Securing Wealth and Wellbeing of Rural Communities

Cotton Catchment Communities CRC
Project 3.03.13

Economic profiles, supply chains and implications for the three case study communities

Prepared by
Strategic Economic Solutions
February 2012

Contents

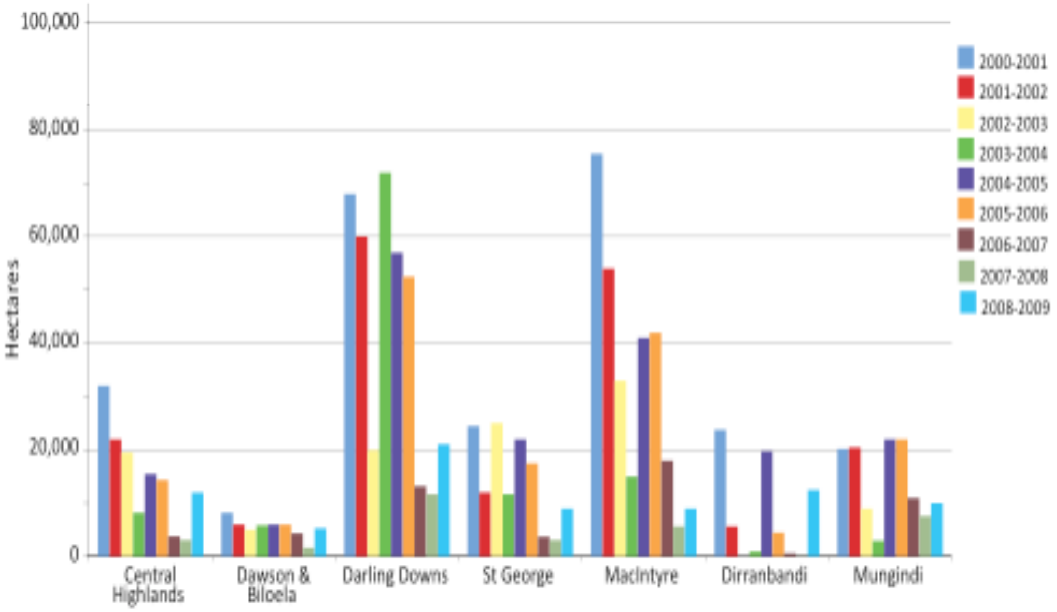
1 Balonne Shire and St George

Introduction
Balonne Shire is located in Queensland near the New South Wales border about 500km from the east coast of Australia and has an area of approximately 31,000km2. St George is the principle township and was founded in around 1850 as the district centre of what was then mainly a wheat-sheep area. This was true until the mid-twentieth century, when the community began a transition towards irrigation production, mainly of cotton. The Balonne regional economy has always been highly reliant on agriculture, with 2006 Census data indicating that 36.1 per cent of employment was in agriculture, or 10.6 times the ratio for the whole of Queensland.

Cotton Production
In 2006, there were 2,485,443ha of land under agricultural cultivation in Balonne Shire, and approximately 50 cotton growers in the area around St George and Dirranbandi. The majority of this land was used for grazing, with a small proportion used for broadacre crops and with cotton a smaller but economically significant use; the value of agricultural production for Balonne Shire in 2005–06 was $221 million, of which $134.1 million was crops of mainly cotton (MDBA 2010).

Cotton plantings and yields can vary significantly from year to year, depending on factors such as water availability, temperature and insect pressure. Figure X below shows area planted in the cotton growing regions of Queensland between 2000 and 2009. In St George the area fluctuated between over 20,000ha and under 10,000ha, while Dirranbandi experienced a year of no plantings in the last five years due to drought conditions. Between 2000 and 2008, the number of cotton bales ginned in the St George cotton growing region has varied from 26,000 to 185,000 with an average of 114,687 bales per season (Roth 2010).

Figure 1 Area of Cotton in QLD



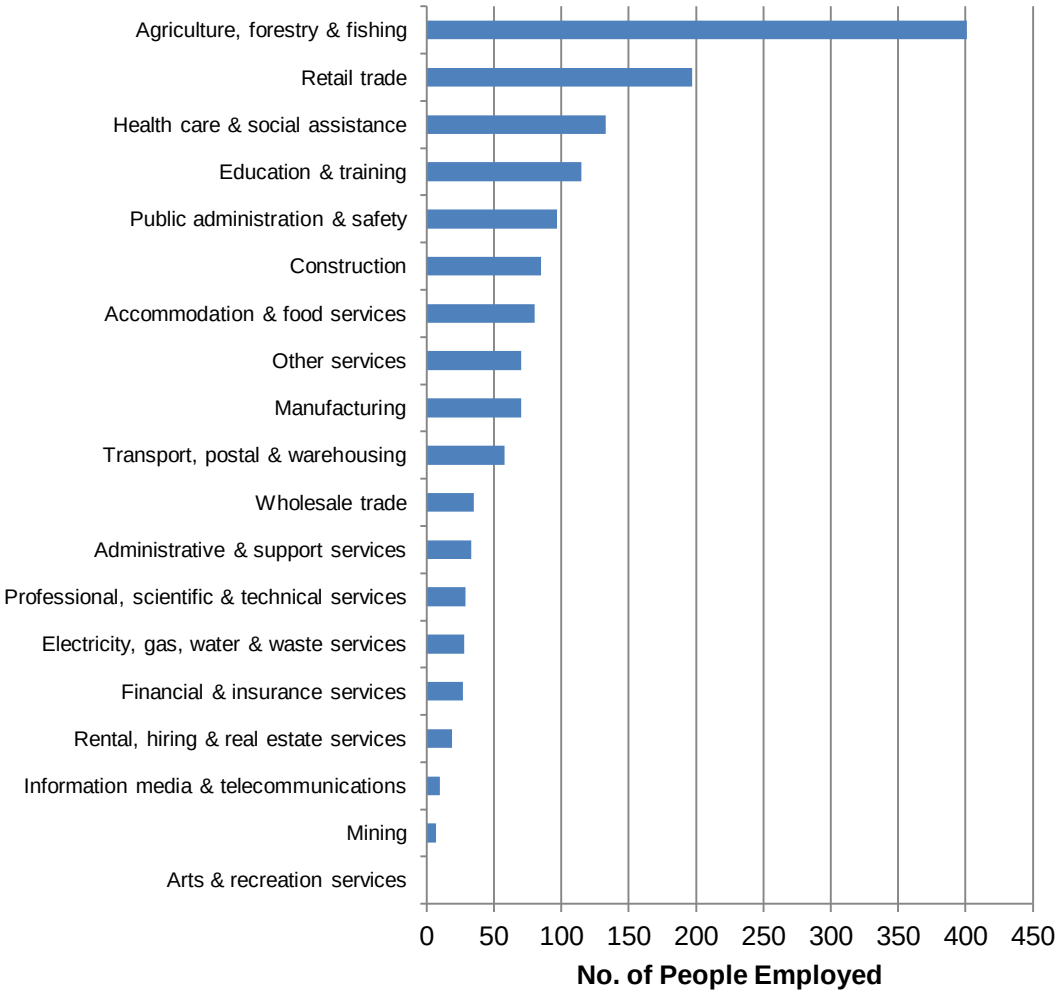
(Source: Roth 2010)

Employment

In 2006, there were 2,058 people employed in Balonne SLA. Of these, 844 people (41 per cent) were employed in agriculture, fisheries or forestry. The majority of these were in grazing (462 people, 55 per cent). Lesser but relatively high proportions were represented by cotton (179 people, 21 per cent), as well as the balance of other agricultural services (102 people, 12 per cent) and cereals, oilseeds and other broadacre land uses (68 people, 8 per cent) The retail, education and health industries were the next biggest employment industries (11 per cent, 8 per cent and 8 per cent respectively).

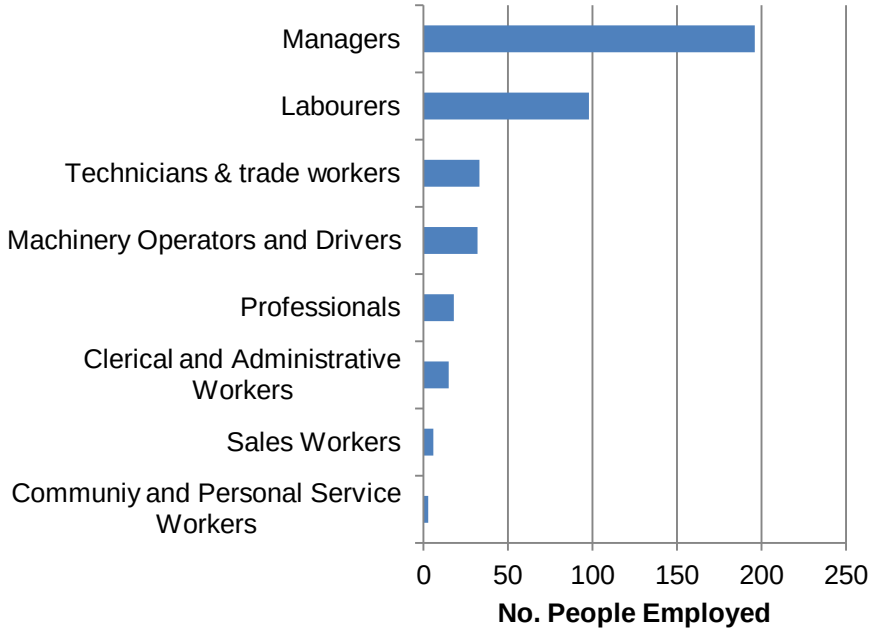
Figures X and X show overall employment by industry in St George and employment by occupation within the agricultural sector, respectively. In St George in 2006 there were 316 people employed in agriculture, and 63 employed in 'Agriculture, Fishery and Forestry Support Services' (out of a total 1543 employed persons in the town). Similar to the shire as a whole, retail trade and health industries were the next biggest employers. Of those 401 people in St George working in agriculture, fishery and forestry, 163 were machinery operators, labourers, technicians or trades people, while 129 were managers, administrative workers or professionals.

Figure 2 Employment by Industry, St George



(Source: ABS Census 2006)

Figure 3 Employment by Occupation in the Agriculture Sector

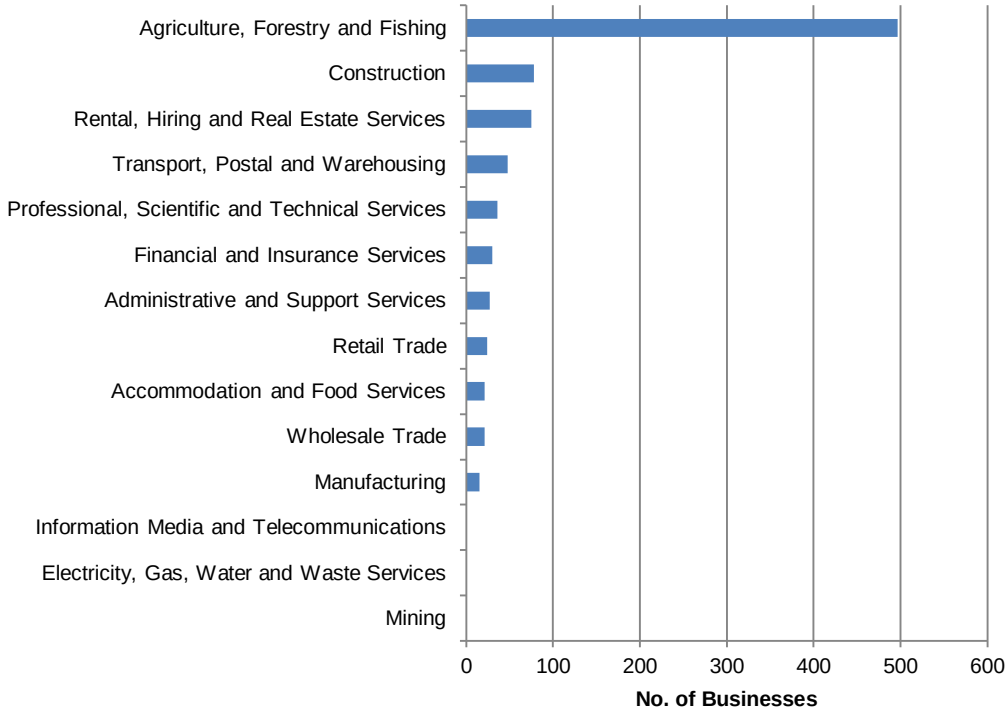


(Source: ABS Census 2006)

Business

Figure 4 shows the number of businesses in Balonne Shire in 2009. Of a total 872 businesses, 497 (57%) were in agriculture, fisheries and forestry. Construction and real estate were the next most common business types in the shire. The table below shows the size of businesses in Balonne Shire in the agriculture, fisheries and forestry industries in 2009. Over half of businesses in agriculture were non-employing, and only 25 of these 497 businesses employed more than 20 people.

Figure 4 Business Counts by Industry



(Source: ABS Business Counts 2009)

Table 1 Businesses in Agriculture

Business Size	Number
Non employing	279
1-4	108
5-19	85
20-49	19
50-99	6
100-199	0
200+	0
Total	**497**

(Source: ABS Business Counts 2009)

Recent Economic Impacts of Drought

In the five years from 2001 to 2006, Balonne Shire lost almost 15% of its population. St George lost approximately 600 people (22%) in the same period. This contrasts with the MDB (1.1 per cent growth in the same period) and 10 per cent growth in Australia as a whole (Stubbs 2010). Drought was a major factor in the decline; average volume of water used in the Lower Balonne for the period 1995–96 to 2006–07 was 226,986 ML per year, but the actual use has been much lower for most years after 2000 (MDBA 2010). Due to drought conditions, and the resultant fluctuations in the cotton crop, recent years have seen a limited diversification of irrigated agriculture into crops such as grapes and more dryland cropping.

Implications

Irrigated farming has allowed the St George community to thrive and grow. The significant decline in population from 2001 to 2006 was quite different to the upward trend in population generally experienced by Balonne Shire over the past 30 years. The population increase occurred at a time when irrigated agriculture became a more significant component of the local economy, offsetting climatic variability and the resultant job losses and population decline that have been experienced in other remote communities where dryland agriculture is the dominant land use. However, a regional economy focused in this way is also clearly vulnerable to changes in external circumstances, and the heavy reliance of the shire's economy on irrigated cotton means that variability of production, for example in recent drought years, have significant flow-on impacts in terms of population, employment and income.

St George and its surrounding region are now highly dependent on irrigated agriculture both directly and indirectly as a major source of economic activity and employment; crops account for approximately 60% of the total value of agricultural production. Analysis by Price Waterhouse Coopers in 2000 for the Condamine–Balonne concluded that direct and indirect employment was around 25.5 jobs per thousand hectares, compared to 3 jobs per thousand hectares in dryland farming. In other words, employment intensity in irrigated agriculture is approximately 8.4 times as high as for dryland farming.

Despite this, employment per farm at a national level is trending downwards due to improved productivity and efficiency. The Productivity Commission Research Paper, *Trends in Australian Agriculture*, found that:

> *"While in absolute terms employment in agriculture has remained relatively constant over the last four decades, agriculture's contribution to Australia's total workforce has more than halved since the late 1960s, when it accounted for around 9 per cent of the workforce. Agriculture declined to around 6.5 per cent of the workforce from around the mid 1970s, before falling further to around 5 per cent in the decade to 2001-02. Employment losses associated with the most recent drought saw agriculture's share fall to under 4 per cent in 2003-04."*

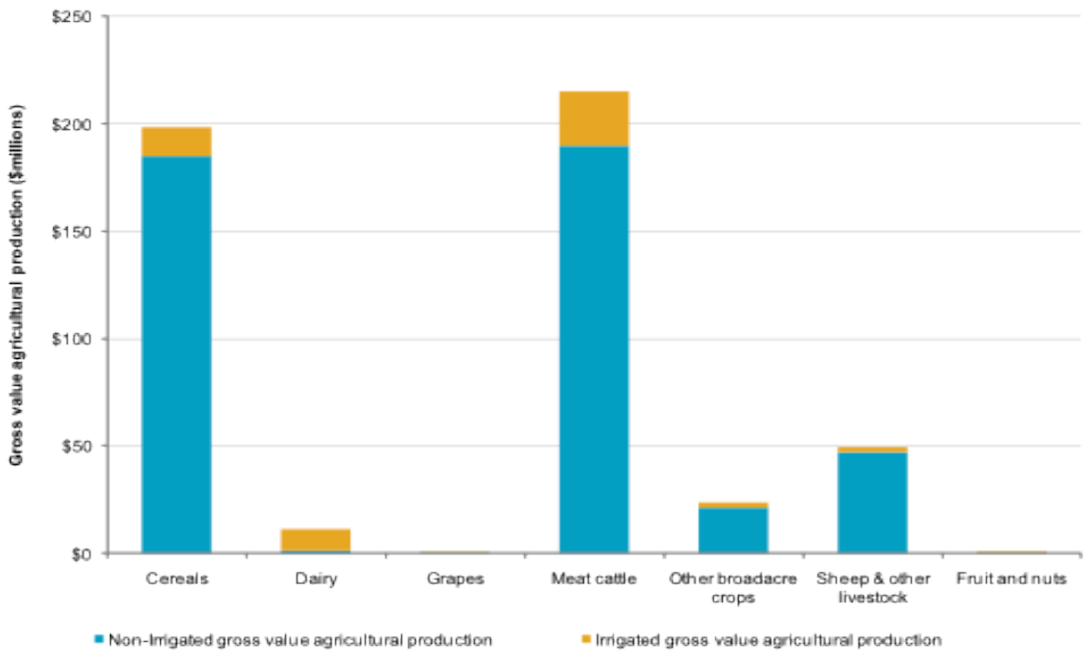
In terms of agricultural employment in St George, about 26 per cent of the town's population is employed in agricultural industries, compared to 41 per cent in Balonne shire as a whole. Of the 400 people employed in agricultural industries in St George, about half are farm managers, and there is relatively little flow-on to labouring (1 labourer for every two managers) and 'service to agriculture' which includes activities such as fertilizer spreading, harvesting, agistment and vetinary services . Businesses are predominantly small, but show signs of diversifying in response to drought

2 The Namoi Valley and Gunnedah

Introduction
The shire of Gunnedah in the North West of NSW covers an area of 5,092 km2 and has a population of around 12,000 people. It is part of the Namoi Catchment, located in the upper Namoi valley and with an area of approximately 42,000km2. Europeans originally settled Gunnedah as a sheep farming area, and coal mining was also a major part of its early history. Agriculture has remained the major industry, with 80% of the shire area devoted to farming. Gunnedah's primary exports are cotton, coal, beef, lamb and pork, and cereal and oilseed grains.

Agricultural Production
The dominant land use in the Namoi Valley is cattle and sheep grazing. Wheat, cotton and other broadacre crops are grown on the alluvial floodplains. Around 112,000ha were irrigated in 2000 with around 80,000 ha (or over 70%) used for cotton production. Figure X shows the gross value of agricultural production for commodities other than cotton in the Namoi Valley.

Figure 5 Gross Value of Agricultural Production



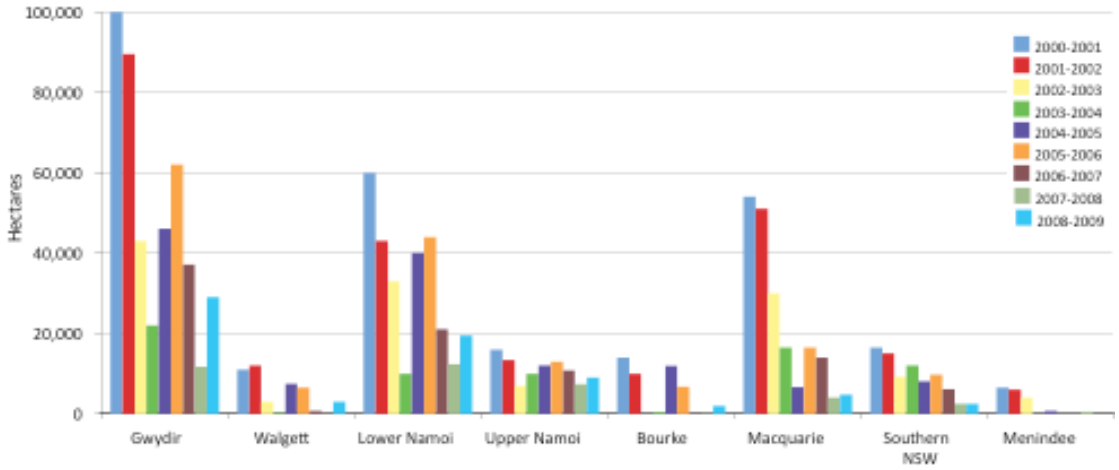
(Source: MDBA 2010)

In the Namoi Valley, cotton typically 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 (MDBA 2010).

Cotton is an expanding industry around Gunnedah; there are over 60,000 hectares of cotton grown in the Namoi Valley and 7 cotton gins, mainly operated by Namoi Cotton. Betweeen 2000 and 2008, production in the Upper Namoi ranged from 56,705 bales to 190,000 bales ginned. The average production over this time was 104,000 bales. In 2006 there were around 45 growers in the Upper Namoi.

Despite its growth, the industry is also susceptible to considerable variability. Cotton plantings and yields can vary significantly from year to year, depending on factors such as water availability, temperature and insect/disease pressure. Figure X below shows area planted in the cotton growing regions of NSW between 2000 and 2009. Compared to the Lower Namoi, cotton production in the Upper Namoi is relatively small but less variable reflecting its diverse agricultural mix and reliable water sources (Roth 2010). Cotton price is also highly volatile, and The Australian recently reported that Namoi Cotton has suffered significant losses on cotton futures (December 30 2011).

Figure 6 Area of Cotton in NSW



(Source: Roth 2010)

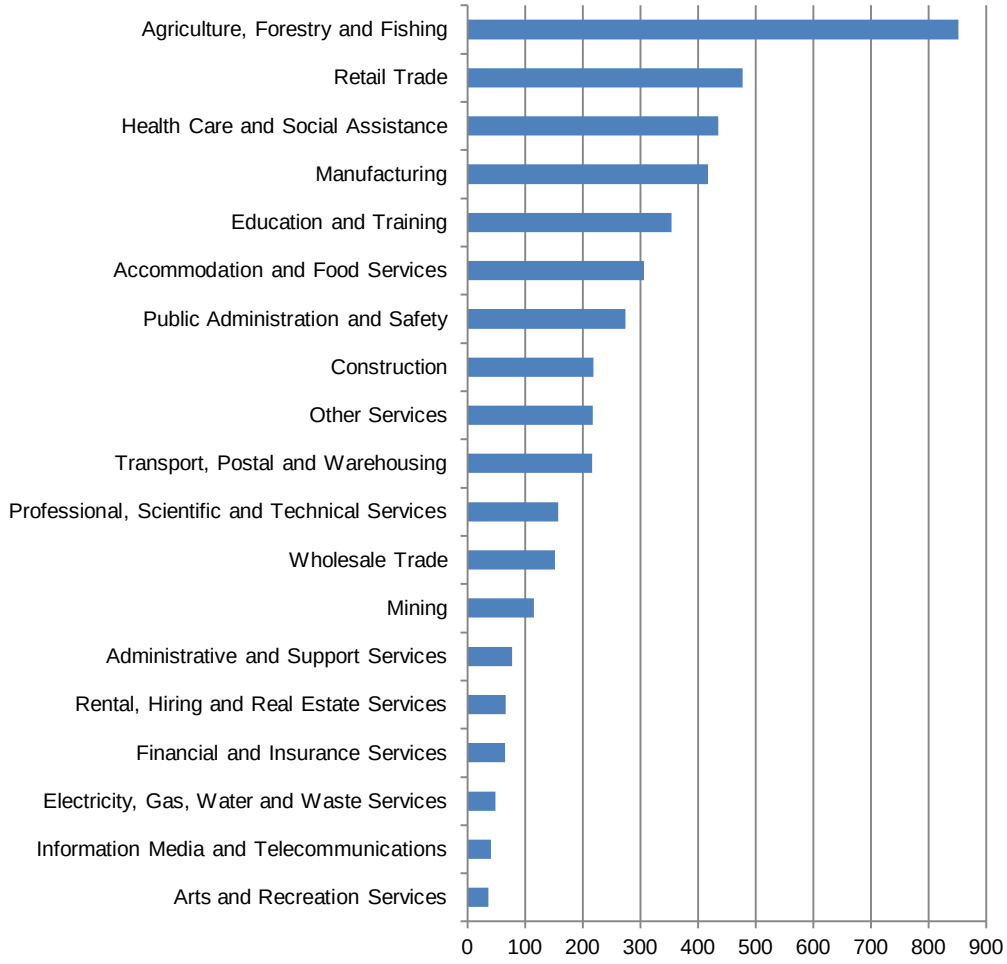
Employment

For the Namoi region as a whole, there were 39,298 people employed in 2006, of which 5,455 people (13 per cent) worked in agrculture, fisheries and forestry, making it the biggest employing sector. Retail trade (11 per cent) and health care (11 percent) were the next biggest employers.

Figures X and X show the number of people employed by industry in the Gunnedah Shire, and figure x shows the occupations of those working in agriculture. In Gunnedah Shire in 2006 there were 4,532 employed persons, of which 852 were employed in agriculture, fisheries and forestry (18 per cent). The next biggest employing sectors were retail trade (11 per cent) and health care and social assistance (10 per cent), respectively. Of those working in agriculture in Gunnedah, most identified their occupation as managers or labourers.

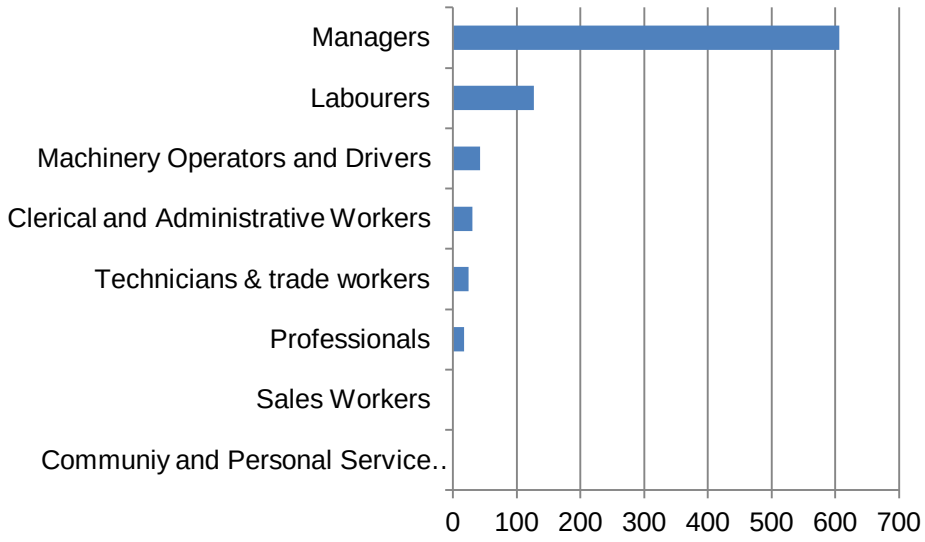
With regard to farms, 245 of those people employed in agriculture in Gunnedah identified themselves as mixed crop and livestock farmers (29 per cent), while there were 106 grain or pasture growers (12 per cent), 91 beef cattle farmers (10 percent) and 17 cotton growers (2 percent).

Figure 7 Employment by Industry in Gunnedah Shire



(Source: ABS Census 2006)

Figure 8 Employment by Occupation in Agriculture, Gunnedah Shire

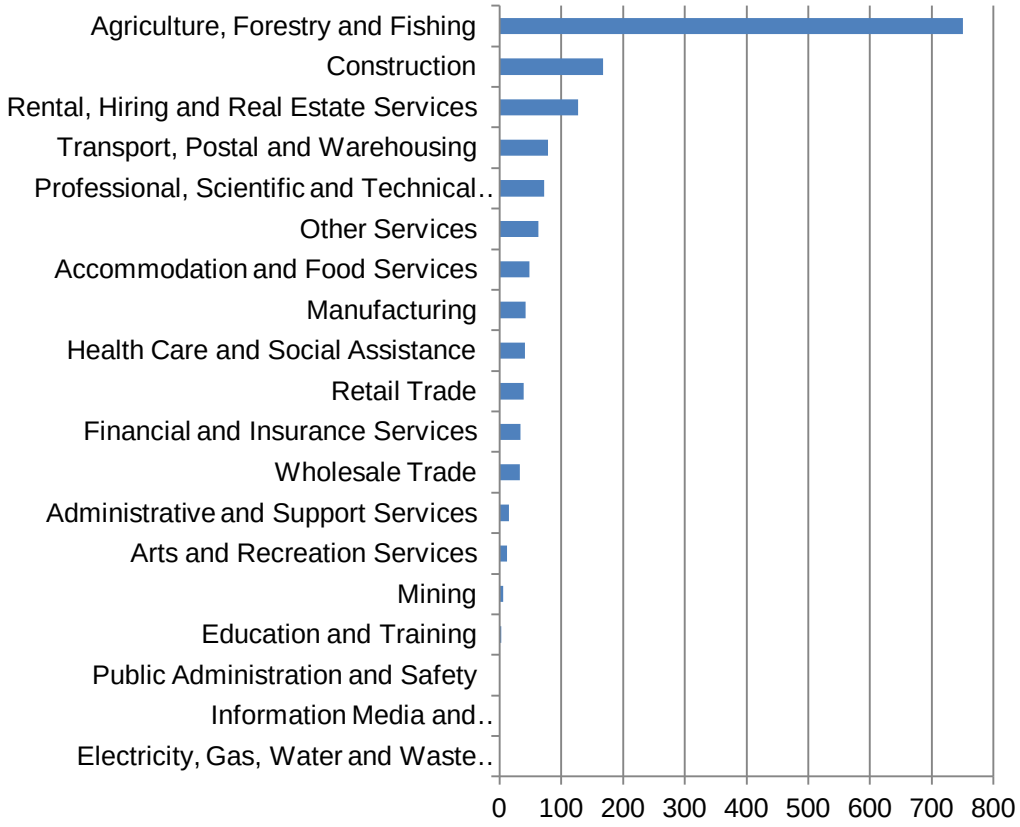


(Source: ABS Census 2006)

Business

Figure X shows the number of businesses in Gunnedah Shire in 2009. Of total 1533 businesses, 751 (49 per cent) were in agriculture, fisheries and forestry. Construction (11 per cent) and real estate (8 per cent) were the next most common business types in the shire. Table X below shows the size of businesses in Gunnedah Shire in the agriculture, fisheries and forestry industries in 2009. Over half of businesses in agriculture were non-employing, and all of the agricultural businesses in the area employed less than 20 people.

Figure 9 Business Counts by Industry in Gunnedah Shire



(Source: ABS Business Counts 2009)

Table 2 Businesses in Agriculture, Gunnedah Shire

Business Size	Number
Non employing	540
1-4	159
5-19	52
20-49	0
50-99	0
100-199	0
200+	0
Total	**751**

(Source: ABS Business Counts 2009)

Implications

Adaptation has been a feature of Gunnedah's economy over recent years. Since 1996, Gunnedah has experienced major economic changes, including the closure of a local abattoir and mine, which led to the town experiencing large employment losses compared to the rest of the Namoi. The impact of drought was also severe during 2002-03. This led to a general downturn in the local economy (Gunnedah Social Plan 2005).

Like St George, a major part of the total value of Gunnedah's agricultural output is in cotton, the production of which can be highly variable. However, Gunnedah has a more diverse agricultural base, more reliable irrigation water and is less isolated from larger population centres (for example, Tamworth is only 100km away). The fertile soils and groundwater supply support a very large livestock industry, as well as summer and winter cropping including wheat, barley, canola and cotton. Greater proportions of labour in industries such as retail trade, education, professional services and manufacturing also mean that the overall impacts of drought on population and employment are softened.

The number of employees per farm is declining at a national level as farms become more productive and efficient. Similar to St George, Gunnedah shire has a high proportion of managers in its agricultural employment base (70 per cent), and there is even less flow-on to labouring than in St George. Businesses are predominantly small, with no businesses in agriculture in 2006 employing more than 20 people.

3 Waikerie and the Riverland

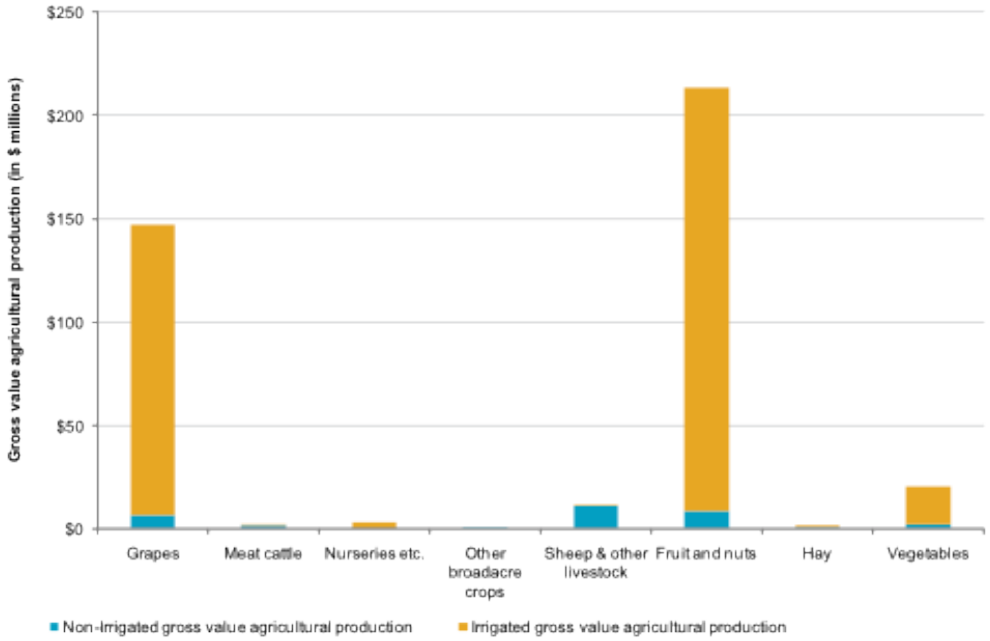
Introduction
Waikerie is a small town located on the southern bank of the Murray River in the Loxton-Waikerie Shire, about 140 kms northeast of the outer suburbs of Adelaide. The town is part of the Riverland Region, with other major centres including Renmark, Loxton, Barmera and Berri. The population of the Riverland is around 33,455 and is relatively evenly spread, with 34 percent in Berri Barmera Shire, 36 per cent in Loxton-Waikerie Shire and 29 per cent in Renmark-Paringa Shire.

Waikerie was originally established in 1894 as a “village settlement”, and soon became an important fruit growing area. In 1960 and 1961 the Waikerie Irrigation Lands Extension Committee, working as a non-profit company, developed the irrigation land now called Golden Heights and Sunlands (to the south and to the northwest of Ramco). Waikerie is now one of the key towns in the Riverland region, servicing an agricultural community based on irrigated citrus, viticulture and horticulture, as well as dryland crops such as wheat and barley.

Agricultural Production
The regional economy of around $2.2 billion has a high dependence on irrigation, with wineries, packing sheds and other food processing reliant on a consistent supply of irrigated crops. There are an estimated 3,000 growers and 33,455 people living in the region. More than one in three employed people in Waikerie work directly in the agricultural sector, with the main enterprise being grapes and citrus. The total gross value of agricultural production in Waikerie-Loxton Shire in 2006 was $366.2 million.

The Riverland is Australia's largest wine producing region, growing in excess of 50% of South Australia’s wine grapes. The Waikerie area is home to such brands as Banrock Station and Kingston Estate amongst others. The Riverland region is also well known for its production and processing of citrus, stone fruit, almonds and vegetables. The location of horticultural quality soils adjacent to the Murray is a key advantage for the area. Figure X shows the gross value of agricultural production in the Riverland Region.

Figure 10 Gross Value of Production in the Riverland Region

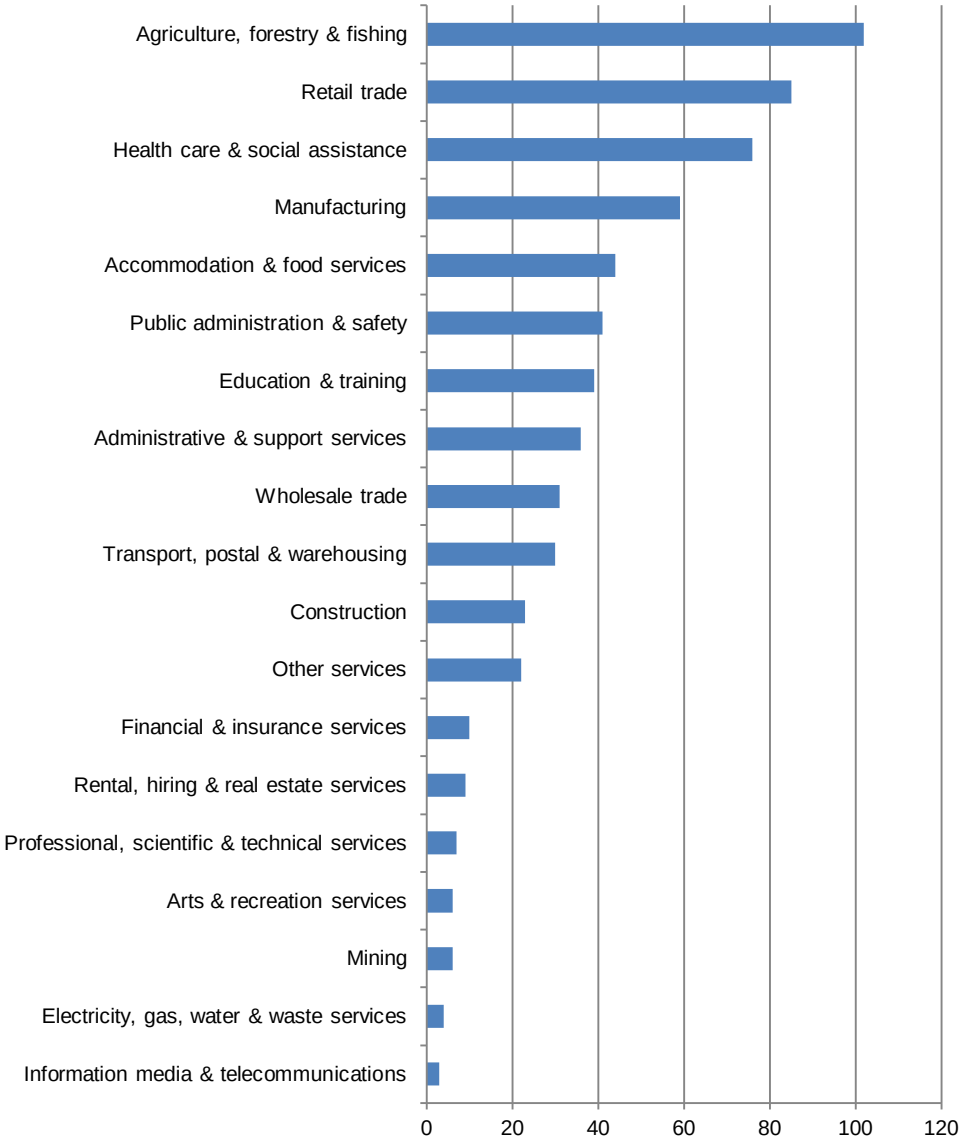


(Source: MDBA 2010)

Employment

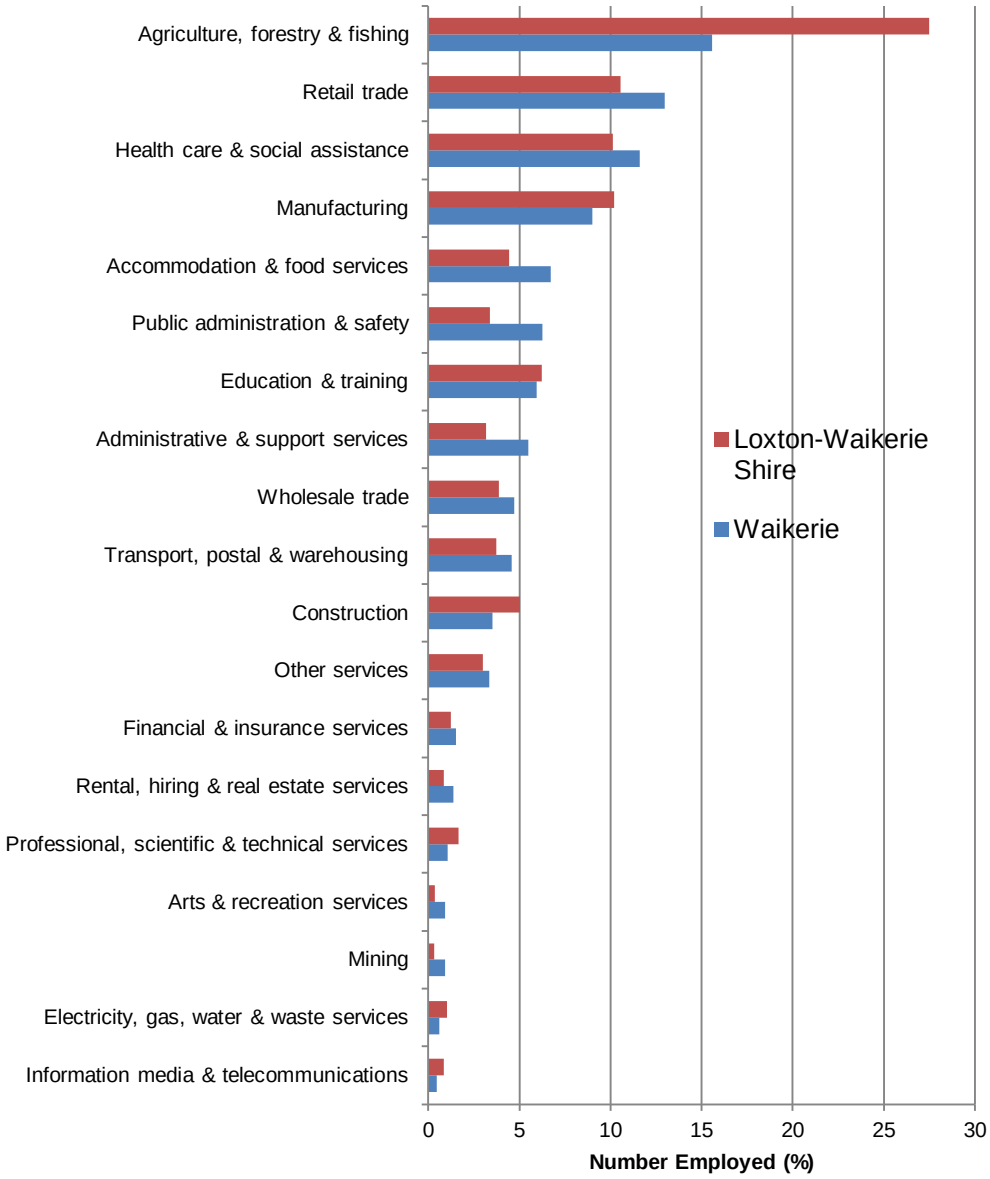
In 2006, there were 5,493 people employed in Loxton-Waikerie SLA. In the township of Waikerie, there were 655 persons employed, of which 102 (16 per cent) worked in agricultural industries. Figure X shows the number of people employed by industry in Waikerie, and figure X shows a comparison of employment in Waikerie and Loxton-Waikerie Shire. It can be seen that for both the shire and for Waikerie, agriculture, retail and health care are the major industries of employment. However, the Loxton-Waikerie Shire has a much higher proportion of people in agricultural industries (about 27 per cent) compared to Waikerie, which has a greater proportion of services. This reflects the fact that most agricultural holdings are outside of the town.

Figure 11 Employment by Industry in Waikerie



(Source: ABS Census 2006)

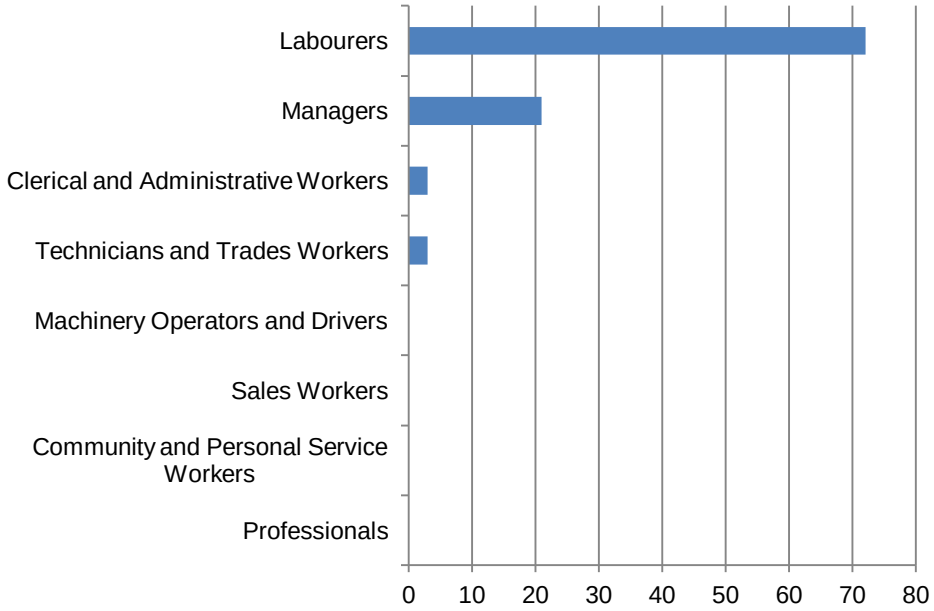
Figure 12 Employment by Industry for Waikerie Township and Loxton-Waikerie Shire



(Source: ABS Census 2006)

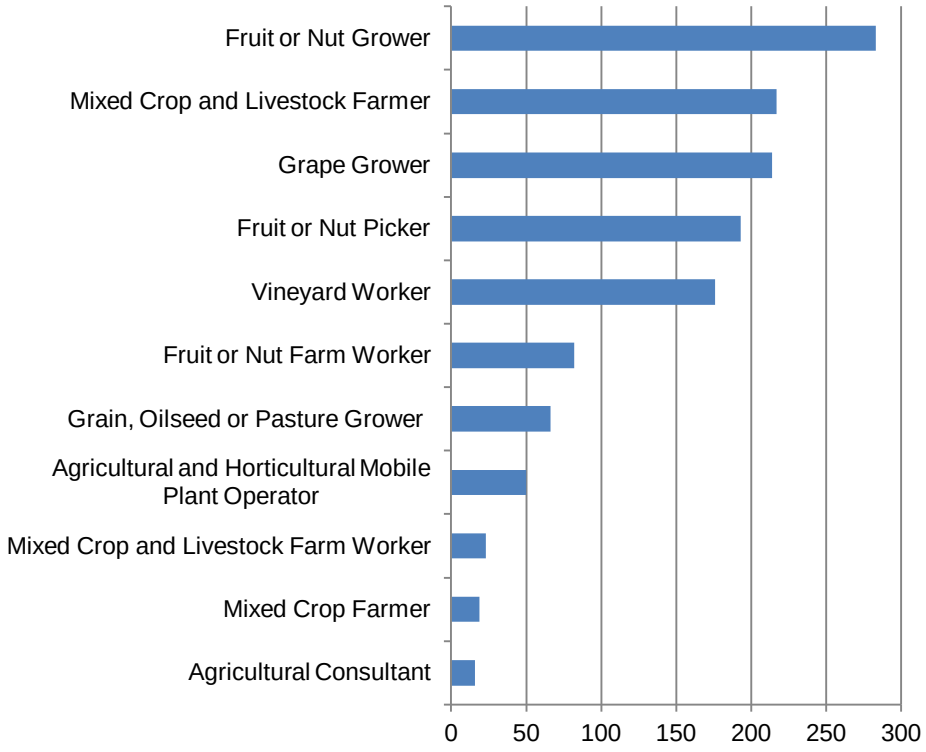
Figure X shows the number of people employed in broad agricultural occupations in Waikerie, and Figure X shows the most numerous specific agricultural occupations in Loxton-Waikerie Shire. It can be seen that the majority of agricultural workers in the town are labourers (72 persons), while managers are the next most numerous employment type. This contrasts with Loxton-Waikerie Shire as a whole, which has 829 managers (54 per cent) and 522 labourers (34 percent) in agricultural employment. The most numerous farmers in Loxton-Waikerie Shire in 2006 were fruit or nut growers (283), followed by mixed crop and livestock farmers (217), and grape growers (214). Workers for these industries made up most of the other agricultural employment in the shire.

Figure 13 Employment by Industry in Agriculture, Waikerie



(Source: ABS Census 2006)

Figure 14 Agricultural Occupations in Loxton-Waikerie Shire

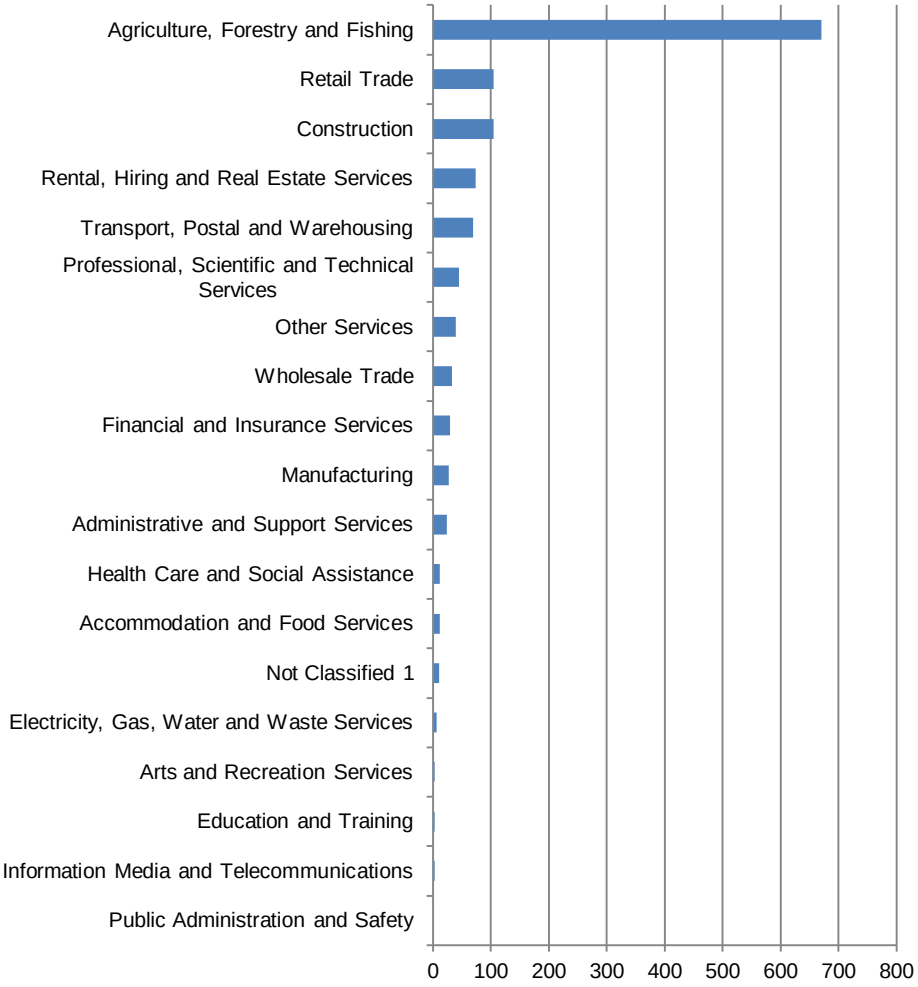


(Source: ABS Census 2006)

Business

Figure X shows the number of businesses in Loxton-Waikerie Shire in 2009. Of total 1268 businesses, 670 (52 per cent) were in agriculture, fisheries and forestry. Retail trade (8 per cent) and construction (8 per cent) were the next most common business types in the shire. Table X below shows the size of businesses in the Shire in the agriculture, fisheries and forestry industries in 2009. Over half of businesses in agriculture were non-employing, and most of the agricultural businesses in the area employed less than 20 people.

Figure 15 Business Counts by Industry, Loxton Waikerie Shire



(Source: ABS Business Counts 2009)

Table 3 Agricultural Businesses, Loxton-Waikerie Shire

Business Size	Number
Non employing	348
1-4	160
5-19	135
20-49	27
50-99	0
100-199	0
200+	0
Total	**670**

Implications

In the period from 1998–99 to 2007–08, irrigators in the SA Murray faced drought and low water allocations (particularly from 2006–07 when allocations to SA Murray high-security entitlements fell to 60%), adjustment in the dairy industry (from the early to mid-2000s), and the simultaneous downturn in the wine and citrus industries from the mid-2000s (National Water Commission 2010). In Waikerie, this has led to economic stagnation that is in contrast with Loxton-Waikerie's growth over the last century, which has continued steadily. A feature of this development has been the continual improvement of irrigation and farming techniques and heavy dependence on the water of the Murray River.

Waikerie's economy is highly dependent on the Citrus and Wine industries, the combination of which make up much of the employment in the area. The wine industry around Waikerie differs from the nearby Barossa Valley in that it is made up of larger vineyards that cater to lower quality wine markets. In the Barossa Valley there are many more "value chain" vineyards i.e. those that also make wine and market a wine product with their own branding, often at the top-end of market quality. Waikerie's vineyards are thus more susceptible to "economies of scale" and the trend towards large-scale industrial farming. The CCW Limited (2011) has found that the average price of wine grapes per tonne in 2002 was $674 compared to $274 estimated value per tonne in 2011, which is currently below the long-term cost of production. The low returns have had a strong impact on growers, with many leaving the industry. The area under vineyard in the Riverland has decreased by 18% over the past 4 seasons, and CCW Co-op shareholder base has declined from 741 members in February 2004 to 612 members in 2011.

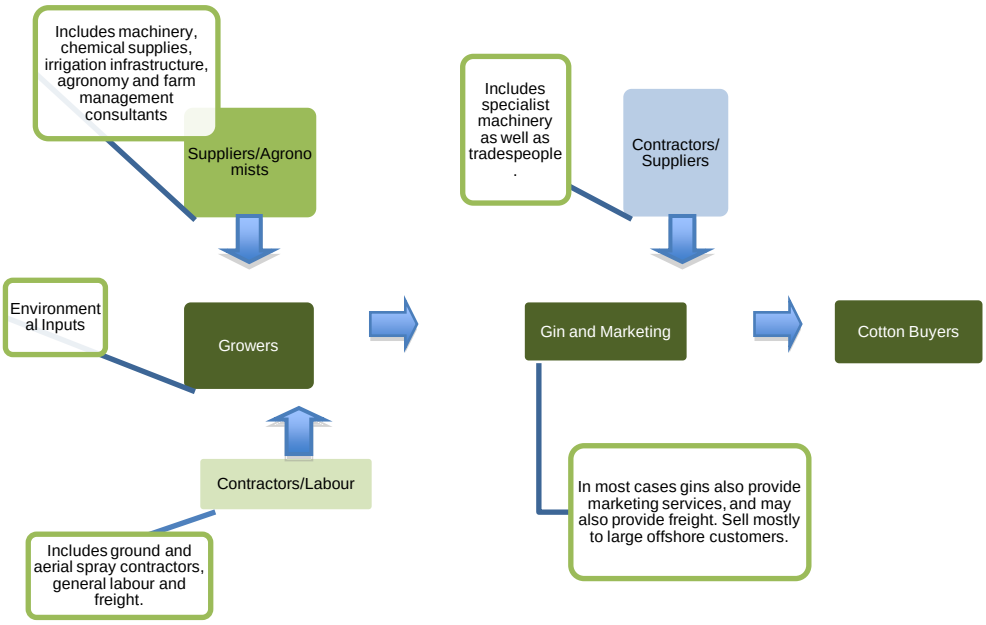
The citrus industry has also faced major structural and economic challenges in the last ten years. Over supply and low prices, combined with rising cost of production and uncertain water availability, have been major issues. Growers rely heavily on export markets (fresh fruit), and the recently high Australian dollar has meant that these markets have reduced significantly. Anecdotal evidence suggests that orchard land prices have been falling, and that many farmers have been experiencing significant financial loss on crops.

4 Supply Chains in the Study Areas: Cotton, Citrus and Wine

Cotton

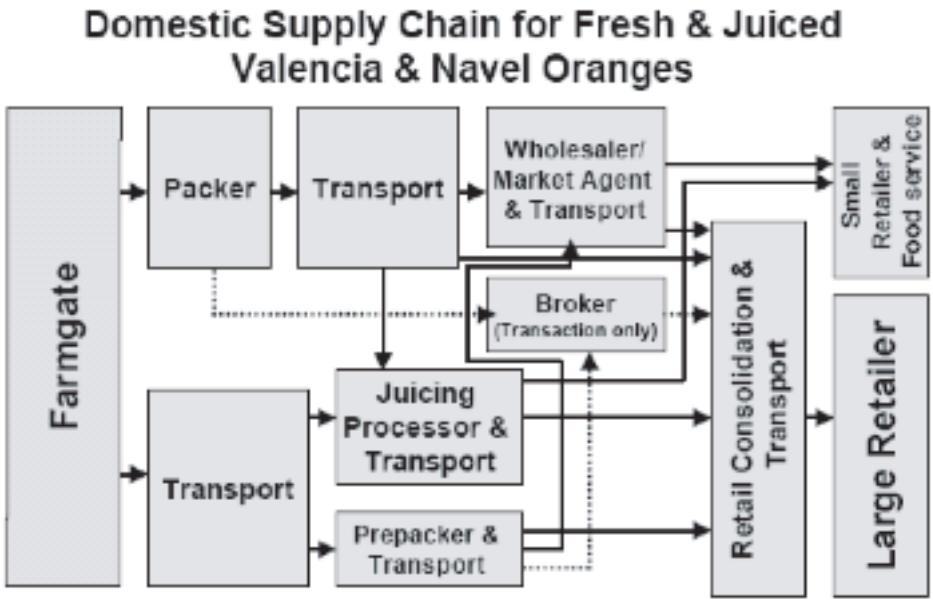
The figure below shows a simple representation of the cotton supply chain in St George and Gunnedah. Cotton moves along the middle line from growers to gins (where fibre is separated from the seed) and then to buyers. The major buyers of Australian cotton (in order) are currently China, Indonesia, Thailand, South Korea, and Japan, and there is no government intervention in the growing or marketing of the crop (Roth 2010). Queensland Cotton operates the three gins in the St George/Dirranbandi area, and in Gunnedah Namoi Cotton Cooperative is the main gin operator and marketer. Most of the services required by the growers in both areas, such as machinery, agronomy and chemical supplies, are provided by local businesses.

Figure 16 The Cotton Supply Chain



The figure below gives a schematic representation of the citrus supply chain in the Riverland

Figure 7 The Citrus Supply Chain (From SA Citrus Industry Situational Analysis 2005)



5 Cotton Businesses in St George

A cross section of businesses in the St George cotton supply chain was interviewed for this study. The following tables provide a snapshot of business operations in the area.

Table 4 Cotton Businesses, St George

Supply Chain Business	Time Operating in the Area	Importance of Cotton production to Operation	Average Yearly Turnover	Employment
Machinery Business 1	15 to 25 years	Very Important (60-90% of income)	Over $2 million	18 full time staff
Supply and Agronomy 1	More than 25 years	Not Important (Less than 10% of income). Other activities are grapes, animal health, general merchandise	Over $2 million	7 full time, 2 casual
Supply and Agronomy 2	15 to 25 years	Very Important (60-90% of income)	$30 million	5 full time
Supply and Agronomy 3	15 to 25 years	Very Important (60-90% of income)	Over $2 million	3 full time, 1 casual
Aerial Spray 1	More than 25 years	Crucial (More than 90% of income)	Over $2 million	15 full time, 6 contractors (FTE)
Ground Spray Contracting 1	5 Years	Very Important (60-90% of income)	$250,000 - $1 million	2 full time, 1 part time
Cotton Gins and Marketing in St George/Dirranbandi	More than 25 years	Crucial (More than 90% of income)	Over $100 million	22 full time, 104 casual from March-July plus 9 marketing staff for the entire business (12 gins), 1 for the St George area

Table 5 Growers, St George

Grower	Time Farming in the Area	Scale of Production	Other Land Uses	Water Allocation	Best Profit in the Last 5 Years	Employment
Grower 1	15 to 25 years	178ha at 12 bales/ha or 1.1 bales/ML	None	2900 Ml General Security plus flood harvesting (200ML used last season)	$150,000-250,000	3 full time, 8 casual (for harvest)
Grower 2	15 to 25 years	715ha at 11.3 bales/ha or 1.7bales/Ml	Cattle (300 head)	3360Ml General Security plus flood harvesting (3500 Ml used last season)	$150,000-$250,000	6 full time, 2 full time contractors, 1 casual
Grower 3	More than 25 years	396ha at 12.6 bales/ha or 2 bales/Ml	None	2300Ml General Security plus flood harvesting (2500Ml used last season)	$250,000 to $499,999	3 full time

Managing Change

The three farmers interviewed in St George were asked about their management decisions in the last five years and in the next five years. In the last five years (including some poor seasons) they had all decreased their irrigated area, changed the crop mix of their irrigated production, and improved or made plans to improve water efficiency. Planning for the next five years was much less uniform, and all farmers interviewed made the point that often management decisions were not planned but had to be made due to water availability and other seasonal conditions. The table below summarises some of their comments regarding the recent drought.

Table 6 Managing Change, St George Growers

	Strategies for Managing Change
Grower 1	Alternative crops were grown in the drought to provide income. Sunflowers, chick peas and mung beans have all provided good yields. The agronomic ability to move these crops around depending on timing and amount of water available is getting better. *"I didn't lay off staff [during the drought] because I knew that they were going to be hard to replace, and I had one fella coming up for retirement anyway, and it's very hard to pelt [sic] someone for two years and then say can you come back now…..everyone knew that we should be decreasing staff but I actually decreased hours and I worked around it that way……."*
Grower 2	The area of cotton is decreased only when forced by water availability. Staff were reduced for a time during the drought, down to 1 permanent for five to six years. At the lowest point in the drought the farm was down to 100 ha of cotton production, and in this year corn and sunflower were also grown.

Grower 3	More opportunity crops were planted during the drought. This grower also did some labour contracting at Cubbie Station for 8 months. Machinery is not replaced during the drought. This creates a cost later on. Employees were decreased (most of the time by retaining staff who wanted to stay). Had to give notice only during two years in 2006/07. Also greater proportion of casual staff was employed during the drought.

Farmers were also asked to predict their actions if water availability (and its impact on cotton related businesses) was decreased or increased by 10, 25 or 50 per cent, respectively. The results for farmers are shown in the tables below. While the sample size is small, it is possible to see a pattern of individual decision making, where small decreases to water availability can trigger changes to crop management, production area and on-farm labour requirements, while large decreases may force sale of assets and seeking other income sources. Conversely, labour requirements and crop management are also affected by relatively small increases.

Table 7 St George Growers Management Action for Decreased Water Availability

	Decrease in Water Availability		
Possible Actions	10%	25%	50%
Increase Borrowings	1	1	
Sell Business Assets		1	
Sell Private Assets			1
Seek Other business income		1	1
Seek Other employment			1
Reduce Labour	1	1	1
Decrease Plantings	1	2	
Change Crop Mix	1	1	
Sell Water	1		
Leave Farming			1
Leave Community			1

Table 8 St George Growers Management Action for Increased Water Availability

	Increase in Water Availability		
Possible Actions	10%	25%	50%
Increase Borrowings		1	
Repay Debt	2		
Buy Business Assets		1	1
Buy Private Assets			1
Seek Other Business Income			2
Less Employment			
Increase on-farm Labour	1	1	
Increase Plantings		2	
Change Crop Mix	1		1
Sell Water Entitlements			
Buy Water Entitlements	1	1	
Leave Farming			
Leave Community			

Businesses in the St George Cotton Supply Chain were asked a similar question to farmers i.e. to predict their actions if cotton related businesses was decreased or increased by 10, 25 or 50 per cent, respectively. Results for all businesses except the gin are summarized in the tables below. It can be seen that for decreases in cotton related business, the trigger point for most actions tended to be higher i.e. 25 or 50 per cent. Increased cotton business was likely to have positive affects from 10 percent onwards. These results are supported by comments from businesses regarding how they managed change during the recent drought, which are summarized in table X.

Table 9 St George Businesses Management Action for Decreased Cotton

	Decrease in Cotton Business		
Possible Actions	10%	25%	50%
Increase Borrowings			1
Sell Business Assets		1	1
Sell Private Assets			1
Seek Other business income	1		4
Seek Other employment			2
Reduce Staff		1	3
Move to a smaller premises or reduce operation		1	2
Close the Business			1
Leave Community			1

Table 10 St George Businesses Management Action for Increased Cotton

	Increase in Cotton Business		
Possible Actions	10%	25%	50%
Increase Borrowings	1	1	
Repay Debt		2	1
Buy Business Assets		2	1
Seek Other business income	1	1	
Seek Other employment			
Increase Staff	1	2	2
Move to a bigger premises or increase operation	1	1	1
Leave Community			

Table 11 Managing Change, St George Businesses

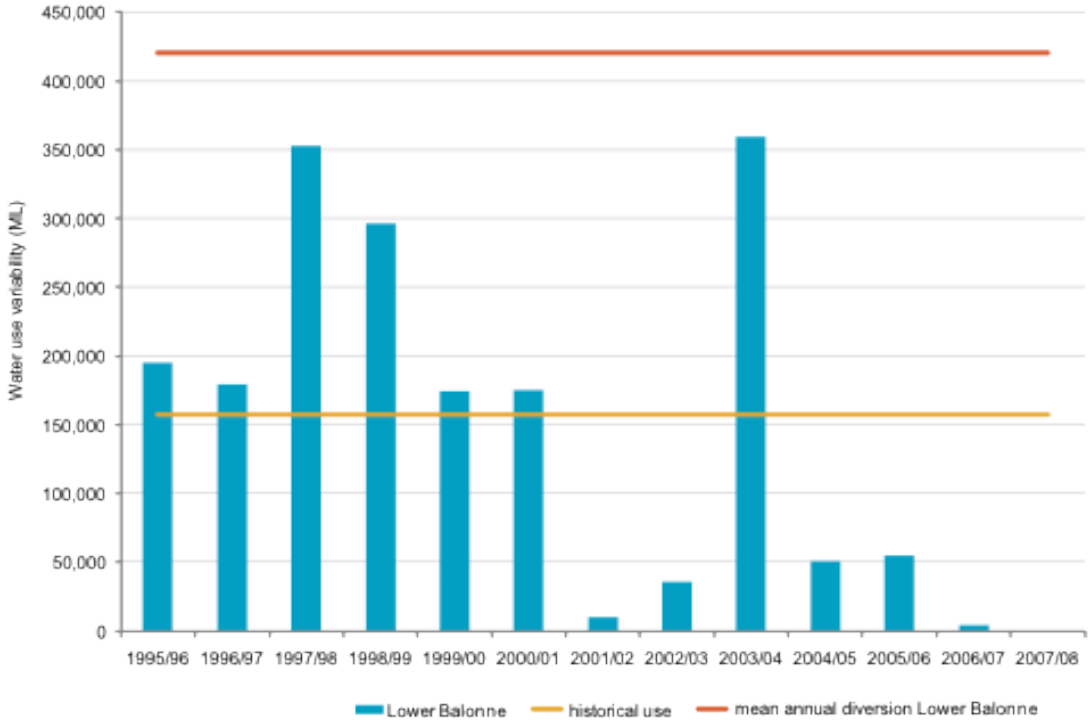
	Strategies for Managing Change
Machinery Business 1	The recent drought greatly impacted this business, which was operating at 30% of where it is at present (after a few good seasons). Business branches in other towns help to insulate and spread risk. No one was fired during the drought, staff can be moved to other branches (although this is not ideal) or simply not replaced when they retire or move on.
Supply and Agronomy 1	This business is not greatly affected by changing cotton production. During the recent drought, staff levels were maintained and other areas of the business prospered.
Supply and Agronomy 2	This business is a major agronomy supplier in the area, servicing 25-30 growers. During the drought the business went back to 2-3 staff at its lowest point. The business also tried to diversify into other broadacre landuses to maintain income.
Supply and Agronomy 3	This business became less active and reduced its turnover during the drought. Work was carried out on more of an ad hoc basis when required.
Aerial Spray 1	Changing cotton production leads to decreases in staff and contracted pilots, as well as possible sale of aircraft. The business was able to diversify into more bushfire associated work during the drought period. Firebombing also provides some extra income during the summer months.
Ground Spray Contracting 1	This business has scaled down from 5 employees since the drought. There are several factors making this form of contracting much less viable than in previous decades, including improved plant varieties, improved operating efficiency of farmers (meaning decreased land parcels and operating times), increased competition (with more farmers owning machinery and contracting to neighbours etc.There has been a significant increase in the cost of machinery with little increase in the price paid to contractors.
Cotton Gins and Marketing	The gins have several ways of managing decreased production, including putting off casual workers, reducing operating hours, operating gins at night (off-peak power), diversifying into grain storage, contracting employees to neighbouring businesses, and closing gins. When less gins are operated due to less production, it is at a greater cost to the grower due to increased freight.

Water Use in the Balonne

Water variability in the Lower Balonne is higher than much of the Murray– Darling Basin and the bulk of irrigated agriculture, particularly cotton, in the Queensland part of the Lower Balonne relies extensively on harvesting of river flows and floodplain diversions. Water is moved via a river distribution system and approximately 114 km of unlined channels, and the remaining economic life of major irrigation infrastructure is estimated to be 75 years (MDBA 2010).

Figure X shows water variability and averages in the Lower Balonne. The estimated mean annual diversion (MAD) of water for the Lower Balonne is approximately 420 GL. The MAD represents a modelled long run average volume of water available for consumptive use. The average volume of water actually used in the Lower Balonne for the period 1995–96 to 2006–07 was 226,986 ML per year highlighting the relative dryness of this period. This comprised estimated average volumes of 67,244 ML/year for regulated use, 2,407 ML/year for unregulated use and 157,335 ML/year for water harvesting.

Figure 17 Water Use in the Lower Balonne



(Source: MDBA 2010)

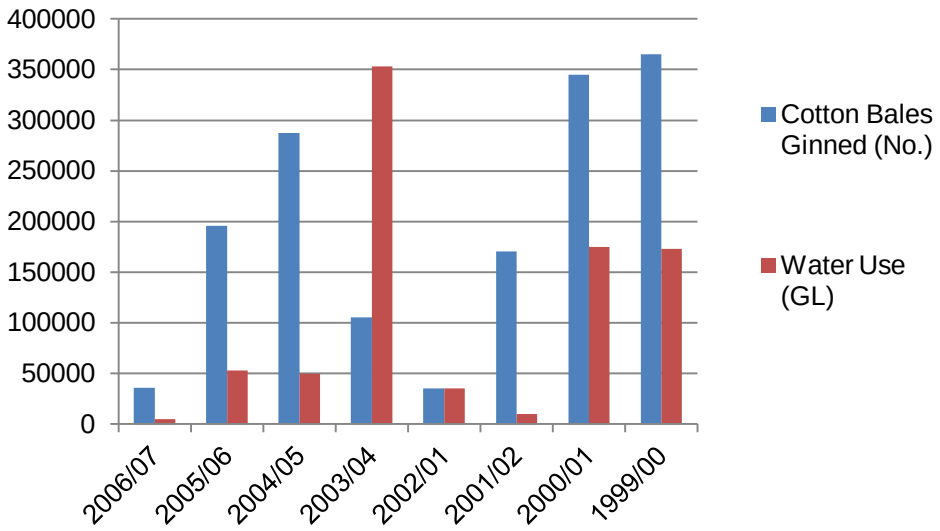
The variability in water use, water availability and production is highlighted in table X and in figure X. It can be seen that yields are not always directly related to water use, and in fact each season is complicated by many other factors including timing of water availability, local temperature and climate during the growth period, and presence of pests and insects. The availability of water thus becomes a way of optimising against these other factors.

As an example, the 2001/02 season had relatively low water availability, but this season had a wide range of weather conditions. It was very dry around planting, which resulted in a small dryland crop. Early season from October to December was cold, but it then remained hot with clear skies producing record yields at the time and helping to explain the relatively high number of bales. Insect pressure was low, which helped reduce production costs, but prices were also low.

Table 12 Water use and Production in the Lower Balonne

Season	Cotton Bales Ginned (St George and Dirranbandi)	Approximate Water Use in the Lower Balonne (GL)	Bales/GL
2007/08	26929	Less than 5000	Unknown
2006/07	35736	5000	7.1
2005/06	195517	53000	3.7
2004/05	287581	50000	5.8
2003/04	105658	353000	0.3
2002/01	35145	35000	1.0
2001/02	170301	10000	17.0
2000/01	345000	175000	2.0
1999/00	365000	173000	2.1
Average	174096.3	106750	1.6

Figure 18 Water Use and Production, Lower Balonne



Implications

The interview responses, coupled with the general comments from businesses, growers and community members indicate that they saw themselves and their community as being adaptive and resilient, being able to 'tighten the belt' and see out difficult periods, then 'bounce back' in good times. Family businesses, i.e. those that could survive without significant turnover, were seen to be an important part of this. The importance of the river running through the town as a physical representation of the community's resilience was also evident.

Farm and non-farm businesses exhibited strategies aimed at retaining staff through difficult periods. The reluctance to lose staff (except when absolutely necessary) means that employment loss due to lack of water availability is non-linear, i.e. there is no direct relationship between declining production, subsequent loss of business and declining employment (although of course that is not to say there is no relationship). The reasons for this include difficulty in attracting new staff when times get better, and the fact that employers know the impact that job loss will have on individuals and

the community and try to avoid it. Most businesses mentioned issues of labour availability, including competition with mining and lack of skilled candidates.

The relationship between production, profitability and water availability is also highly complex and non-linear. It depends on many factors including the timing of the water and the ability of the farmer to employ opportunistic cropping, severity of pests, localised climatic conditions and the ongoing financial position of the grower. This means that the flow-on effects of on-farm employment are difficult to predict. However, in the case of the cotton gins there is a clear impact on employment, which is directly related to the amount of cotton available in any one season. The affects are thus varied across the supply chain and elasticity is a key feature of the interactions within it.

6 Cotton Businesses in Gunnedah

Similar to St George, a cross section of businesses in the Gunnedah cotton supply chain was interviewed for this study. The cotton supply chain in Gunnedah is similar to that of St George, but many farmers and businesses are more diverse in their operation. The following diagrams give examples of businesses and growers in Gunnedah who are part of the cotton supply chain.

Table 13 Cotton Businesses, Gunnedah

Supply Chain Business	Time Operating in the Area	Importance of Cotton production to Operation	Average Yearly Turnover	Employment
Irrigation Supplies 1	1 to less than 5 years	Important (40-60% of income), service about 50 growers, other activities include dairy and effluent piping.	$2-10 million	6 full time staff, 9 contractors
Supply and Agronomy 1	More than 25 years	Small Contributor (10-40% of income), service about 20 growers, other activites are broad acre cropping and fallow.	$2-10 million	10 full time
Cotton Gin and Marketing 1	15 to 25 years	Crucial (More than 90% of income), about 35 growers serviced. Marketing includes 6 buyers over 1000t and 35-40 smaller buyers of cotton seed.	About $8 million	5 full time
Cotton Gin and Marketing 2	More than 25 years	Crucial (More than 90% of income), about 35 growers serviced.	$2-10 million	70 full time, 100 casual from March-July in the Namoi Valley

Table 14 Growers, Gunnedah

Grower	Time Farming in the Area	Scale of Cotton Production	Other Land Uses	Water Allocation	Best Profit in the Last 5 Years	Employment
Grower 1	25 or more years	506ha (irrigated) at 9.2 bales/ha or 1.6 bales/ML, also 200 ha dryland.	Wheat, canola and cattle	1520Ml General Security, 1600 ground water entitlement and 8 Ml high security (2870Ml used last season)	Over $1 million	5 full time, 2 casual and 5 contractors
Grower 2	15 to 25 years	282ha at 12bales/ha or 1.9bales/Ml	Cattle, wheat, barley, chickpeas, dryland cotton	642ML groundwater entitlement and 2400 unregulated (1700ML used last season)	$500,000-$749,000	2 full time, 2 full time contractors, 7 casual
Grower 3	25 or more years	464ha at 10-12 bales/ha or 3.3 bales/Ml	Wheat, barley, canola, corn, sorgum, dryland cotton and faba beans.	1724Ml ground water entitlement plus 300-600Ml overland flow utilised every year (1400Ml used last season)	$750,000 to $1 million	6 full time, 1 part time and 2 casual

Managing Change

The growers interviewed in Gunnedah had more diverse farming operations than those in St George, including cattle and growing other crops such as wheat, barley, canola, faba beans, corn and sorghum. When asked about their management actions in the last five years, the growers interviewed in Gunnedah all indicated that they had changed their irrigated production crop mix and improved the efficiency of their irrigation infrastructure. Two of the growers also indicated that they had increased their irrigated area. The table below summarises some of their comments regarding the recent drought.

Table 15 Managing Change, Growers

	Strategies for Managing Change

Grower 1	During the drought this farm increased non-irrigated cropping, maintained income through off-farm contracting and increased water efficiency, thus leading to an increased area of irrigated production. In better times employment has increased and machinery has been purchased, thus reducing the use of contractors.
Grower 2	During the drought lateral move irrigators were installed to save water. Water saving for next season's cotton crop is also an important strategy and allows some forward selling each year to get a better price.
Grower 3	This farm is planning for reduced water availability over the next five years, but the reduction of water availability is not a major threat because of the certainty of rainfall and groundwater. There was no affect on the business during the recent drought because of the reliability of the area, and the high rotation of crops is for agronomic, marketing and risk management reasons.

Farmers were also asked to predict their actions if water availability (and its impact on cotton related businesses) was decreased or increased by 10, 25 or 50 per cent, respectively. This question was not as well answered as in St George, because the growers saw it as less relevant to their operation; there is much higher water security around Gunnedah because of access to ground water and higher rainfall. The overall results were:

- One farmer indicated that his water availability didn't change because of the reliability of ground water and rainfall on the Liverpool Plains.
- One farmer indicated that he would have to reduce labour requirements at a cut of 10 per cent water availability.
- One farmer indicated that a 10 per cent cut in water availability would lead to reduced labour requirements, decreased plantings and changed crop mix, while a 25 per cent reduction would lead to him leaving farming and the community.

These answers show the diversity of business operations amongst growers and illustrate the difficulty in generalising the affects of cuts to water availability on the local economy as a whole.

Businesses in the Gunnedah Cotton Supply Chain were asked a similar question to farmers i.e. to predict their actions if cotton related business was decreased or increased by 10, 25 or 50 per cent, respectively. The businesses interviewed were unlikely to take action before their cotton related business was reduced by 50 per cent, and the most likely actions were to seek other business income and reduce staff. For the two ginning companies interviewed, reducing cotton business had a much more direct impact; one indicated that they would reduce staff at a decrease of 10 per cent and one at a decrease of 25 per cent. Both indicated that they would sell business assets and seek other business income at 25 percent or more reduction in cotton production. Comments by businesses on how they managed the recent drought are summarised below.

Table 16 Managing Change, Businesses

	Strategies for managing Change
Irrigation Supplies 1	Irrigation supplies and infrastructure is a growth area, with growers looking to increase their efficiency all the time. The drought did not lead to a change in business, and it focused attention on water availability.
Supply and Agronomy 1	Business has not noticed a change in cotton production and business practices have not been affected. Diversity of the farming base is an advantage.
Cotton Gin and Marketing 1	Changing cotton production had a direct impact on this gin during the drought, which halved its workforce from 2004 until the upturn in the last few seasons. The gin also used strategies such as reducing work hours and working 5 days instead of 7 to maintain full time staff.
Cotton Gin and Marketing 2	Changing cotton production is managed through decreasing casual staff, dealing in other commodities (for example, grains) and reducing capital expenditure. Plants can also be "moth balled" or closed down for a finite time so that a smaller number of gins are run at full capacity.

Water Use in the Namoi

Keepit and Split Rock dams regulate the Namoi water resource and enable management of general security water supply for irrigation. Publicly owned storages account for more than half of the total water storage in the Namoi Valley, but groundwater accounts for almost half of the water used for irrigation. The Namoi has the highest rate of groundwater use in NSW, but major reforms in groundwater management are currently being implemented to address over allocation. The region also has one of the largest levels of groundwater extraction within the Murray-Darling Basin and uses 15.2 percent (255 GL/year in 2004/05) of the MDB groundwater resource.

The table below shows the water entitlement volumes in the Namoi Catchment. It should be noted that the actual amount of water used from each license type varies depending on the conditions of a particular season.

Table 17 Water Entitlements in the Namoi Valley

License Type	Volume (GL)
General Security	240
High Security	4
Supplementary	122
Ground Water	191
Total	557

(Source: MDBA 2010)

7 Citrus and grapes in Waikerie

Several growers and businesses in the citrus and grape/wine industries were interviewed in Waikerie. The compounding factors of recent drought, reduced water allocation, a high Australian dollar and rising costs of production have resulted in a number of very difficult years for producers and associated businesses. The following tables show examples from the supply chain in Waikerie.

Table 18 Growers in Waikerie

Grower	Time Farming in the Area	Scale of Production	Other Land Uses	Water Allocation	Best Profit in the Last 5 Years	Employment
Citrus Grower 1	25 or more years	22ha farmed and irrigated with an average of 25 to 30 t/ha	None	220ML all used	$50,000 to 99,999	0.5 FTE plus contract pickers when required
Citrus Grower 2	5 to 15 Years	60ha of irrigated citrus with between 40 and 60 t/ha depending on quality of the fruit	Other horticulture and some dryland farming	560ML (260ML used in the last season)	$50,000 to 99,999	2 Full time, 2 Part time 3 Casual plus contracting for pickers (up to 30 people per day for about two months)
Grape Grower 1	25 or more years	200ha of irrigated vineyard with average yields of about 25 t/ha	Small scale production of garlic and vegetables	Purchases water as needed, 500ML purchased last season	$250,000 - 500,000	5 Full time plus a $130,000 budget for casual staff as required

Table 19 Supply Chain Businesses in Waikerie

Supply Chain Business	Time Operating in the Area	Importance of Citrus/ Wine to Operation	Average Yearly Turnover	Employment
Horticultural Contracting 1	5 to 15 Years	Crucial (90% of income or more)	$2million, down by 60% in the last three years	Turnover of about 1200 staff as pickers, mainly backpackers. Currently about 150 people, and could be up to 250 people at any one time.

Citrus Packing and Processing 1	5 to 15 years	Crucial (90% of income or more)	Over $2million	20 full time (52 weeks of the year) Up to 20 Casual (40 Weeks of the year) Up to 30 others (16 weeks of the year)
Irrigation Supplies 1	25 or more years	Important (40-60% of income)	$1-2 million	4 full time 3 part time Ad hoc contractng
Supply and Agronomy 1	5 to 15 years	Crucial (90% of income or more)	Over $2million	3 full time 1 Part time

Managing Change

Growers were asked about their actions in the last five years and for the next five years. In previous years, all three growers had improved their irrigation efficiency and changed their production i.e. the mix of crops and citrus varieties. The only common element of planning for the next five years was that the production mix would change. In general, the growers interviewed in Waikerie were facing difficult questions about viability, brought on by the impact of a high Australian dollar on export markets and uncertainty over water availability into the future. Some of their comments about the recent drought are summarised in the table below.

Table 20 Managing Change, Waikerie Growers

	Strategies for Managing Change
Citrus Grower 1	During drought, this grower reduced income, cut back on water use and used up surplus funds. Recent over supply and low price has meant that picking is much more selective, with an emphasis on premium fruit. Commented that the last few years have felt like it “wasn’t worth it.”
Citrus Grower 2	The drought had little impact on management, but irrigation efficiency was improved during the drought.
Grape Grower 1	This grower entered the water market to get through the drought. Water was bought when needed to ensure production remained viable.

Farmers were also asked to predict their actions if water availability was decreased or increased by 10, 25 or 50 per cent, respectively. Similar to St George and Gunnedah, decreases of up to 25 per cent were likely to affect decision making on crop mix and management, while large cuts (up to 50%) were more likely to influence decisions on labour and long term business decisions (for example reduced assets or closing entirely). Increased water entitlements usually led to farmers increasing their business operations and assets, but the three interviewed saw this scenario as highly unlikely.

Businesses were asked a similar question i.e. to predict their actions if citrus and/or wine related business was decreased or increased by 10, 25 or 50 per cent, respectively. The businesses interviewed were unlikely to take action before their business was reduced by 25 per cent, and the most likely actions were to seek other business income and reduce staff. For the citrus horticultural contractor interviewed, reducing citrus business had a much more direct impact; they indicated that they

would reduce staff at a decrease of 10 per cent. Changes to production had the least impact on the Supply and Agronomy business; only cuts of 50 per cent affected decision-making. Comments by businesses on how they managed the recent drought are summarised below.

Table 21 Managing Change, Waikerie Businesses

	Strategies for managing Change
Irrigation Supplies 1	As citrus and wine have become less viable, the business has had to manage cash flow problems including offering extended payment terms. The business is diversifying away from horticulture where possible. Full time staff has been reduced, with more use of casual and sub-contractors. Have also reduced hours of some staff by agreement.
Supply and Agronomy 1	The business has not been impacted by changes to citrus and wine viability as yet. Cash flow is being monitored while growers receive lower prices for produce. The business was not impacted by the drought.
Citrus Packing and Processing 1	Change to supply is managed by reducing or increasing the number of casual staff. For example, the business has just reduced down to full time staff only because of low supply. Keeping skilled staff is an issue for the business if it can't offer permanent full time work.
Horticultural Contracting 1	This business manages fluctuations in payment from growers by not replacing staff as they leave. Staff are not fired. The drought has meant that there are less people employed and cash flow is reduced. The business is run from a property with little debt, so it is possible to reduce operations significantly for a number of years and then increase operations again when conditions improve.

Water Use in the Riverland

Irrigators in the Riverland region are entirely supplied by the River Murray. Average yearly water use between the years 2002 and 2009 has been approximately 291GL (of a total available of about 344GL). There has been a large investment, both private and Government, in piped systems and modern metering in the Riverland over the last 40 years; the scope for improvement in irrigation efficiency is very low due to the current high level of efficiency. The extent of the Commonwealth Government buyback has been approximately 27 GL of water to 2008-09 from South

Australia's high security entitlement in the Riverland. The Riverland area is underlain by saline groundwater that is too salty for irrigation (MDBA 2010).

Decisions about managing water create substantial challenges for growers. The Murray Darling Basin Authority (2010) states that:

> *"Over the last five years there has been substantial purchase of temporary water from upstream states to assist with the low water allocations, especially in 2008-09 when a finishing allocation of only 18% was available. This followed the 2006-07 season allocations of 60% and the 2007-08 season of 32%. Difficulty in planning water purchases and in deciding which areas to dry off were caused in 2005-06 where a starting allocation of 80% was reduced to 60%. The low starting allocations of 4% to 2% also made it difficult to plan water purchases or drying off. The ability to buy-in water has generally been perceived to be a good thing, but growers have been unhappy to pay the high prices, especially in 2007-08 when the price of temporary water exceeded $1,000/ML."*