will broadly translate into a proportionate reduction in cotton plantings reducing employment and reducing expenditure on inputs – much of which is sourced locally. Moreover, those who have sold water to the Commonwealth are thought likely to retire outside the region,

\textsuperscript{179} ABS National Regional Profiles Database 2004 - 08
taking the proceeds of the sales with them. In the mean time, the perceived risk of compulsory water acquisition in the future may reduce investment in infrastructure upgrades and renewals.

Changes in water availability in the region will translate to reduced irrigated area and commensurate reduction in demand for inputs, which are mostly purchased locally.

The immediate impact has been a loss of business confidence. Uncertainty about the future is making people reluctant to invest and causing them to doubt the wisdom of their recent investments. The full benefits of the breaking of the drought are therefore not flowing through.

People in the social catchment are worried that the proposed SDLs will tip them from a path of steady growth into the spiral of decline that they perceive happening in neighbouring catchments. This is a particular worry in the smaller towns like Texas and Inglewood, but the residents of Goondiwindi are now also starting to lose confidence in the belief that they wouldn’t have to travel often to Toowoomba and Warwick to take advantage of community services.

5.5.3 Mungindi Social Catchment

The people of Mungindi have been keeping a watchful eye on the fates of neighbouring Collarenebri and Moree. They have stronger economic connections with Moree in the Gwydir than they do with Goondiwindi. They have taken careful note of the population and services decline in Moree, and they have taken particular interest in the relative fortunes of Collarenebri, which in the days of the wool boom, was a bigger and more prosperous town than Mungindi. Mungindi now has the advantage.

Mungindi, has broadly managed to maintain its basic services over the past two decades. Fortunately, the development phase of the cotton industry overlapped with the decline of the wool industry (following the collapse of the reserve price scheme). Nonetheless, the town was badly affected by the drought superimposed on top of the reduced labour requirements springing from the introduction of genetically modified cotton varieties. As a result many skilled and unskilled workers left town with their families. School enrolments dropped from 220 to less than 100 at the local K–12 public school and some students also left the local catholic school.

The challenge now is to attract workers back to the town and to build the numbers up again while the outlook for cotton is so positive. One approach has involved the development of a recruitment company focussed on helping local farmers and businesses to resolve their skill shortages, by recruiting South Africans and Zimbabweans who are looking to migrate to the rural sector in Australia.180

Prior to the release of the Guide, the town looked to be on a stable path to some form of recovery. No one is expecting the population to grow above its previous level, but the spectacular redevelopment of one of the town’s two pubs (which an electrical fault had reduced to ashes) and the recent establishment of three small businesses in the main street had delivered an air of optimism. The townsfolk were increasingly confident of their ability to retain the local GP and the pharmacy. Along with the hospital, where the long-serving nurses are retraining as nurse practitioners, these health services are seen as essential in giving the town the critical mass necessary to support other services.

The irrigation farmers around Mungindi are civic-minded. Many have come into the region from further afield, but they value the town for its community spirit and they are pleased to help build and maintain its social capital. Partly this is self interest; the more liveable the town, the easier it is to attract skilled workers. And if they can help keep the one mechanic, the one electrician, the one doctor and the one pharmacy in business they won’t have to travel so far for their repairs and upkeep. Mostly, however, it is about a sense of belonging and a sense of care and concern for their community.

Discretionary spending by farm workers has most impact on Mungindi’s local economy. Where water is sold from a typical irrigation farm, the local farmers expect annual turnover to fall from, say, $5 million to $500,000 on conversion to a dryland farm of the same size. Total employment would also fall from perhaps seven full-time-equivalent jobs to just one.

Most of the irrigation water in the Border Rivers region is used around Mungindi. All the irrigation infrastructure there is privately owned and privately funded. Local farmers see a slow long-term trend towards pressurised on-farm systems through normal redevelopment and upgrade. They expect this to have a small positive impact on water savings – perhaps something less than 10 GL. From a grower’s perspective any potential water savings, and labour savings, have to be balanced against the higher capital costs for drippers or centre pivots; they also have to be balanced against the higher ongoing energy costs involved in running them. Governments have been offering financial incentives to make the transition. In return, growers are required to transfer the saved water to the Commonwealth. So far there has been a partial uptake, and the water volumes involved are not insignificant, but growers generally see this program as expensive for the water savings achieved and hence not feasible for most.

Local irrigators doubt that many more people would sell water to the Commonwealth given the current positive outlook for cotton. Growers see the Guide as politically opportunistic and have little faith in the science behind the environmental flow models. They see the lack of community engagement and short timeframes of the rollout of the Plan as a debacle and have no faith in the planning process.

“It took 10 years to agree on a Qld/NSW BR water sharing plan and these guys want to reform a national asset across 4 States in 18 months.”
Business owners in the town feel threatened by the *Guide*. They are concerned about losing critical mass to sustain the most basic services: the doctor, the pharmacy, the mechanic and the electrician etc. They are also concerned about the affect on their own business viability.

Before the *Guide* was released, there was an air of confidence about the future of Mungindi. But the prospect of a 20–25% cut in water availability is translated by most local business people into a 20–25% cut in local employment and therefore a 20–25% cut in local business activity and a bigger cut in profits. No one sees Mungindi as having the reserves to cope with such a step change. It would be enough to tip Mungindi on to the same trajectory as Collarenebri.

> “It all comes down to the size of the cut – if it’s 20% that’s 20% off my business turnover.”

Local people anticipate that some businesses, for example the recently established tyre business, would close quickly on the back of reduced farming activity. Those businesses providing for the most basic human needs such as the pubs and general stores would have better prospects for the future – but only after some of the existing ones closed.

They are frustrated that the government could introduce a plan that will directly reduce economic activity in their town without a plan to help farmers or other businesses transition to something else and prevent a decline.

> “In 10 years time when the government wants to give the water back there will be know one here.”

> “I don’t know how you can get this down on paper but the community spirit around this place is what keeps what we’ve still got going.”

Mungindi is dealing with a range of health issues common in rural Australia. Stress levels were higher during drought, though dryland farmers have experienced average to good seasons in the main. Farmers are now quite optimistic about their immediate prospects. Aboriginal people account for a significant part of Mungindi’s population, and they experience several health issues associated with socio-economic disadvantage. The townspeople are therefore understandably desperate to maintain the basic health services currently available.

Student numbers in Mungindi Central School (a public school offering enrolments from preschool through to year 12) apparently fell markedly during the drought. Pre-drought, there were 220 children, and early 2011 were reported to be back to around 100 and hoping to build to about 150. The My School website lists the 2010 student population at 84 with 75% Indigenous students. Mostly it was non-Indigenous families who left during the drought. Consequently the peer groups for non-Indigenous children have narrowed substantially at the Central school. This makes it difficult to attract new families to the school. St Josephs Primary School (K-6) had 66 students in 2010 with 11% Indigenous students. The Central School is
endeavouring to build up a TAFE annex to provide better opportunity for senior students.

Local service providers believe it is very difficult to attract professionals to fill positions within the hospital and schools – especially as other businesses and services shrink. The hospital is actively retraining its nurses, who are said to be mostly in their 50s, to become nurse practitioners. The town’s one doctor is said to be near retirement age. Being in a position to sustain basic health and education services is understood to be vital by everyone. Without the proposed cuts to SDLs people seemed confident that the Central school numbers would claw back to 150. With the proposed cuts people were pessimistic about the quality of health and education services that could be provided. A basic education will continue to be provided in Mungindi, but with little equity. There will be increased reliance on distance education courses, perhaps provided through video links, with fewer teachers based at the school. There would also be reduced peer interaction for the remaining children, and overall a narrowing in their educational experience. Health services might shrink back to one or more district nurses.

5.5.4 Stanthorpe

People in Stanthorpe are optimistic about the future. They doubt that any of the local horticultural farmers would sell water back to the Commonwealth; the outlook is too positive and water is the major limiting factor to further development. Water entitlements are still bundled with land in the Stanthorpe region, and anyone wanting to sell would sell to their neighbours. There is a new tertiary-trained generation looking to take over the intergenerational family farms, and many families are on the lookout for opportunities to expand.

Because the storage capacity of the main public storage is very small, water availability and reliability are seen as the main factors holding back regional development. It is needed to underpin the running of proposed large function and conference centres, proposed horticultural processing facilities and proposed additional horticultural plantings. Local people therefore see no reason why the MDBA would include their region in a buy back program.

Although the people of Stanthorpe are highly confident that few growers would sell their entitlements, the Guide is nonetheless generating uncertainty and anxiety. People have expectations that 4 GL of unallocated water – identified in the local Resource Operation Plan – would eventually be used for further development (both agricultural and non-agricultural). There is unlikely to be local acceptance if this were to be returned as environmental water.

Stanthorpe mostly supplies food to south east Queensland, Brisbane in particular. Its high gross value of agricultural production is generated from a tiny percentage of the Border Rivers’ water. Production levels and quality are both primarily limited by water.
“We are the only district in Qld that produces summer crops due to our altitude and climate – with climate change this area will be even more important”

Horticulture underpins the economy and it helps to generate the second most important industry, tourism. The amenity of the town and its surrounds coupled with its reasonable proximity to Brisbane and the coast mean that it is a popular destination for short stays.

Because horticulture is labour intensive, many permanent and seasonal workers live in town. The highest demand for seasonal labour is felt between November and April. With less water there would be less local employment. Labour (wages & salaries) represents 50% of operating expenses and local people say there is an average of 25 employees per ML of water. Most agricultural inputs are sourced within Stanthorpe or further afield in Warwick. Any reduction in water would mean less employment and demand for goods and services and have a significant impact on local businesses.

Local farmers express a sense of disbelief that their valley would be targeted for any buyback, given they produce high value crops using water efficient delivery and monitoring systems.

“We won’t just sit back and be told to reduce the size of our enterprise”.

Growers are concerned about water security for their predominantly family businesses and worried that uncertainty brought about by the Plan will discourage the next generation as growers.

“Our next generation have studied horticulture and they want to farm”.

There will be few if any sellers at current water price coupled with a positive commodity and water supply outlook. If the buy back price were to dramatically increase there may be some sellers.

“For every ML bought, that food would need to be grown somewhere else, and probably using more water”.

Local people believe the MDBA should focus their attention elsewhere and leave the region’s unallocated water alone.

5.6 Minimisation of Impacts

Their previous involvement with the development of water sharing plans, and with other community-based natural resource management activities, mean that local irrigators have a good knowledge of water and environmental processes in their valley. They believe the existing plans should be given an opportunity to prove their worth.

Local people have concluded that the environmental water needs are now mostly being met. They hold on to the hope that when governments come to understand this, they will reduce their buyback aims. Moreover, they have many ideas for
environmental works and measures that would improve the environment and reduce the demand for environmental water.

If those hopes are not realised, people want to see an adjustment plan for regional communities. They want to know what governments will do to help maintain community viability.

The people of the Border Rivers are angry that the government could propose a plan that directly reduces economic activity in regional towns without any plan around how to sustain local towns and businesses.

“If the federal government wants national water reform there needs to be an accompanying plan to assist farmers add value to their businesses with less water – where’s the plan for this?”

“Why not develop a plan around temporary water sales rather than permanent – gives everyone more flexibility?”