Gwydir community profile

Irrigation region

Key issues for the region

1. Region’s population — The region’s population is approximately 25,350 people, and the ABS records around 150 irrigating agricultural businesses.

2. Gross value of irrigated agricultural production
   • The drought affected gross value of irrigated agricultural production for 2006 in the Gwydir valley was $171 million.

3. Water entitlements (approximate)
   • The Surface Water Long-term Cap is 392 GL.
   • High Security entitlements for the Gwydir region are 19 GL.
   • General Security entitlements are approximately 510 GL.
   • Supplementary licences are 178 GL.
   • Groundwater entitlements are worth approximately 29 GL.
   • Supplementary Groundwater entitlements are 14 GL.

4. Major enterprises — Cotton is the major irrigated enterprise, but cereal crops, fodder crops, fruit and vegetables are also grown in different parts of the catchment.

5. Government buyback — The Commonwealth Government buyback in the Gwydir has been 105 GL.

6. Water dependence — The Gwydir region has a high level of water dependence because the regional economy is largely reliant on irrigated cotton.

7. Current status
   • The Gwydir is an agricultural valley. Agriculture is responsible for more than twice as much employment as any other sector in the local economy. Moree is by far the largest service centre, with an economy that is also focussed on agriculture. Irrigated crops, particularly cotton, account for about half of all agricultural inputs.
   • The limited diversity of the local economy means that out-migration of workers, and their families, provides the main adjustment to prolonged periods of poor returns — especially when jobs are readily available elsewhere. For example, significant migration occurred in the droughts of the mid–1990s and mid–2000s, and 1741 people moved out of Moree Plains Shire in the census period between 2001 and 2006. More people have left since 2006. The smaller agricultural towns in particular are working towns and people move away if there is no work.
   • By contrast, the region’s large Indigenous population, who have strong links to country, tend to stay in the region during the good and bad times. They live in expectation of employment returning to the region. Consequently, the Indigenous population is getting larger in both in absolute and proportionate terms.
   • Because agriculture is such a large employer, any hit to that sector also affects the next largest regional employment sectors: retailing; and health and community services.
Reduced water availability, caused by the combination of drought and the Commonwealth Government buy-back, has significantly reduced economic activity in the region over the past five years. Most of the nine cotton gins are running well below optimum levels. One is said to have become unviable since Twynam sold their water to the Commonwealth Government.

There is scope to triple high value horticultural production (pecans, olives and citrus) in the region, but this would still account for a very small percentage of the total volume of water used. It is highly unlikely that any other enterprise will make significant inroads into the dominance of the cotton industry. Moreover the outlook for cotton production is good, providing there is sufficient water to support that production.

The most immediate issue is the potential for business recovery following the drought. The economic prospects for irrigated cotton are strong, but those prospects cannot be realised without water. After several years of low incomes, those irrigators with high debt levels may struggle to recover from the drought.

Water use efficiency, in terms of the cotton produced per megalitre of total water use has been improving steadily. There has been gradual adoption of pressurised irrigation in some regions, but for many irrigators the reliability of the water is already too low to justify costly capital investment. Pressurised irrigation also brings with it the risk of increasing energy costs over time. Drip irrigation is not suited to the cracking clay soils common in many areas.

Commodity prices will continue to fluctuate. If agriculture were still the large share of exports it was a generation ago, cycles in international prices would be partly offset by changes in exchange rates. The future is uncertain, but the recent rapid growth of mining suggests that future exchange rates will not be significantly affected by the ups and downs of agriculture. By contrast, agricultural profitability will be affected by changes in exchange rates. Agriculture has no choice but to continue to adapt as it has in the past.

8. Responses to water availability scenarios

The relationship between water availability and economic activity is more or less a straight line; the more water available for irrigation, the more economic activity. Consequently, outside the usual concerns about variable water availability, uncertainty about future water security, that is, uncertainty about sustainable diversion limits, is influencing confidence and investment in irrigation enterprises. In particular, uncertainty about the nature of the move to sustainable diversion limits is eroding confidence and investment.

If the sustainable diversion limit is achieved through buy-back, something that local communities are now familiar, but uncomfortable, with, then the remaining irrigators will keep on with business as usual. For them, yields, quality and productivity will continue to improve, and terms of trade pressures will continue to grow, as they do for all of agriculture. Increasing competition for labour from mining industries will continue to make skilled labour scarcer and it will increase the need for capital efficiency. Commodity price trends, input price trends and exchange rate trends will continue to drive the search for economies of scale.
• If the sustainable diversion limit were to be achieved through universal cuts to existing entitlements, then the effects on overall economic activity would be much the same, but the number of individuals directly affected would increase. Total transaction costs would be greater with this sort of approach. A series of market adjustments would be required help to consolidate the remaining water on to fewer farms. Irrigators are wary of this approach; they feel it would not give significant recognition to previous reforms that have already reduced the volumes of water that irrigators can expect to receive, and the reliability with which they can expect to receive those nominal volumes. Irrigators would welcome recognition of what they have already done to improve the sustainability of irrigation.

• Whatever approach to sustainable diversion limits is adopted, people would feel better about the change if they had confidence that environmental benefits were transparent and achievable. The people of the Gwydir are concerned that there might be a lot of economic pain for little or no environmental gain. They want to understand the potential environmental gains. The community understands the importance of the Gwydir Wetlands as a key environmental asset, but up until recently all of the wetlands were in private hands; few people had therefore had the opportunity to gain an appreciation of their environmental worth. The debate centres on how this asset is to be best managed, and the relative importance of more water or less grazing pressure for its future health. Increased flows will also generate economic benefits for the graziers who own and manage the wetlands.

• The owners of small businesses in the smaller agricultural towns feel particularly vulnerable to the potential reduction in diversions. Their livelihoods are affected, but they don’t have any control over the decisions to buy or sell water.

Regional overview

Towns in the Gwydir region include Ashley, Bingara, Garah, Gravesend, Moree, Pallamallawa, Rowena, Upper Horton, Uralla, and Warialda. Of these, irrigation is particularly important to Moree and Pallamallawa.

Moree, on the Mehi River (a tributary of the Gwydir), is by far the largest service centre. Situated on the junction of the Newell and Gwydir Highways, it is a popular stopover destination for travellers as well as a transport hub with daily air and rail links to Sydney. For more than a hundred years it has had a tourism industry based around its artesian spa.

Moree Plains Shire Council boasts a large Indigenous population (17%), and is committed to leading the way in reconciliation.¹

The Gwydir Wetlands are Ramsar-listed and, earlier in 2010, the Commonwealth Government purchased part of the Wetlands, and associated water entitlements, intending to create a national park.²
Figure 1  Location of irrigation district

Collection District based Irrigation Regions

- capital city
- main town
- state border
- main rivers
- Basin Plan regions

- Riverland irrigation districts
- Sunraysia irrigation district
- Goulburn–Murray irrigation district
- NSW Central Murray irrigation districts
- Murrumbidgee irrigation district
- Namoi irrigation district
- Gwydir irrigation district
- Border Rivers irrigation district
- Lower Balonne irrigation district
- SA Below Lock 1 Irrigation District

Appendix C  Irrigation district community profiles
Irrigation overview

The history of water use on the Gwydir closely mirrors that on the Namoi, despite the 18-year gap between the construction of the Keepit and Copeton Dams and the nature of the lessons that could have been learned from the Namoi. When work began on the Copeton Dam in 1968; the total storage was estimated at 1.36 million megalitres; this was thought capable of irrigating around 50,000 ha. In 1971, five years before Copeton became operational, volumetric allocations on the Namoi had been set based on approximately six ML per ha. On this basis, if the target for the Gwydir was 50,000 hectares of irrigation, licences totalling 300,000 ML should have been issued. Licences on the Gwydir totalled more than 525,000 ML at their peak. Issuing this volume of entitlement served to reduce the reliability of all entitlements.

The Gwydir River catchment covers 25,900 km². The river flows north-west from Uralla and Guyra in the east to Collarenebri in the west. Major tributaries drain from the New England Plateau in the east, the Mastermans Range in the north and the Nandewars in the south. About 75% of the river basin is flat and 15% is steep. Most major tributaries enter above Moree. Below Moree the river has the characteristics of an inland delta with important wetlands. In floods, water can flow to and from the adjoining river valleys. The Gwydir Raft, an accumulation of timber, debris and sediment, extends about 35 kilometres along the river below Moree. Water pooled behind this blockage breaks out of the Gwydir channel northwards into the Gingham Watercourse and south into the Tyreel Anabranch.

The first cotton crop on the Gwydir was harvested in 1977, 15 years after the first crop on the Namoi. The first harvest showed the prospects for cotton production on the Gwydir were excellent. It was followed by a rush of applications for water licences. An administrative embargo on further processing of applications was declared in 1977. This was a year after a statutory embargo on the Namoi had put an end to applications being accepted there. In between the administrative embargo and the statutory embargo on the Gwydir, applications for a further 30,000 ha of potential irrigation were accepted. In good years 80,000–90,000 ha have since been irrigated on the Gwydir. Cotton accounts for nearly 90% of irrigation.

Australian cotton production has been transformed since irrigation commenced on the Gwydir. Australian average cotton yields per ha are the highest of any major cotton producing country in the world; they are almost three times the world average. Australian cotton is considered a premium quality product on world markets. In addition, there is strong evidence that growers have increased their water use efficiency by 3–4% per year or 20% in the past decade.iii

![Figure 2. The Gwydir Raft](image)
Rural water supply

Regional system description

Publicly-owned storages account for nearly 75% of the total storage capacity on the Gwydir, but less than half of the long-term average water use comes from regulated flows. The rest comes from groundwater, supplementary licences and overland flows. Large on-farm storages are a feature of irrigation on the Gwydir.

The NSW Government has signalled that all existing floodplain harvesting works and floodplain harvesting extractions will be licensed. Licensing will focus initially on controlling the structures, but with movement towards specifying volume limits and flow related access conditions, including metering of pumps. Once licensing is completed, an assessment of long-term use, resulting from authorised structures against that from structures which existed in 1994, will be carried out and appropriate steps taken to keep harvesting to Cap levels.

A small volume of high security water entitlements were issued on the Gwydir. The operating rules for Copeton require two years supply of high security water to be held in storage after the last general security allocation is made. Therefore, because the proportion of high security water in the Gwydir system is very small, this water is thought to be at least as secure as Murrumbidgee high security water. There is scope for about 3,000–4,000 hectares of perennial horticulture, of which around 1,300 has been developed.

Table 1 Water Entitlements for the Gwydir Valley

<table>
<thead>
<tr>
<th>Licence Type</th>
<th>Volume (GL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Security</td>
<td>19</td>
</tr>
<tr>
<td>General Security</td>
<td>510</td>
</tr>
<tr>
<td>Supplementary Water</td>
<td>178</td>
</tr>
<tr>
<td>Groundwater</td>
<td>29</td>
</tr>
<tr>
<td>Supplementary Groundwater</td>
<td>14 GL</td>
</tr>
</tbody>
</table>

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 climate and soils of the Gwydir region in the lower reaches are suited to cotton production. Cereal rotations are part of the farming system, however irrigators make their money from cotton. The upper reaches are better suited to lucerne production, vegetables and fruit crops. Large-scale changes to the crop mix are thought unlikely.
Figure 3  Regional issues — all farms

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 43

Figure 4  Survey respondents by farm type

Number of farms = 23.
Financial capital

Cotton farmers have very sophisticated and financially savvy management systems. For example, forward selling means that when a crop is planted, the selling price is already known. The Gwydir’s long history of irrigation meant that many growers had financial reserves to draw on in the drought. Nonetheless, many farms now have high levels of debt and limited financial capacity to recover from the drought. Others with less debt have been able to contain their costs and wait for the opportunity to generate revenue once water becomes available. In more remote areas, the opportunities for increasing off-farm income are low.

Human capital

The level of stress amongst farming families has increased over the last five years. A continuation of current conditions will see considerable adjustment and fewer farmers. Reduced water availability will compound these strains. Outside the large centres, there is limited capacity to support farming families through further change.

Financial ratios

Debt to equity ratios have increased because low water availability during the drought has reduced the potential to generate revenue from the different forms of capital held on the farm. By contrast interest payments mean that there is a steady stream of costs.

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

The farm: Livestock farms

The figures and 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 (36% of livestock farmers in the Gwydir have off-farm income (11 survey respondents)); and
• measures of optimism, and how satisfied farmers are with a range of life issues.

Table 2 Farm financial measures

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on assets</td>
<td>2.13%</td>
</tr>
<tr>
<td>Debt ratio</td>
<td>8.06%</td>
</tr>
<tr>
<td>Water/total assets</td>
<td>0.00%</td>
</tr>
</tbody>
</table>
Figure 5 Farm issues — livestock farms

*Note: 1 = No problem to 5 = Significant problem. Number of respondents = 11*

Figure 6 Farm financial measures — livestock
The farm: livestock and broadacre

'Broadacre' includes cotton farming; this is an ABS definition.

The figures and 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.

On-farm irrigation water use

Irrigation application methods

Drip irrigation is used for fruit and vegetable crops, but the vast majority of cotton is furrow irrigated. Drip irrigation is generally not suited to heavy, self-mulching clay soils. Some irrigators have installed travelling irrigators and are reporting improved efficiency. Changes over the last five years have mostly focussed on decisions around the right time to irrigate and the right volume to apply. This has improved efficiency.

Technically, more efficient systems are possible for cotton, but they come with extra costs. Efficiency will continue to improve. There may be scope to limit evaporation from on-farm storages.

Most irrigation farms depend on river pumps, ring tanks, open-channel conveyance systems and siphon-fed furrow irrigation. Groundwater pumps are an important adjunct in many places. The efficiency of furrow irrigation has increased by applying water at faster rates and by irrigating only every second row.
Figure 8 Farm issues — livestock and broadacre farms

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 10

Figure 9 Optimism — livestock and broadacre

Note: 1 = Completely dissatisfied to 10 = Completely satisfied. Number of respondents = 10
Table 3 On-farm irrigation management (2007–08)\textsuperscript{xi}

<table>
<thead>
<tr>
<th>Irrigation parameter</th>
<th>Livestock (%)</th>
<th>Broadacre &amp; livestock (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flood flow</td>
<td>0</td>
<td>22%</td>
</tr>
<tr>
<td>Travelling</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Microject fixed sprinklers</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Drip/trickle</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>11%</td>
</tr>
<tr>
<td>Timing irrigation on the basis of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil moisture measuring tools</td>
<td>0</td>
<td>33%</td>
</tr>
<tr>
<td>Calendar based</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Weather forecast</td>
<td>0</td>
<td>11%</td>
</tr>
<tr>
<td>Own observations/knowledge</td>
<td>0</td>
<td>33%</td>
</tr>
<tr>
<td>Percentage of farms trading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchasing</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Selling</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

**Opportunities/trends**

Reduced water availability combined with the potential to sell water entitlements will continue to encourage improvements in water use efficiency. The irrigation industry is actively researching the potential to reduce evaporation from on-farm storages by making them deeper to reduce the surface area to volume ratio or through the application of thin films to the water surface. There is potential to halve existing evaporation losses. The main technical problem is wind shear of the films — wind-induced wave action breaks the films up and allows evaporation to continue.

**Water entitlements**

As with the other valleys in the northern Basin, irrigators in the lower reaches of the river, where large on-farm storages are viable, rely on a mix of three water entitlement types to meet their needs. General security licences allow them to pump limited volumes from rivers during low, regulated flows. Supplementary licences allow them to pump limited volumes from rivers once flows exceed a predetermined rate, and overland-flow harvesting allows them to capture and store rainfall run-off from their properties.

**Soil moisture measurement**

Soil moisture is monitored in the region using capacitance probes. The scope to improve water use efficiency through improved soil moisture monitoring is being continuously refined. The adoption of this technology is very high in the cotton industry relative to other extensive irrigated crops.

**Irrigation timing**

Best practice irrigation management is about applying the right amount of water at the right time. Irrigators use their understanding of soil moisture levels and evaporative demands to guide their decisions about when to irrigate. The aim is to apply irrigation water late enough to ensure that the application method will not result in waterlogging, but not so late that the crop suffers from moisture stress.
Regional agricultural production

Regional agricultural value chain

Because agriculture is the biggest employer, climate variability is a major economic driver in the region. The people of the Gwydir depend on the returns from good years to help them ride out the bad years.

The ups and downs of irrigated agriculture have a big impact on other sections of the regional economy. Relative to other agricultural industries a higher proportion of the income generated from cotton goes outside the region. It is spent servicing debt and purchasing inputs directly from suppliers outside the region. However, the total revenue involved is so large that what does stay in the regional economy drives numerous other economic activities and supports many jobs. Low water availability over the last five years has seen a drop in the number of people directly employed in cotton production. On top of this, the move to grow genetically modified cotton has resulted in less demand for unskilled workers to chip weeds.

Water availability is the major constraint for irrigated agriculture. As just one example, there are nine cotton gins in the region, seven near Moree and two near Collarenebri. Therefore, at face value, the existing buyback is likely to result in the closure of two or three gins. A sustainable diversion limit that reduced long-term average water use by 20% might bring about the closure of another one or two gins. A 40% reduction might see two or three close and a 60% reduction, three or four. A reduction in irrigated agriculture would provide a shock to Moree's economy. These are working towns and people move if there is no work. Further reductions to water availability would therefore put a big dent in the demand for the existing retail and service sectors. This would make it even harder for farmers in the more remote parts of the catchment to attract and retain skilled workers, especially those with young families desiring ready access to schools and other services. Any gin closure would also change transport patterns, possibly incurring significant costs in road maintenance.

Figure 10  Gross value of agricultural production (GVAP) (2006)
Figure 11  Gross value of agricultural production (GVAP) $/ML of water used (2006)\textsuperscript{xxiv}

Figure 12  Level of highest school education (2006)\textsuperscript{xxv}
Figure 13 Higher education (2006)\textsuperscript{xvi}

Figure 14 Employment (2006)\textsuperscript{xvii}
The region’s community — education, employment and income

Community overview

Moree is the major service centre for the irrigated parts of the Gwydir. Moree’s economy is highly dependent on agriculture, with irrigation accounting for about half of the agricultural inputs. The limited diversity of the local economy means that out-migration of workers and families provide the main adjustment to prolonged periods of poor returns, especially when jobs are readily available elsewhere. Significant migration occurred in the droughts of the mid 1990s and mid 2000s. For example, 1,741 people moved out of Moree Plains Shire between 2001 and 2006.

Collarenebri is another population centre likely to be affected by the move to sustainable diversion limits. It is a town of fewer than 500 people and two cotton gins in close proximity. One of the gins is said to have become unviable when Twynam sold to the Commonwealth Government.
Figure 16  Regional issues

Note: 1 = No problem to 5 = Significant problem. Number of respondents = 36

Figure 17  Optimism (regional people)

Note: 1 = Completely dissatisfied to 10 = Completely satisfied. Number of respondents = 36
The region’s community — demographics and key statistics

Table 4 Demographics and key statistics (LGAs within study area. 2006)\textsuperscript{xx}

<table>
<thead>
<tr>
<th></th>
<th>Armidale</th>
<th>Dumaresq</th>
<th>Guyra</th>
<th>Gwydir</th>
<th>Inverell</th>
<th>Moree Plains</th>
<th>Uralla</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>113</td>
<td>2,419</td>
<td>4,687</td>
<td>1,662</td>
<td>11,676</td>
<td>4,793</td>
<td>25,350</td>
<td></td>
</tr>
<tr>
<td>Total Indigenous persons</td>
<td>3</td>
<td>322</td>
<td>110</td>
<td>32</td>
<td>1,947</td>
<td>262</td>
<td>2,676</td>
<td></td>
</tr>
<tr>
<td>Farm and farm managers</td>
<td>28</td>
<td>208</td>
<td>525</td>
<td>183</td>
<td>664</td>
<td>210</td>
<td>1,818</td>
<td></td>
</tr>
<tr>
<td>Farm and farm managers as percentage of total employed</td>
<td>47%</td>
<td>23%</td>
<td>27%</td>
<td>24%</td>
<td>13%</td>
<td>10%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td>43</td>
<td>893</td>
<td>1,966</td>
<td>630</td>
<td>4,450</td>
<td>1,879</td>
<td>9,861</td>
<td></td>
</tr>
<tr>
<td>Dwelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully owned</td>
<td>9%</td>
<td>25%</td>
<td>20%</td>
<td>33%</td>
<td>24%</td>
<td>32%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Being purchased – directly or rent/buy scheme</td>
<td>33%</td>
<td>17%</td>
<td>17%</td>
<td>9%</td>
<td>30%</td>
<td>17%</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>Rented</td>
<td>16%</td>
<td>5%</td>
<td>7%</td>
<td>6%</td>
<td>5%</td>
<td>4%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Community services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population per health employee</td>
<td>0.00</td>
<td>0.00</td>
<td>180.27</td>
<td>554.00</td>
<td>243.25</td>
<td>165.28</td>
<td>239.15</td>
<td></td>
</tr>
<tr>
<td>Population per culture and recreation employee</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

The regional economy

Regional economic structure

Employment is concentrated in agriculture and retailing. The health and community services industry is the next biggest employer. The relative share of employment in agriculture tends to be higher in the downstream reaches.

Relative to other irrigated regions in the northern Basin, there are fewer farms and the farms are larger. Five large operations account for more than half the water use. Most of these larger operations have integrated irrigation and dryland enterprises.

The regional economic structures of various cotton communities have been documented in a set of case studies. In the case of Moree the study concluded that agriculture is the dominant industry, accounting for 44% of gross regional production and virtually all of the exports from the region.\textsuperscript{xx}

Main future risks, opportunities and constraints to the major industries

Cotton has excellent prospects for the future, provided there is water to support its production.

Irrigated horticultural production in the region has the potential to triple. Increased irrigated horticulture would add to the regional economy, but would remain a small part of total water use.
Regional response over the last five years

Water shortage

Water shortages have had a significant impact in the Gwydir over the past five years; they have reduced incomes substantially and made the business of irrigation very difficult.

Regional response

In general, irrigators have scaled back production and tried to minimise costs. They have done what they can to grow other crops opportunistically, but there is very limited potential for them to transform their businesses. Most of the smaller farms are too small to be viable dryland enterprises, and most farmers want to generate a return from their existing investments in on-farm water infrastructure. Cotton is where they have most potential to make money in the long-run and the future for the cotton industry is bright if there is enough water to produce a viable crop.

While water trade has played an important role in farm adjustment, it has played a limited role in managing the risk of drought. In each of the northern valleys, cotton is the dominant crop, diminishing the scope for individual irrigators to swap risks with each other. By contrast, in the southern Basin, horticulturists and dairy farmers have been able to buy water from rice farmers. This has allowed the horticulturists and dairy farmers to maintain their enterprises, and it has allowed rice farmers to make more money from selling their limited allocations of water than they would have by using the water.
For larger irrigation enterprises, one risk management strategy has been to have a presence in more than one valley. This has helped some to ride out the variability. Within each valley there has been some consolidation of water from several farms on to individual farms held in the same ownership. Often the chosen farm offers better water use efficiency, but sometimes it might be the one closest to the gin, thereby helping to contain transport costs.

Some irrigators have now run-down the equity in their businesses and will struggle to recover from the drought. A long-term reduction in the average amount of water available for irrigation will see a reduction in the total number of farm businesses.

**Regional vulnerability**

None of the towns in the region have diverse economies and those, like Moree, that are heavily dependent on irrigated agriculture are particularly vulnerable to changes in sustainable diversion limits. The high labour force participation rates in some parts of the region show that these are working towns and people will move out if there are no employment opportunities.

**Regional water dependence**

The region is vulnerable to changes in sustainable diversion limits because irrigated agriculture plays a prominent role in the regional economy.

**Community resilience to change in water allocation**

Community resilience to changes in water allocation is low.

**Scope for regional transformation**

**Scope for farm transformation in response to low water availability**

Typically, cotton accounts for 70–80% of farm income while in any one year it might account for as little as 10% of the farm area. The rest of the farm is typically taken up with other crops, crop fallow areas, pastures, roads, irrigation channels, dams and native vegetation. Wheat, sorghum and beef cattle are often part of the enterprise mix. The farm system has dryland components, but many of the smaller farms are too small to be viable dryland farms in their own right. The largest operations in the Gwydir typically have integrated irrigation and dryland enterprises.

There is very low capacity for cotton farms to transform profitably into the production of different commodities. Although a few may be able to shift to large scale vegetable production, vegetable markets would soon be saturated if everyone adopted this approach.

There may be scope for other broadacre irrigation enterprises to transform their crop mix, but more realistically, in the absence of any restrictions on water trade it is likely that water would move away from these enterprises to support the cotton industry.

**Scope to strengthen irrigation management**

There is limited scope to further strengthen irrigation management in the Gwydir. Further changes are likely to be evolutionary rather than revolutionary. Reduced water availability may result in some consolidation of farms and the cessation of irrigation on certain marginal lands.
Figure 19  Index of Relative Socio-economic Advantage and Disadvantage (2006)

Figure 20  Unemployment and labour force participation (2006)
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 (LCTE) water entitlements for the irrigation region. Baseline data are provided below. The total entitlement for the region is around 750 GL, which is expressed in LTCE terms.

It is important to note that these figures do not include the volumes harvested as overland flows which are estimated to average 97 GL.

<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>Gwydir</td>
<td>390</td>
<td>160</td>
<td>40</td>
<td>–</td>
<td>150</td>
</tr>
</tbody>
</table>

This profile uses a range of scenarios of possible changes in water availability to support discussions (20%, 40% and 60% reductions against the long-term average). 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.

<table>
<thead>
<tr>
<th>Region</th>
<th>Sector</th>
<th>20% GL</th>
<th>40% GL</th>
<th>60% GL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gwydir</td>
<td>Primarily cotton</td>
<td>315</td>
<td>235</td>
<td>155</td>
</tr>
</tbody>
</table>
Water availability scenarios — direct impacts (face-to-face interviews)

Cotton

Cotton accounts for more than 80% of the irrigated area.

The relationship between water availability and economic activity is more or less a straight line; the more water available for irrigation, the more economic activity.

Under the 20% scenario irrigators would initially scale back production and try to minimise costs. Irrigators would take what opportunities they could to grow crops opportunistically, but there is very limited potential for business transformation. Most farms are too small to be viable dryland enterprises, and most farmers want to generate a return from their existing investments in on-farm water infrastructure. Cotton is where they have most potential to make money in the long-run and the future for the cotton industry is bright if they have enough water to produce a viable crop.

The 20% scenario would affect people’s profitability and would see some people leaving farming.

The 40 and 60% scenarios would result in major changes. xxvii A series of market adjustments would consolidate the remaining water on to fewer farms.

<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>Gwydir</td>
<td>Cotton, broadacre, livestock</td>
<td>Reduced profitability, scaling back of production, efforts to reduce costs, many exiting irrigation, resulting in water market adjustments.</td>
<td>Significant cuts in production and consolidation of water on to fewer farms through water market adjustments.</td>
<td>Further significant cuts in production and consolidation of water on to many fewer farms through water market adjustments.</td>
</tr>
</tbody>
</table>

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

Communities

A reduction in irrigated agriculture would have a big impact on small centres, which could be reduced to welfare-dependency and a reduction in services. This would make it harder again for farmers in the more remote parts of the catchment to attract and retain skilled workers, especially those with young families desiring ready access to schools and other services.

The owners of small businesses in the smaller agricultural towns would be particularly vulnerable to the potential reduction in diversions. Their livelihoods are affected, but they don’t have any control over the decisions to buy or sell water.

<table>
<thead>
<tr>
<th>Region</th>
<th>Key sectors</th>
<th>–20% LTCE</th>
<th>–40% LTCE</th>
<th>–60% LTCE</th>
</tr>
</thead>
</table>
Figure 21 Map of irrigation district
Endnotes

i Moree Plains Shire Council. 2010, see www.mpsc.nsw.gov.au

ii The Ramsar Convention on Wetlands of International Importance is an intergovernmental treaty that provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources

iii Roth, Guy 2009, Economic, Environmental and Social Sustainability Indicators of the Australian Cotton Industry, PhD thesis, University of New England, Armidale

iv Water Sharing Plan for the Gwydir Regulated River Water Source 2002

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 MJA Socio-economic Survey for MDBA 2010

xii MJA Socio-economic Survey for MDBA 2010

xiii Australian Bureau of Statistics. 2006, 2006 Agricultural 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 Cotton Catchment Communities CRC, Communities and People Series. 2009, The Socio-economic Impact of the Australian Cotton Industry of Regional Communities in NSW and Queensland, Armidale

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 Australian Bureau of Statistics. 2006, 2006 Census, Canberra

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


Also pers. comm. Craig Cahill, State Water Corporation, Water Delivery Manager Northern, April 2010

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

xxvii 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.