Lachlan community profile

Irrigation region

Key issues for the region

1. Region’s population — The population of the Lachlan region is approximately 100,000, including 600 farm businesses.

2. Gross value of irrigated agricultural production
   • The gross value of irrigated agricultural production (GVAP) was about $165 million, though local feedback indicated that this was lower than actual GVAP.
   • The pre-drought irrigated GVAP was approximately $257 million.

3. Water entitlements
   • Surface Water Long-term Cap (regulated) — 305 GL.
   • High Reliability/Security (irrigation) – 31 GL.
   • General Security/Low Reliability — 603 GL.
   • Groundwater entitlements — 300 GL, plus fold belt licences of 47 GL.

4. Government buyback — Buybacks (published results to date) have resulted in the purchase of 107 GL or 15% of total entitlements with 80% sourced from below Lake Cargelligo (45 GL LTCE).

5. Major enterprises — Vegetables and horticulture enterprises are located in the upper (Cowra) and lower (Hillston) areas while cotton was a major crop pre-drought in the lower catchment. Lucerne and winter crops are major irrigated enterprises in the mid catchment.

6. Water dependence
   • Irrigated agriculture is a major economic driver within the upper Lachlan upstream of Jemalong Weir and the lower Lachlan around Hillston. Vegetable, horticultural, cotton and specialist lucerne producers in the upper and lower catchment have a high dependency on irrigation.
   • The economies of the major urban communities of Forbes and Cowra are moderately dependent, and Hillston is highly dependent, on irrigated agriculture.
   • The severity of the drought has limited irrigation primarily to groundwater use and small quantities of high security water.
   • Groundwater access is limited to the upper and lower regions along the Lachlan River. Only a small proportion of farms have access to both surface and groundwater.

7. Current status
   • The population within the larger urban centres has been stable with mining being an important source of off-farm income and employment. The Condobolin and Hillston communities have been impacted by the drought to a greater extent as cotton was a significant source of local employment.
   • The Jemalong Irrigation Area was formed in the early 1940s as a government irrigation area and supplies water to 100 farms.
   • The drought has severely impacted farm businesses reliant on surface irrigation water, with General Security allocations falling from an average of 76% prior to the drought to 3% over the period 2002 – 09.
• There has been a major downsizing of the lucerne and cotton industries as a result of the drought.

• As a direct result of the drought farms are accessing Exceptional Circumstances provisions at one of the highest rates in NSW.

• The horticulture industry has been reliant on groundwater and High Security water to maintain high value markets.

• Some intensive irrigated farm businesses have established major long-term high value supply contracts with food retailers and processors.

• Most post gate processing is undertaken outside the region, except for individual large horticultural businesses, which undertake processing and packaging on-farm.

• There is scope for improved farm water use efficiency of around 10% in the short-term. This improvement in water use efficiency would enable most enterprises to offset predicted climate change impacts.

• Jemalong Irrigation is preparing a modernisation plan that is anticipated to achieve relatively small savings. There is scope for water savings in low allocation years by piping stock and domestic water rather than using the channel system for delivery.

8. Response to water availability scenarios

• All farms will be financially impacted by a reduction in long-term water availability. A uniform adjustment will impact on efficient as well as inefficient users.

• A material reduction in water availability in the mid and upper catchment will impact on the smaller farms and lead to an increased reliance on groundwater and a long-term reduction in economic production. This will result in reduced lucerne, summer crop (primarily cotton) and livestock production.

• All vegetable and horticulture produce is currently generated from groundwater or High Security water use. Any reduction in water use or a reduction in seasonal reliability will impact on the highly geared farm businesses that have major year round supply contracts with supermarkets, fast food outlets and processors.

• Subject to annual water prices and commodity prices, the horticultural industries generally have greater capacity to use the trade market to offset reduced annual water allocations. These industries have historically generated higher returns per unit of water. An adjustment to lower water availability will however result in increased operating costs to these businesses. A number of these businesses have recently purchased groundwater entitlements in response to the reduction in groundwater availability introduced as part of the Groundwater Sharing Plan 2008.

• The major groundwater adjustment process implemented in 2008 limits the scope for further adjustment.
  – There is limited scope for the smaller and more intensive irrigated farm businesses to adjust to lower long-term water allocations. Dryland farming is not a long-term viable option for these smaller farms in the upper catchment, without significant farm aggregation.
  – Groundwater is not a long-term viable option for many of the farms presently reliant on this water source due to the high cost of extraction and long-term water quality impacts.
  – There is limited scope for farm transformation below Lake Cargelligo due to low rainfall. A reduction in water availability in this area will lead to industry contraction, particularly cotton production.
• The medium size farms in the mid catchment, including Jemalong Irrigation, are likely to be more adversely affected by reduced water availability as they have the least capacity to adjust either via scale (larger farms) or via supplementation with off farm income (smaller farms).
  – There are few significant (if any) economic development opportunities from increased environmental flows that will offset the impacts of irrigated agriculture.
  – A uniform long-term water availability reduction of up to 20% will result in some farm businesses becoming unviable and many other businesses not able to maintain business growth required to accommodate the long-term cost price squeeze. Some larger farms will attempt to restructure their businesses and purchase water entitlements or annual allocated water to maintain productivity. Within Jemalong Irrigation it is estimated that most of the smaller businesses (20% of the total businesses) would be expected to cease operation.
  – A reduction in the long-term water availability of greater than 20% will result in medium to larger farm businesses becoming unviable with direct flow on impacts occurring at a community level.
• A reduction in long-term water availability in the order of 60% will not be as severe as the drought conditions experienced since 2002–03, however the impacts are expected to be similar. That is, a continuation of the erosion of working capital, increased borrowings and realisation of assets to meet commitments.

Regional overview
The Lachlan Valley, located in central western NSW, covers an area of 84,700 km², running from Crookwell and Gunning in the east to Oxley and Ivanhoe in the west. The Lachlan River rises near Yass and flows for approximately 1,450 km to the Great Cumbung Swamp, north west of Hay. The Lachlan is effectively a terminal or enclosed catchment. This is a significant feature of the catchment as the urban population and industries, including agriculture, and key environmental assets are reliant on the one water supply.

Irrigation infrastructure
The majority of the surface water irrigation is by licensed diverters directly from the Lachlan River. The only exception is Jemalong Irrigation District, which diverts water from the Jemalong weir downstream of Forbes. Wyangala Dam, which has a capacity of 1,220 GL, is the major water storage on the Lachlan River and is located at the junction of the Lachlan and Abercrombie rivers approximately 50km upstream of Cowra.

Irrigation development occurred more slowly in the Lachlan valley than in most southern valleys within the Murray–Darling Basin. Irrigation commenced in the now Jemalong Irrigation area in the 1940s following the construction of the Jemalong Weir in 1936, 30 km south of Forbes. Jemalong Irrigation supplies surface water to 100 farms, with most farms holding an entitlement of 970 ML General Security water entitlements. All surface irrigation diversion infrastructure is privately owned, either by individual private diverters or Jemalong Irrigation Ltd.
Commodities

There are around 98,000 ha of irrigated agriculture in the Lachlan valley producing a diverse range of crops. The value of irrigated agricultural production for the catchment was around $270 million pre-drought, which contributed around 20% of the total agricultural production within the region. In the eastern highlands, irrigation is primarily used for horticulture, viticulture, lucerne production and grazing enterprises. In the central part of the catchment, winter cereal and oilseed crops, lucerne, horticulture, and summer crops, such as maize and soybean, are the predominant irrigated enterprises. The lower reaches were dominated by cotton production prior to the drought. More recently there have been increases in the areas of annual and permanent horticultural crops in the Hillston area.

Changes to commodities over the past 10 years

The drought has resulted in a substantial reduction in irrigated agricultural production, particularly winter and summer (cotton and maize) broadacre crop production and lucerne production. The total surface water allocation over the past seven years has been 22% with 19% being allocated in 2005–06. A large proportion of this water was suspended due to insufficient river flows to transfer the stored water to the points of diversion. As such the only significant irrigated agricultural production since 2002–03 has been from use of groundwater, which has increased significantly.
Figure 1  Location of irrigation district
Irrigation overview

Irrigation is focused on the river flats and plains along the Lachlan River, mainly around the townships of Cowra, Forbes and Hillston. The average annual surface water availability is 1,140 GL plus tributary inflows of 30–40 GL and episodic inflows downstream of the storages in high rainfall years. The Water Sharing Plan (WSP) limits average annual usage to 305 GL or approximately 27% of the modelled annual average water availability. Individual licence holders may use up to 76% of their entitlement subject to the maximum diversion limit being exceeded.

There is 655 GL of surface water entitlements on the Lachlan River and a further 26 GL on the Belubula River, a tributary of the Lachlan. The Lachlan region entitlement includes 55 GL of High Security entitlement used for town water supply (15 GL), stock and domestic use on farm (14 GL) and High Security irrigation (31 GL) and 603 GL of General Security entitlement. Jemalong Irrigation holds a conveyance licence of 18 GL.

The Lachlan valley is split into two zones for surface water management purposes with the boundary at Lake Cargelligo. Permanent trade cannot occur between the two zones and there is a limit to the volume of annual net trade (31 GL) occurring downstream between the two river reaches. There is 430 GL of surface water entitlement held upstream of Lake Cargelligo and 220 GL downstream. Jemalong Irrigation is located on the upstream reach between Forbes and Condobolin.

Surface water irrigation expanded significantly after the 1982–83 drought with water use increasing from 100 GL in 1983–84 to 400 GL in 1994–95. Prior to the drought surface water use ranged from between 280 and 435 GL. Immediately prior to the drought total surface and groundwater use was approximately 550 GL. The seven year average allocation for the period 2002–03 to 2008–09 was 3%, with surface water use limited to High Security water.

The surface WSP was introduced in July 2004 and immediately suspended. Surface water use immediately prior to the WSP introduction was approximately 360 GL. The impact of the WSP reduction of long-term use to 305 GL has been overwhelmed by the far more significant impacts of the drought.

There is 300 GL of groundwater entitlement in the Lachlan catchment held in two major groundwater zones, including 108 GL of water entitlement held in the Lower Lachlan region around Hillston and 183 GL in the upper Lachlan. The Lower Lachlan groundwater zone has been reviewed as part of the Australian Sustainable Groundwater Entitlement (ASGE) process. The ASGE process for the Lower Lachlan aquifer resulted in a reduction in groundwater entitlements from 215 GL to 108 GL in 2007–08. This process included the allocation of 120 GL supplementary entitlements that will reduce to 0 GL by 2015. Groundwater use in this aquifer peaked at 135 GL in 2003–04. The upper Lachlan groundwater aquifer has 180 GL of water entitlement, however has not been subject to the ASGE process. Current annual use from this zone is 75 to 85 GL. There is 8 GL of groundwater entitlement in the Belubula valley.
Table 1  Value of irrigated agriculture in the Lachlan Valley (pre-drought) 2000–01

<table>
<thead>
<tr>
<th>Industry</th>
<th>Total production irrigated in Lachlan (%)</th>
<th>Value of irrigated production ($millions) 2000–01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pastures for stock feed</td>
<td>54.5</td>
<td>11.8</td>
</tr>
<tr>
<td>Crops for hay</td>
<td>24.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Cereals for grain</td>
<td>9.5</td>
<td>51.1</td>
</tr>
<tr>
<td>Other crops</td>
<td>9.5</td>
<td>51.1</td>
</tr>
<tr>
<td>Vegetables</td>
<td>99.9</td>
<td>36.5</td>
</tr>
<tr>
<td>Fruit (excluding grapes)</td>
<td>63.7</td>
<td>23.1</td>
</tr>
<tr>
<td>Grapes</td>
<td>80.0</td>
<td>11.8</td>
</tr>
<tr>
<td>Livestock slaughters</td>
<td>5.5</td>
<td>15.5</td>
</tr>
<tr>
<td>Livestock products</td>
<td>8.6</td>
<td>19.2</td>
</tr>
<tr>
<td>Total</td>
<td>20.8</td>
<td>274.9</td>
</tr>
<tr>
<td>NSW Total</td>
<td>307</td>
<td>2,703</td>
</tr>
</tbody>
</table>

Rural water supply

Regional system description

Surface water, diverted from the Lachlan and Belubula rivers is the major water source within the region. There is around 1,500km of regulated river in the catchment. Surface water entitlements represent two thirds of the total water entitlements.

Jemalong weir was constructed in 1936 and initiated the commencement of irrigation in the Jemalong district, 30km downstream of Forbes. Water was initially made available to 81 farms by 1941. Further subdivisions of 565 ha were made by the War Service Land Settlement Board in 1951. Jemalong Irrigation was privatised in 1995 and is now an unlisted public company. Each irrigator landowner is a shareholder in the company. The irrigation district comprises 96,000 ha of farm land.

Water distribution efficiency

Jemalong Irrigation holds a water entitlement licence of 100 GL which includes 80 GL of General Security water entitlements, 18 GL of conveyance and 2 GL of stock and domestic and High Security water entitlements. Under normal operating conditions 80 GL is diverted from the Lachlan river to 155 landholdings within the district. The distribution losses have been around 23% for annual deliveries of 60–65 GL. Water is supplied to almost 100 farms via 300 km of earthen channel. Water distribution has been limited to providing stock and domestic water to farms for six of the past seven years.

Jemalong Irrigation has prepared a modernisation plan. It focuses on channel lining, rationalization and piping for a stock and domestic water supply to farms. The plan also includes achieving on farm water use efficiencies, including construction of farm storages, lining channels, installing low pressure overhead irrigation and farm drainage reuse systems. The modernisation plan proposes that distribution efficiencies will reduce water losses within the distribution system and on farm by 15–25 GL.
**Water buybacks**

A number of Government organisations have been purchasing water entitlements from the NSW Lachlan valley. A total of 100 GL has been purchased from the region for environmental use during the period 2007–08 to December 2009 through the Commonwealth Government Buy back and the NSW Riverbank programs. This includes 80 GL purchased by the Commonwealth Government and 20 GL purchased through the NSW Riverbank program. A large proportion of the water purchased has been sourced from the Lower Lachlan, including a 50 GL parcel from Twynam Pastoral Company.

**The farm**

**Natural capital**

Farms within the region fall into five production zones moving from east (upstream) to west (downstream) as outlined below (cropped areas for 2001–02):

- **Zone 1** high annual rainfall of 600 mm and light textured soils. Main enterprises are lucerne, lamb production, vegetables and wine grapes. The main irrigation type is spray irrigation. There are around 11,000 ha of irrigated land and 82 GL surface water entitlement;

- **Zone 2** medium rainfall area of 525 mm. Main enterprises are winter crops, maize, lucerne and annual clover. The main irrigation type is flood irrigation and there are around 19,000 ha of irrigated land and 107 GL of surface water entitlement;

- **Zone 3** medium rainfall area of 425 mm. Main enterprises are winter crops, maize, lucerne and annual clover. The main irrigation type is flood irrigation and there are around 15,000 ha of irrigated land, mostly landformed and 145 GL of surface water entitlement;

- **Zone 4** Below Lake Cargelligo, low rainfall area of 360 mm. Main enterprises are winter crops, maize, lucerne, annual clover, cotton, vegetables and horticulture. The main irrigation type is flood irrigation and there are around 56,000 ha of irrigated land, mostly landformed and 220 GL of surface water entitlement. The vegetables and horticulture are produced using either overhead or drip irrigation; and

- **Zone 5** Jemalong Irrigation. Annual rainfall of 430 mm. Main enterprises are winter crops, maize, lucerne and annual clover. The main irrigation type is flood irrigation and there are around 42,000 ha of irrigated land, mostly landformed and 100 GL of surface water entitlement.

Irrigated agriculture comprises around 40% or less of the farm area except for the smaller and more intensively irrigated farms in zone 1. The mix of dryland and irrigation provides some capacity for farmers to spread the risk of low water availability in individual years. However, the impacts of extended droughts compound, when irrigation water availability is also reduced.
Figure 2  Regional issues — livestock farms

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 54

Figure 3  Survey respondents by farm type

Number of farms = 112. A number of respondents had multiple types.
Financial capital

Almost all farms within the region have had substantially reduced incomes as a result of the current drought. Exceptional Circumstance (EC) provisions were first made in 2004. However, irrigated farm businesses have been a small proportion of farm businesses actively seeking assistance as evidenced by EC household relief payments to irrigators and non-irrigators in the following table. It has been noted that off-farm income has become increasingly important over the last five years, particularly amongst small farms that have a large proportion of the farm under irrigation.

Table 2  Recipients of household support payments from Centrelink by EC districts within or partly within the Lachlan catchment from December 2009 (DAFF)

<table>
<thead>
<tr>
<th>EC area</th>
<th>Farm enterprise type</th>
<th>Non-irrigated</th>
<th>Irrigated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forbes</td>
<td>496</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Condobolin–Narrandra</td>
<td>636</td>
<td>&lt;20</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>268</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Applications and assistance amongst all farm businesses for interest rate subsidy under Exceptional Circumstances in Forbes and Condobolin have been amongst the highest in NSW and steadily grew between 2004 and 2009.

Table 3  Trends in applications and assistance provided to farm businesses between 2005 and 2009 by Rural Land Protection Board District. (NSW Rural Assistance Authority)

<table>
<thead>
<tr>
<th>Rural Land Protection Board District</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Applications received</td>
<td>Assistance $million</td>
<td>Applications received</td>
<td>Assistance $million</td>
<td>Applications received</td>
<td>Assistance $million</td>
</tr>
<tr>
<td>Condobolin</td>
<td>415</td>
<td>9.6</td>
<td>600</td>
<td>11.7</td>
<td>477</td>
<td>15.6</td>
</tr>
<tr>
<td>Forbes</td>
<td>527</td>
<td>11.2</td>
<td>602</td>
<td>10.6</td>
<td>631</td>
<td>20.0</td>
</tr>
<tr>
<td>Hillston</td>
<td>99</td>
<td>2.7</td>
<td>150</td>
<td>3.1</td>
<td>87</td>
<td>3.7</td>
</tr>
<tr>
<td>Total NSW</td>
<td>2,951</td>
<td>66.2</td>
<td>3,848</td>
<td>84.2</td>
<td>5,591</td>
<td>198</td>
</tr>
</tbody>
</table>

Human capital

The successive changes to water policy in NSW over the past 15 years have left many farmers suffering change fatigue. The uncertainty of future water policy and the need to repeatedly adapt business strategies has been very trying for many farm businesses. The drought over the past seven years has introduced an additional level of uncertainty associated with seasonal crop failures and significant financial implications. There has been an increase in stress amongst farm families, particularly over the last five years. Some segments of the farming community have been more impacted than others. Those that have experienced or are experiencing significant stress include those with a heavy reliance on irrigated agriculture with access to General Security water only. This includes the region’s small number of dairy businesses and livestock fattening businesses.
A large proportion of farm businesses in the catchment have both dryland and irrigated production. While the drought and low water allocations have impacted on both production systems, there is a level of knowledge and skills from past ‘dryland’ droughts that have prepared the larger growers for low water availability as well as providing a more diverse income base. Despite this, many irrigation farms are in a holding pattern and eroding working capital. Most farm workers have been retrenched from irrigation farm businesses.

The following pages provide more detail about farms within different sectors in the region.

The farm: livestock farms

Figures 4–6 and the table on this page present results from the telephone survey of irrigation farmers undertaken in the region. They include:

- farmers’ ranking of a range of issues that they considered problematic;
- farm financial measures; and
- measures of optimism, and how satisfied farmers are with a range of life issues.

### Table 4 Farm financial measures

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Measure %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on assets</td>
<td>-3.74</td>
</tr>
<tr>
<td>Debt ratio</td>
<td>12.28</td>
</tr>
<tr>
<td>Water/total assets</td>
<td>1.34</td>
</tr>
</tbody>
</table>

**Figure 4 Farm issues — livestock farms**

*Note: 1 = No problem to 5 = Significant problem. Number of respondents = 54*
Figure 5  Farm financial measures

Figure 6  Optimism  — livestock

Note: 1 = Completely dissatisfied to 10 = Completely satisfied. Number of respondents = 54
The farm: broadacre farms

‘Broadacre’ includes cotton farming; this is an ABS definition.

Figures 7–11 and the table on this page present results from the telephone survey of irrigation farmers undertaken in the region. They include:

• farmers’ ranking of a range of issues that they considered problematic; and
• measures of optimism, and how satisfied farmers are with a range of life issues.

82% of broadacre farmers in the Lachlan have off-farm income (11 survey respondents).

The farm: broadacre and livestock

Figures 7–11 and the table on this page present results from the telephone survey of irrigation farmers undertaken in the region. They include:

• farmers’ ranking of a range of issues that they considered problematic;
• farm financial measures (note that 48% of livestock and broadacre farmers in the Lachlan have off-farm income (31 survey respondents)); and
• measures of optimism, and how satisfied farmers are with a range of life issues.

On-farm irrigation water use

Irrigation application methods

Irrigation water is a limiting factor to all farm businesses involved in irrigated agriculture. Water availability is a relatively greater limiting factor for farm businesses in the upper (zone 1) and lower (zone 4) areas of the region, where more intensive irrigated farm systems are located, particularly those involving dairying, horticultural, vegetable and summer cropping enterprises. Water availability is also a major limitation for the more intensively developed irrigation farms in the Jemalong Irrigation area (zone 5).

A typical farm business in the mid catchment has around 40–50% developed for irrigation. Irrigated winter cropping and lucerne production has been an integral component of these farm businesses prior to the drought. During the drought these farms have relied to a greater extent on their dryland cropping and grazing enterprises to maintain farm viability.

Table 5  Farm financial measures

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Measure %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on assets</td>
<td>1.29</td>
</tr>
<tr>
<td>Debt ratio</td>
<td>14.11</td>
</tr>
<tr>
<td>Water/total assets</td>
<td>6.88</td>
</tr>
</tbody>
</table>
Figure 7 Farm issues — broadacre farms
Note: 1 = No problem to 5 = Significant problem. Number of respondents = 12

Figure 8 Optimism — livestock
Note: 1 = Completely dissatisfied to 10 = Completely satisfied. Number of respondents = 12
Figure 9  Farm issues — broadacre & livestock farms\textsuperscript{x}

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 31

Figure 10  Farm financial measures\textsuperscript{x}
Figure 11 Optimism — broadacre & livestock

Note: 1 = Completely dissatisfied to 10 = Completely satisfied. Number of respondents = 31

Table 6 On-farm irrigation management (2007–08)

<table>
<thead>
<tr>
<th>Irrigation parameter</th>
<th>Livestock (%)</th>
<th>Broadacre (%)</th>
<th>Broadacre &amp; livestock (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>Broadacre (%)</td>
<td>Broadacre (%)</td>
<td>Broadacre &amp; livestock (%)</td>
</tr>
<tr>
<td>Flood flow</td>
<td>18</td>
<td>18</td>
<td>39</td>
</tr>
<tr>
<td>Travelling</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Microjet fixed sprinklers</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drip/trickle</td>
<td>0</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Timing irrigation on the basis of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil moisture measuring tools</td>
<td>6</td>
<td>27</td>
<td>19</td>
</tr>
<tr>
<td>Calendar based</td>
<td>4</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Weather forecast</td>
<td>8</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Own observations/knowledge</td>
<td>24</td>
<td>9</td>
<td>29</td>
</tr>
<tr>
<td>Percentage of farms trading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing (15 traders)</td>
<td>13</td>
<td>25</td>
<td>–21</td>
</tr>
<tr>
<td>Selling</td>
<td>7</td>
<td>25</td>
<td>–29</td>
</tr>
</tbody>
</table>
Opportunities/trends

It is estimated that over 90% of the irrigation water is applied as surface or flood irrigation. Almost all broadacre crops and most lucerne crops are flood irrigated. Horticulture and vegetable crops are irrigated using micro, sub surface or overhead irrigation. Cotton has been grown using furrow irrigation. Table 6 shows types of on-farm irrigation management.

Achievable on farm water efficiency savings are estimated to be in the order of 10–20%. However, to achieve the higher efficiencies, significant capital investment in irrigation delivery technology and associated management practices will be required.

Government support for farm system transformation has been limited to incentives to redevelop aspects of the farm level irrigation supply and drainage system via the Jemalong Land and Water Management Plan and low interest rate loans for farm redevelopment.

The CSIRO Sustainable Yields Project concluded that the impact of climate change on NSW General Security water availability is likely to be a reduction of around 11% by the year 2030 using the median climate scenario. The anticipated gains in water use efficiency may provide the opportunity to offset this impact.

Water entitlements

Water entitlement licences are held by either Jemalong Irrigation or individuals. Jemalong Irrigation members and individual licence holders have been able to freely trade water entitlements for many years.

The limited water availability has provided a major constraint to seasonal trade of allocated water. There has been some transfer of High Security allocated water to General Security water licences to enable water to be carried over from one season to the next. There is currently around 33 GL of carryover water suspended, primarily from the 2005–06 allocation. This suspension is a result of insufficient water in the river system to deliver the allocated water to the point of extraction.

The stimulus for the trade of water entitlements has been driven both by price and the need to reduce debt resulting from failed crops and increased grain and fodder purchase prices.

Soil moisture measurement

There has been a low uptake of soil moisture monitoring and scheduling with around 10% of the total irrigated area monitored. Vines and cotton are the main crops where soil moisture monitoring is undertaken to aid irrigation scheduling.

Irrigation timing

Most cropping and pasture farmers use a combination of field observations and weather data to guide the timing of irrigation events. Due to the low levels of water availability most winter crops and pastures are irrigated using sub optimal levels of water. Water is applied at the more critical periods of plant growth to achieve the greatest crop yield response, rather than be specifically guided by soil moisture deficits.

Water application to lucerne is based on crop growth stage and existing weather conditions.
Regional agricultural production

Regional agricultural value chain

Value adding of agricultural production is relatively limited and primarily associated with the packaging, freight and marketing of horticultural and vegetable produce, as well as cotton processing (when there is sufficient water to produce the crop), lucerne processing, freight, marketing, and grain storage and handling.

Almost all vegetable and fruit produce is marketed into the Sydney basin with a proportion of the crop exported. Some horticultural producers have major supply contracts with supermarkets, fast food outlets and food processors. A large dairy sends fresh milk to Sydney for processing twice daily. Lucerne is marketed into the Sydney, Goulburn and Canberra regions, with a particular focus on high value horse feed (baled and cubed).

Livestock are sent outside the catchment to abattoirs in Dubbo and Wagga for processing following closure of the abattoir at Forbes in 1999.

The saleyards at Forbes are in the process of being redeveloped to a major livestock exchange servicing the central west region.

The gross value of agricultural production in 2006 (Figure 12) does not reflect the significance of the lucerne industry in the region or the development of major horticultural enterprises in the upper and lower catchment. Prior to the drought, lucerne production generated $12 million to the region. During the drought the limited available water has been primarily used for horticultural and vegetable production.
Figure 12 Gross value of agricultural production (GVAP) (2006)\textsuperscript{xiii}

Figure 13 Gross value of agricultural production $/ML of water used (2006)\textsuperscript{xiv}
The region’s community

Figure 14  Level of highest school education (2006)**

Figure 15  Higher education (2006)**
Figure 16  Employment (2006)\textsuperscript{xvii}

Figure 17  Nominal income (2006)\textsuperscript{xviii}
The region’s community — education, employment and income

The Lachlan valley has a population of over 100,000 people. The major towns include Cowra, Forbes, Parkes, Young, Condobolin, West Wyalong and Hillston. Of these, Cowra, Forbes and Hillston are more strongly linked to irrigated agriculture.

Parkes is the major service centre for the central catchment and Cowra is the major service centre in the east. These towns have regional hospitals and retail services and, together with Forbes, have a number of both private and public primary and secondary schools. Tertiary education, other than some TAFE courses, is not available within the catchment. Cowra has recently signed a memorandum of understanding with Charles Sturt University to provide university courses from a campus in the town.

The population in the western portion of the catchment tends to access services from Griffith, in the Murrumbidgee region.

The expansion of irrigated agriculture in the Hillston area resulted in a ‘rebirth’ of Hillston in the late 1990s. The town population increased from 1,200 to 1,500 permanent residents and an influx of around 600 casual employees. The town’s football went from a single code town to fielding teams in three football codes. A social scene for the younger generation re-established, which encouraged young people from the area to return. The subsequent decline in surface water availability has resulted in the town population falling to 1,100 people and only one football code being supported. Around 600 casual employees still come to the region, however their period of employment has been reduced to around one third of that previously.

Similarly, the commencement of mining at West Wyalong caused significant demand for housing with a sudden influx of workers. Mining at Parkes and West Wyalong has been instrumental in revitalising the local economies of these towns.

Elsewhere in the catchment, the population of the larger towns (Cowra, Forbes) has remained steady and the population in the rural areas is declining. The catchment population is an ageing one, with 18–25 year olds leaving the catchment for employment and education. Migrants to the towns tend to be retirees from farms or from major urban centres seeking a more affordable retirement.
Figure 18  Regional issues

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 80

Figure 19  Optimism (regional people)

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 80
The region’s community — demographics and key statistics

Table 7 Demographics and key statistics (LGAs within study area. 2006)¹

<table>
<thead>
<tr>
<th></th>
<th>Inner regional Australia</th>
<th>Outer regional Australia</th>
<th>Remote Australia</th>
<th>Very remote Australia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>36,561</td>
<td>50,165</td>
<td>3,493</td>
<td>350</td>
<td>90,569</td>
</tr>
<tr>
<td>Total Indigenous persons</td>
<td>1,303</td>
<td>2,763</td>
<td>296</td>
<td>109</td>
<td>4,471</td>
</tr>
<tr>
<td>Farm and farm managers</td>
<td>1,579</td>
<td>3,812</td>
<td>711</td>
<td>25</td>
<td>6,127</td>
</tr>
<tr>
<td>Farm and farm managers as percentage of total employed</td>
<td>10%</td>
<td>18%</td>
<td>41%</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>Households</td>
<td>14,152</td>
<td>19,729</td>
<td>1,442</td>
<td>126</td>
<td>35,449</td>
</tr>
</tbody>
</table>

Dwelling

<table>
<thead>
<tr>
<th></th>
<th>Inner regional Australia</th>
<th>Outer regional Australia</th>
<th>Remote Australia</th>
<th>Very remote Australia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully owned</td>
<td>22%</td>
<td>21%</td>
<td>18%</td>
<td>33%</td>
<td>21%</td>
</tr>
<tr>
<td>Being purchased – directly or rent/buy scheme</td>
<td>3%</td>
<td>5%</td>
<td>12%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Rented</td>
<td>4%</td>
<td>5%</td>
<td>5%</td>
<td>10%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Community services

<table>
<thead>
<tr>
<th></th>
<th>Inner regional Australia</th>
<th>Outer regional Australia</th>
<th>Remote Australia</th>
<th>Very remote Australia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population per education employee</td>
<td>162</td>
<td>304</td>
<td>1,164</td>
<td>0</td>
<td>230</td>
</tr>
<tr>
<td>Population per health employee</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Population per culture and recreation employee</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

The regional economy

Regional economic structure

The major regional industry is service provision to the agricultural sector (Figure 20).

Local governments are one of the largest employers within the catchment with four shires within the region.

Irrigated agriculture contributes over 80% of the gross value of agricultural production for the Carathool Shire. Many of the service businesses that established in the Hillston area in the late 1990s and early 2000s have since contracted and now provide services from Griffith. The cotton gin, which employed 10 permanent and casual staff, is not functioning at present. Other major local businesses include road transport, packing sheds and irrigation technology specialists. The Carathool Shire Council has advised that all businesses in Hillston service irrigated agriculture and that these businesses rely on irrigated agriculture for around 90% of their business.

In the central and eastern parts of the catchment, the economies are somewhat more diversified with a wider range of service. Parkes, Cowra and Forbes have regional hospitals, large regional retail outlets and offices for state agencies, such as water and catchment authorities. The development of mines at Parkes and West Wyalong in 1993 and 1999 respectively have triggered significant economic activity and employment in these towns and their hinterlands.
Regional response over the last five years

Water shortage

The drought has resulted in a substantial reduction to irrigated agricultural production. The only significant irrigated agricultural production has been from groundwater use since 2002–03. Farm transformation over the past five years has been driven by the need to respond to the severe drought conditions. Dairy farms and other livestock farmers within the valley have purchased in supplementary feed supplies. Water use on lucerne and winter crops has been substantially reduced.

The low water allocations have seen activation and development of a number of groundwater licenses previously issued, but not developed, to support the horticulture and vegetable enterprises. Groundwater use in the lower Lachlan increased from 45 GL in 2000–01 and stabilized at around 120–130 GL in the period 2002–03 to 2007–08. This groundwater has been used to produce cotton, maize, potatoes and horticulture crops, including citrus and vegetables. Groundwater use in the upper Lachlan increased from 26 GL in 2002–03 to 83 GL in 2006–07 and is primarily used for vegetable and lucerne production, with some use also for cereals, pastures and dairy production.

Many farmers, who invested in groundwater, are looking to re-substitute surface water for groundwater due to the high cost of groundwater pumping. If groundwater is the only long-term water supply, a number of these farm businesses are likely to become unviable.
The economic production from irrigated agriculture in the region was $270 million prior to the drought with irrigated agriculture contributed around 20% of the region’s total agricultural production. Lucerne was the dominant crop 10 to 15 years ago. At that time the area of winter and summer irrigated enterprises was similar. In the late 1990s cotton and horticultural crops developed at Hillston, leading to the relative areas of summer and winter irrigated enterprises being around 65:35. There has been a consolidation of horticultural enterprises and further development of the vegetable industry particularly in the upper catchment and a significant contraction in cotton and lucerne production due to the drought. The sale of a large quantity of water by Twynam Pastoral Company is likely to reduce the area of cotton grown in the future.

Regional response

At a regional level, the Lachlan catchment has been ‘quiet’ as it dealt with the drought and low water allocations. Local retail businesses have had to carry more debt with farming families less able to pay for goods and services. There has been reduced expenditure generally on luxuries such as restaurants and entertainment.

There is recognition by the broader community that in the long-term, the reliance on agriculture needs to be reduced and that the regional economy needs to become more diverse. Local government is strongly focussed on seeking to attract new businesses based on cheap land, lifestyle advantages and infrastructure (rail, road and air). It is also looking at new models of service delivery to attract professionals such as health workers. Off-farm income has been important for farming families and the mines at Parkes and West Wyalong have been significant employers.

Regional vulnerability

The Lachlan region is moderately dependent on irrigation. At a farm level, water supply is critical to those farm businesses involved in intensively irrigated enterprises, including horticultural, vegetable, summer crop and fodder enterprises. Irrigation water availability is important but less critical to farms undertaking irrigated broadacre crop and fodder production in the mid reaches of the valley between Eugowra and Lake Cargelligo, where irrigation typically makes up less than 40% of the farm business.

Mining has been important over the last five years providing significant employment and off-farm income for farming families as well as being a continuing source of economic activity during the drought. The economies of Parkes and Forbes have been underpinned by mining over the last five years. The mines are reliant on water and further expansion of mining will be constrained by access to a reliable water supply. The mines currently use around 3 to 3.5 GL water annually.

Based on the number of irrigation farms accessing Exceptional Circumstances support and utilising the Rural Counselling services, it is likely that the community has limited capacity to cope with a significant reduction in water availability in the absence of adjustment support. Current total water use is around 40% of the total use prior to the drought. The more intensive water users have limited capacity to adjust to dryland farming operations, due either to farm size, supply contracts or the high level of farm investment in irrigated agriculture infrastructure. Larger farms in the mid catchment that have a lower reliance on irrigation will have a greater capacity to respond to ongoing reduced water availability.

Increasing the diversity of the regional economy and reducing the reliance on agriculture is an important strategy for local government to minimise vulnerability in the long-term. Access to a reliable water supply will be important to attract new businesses. The health and reliability of water supply within the
Lachlan river in the Cowra area is seen to be an important component of that local economy.

**Regional water dependence**

In addition to irrigated agriculture, the region's water supply is important for:

- urban population and industry, including the capacity to attract and develop new industry;
- regional tourism (worth around $40 million per annum in Parkes alone); and
- recreational and sporting activities for the regional community and as part of its tourism product.

The recent period of low water availability has seen local government seeking to substitute potable water and secure water for recreational and amenity purposes by stormwater harvesting and recycling of treated effluent.

**Community resilience to change in water allocation**

The Cowra, Forbes and Hillston communities have a high dependency on irrigated agriculture. The impacts of reduced water availability are more obvious in the smaller town of Hillston, however the impacts on Forbes and Cowra are significant. The community resilience to an ongoing reduction in water availability is considered to be limited in the absence of adjustment support.

Both the following figures use summary LGAs within the Lachlan region.

![Index of relative socio-economic advantage and disadvantage (2006)](image-url)

**Figure 21  Index of relative socio-economic advantage and disadvantage (2006)**

**Appendix C  Irrigation district community profiles**
Scope for regional transformation

Scope for farm transformation in response to low water availability

The lighter textured, free draining soils and a slightly higher rainfall in the mid and upper areas of the Lachlan valley support a diversified range of irrigated enterprises. The reliance on groundwater for irrigated agricultural production, while considered a successful short-term response to the drought, is not viable as a long-term strategy for a number of farm businesses due to the high cost of extraction. Not all surface irrigators have access to groundwater. The Lachlan valley is well placed to service the Sydney basin with horticulture, vegetables and specialist fodder production. These industries are anticipated to continue to be produced in the mid and upper reaches of the valley subject to water availability.

The irrigated area downstream of Lake Cargelligo underwent significant expansion in the late 1990s and contracted quickly as a result of the drought. Specialist industries have developed and are currently reliant on groundwater use. Broadacre crops are not expected to be produced on a large scale with groundwater due to the cost of extraction. Around 80 GL of the 220 GL (or 35%) of the General Security water has been purchased by Government in this part of the region. This buyback will significantly limit the extent of irrigated agriculture in this area.

It is likely that farm transformation will involve the expansion of some farm businesses, a reduced reliance on irrigation water each year and a greater capacity to efficiently utilise irrigation water on a more opportunistic basis on the most suitable land and best developed irrigation layouts. This will require significant aggregation of smaller farms in the upper catchment. Some farm businesses have
established major long-term supply contracts with food retailers and processors. These farm businesses are reliant on a reliable water supply.

The drought is expected to slow farm transformation due to an erosion of the capital base of most farm businesses. A significant reduction in water availability in the short-term without the provision of adjustment support would also be likely to result in a relatively slower transformation process, akin to a continuation of the drought.

**Scope to strengthen irrigation management**

On farm water use efficiency has continually improved over the past 50 years. There has been a major focus at a farm level to improve surface water irrigation layouts during the past 15 years as part of the Jemalong Land and Water Management Plan and other program initiatives within the Lachlan valley. Approximately 70% of surface layouts within the more intensively irrigated mid and upper areas of the valley. Most new developments over the past 10 years have been established using best practice both in the upper catchment and the lower catchment.

It is concluded that there is scope to improve farm water use efficiency by around 10% in the short-term. This scope may increase as more experience is gained from the adoption of alternative technologies. It is important to note, however, that most techniques that may increase water use efficiency will also have higher energy requirements. The Lachlan catchment has received funding for two projects as part of the Commonwealth Government On Farm Efficiency Pilot program. One project involves the conversion of surface irrigation to overhead irrigation using centre pivots and the second project involves upgrading a surface irrigation layout to best practice.

The Jemalong Irrigation distribution system has a distribution efficiency of 77% at full allocation. The strategic investment of capital is modelled to raise this efficiency level and reduce conveyance losses.

**Water availability scenarios – introduction**

**Description of scenarios**

Face-to-face interviews of key stakeholders, and a telephone survey of dryland and irrigation farmers, businesses and 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 expressed relative to the long-term cap equivalent water entitlements for the irrigation region. Baseline data are provided below.

The Lachlan region, like other regions within NSW, has undergone a number of adjustments over the past 15 years. Including adjusting to the Murray–Darling Basin Cap on diversions, the NSW Water Sharing Plan, and more recently the changes to water management outlined by the ACCC.

The drought commenced in 2002–03 in central NSW. Over the past seven years up to June 2009, average allocations have been 58% for High Security irrigation and 3% for General Security. High Security allocations ranged between 100% and zero over the seven-year period. General Security allocations have ranged from 0% to 19%, with five of the years recording 0% and one year recording 3%.
There is estimated to be approximately 603 GL General Security entitlements and approximately 60 GL High Security entitlements (31 GL High Security irrigation entitlements) within the Lachlan region. In addition, Jemalong Irrigation holds a conveyance licence of 18 GL. There is 291 GL of groundwater entitlements and supplementary licences of 28 GL reducing to 0 GL by 2015.

Since 2007, there has been a number of government funded water entitlement purchase programs operating within the region. Approximately 100 GL of water entitlement has been purchased, the vast majority (80 GL) by the Commonwealth Government and from the lower Lachlan River (70GL).

Long-term average use is the surface water use during the five years prior to the drought. Groundwater use increased during the drought to approximately 220 GL in response to reduced surface water availability.

A reduction in water availability based on the long-term average allocation would result in a reduction of High Security irrigation water use from 31 GL to approx 12 GL for a 60% scenario. A 60% reduction scenario would reduce General Security water use from 305 GL to 122 GL. This level of reduction is lower than the average seven year drought induced water availability reduction for High Security water use, but greater than the drought allocations for General Security water use. A reduction in High Security water allocations would initially impact on the horticultural industry. The reduction in General Security water availability would impact on the lucerne, cotton and winter crop based farming systems.

### Table 8 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)</th>
<th>Efficiency project savings (GL, committed)</th>
<th>Number of irrigators (number, approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lachlan</td>
<td>335xxiii</td>
<td>35</td>
<td>45xxiv</td>
<td>–</td>
<td>500</td>
</tr>
<tr>
<td>General Security</td>
<td>305</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Security (Irrigation)</td>
<td>31</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundwater (not included in LTCE surface water)</td>
<td>291</td>
<td>220</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 9 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>Lachlan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High security</td>
<td>Horticulture</td>
<td>25</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>General security</td>
<td>Lucerne, cotton and winter crops</td>
<td>245</td>
<td>185</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Groundwater</td>
<td></td>
<td></td>
<td>235</td>
<td>175</td>
<td>115</td>
</tr>
</tbody>
</table>

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

A reduction in long-term water availability will result in financial impacts on irrigated farm businesses and will have flow on impacts to the regional economy. The extent of the impact will be dependent upon the level of income derived from the use of the water and the associated reduction in production.

**Horticulture, including vegetables**

Almost all horticulture (citrus, cherries, almonds and vegetables) is underpinned by High Security water and groundwater. As such a reduction in High Security water allocations or groundwater would initially impact on these industries. Prior...
to the drought the vegetable industry used General Security water. Groundwater has been used as a substitute for General Security water, however many growers plan to switch back to General Security water use as groundwater is not considered a long-term viable water supply option. A reduction in General Security water availability would therefore also have long-term impacts on these producers. Subject to commodity prices and water prices horticultural growers may enter the annual water market and purchase water from other industry groups from within the region. Many of the horticultural growers either have supply contracts with supermarkets, fast food outlets or food processing companies or they sell directly into the fresh produce markets in the Sydney basin.

Table 10 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>Lachlan</td>
<td>Horticulture</td>
<td>Strategic purchase of allocated water on a seasonal basis.</td>
<td>Strategic purchase of allocated water on a seasonal basis by the more efficient and highly developed farm businesses.</td>
<td>Strategic purchase of allocated water on a seasonal basis by a limited number of efficient businesses. Subject to water prices and commodity prices there is likely to be a moderate reduction in production due to less viable growers ceasing to operate due to increased water expenses.</td>
</tr>
<tr>
<td>Lachlan</td>
<td>Lucerne, cotton and winter crops</td>
<td>Strategic purchase of allocated water by larger farms or farms producing specialist products. A number of the smaller and mid-size farms become unviable.</td>
<td>Most farms reliant on irrigated agriculture become marginal or unviable.</td>
<td>Significant rationalisation of the number of irrigation farms with most farms being dependent on dryland agriculture.</td>
</tr>
</tbody>
</table>

**Broadacre farms**

Prior to the drought, these farm businesses had access to annual allocations of around 75%. Water use prior to the drought averaged 60% of entitlement. The General Security water was used for lucerne, winter crop production and summer crop production. The lucerne enterprise underpinned livestock fattening enterprises (mainly lamb). A transition to the Lachlan WSP long-term diversion limit equivalent to 50% allocation for General Security entitlements will mean these farm businesses will have access to approximately 10% less water than they used prior to the drought. As such a 20% reduction in long-term availability will in effect be a reduction of 30% compared to prior to the drought. The more developed intensive irrigation farm businesses that were using the majority of the irrigation water will be more severely impacted. Approximately 20% of irrigation farm businesses use approximately 65% of the total water use. Most farm businesses have not developed longer term strategies to adjust to the lower WSP diversion limit due to the imposition of the drought.

During the drought, General Security water allocations have averaged 3%. Farms that were producing lucerne, hay or irrigated winter and summer crops have ceased production of these as a result of the drought. Irrigation farmers have either sold the small quantities of water they were allocated, used it to irrigate winter crops or carried the water forward. A significant quantity of the carryover water has been suspended due to insufficient river flows to deliver the water to diversion points.

A long-term reduction in available water is expected to result in a relatively greater reduction in irrigated broadacre production, depending on the scale of reduction. It will be uneconomic for individual farm businesses using small quantities of irrigation water to undertake the necessary investment to maintain and redevelop irrigation enterprises. It is likely that farm rationalisation will occur with fewer larger farm businesses using the water previously used by the smaller farms. Irrigation is likely to contract from the larger broadacre, predominantly dryland farms in the mid catchment region and used by the more
intensive irrigation farm businesses in the upper and lower catchment. This may also lead to a change in crop mix with less irrigated winter crop grown.

The impacts of the water scenarios evaluated will impact differently on the region’s broadacre farms. It is expected that the smaller farms and a number of the mid sized farms will become unviable, if the long-term water availability was reduced by 20% compared to the long-term average diversion limit. Any further increase in the level of reduction will increase the proportion of farms becoming unviable. A 60% reduction in the long-term water availability is expected to lead to significant restructuring of the irrigated agricultural sector.

**Water availability scenarios — telephone survey responses**

For the Lachlan as a whole, in the telephone survey conducted for this assignment, 6% of irrigation farmers indicated they would seek to exit if water availability reduced by 20%, with 17% indicating they would seek to exit if it reduced by 40%.

The response to the scenarios from different sectors across the Basin as a whole are discussed in the Synthesis Report for this assignment.

![Figure 23 Lachlan: telephone survey responses to water availability scenarios](image-url)

**Figure 23** Lachlan: telephone survey responses to water availability scenarios
Water availability scenarios — value chain and flow-on impacts (face-to-face interviews)

The major flow-on effects of reduced water availability are expected to result from the impact on the lucerne and crop based businesses. While there is anticipated to be an effect on the horticultural industries in the region, this is likely to be relatively small, unless the reductions in water availability were 40–60%. The initial impacts will be a reduction in farm inputs, freight from the farm to the grain storage, farm level processing and reduced labour requirements. A significant proportion of the irrigated produce is transported and marketed within the Sydney Basin.

The impacts of reduced water availability will initially be felt within the Cowra, Forbes and Hillston business communities and to a lesser extent Condoblin. The larger centres have been underpinned by High Security water allocations and groundwater during the drought. They will, however, be directly impacted by flow-on effects from any reduction in General Security water availability as a significant number of the region’s businesses provide services to the broadacre irrigated industries. Subject to the scale of the reduction in water availability, the flow-on effects could have substantial impacts on the level of services local government can provide and other services including health, education and policing, particularly in Hillston.

Table 11  Summary 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>Lachlan</td>
<td>Horticulture</td>
<td>Post-farm processing and direct marketing expected to continue to occur at similar levels subject to commodity prices and water prices.</td>
<td>Post-farm processing and direct marketing expected to continue to occur at lower levels subject to commodity prices and water prices.</td>
<td>Post-farm processing expected to occur at lower levels due to reduced production. There is likely to be reduced farm production.</td>
</tr>
<tr>
<td>Lachlan</td>
<td>Broadacre</td>
<td>Freight of hay and grain and grain handling and storage requirements reduced. Cotton gin at Hillston to reduce capacity.</td>
<td>Freight of hay and grain and grain handling and storage requirements reduced. Cotton gin at Hillston to reduce capacity.</td>
<td>Post farm processing of irrigated production to be significantly reduced.</td>
</tr>
</tbody>
</table>
Figure 24 Map of irrigation district
Endnotes


ii  MJA Socio-economic Survey for MDBA 2010

iii  MJA Socio-economic Survey for MDBA 2010

iv  MJA Socio-economic Survey for MDBA 2010

v  MJA Socio-economic Survey for MDBA 2010

vi  MJA Socio-economic Survey for MDBA 2010

vii  MJA Socio-economic Survey for MDBA 2010

viii  MJA Socio-economic Survey for MDBA 2010

ix  MJA Socio-economic Survey for MDBA 2010

x  MJA Socio-economic Survey for MDBA 2010

xi  Australian Bureau of Agricultural and Resource Economics. 2008, Australian Farm Survey Results 2005–06 to 2007–08, Canberra

xii  Australian Bureau of Statistics. 2006, 2006 Agricultural Census, Canberra

xiii  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xiv  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xv  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xvi  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xvii  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xviii  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xix  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xx  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xxi  Australian Bureau of Statistics. 2006, 2006 Census, Canberra

xxii  NSW WSP

xxiii  Published figures from the NSW and Commonwealth Governments were used to estimate buybacks.

xxiv  MJA Socio-economic Survey for MDBA, March–April 2010. n=51 (–20% scenario), n=87 (–40% scenario). Samples were independent.