Lower Balonne community profile

Irrigation region

Key issues for the region

1. Region’s population — The population of the Lower Balonne region is 3,800 people and declining.

2. Gross value of irrigated agricultural production (GVIAP)
   - The drought affected gross value of agricultural production for 2006 was $220 million.
   - The pre-drought GVIAP for the Lower Balonne ranges between three to four times drought affected levels.

3. Water entitlements (approximate)
   - The estimated mean annual diversion for the Lower Balonne is approximately 420 GL.

4. Major enterprises — Agriculture is a main enterprise in the region, with a large focus on crops, predominantly cotton.

5. Government buyback — There have been no Commonwealth Government buybacks to date, but recent amendments to the Condamine Balonne Resource Operations Plan now allow for separation of water and land, and sales to the Commonwealth Government.

6. Water dependence — The Lower Balonne regional economy is probably more reliant on agriculture than any other regional economy in Queensland, with approximately 36% of employment directly in agriculture.

7. Current status
   - While there is technically some scope for further water use efficiency, commercially viable water use efficiency opportunities are limited, particularly given policy uncertainties and the prohibitive capital cost of many remaining options. As most irrigators are now utilising soil moisture testing and efficient application timing, the most likely viable water use efficiency option is to deepen on-farm storages.
   - Opportunities for diversification into higher value crops (margins per ML) are agronomically possible. However, these options are commercially limited by a lack of competitive advantage in the Lower Balonne and access to capital. In addition, these markets tend to be very small and wholesale crop changes would likely result in significant reductions in prices received (due to oversupply into key markets).
   - The recent drought has already resulted in population decline, specifically in areas such as Dirranbandi. This has already resulted in a decline in some community services and there is a significant concern amongst the community that the permanent introduction of SDLs would trigger further declines and permanent losses of key services (e.g. health clinics and schools).
8. Responses to water availability scenarios

- The most likely response to any permanent and material reduction in water availability would be a wholesale shift into lower value dryland broadacre crops, with irrigation only being practiced on the rare occasions when water is very plentiful.

- A wholesale shift out of cotton would be a major concern to the region as irrigated cotton produces over eight times as much employment per hectare as dryland crop alternatives.

From a structural adjustment perspective, the Lower Balonne provides a difficult situation for adjustment as there are few, if any, viable alternative economic activity opportunities in the region.

Regional overview

The Lower Balonne is part of the wider Condamine–Balonne region. The Shire of Balonne is located in Queensland on the New South Wales border some 500 km from the east coast of Australia and has an area of approximately 31,000 km². A region of surprising diversity and unique attractions, the Balonne Shire is rich in native bird and animal life, wide open spaces, beautiful waterways, and historic buildings.

The two major towns in the region are St George and Dirranbandi. Rural industry has created and is supported by these two towns, as well as the towns of Bollon, Thallon, Mungindi and Hebel. Small localities such as Nindigully, Boolba and Alton are places of historic significance.

Balonne Shire has a predominately rural based economy with cotton, wool, beef, grain and horticultural production being the most common primary industries. However, cotton is very much the dominant crop. More recently, some economic growth has also occurred in areas such as tourism.

The region has a semi-arid climate, with temperature (as measured at the St George Airport) fluctuating between 13.8°C and 28.0°C. Mean average annual rainfall is approximately 490 mm.

The social benefits of water to the Lower Balonne community are derived from both the irrigation developments as well as important ecological assets dependent on flow, such as the Narran Lakes and the National Parks of the Culgoa floodplain. The Lower Balonne River Floodplain System and the Narran Lakes have both been identified as key ‘indicator assets’ for the Murray–Darling Basin Plan. The irrigation community itself recognises the importance of protecting these natural areas and stated in their submission to the Cullen Review that significant degradation of the protected natural areas would be unacceptable to the local community.
Figure 1 Location of irrigation district
Irrigation overview

History of irrigation

Major irrigated agriculture has been practised in the region since 1956. It was later expanded in the 1970s with the development of Beardmore Dam in 1972 (near St George, Queensland). The first Queensland cotton gin was built in St George in the early 1970s and the late 1990s saw the addition of the Dirranbandi cotton gin and a second cotton gin in St George.

Recent years have seen a limited diversification of irrigated agriculture away from cotton into crops such as grapes and more dryland cropping driven by the drought.

Balance between public and private infrastructure

Key irrigated agriculture infrastructure includes Beardmore Dam (effective storage capacity 78,580 ML) and the Jack Taylor, Moolabah and Buckinbah Weirs (combined effective storage 14,910 ML).

In addition to the state-owned infrastructure in the St George scheme, individual irrigators have also established and maintained significant private infrastructure. This is primarily for the diversion and capture of water in large ring tanks and on-farm irrigation distribution and management infrastructure. Based on information from the Department of Environment and Resource Management, it is estimated that private storages in the Lower Balonne Management Area (LBMA) total approximately 1.1 million ML.

Commodities

The St George Irrigation Area covers approximately 19,000 ha, 12,000 set up for irrigation. Cotton is the dominant broadacre irrigation crop (although some irrigated sorghum, wheat and barley is produced), while a relatively smaller area is under irrigated horticulture (grapes, melons and some vegetables, particularly pumpkins, sunflowers and onions). In 2005–06, approximately 8,700 ha was under cotton using 6.5 ML/ha, 800 ha under grapes (3.5 ML/ha) and 200 ha under vegetables (4.0 ML/ha). Salinity is not a problem (Electrical Conductivity (EC) peaked at 142 in 2005–06 and has been stable for the past five years).

Similarly, the LBMA is highly concentrated on irrigated cotton, with temporary diversification into other annual crops when water is limited and other crops are commercially viable.

While the area under grapes and to a lesser extent horticulture does not fluctuate greatly from year to year, the area under cotton does. Based on an annual water use of 6.5 ML/ha and estimates of mean annual diversions from DERM, it is estimated that since 1995, the size of the irrigated cotton crop has fluctuated between less than 1,000 ha and in excess of 50,000 ha. Prior to the onset of the drought around 2002, average estimated areas under production between 1995 and 2001 were approximately 35,000 ha.
Significant changes in commodities, water supplies over the past 10 years

The irrigated cropping economy has experienced considerable growth and development in the past 20 years. The crop mix in the more established irrigation areas has diversified in recent years, with a greater emphasis on perennial and annual horticulture crops. However, cotton is still the primary crop and this is likely to remain the case. During the recent drought, there has been an increase in mixed farming strategies as landholders adjust their production regimes to reflect restricted water availability. This sometimes resulted in higher proportions of crops such as wheat in the crop mix in some years, although cotton remains the preferred crop due to its relative profitability when water is available.

Unique features

Water variability in the Lower Balonne is higher than much of the Murray–Darling Basin and the bulk of irrigated agriculture, particularly cotton, in the Queensland part of the Lower Balonne relies extensively on harvesting of river flows and floodplain diversions. On the NSW part of the floodplain, only limited irrigation entitlement exists. There are some small dams in place to improve the security of stock and domestic water supply. Grazing and opportunity cropping are the main land uses relying on beneficial flooding events on the NSW side. Most cotton growers rotate their cotton crops with irrigated grains.

The majority of irrigation is furrow irrigation, with water drawn from channel systems in supplemented areas and the river system or overland flow in unsupplemented areas. Irrigators in unsupplemented areas have on-farm storages, some of them very substantial.

Rural water supply

Regional system description

Key state-owned water infrastructure includes Beardmore Dam (effective storage capacity 78,580 ML) and the Jack Taylor, Moolabah and Buckinbah Weirs (combined effective storage 14,910 ML). These systems are all run by SunWater. SunWater’s St George scheme has 155 customers (99% irrigators). Water is distributed via a river distribution system and approximately 114 km of unlined channels. The remaining economic life of major irrigation infrastructure is 75 years.

In the area with supplemented supply by SunWater, medium reliability entitlements are delivered in excess of 90% of years. SunWater applies a two-part tariff, where Part A is based on the customer’s water allocation and applied quarterly in advance, and Part B is the usage charge for the actual water the customer has used based on meter readings for the previous quarter. Charges for channel sections are $31.84/ML for Part A and $11.50/ML for Part B. For the Regulated Section (Beardmore Dam or Balonne River) the charges are $15.60/ML for Part A and $3.24/ML for Part B. For the Regulated Section, Thuraggi Watercourse, Part A charges are $15.60/ML and Part B charges are $3.24/ML.

In the lower end of the system in the LBWMA, 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.
The farm

Please note: due to low respondent numbers, this profile does not include some of the farm type analysis that was able to be included in other regional profiles.

Natural capital

The recent drought has seen a partial and temporary move in crop composition from irrigated crops (particularly cotton) to dryland crops (e.g. wheat).

While the natural capital base could underpin a broader range of crops from an agronomic perspective, the region lacks any major competitive advantage in most other crops and would arguably struggle to achieve commercial viability for many new crops at a major scale in the absence of fundamental changes in key markets (e.g. prices received, significant demand growth, or significant declines in production in competing regions).

However capacity sharing arrangements in the St George region have allowed cotton farmers (when economic conditions are favourable) to plant more winter crops, such as wheat. Moreover, irrigators in St George noted in interviews with ABARE that capacity sharing arrangements make it easier to plant alternative crops with different water requirements (such as grapes and vegetables).

Financial capital

Available evidence suggests that debt levels in the region are relatively high due to the expansion in areas under irrigation in the past 20 years. In addition, debts have risen sharply during the recent drought period. Due to the relatively narrow structure of the economy and employment, opportunities for off-farm income are often limited in the Lower Balonne when compared to other areas in the Basin. In short, debt to equity ratios have increased during the drought and banks are often reluctant to provide further debt funding due to the uncertainty regarding future water availability and the subsequent higher degree of commercial risks.

These factors combined will make substantial change in the configuration of irrigated agriculture difficult, particularly where significant upfront capital investment is required.

Human capital

The education and skills profile of the Lower Balonne is typical of regional areas with a high reliance on primary industries. 43.3% of Lower Balonne residents aged 15 years or over had completed Year 11 or 12 or equivalent as their highest level of schooling in 2006. Those residents with Year 9 or 10 (or equivalent) as their highest level of schooling comprised 36.3% of the population, whereas 12.0% did not go to school, or had completed Year 8 or below as their highest level of schooling. Of the population of the Lower Balonne who were 15 years and over, 39.5% had a post-school qualification in 2006. This can be broken down into 14.6% with a certificate, while 5.4% with an advanced diploma or diploma, and 8.1% with a bachelor degree or higher.
**Financial ratios**

There is evidence to suggest debt to equity ratios have increased in recent times due to reductions in property values and a corresponding inability of the irrigation sector to retire debt during drought conditions. A number of irrigation properties are under financial stress, while others have folded, are in liquidation, or have sold out to other producers. There does not appear to be any particular segment of the irrigation sector (e.g. small properties) that is in relatively more or less financial stress. Rather it appears to be an across the board problem. There are some concerns amongst irrigators that any significant reductions in SDLs will result in many irrigators having extremely low or negative equity in their enterprises. This would make accessing capital for adjustment or exiting the industry difficult.

**On-farm irrigation water use**

**Irrigation application methods**

The majority of irrigation for cotton is via conventional furrow techniques, often where land has been laser levelled to enhance efficiencies. Significant efforts have been made in recent years to enhance water use efficiency (WUE) via better scheduling and application rates (e.g. optimal siphon discharge) which have had the ability to enhance efficiencies by up to 30%. Other typical WUE initiatives include greater use of soil moisture testing and improvements to on-farm storage. Consultation with industry and professionals servicing the industry (i.e. agronomists and irrigation engineers) indicate that commercially feasible water use efficiencies are generally adopted across the board in cotton irrigation in the region and that options for further efficiencies are extremely limited in the absence of any co-investment.

All cotton irrigators employ a closed system, eliminating losses of tail water to river systems and wetlands.

Horticulture crops use a mix of application methods depending on crop type and available technologies. There has already been a move in recent years to more efficient technologies in the horticulture sector, although further efficiencies are somewhat capital constrained.

During drought, the strategy of many producers was to move from a typical deficit irrigation approach to a strategic irrigation approach (e.g. delaying first in-crop applications as long as possible). In addition, significantly more emphasis was placed on soil testing, irrigation timing and application efficiencies.

While awareness of WUE opportunities is generally very high, there are significant impediments to further WUE efficiency uptake, particularly commercial.

**Opportunities/trends**

While there is some limited scope for more WUE from enhanced soil moisture testing and irrigation timing, fundamental changes in irrigation practice such as moving away from furrow irrigation are not commercially feasible for most large scale irrigated crops.

The greatest opportunities for fundamental improvements in WUE in cotton are likely to be from deepening storages. In addition, there is already a significant research effort to further improve WUE (e.g. membrane technologies to reduce evaporation). However, these technologies are not yet commercially feasible.
**Water entitlements**

Water management in the Queensland component of the Lower Balonne is managed via the Condamine–Balonne Water Resource Plan (2004), while in NSW, management falls under the Macro Water Sharing Plan.

Trade of water is restricted in the Lower Balonne. However, recent amendments to the Resource Operations Plan do enable the separation of water from land and the ability to sell water to any Commonwealth buy-back scheme.

The specification of water entitlements in the Lower Balonne differs from most of the Basin due to both the makeup of the institutional arrangements (i.e. a lack of formally separated and tradable entitlements that have specific volumetric values) and the nature of much of the irrigation (water harvesting). The Mean Annual Diversion (MAD) for the Balonne during the period 1995–06 to 2007–08 was 420,053 ML/year. The MAD represents a modelled long run average volume of water available for consumptive use. The average volume of water used in the Lower Balonne for the period 1995–96 to 2006–07 was 226,986 ML per year highlighting the relative dryness of this period. This comprised estimated average volumes of 67,244 ML/year for regulated use, 2,407 ML/year for unregulated use and 157,335 ML/year for water harvesting.

Variability of water use in recent years is shown in Figure 2.

While formal permanent water trading is not possible, an indicator of potential market values is available from other river basins in the far north of the MDB where water trading has commenced: namely, the Queensland Border Rivers, and the Gwydir River valley in northern NSW. During 2008–09 Border Rivers trades were at around $2,200/ML (medium security) and $1,800/ML (unsupplemented). In the Gwydir, medium security share assignments traded for around $2,200/ML, while unsupplemented share assignments were around $1,000.

![Mean annual diversion and estimated historic water use](image-url)

**Figure 2** Mean annual diversion and estimated historic water use

---

Appendix C  Irrigation district community profiles  883
Soil moisture measurement

There is significant anecdotal information from irrigators and agronomists in the region to suggest the uptake of soil moisture measurement is now common practice amongst irrigators. Soil moisture measurement and its use in enhancing irrigation practice has been a major focus of the Queensland Government’s Rural Water Use Efficiency Initiative over the past 10 years.

Irrigation timing

Through programs such as the Queensland Government’s Rural Water Use Efficiency Initiative, significant efforts have been made to establish tools and provide extension advice and financial incentives to enhance irrigation timing and rates.

Regional agricultural production

Regional agricultural value chain

Irrigated agriculture is dominated by cotton production and processing. There are three cotton gins in the region, St George, Beardmore and Dirranbandi, all owned by Queensland Cotton. All gins have significant excess capacity and have been running well below full production and employment. In some seasons, only two of the three gins have been operating to reduce processing and labour costs.

Given the high fixed cost nature of the gins, it would be reasonable to expect some consolidation of ginning capacity should permanent reductions in SDLs be implemented in the region.

It should be noted that irrigated cropping has significant capacity to respond positively to an increase in water availability in any given year. As has been the case in recent years, irrigated agricultural production is likely to fluctuate in a manner that closely resembles patterns in water availability.

There is a regionally significant transport industry reliant on primary production for business activity. Activity in this sector has been constrained during the drought, but would respond directly to increased production levels.

Data for gross value of production by ML (Figure 4) indicates that grapes typically have a higher ratio of gross returns per ML of water used. However, significant moves into irrigated grapes are unlikely to be commercially viable due to constrained demand.

While there is significant value adding for cotton (i.e. processing at the three gins), the remainder of primary production in the Balonne does not involve such significant product transformation (processing) within the region. Therefore any fundamental move into crops apart from cotton may result in significantly less value adding and associated employment in the region.
Figure 3  Gross value of agricultural production (GVAP) (2006)

Figure 4. Gross value of agricultural production (GVAP) $/ ML of water used (2006)
The region’s community

Figure 5  Level of highest school education (2006)

Figure 6  Higher education (2006)
Figure 7  Employment (2006)

Figure 8  Nominal income (2006)
The region’s community — education, employment and income

Community overview

St George is the urban centre of the Lower Balonne, with an estimated population of approximately 2,500 people. Dirranbandi is the second largest locality with an estimated resident population of approximately 430.

The recent drought has seen the population decline in some areas (particularly around Dirranbandi), and there is concern amongst much of the community that population may decline further to a point where key services may be withdrawn (particularly health and education services). Regional issues and optimism are shown in Figure 9 and Figure 10.

The age profile for the Lower Balonne region has changed somewhat in recent decades. There is some evidence of an aging population with the percentage of persons aged 65 and over increasing from 6.5% to 10.0% between 1991 and 2006. Similarly the proportion of the population between the ages of 45–64 has increased from 17.6% in 1991 to 22.6% in 2006. By contrast, the proportion of the population in the 15–24 age group decreased during the same period from 15.5% to 11.4% as many school leavers also leave the region in search of opportunities elsewhere.44

The education, employment by type and income profiles (Figure 5 to Figure 8) are all consistent with expectations for a region highly reliant on primary industries.
Figure 9 Regional issues

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 26

Figure 10 Optimism (regional people)

Note: 1 = Completely dissatisfied to 10 = Completely satisfied. Number of respondents = 26
The region’s community — demographics and key statistics

Table 1  Demographics and key statistics
(LGAs within study area. 2006)**

<table>
<thead>
<tr>
<th></th>
<th>Balonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>3782</td>
</tr>
<tr>
<td>Total Indigenous persons</td>
<td>624</td>
</tr>
<tr>
<td>Farm and farm managers</td>
<td>249</td>
</tr>
<tr>
<td>Farm and farm managers as percentage of total employed</td>
<td>13%</td>
</tr>
<tr>
<td>Households</td>
<td>624</td>
</tr>
<tr>
<td>Dwelling</td>
<td></td>
</tr>
<tr>
<td>Fully owned</td>
<td>28%</td>
</tr>
<tr>
<td>Being purchased – directly or rent/buy scheme</td>
<td>24%</td>
</tr>
<tr>
<td>Rented</td>
<td>31%</td>
</tr>
<tr>
<td>Community services and wellbeing by remoteness</td>
<td></td>
</tr>
<tr>
<td>Population per education employee</td>
<td>26</td>
</tr>
<tr>
<td>Population per health employee</td>
<td>22</td>
</tr>
<tr>
<td>Population per culture and recreation employee</td>
<td>756</td>
</tr>
</tbody>
</table>

The regional economy

*Regional economic structure*

The Lower Balonne regional economy is highly reliant on agriculture, with 2006 Census data indicating 36.1% of employment was in agriculture, 10.6 times the ratio for the whole of Queensland. The value of agricultural production for Balonne Shire in 2005–06 was $221 million, of which $134.1 million was crops (predominantly cotton); 91.7% of businesses in Balonne Shire are small (<20 persons).

There is little manufacturing to speak of and transport related services are predominantly reliant on the continuation of primary production. There are several firms in the region that service agriculture (e.g. machinery supplies and maintenance, agronomists etc.) These firms have already contracted to reflect changes in regional production during the drought. The building sector is characterised by limited growth and growth prospects (due to low population growth).

There is also a modest, but expanding, tourism industry, largely centred on the region’s natural and historic heritage attractions and recreational activities (particularly fishing). Many of the travellers through the region tend to be ‘grey nomads’ staying in caravan parks for short durations and injecting relatively minor expenditure into local businesses.
Regional response over the past five years

**Water shortage**

Analysis of water use data provided by DERM for the 12 years to 2006–07 indicates that estimated average water use has been around 227,000 ML/annum. However, the range over that time period has been from a low of approximately 45,000 ML in 2006–07, to a high of approximately 443,000 ML in 2003–04.

Water harvesting (primarily in the following areas: Nangram Weir to Beardmore Storage; Beardmore Storage to Bifurcation 1; and Bifurcation 1 to NSW Border) accounted for approximately 70% of total estimated irrigation usage. However, water harvesting is an inherently less reliable source of irrigation water. In years where water has been abundant, water harvesting has accounted for up to 353,000 ML (85% of total average estimated use in 1997–98), but has also been as low as 4,000 (9%) of a very constrained 45,000 ML total use in 2006–07.

Water use in the regulated system (St. George Irrigation Scheme) has been significantly more stable, averaging approximately 67,000 ML/annum, ranging from a low of 40,000 in 2006–07, to a high of 87,000 in 2001–02.

**Regional response**

Water shortages are a major concern of most irrigators. The regional response to the variability and regular shortages in water availability and use has been to undertake water use efficiency where feasible and to reduce irrigated crop areas where water use efficiency is not commercially viable, or the production risks are too great. This has been particularly common in the water harvesting areas, where it has been common to establish a dryland wheat crop (or similar) when water is not available.
Regional vulnerability

Regional vulnerability

The regional economy is highly reliant on primary industries with approximately one third of all jobs directly in the primary industries. Irrigated agriculture is dominated by cotton, an industry that has no realistic capacity for increasing prices received (i.e. most commodities, particularly cotton are 'price takers'). In addition, further opportunities for increasing production efficiency are limited as Australian producers are already amongst the most technically efficient in the world.

In short, reductions in SDLs will result in some WUE initiatives, but mostly result in reductions in areas under production. These impacts will have direct flow-on impacts on the cotton gins, all of which are already running at levels significantly below capacity. Pressures on irrigators will likely be further increased as water services charges for remaining customers will increase as fixed costs of supply are spread across a smaller customer base.

Opportunities for diversification into irrigation crops that have lower water requirements are limited as other regions already have a competitive advantage in those crops. Growth in other agricultural sectors (particularly beef) to offset losses in irrigated agriculture is likely in the longer term, but this growth may be constrained by other factors (e.g. vegetation management regulations).

Regional water dependence

The lack of diversity in the regional economy 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 the total value of agricultural production. Analysis by PwC in 2000 for the Condamine–Balonne concluded that direct and indirect employment was around 25.5 jobs per thousand ha, compared to 3 jobs per thousand ha in dryland farming. In other words, employment intensity in irrigated agriculture is approximately 8.4 times as high as for dryland farming.\textsuperscript{xvii}

Community resilience to change in water allocation

The community has 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 the agricultural sector. SEIFA data indicates the proportion of the population that are in the most disadvantaged quintile is almost twice the Queensland average. While unemployment is relatively low, anecdotal information suggests 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 recent drought has already resulted in population decline, specifically in areas such as Dirranbandi where the population as approximately halved in the past decade. This has already resulted in a decline in some community services (e.g. service stations and retail outlets closing, a loss of dental services etc.) and there is a significant concern amongst the community that the permanent introduction of SDLs would trigger further declines of key services (e.g. health clinics and schools).

Furthermore, the Balonne Shire Council has major concerns that their ability to maintain current service levels will be compromised where costs are shared across a diminishing population and rate base.
Figure 12 Index of Relative Socio-economic Advantage and Disadvantage (2006)\textsuperscript{viii}

Figure 13 Unemployment and labour force participation (2006)\textsuperscript{viiix}
Scope for regional transformation

Scope for farm transformation

Dominant soil types in the region are grey to brown, deep alluvial clays and clay loams. Average annual rainfall in the north of the region is between 450–550 mm per annum falling to 350–450 mm per annum in the south, slightly skewed towards higher monthly averages in the summer months.

The recent drought has triggered a degree of farm transformation in the region, with a move towards more efficient water use and/or temporary movements out of irrigation crops into dryland crops (e.g. wheat). Debt levels, limited access to capital and limited low cost options are the key impediments to further uptake of water use efficiency.

Opportunities for a market-led transformation into other forms of agriculture are limited in the absence of structural adjustment.

Scope to strengthen irrigation management

There is some further scope to enhance on-farm water use efficiency (timing, application rates, configuration of on-farm storages and water use to reduce evaporation), particularly in areas with supplemented supplies. However, options are severely constrained by their commercial viability given the scope of potential crops and commodity prices.

Enhancements to scheme efficiencies by SunWater (e.g. lining channels) are limited as they are generally not commercially viable within current pricing arrangements.

Permanent water trading between irrigators as a market-driven structural adjustment mechanism is not possible in the Lower Balonne. However, temporary trades are possible in the SunWater scheme, largely to finish off crops (typically less than 20,000 ML/annum). In addition, recent changes to the Condamine Balonne ROP enable the sale of water to the Commonwealth.

Water availability scenarios — introduction

Description of scenarios

Face-to-face interviews of key stakeholders, and a telephone survey of community members, were undertaken in the region. In addition to providing information for the development of the community profile, respondents were asked about the likely impacts of a range of water availability scenarios. These scenarios are not linked to possible sustainable diversion limits; rather, they are intended to test a range of responses from irrigators, and flow-on effects in communities.

The following pages present the results of those discussions.

Water availability scenarios were discussed with respect to mean annual diversions for the irrigation region. Baseline data are provided below. Summary statistics of water availability and use are shown in the table below. It should be noted that these figures represent modelled estimates of potential water availability and use as mean annual diversions. This differs from the specification of water entitlements in other areas of the Murray–Darling Basin. However, they do provide some broad indications of water use in the Lower Balonne. The key point to note is that the levels of use have been significantly constrained since the onset of the drought, particularly in the LBMA where use during the drought averaged less than 45% of the pre-drought levels. In addition, much of the on-farm storage was established in the years just prior to the drought and many irrigators are yet to utilise the full potential of their investments in storage.
### Table 2 Baseline water data by region (LTCE, approximate, rounded)

<table>
<thead>
<tr>
<th>Region</th>
<th>LTCE allocation volume (GL, approx, rounded)</th>
<th>Drought average use (GL, July 2002 to June 2009)</th>
<th>Buybacks (GL) (already delivered, or committed to)</th>
<th>Efficiency project savings (GL, committed)</th>
<th>Number of irrigators (number, approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balonne</td>
<td>405</td>
<td>165</td>
<td>0</td>
<td>N/A</td>
<td>165 approx ex. overland flow</td>
</tr>
<tr>
<td>St George Irrigation Scheme</td>
<td>79.8 (mean annual diversion)</td>
<td>65</td>
<td>0</td>
<td>N/A</td>
<td>115 approx</td>
</tr>
<tr>
<td>Lower Balonne Water Management Area</td>
<td>274 (mean annual diversion)</td>
<td>101</td>
<td>0</td>
<td>N/A</td>
<td>50 approx</td>
</tr>
<tr>
<td>Overland flow (across Lower Balonne)</td>
<td>53 (mean annual diversion)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Table 3 Water availability scenarios — reductions from estimated LTCE entitlement volume

<table>
<thead>
<tr>
<th>Region</th>
<th>Comment</th>
<th>Sector</th>
<th>20% GL</th>
<th>40% GL</th>
<th>60% GL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balonne TOTAL</td>
<td></td>
<td></td>
<td>325</td>
<td>245</td>
<td>165</td>
</tr>
<tr>
<td>St George Irrigation Scheme</td>
<td>Cotton</td>
<td></td>
<td>65</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Lower Balonne Water Management Area</td>
<td>Cotton</td>
<td></td>
<td>220</td>
<td>165</td>
<td>110</td>
</tr>
<tr>
<td>Across Lower Balonne</td>
<td>Grapes and other horticulture</td>
<td></td>
<td>0</td>
<td>&lt;2</td>
<td>0</td>
</tr>
<tr>
<td>Overland flow across Lower Balonne</td>
<td>Primarily cotton</td>
<td></td>
<td>40</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

### Table 4 Summary of direct (irrigation) responses to water availability scenarios

<table>
<thead>
<tr>
<th>Region</th>
<th>Key sectors</th>
<th>~20% LTCE</th>
<th>~40% LTCE</th>
<th>~60% LTCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Balonne</td>
<td>Cotton (St George Irrigation Scheme — temporary trade possible)</td>
<td>Water availability is marginally lower than long-run average use. Some water use efficiency (including capital expenditure under co-funding). Some temporary trade. More opportunistic cropping.</td>
<td>Water availability is approximately 30% less than long run average use. Capital investment in water use efficiency under co-funding. Some temporary trade. Embedded opportunistic cropping. Severely limited investment in expansion. Potential for some consolidation of properties. Some irrigators will sell water.</td>
<td>Water availability is approximately 50% less than long run average use. Significant temporary trade. Region predominantly opportunistic cropping. No capital expansion. Irrigators will sell water. Some irrigators will exit industry.</td>
</tr>
<tr>
<td>Lower Balonne</td>
<td>Cotton (Lower Balonne Water Management Area — no temporary trade)</td>
<td>Water availability is approximately 5% lower than pre-drought long-run average use. Some water use efficiency (including capital expenditure under co-funding). More opportunistic cropping. Some irrigators may consider selling water.</td>
<td>Water availability is approximately 30% less than long run average use. Capital investment in water use efficiency under co-funding. Embedded opportunistic cropping. Severely limited investment in expansion. Potential for some consolidation of properties. Some irrigators will sell water.</td>
<td>Water availability is approximately 50% less than long run average use. Region exclusively opportunistic cropping. No capital expansion. Irrigators will sell water. Some irrigators will exit industry.</td>
</tr>
<tr>
<td>Lower Balonne</td>
<td>Horticulture (grapes, other)</td>
<td>Some water use efficiency (including capital expenditure under co-funding).</td>
<td>Some water use efficiency (including capital expenditure under co-funding).</td>
<td>Some water use efficiency (including capital expenditure under co-funding).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some temporary trade. Depending on commodity prices, changes to areas under production (e.g. disestablishment of crops if prices cannot justify water use efficiency or trading). Largely opportunistic annual horticulture crops.</td>
<td>Some temporary trade. Depending on commodity prices, changes to areas under production (e.g. disestablishment of crops if prices cannot justify water use efficiency or trading). Largely opportunistic annual horticulture crops.</td>
<td>Some temporary trade. Depending on commodity prices, changes to areas under production (e.g. disestablishment of crops if prices cannot justify water use efficiency or trading). Largely opportunistic annual horticulture crops.</td>
</tr>
</tbody>
</table>
While draft SDLs were not available at the time this report was written, the response to the drought and hypothetical potential responses to permanent reduction water availability were discussed to elicit some intelligence on what might be expected under different circumstances. Water availability scenarios have been benchmarked against the long-term mean annual diversions established by DERM. The reason for this is that irrigation use in the Lower Balonne responds directly to water available. Other limitations on production are negligible.

**Water availability scenarios — direct impacts (face-to-face interviews)**

*Potential irrigator responses*

The table below shows some of the potential responses in the Lower Balonne to reductions in water availability (assuming the mean annual diversions are the base line against which reductions are made).xxi

It should be noted that the design of any buyback program or water use efficiency program will have a marked impact on the levels of voluntary participation by irrigators and the prices sought by irrigators for water. Prices for direct buybacks are likely to be lower as irrigators have more freedom to reinvest the proceeds. Sales that are tied to irrigation infrastructure investments are likely to be higher as irrigators are essentially trading an appreciating asset (i.e. water) for a depreciating infrastructure asset which will require future investments in asset maintenance and renewal.

**Water availability scenarios — value chain and flow-on impacts (face-to-face interviews)**

*Potential regional impacts*

In addition to the direct responses by the irrigation industry, the flow-on impacts will also impact on the broader community, particularly through the loss of jobs and economic flow on expenditure. Under the 40% and 60% scenarios there is likely to be a permanent migration out of the region, impacting on the viability of many businesses (e.g. service stations and retail outlets) and the potential viability of some government services (particularly education services and health services). The demographics of the region are likely to change and welfare dependency is likely to increase sharply, particularly in areas with a less mobile labour force (e.g. Indigenous workers in Dirranbandi).

### Table 5 Summar details of indirect (flow-on) responses to water availability scenarios

<table>
<thead>
<tr>
<th>Region</th>
<th>Key sectors</th>
<th>-20% LTCE</th>
<th>-40% LTCE</th>
<th>-60% LTCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Balonne</td>
<td>Cotton, grapes and other horticulture</td>
<td>Some positive impacts from implementation of water use efficiency as temporary investment and employment to establish new infrastructure occurs. Lower ongoing levels of employment in gins and other upstream and downstream sectors (e.g. farm inputs and transport).</td>
<td>One gin in broader Lower Balonne will possibly close. Permanent migration out of the region, changing demographics (reduced people of working age) and impacting on the viability of many businesses and the potential viability of some government services.</td>
<td>One gin in the broader Lower Balonne region will close permanently. Permanent migration out of the region, changing demographics (reduced people of working age) and impacting on the viability of many businesses and the potential viability of some government services.</td>
</tr>
</tbody>
</table>
Appendix C  Irrigation district community profiles

Culgoa River
Bokhara River
Birrie River
Ballandool River
Whalan Creek
Currajong Creek
Tomoo Creek
Burbar Creek
Mallowa Creek
Bidgel Creek
Narran River
Marshalls Ponds Creek
Barwon River
Moonie River
Tartulla Creek
Tycannah Creek
The Gleer
Balonne River
Croppa Creek
Teelba Creek
Gingham Watercourse
Gwydir River
Wallam Creek
Boomii River
Neabul Creek
Paterson Creek
Mungallala Creek
Nebine Creek
Weir River
Mehi River
Moonie River
Border Rivers
Condamine−Balonne
Warrego

Figure 14  Map of irrigation district
Endnotes

1 Balonne Shire Council, 2009, Annual Report, 2008–09
2 Cullen et al, 2003, cited by SmartRivers see www.smartrivers.com/ourcommunity.html
4 ANCID 2007, note iii
5 Australian Bureau of Agricultural and Resource Economics (ABARE), 2009, Capacity Sharing in the St. George and MacIntyre Brook Irrigation Schemes in Southern Queensland, Canberra
7 Raine, et al. 2003
8 Australian Bureau of Statistics. 2006, 2006 Agricultural Census, Canberra
10 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
11 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
12 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
13 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
14 Please note that this data represents the Balonne Shire Council Local Government Area which is slightly larger than the study area for the Lower Balonne.
15 ABS 2006
16 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
17 PwC, 2000, Socio-Economic Impact Assessment Condamine–Balonne WAMP: A report prepared for the Balonne Community Advancement Committee
18 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
19 Australian Bureau of Statistics. 2006, 2006 Census, Canberra
20 mean annual diversions based on WRP/ROP and advice from Qld DER
21 Note that due to insufficient respondent numbers for responses to water availability scenarios, that output from the telephone survey is not included here. Please refer to MJA’s Synthesis Report for information about survey outcomes.