

SOMERSET REGIONAL COUNCIL; LOCKYER VALLEY REGIONAL
COUNCIL; LOCKYER WATER USERS FORUM

LOCKYER CATCHMENT PRELIMINARY SOCIO-ECONOMIC STUDY

DECEMBER 2017



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Lockyer Catchment Preliminary Socio-economic Study

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December 2017



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Appendix A Survey of irrigators

ABBREVIATIONS

ABARE	Australian Bureau of Agricultural and Resource Economics
ABN	Australian Business Number
ABS	Australian Bureau of Statistics
CPI	Consumer Price Index
DNRM	Department of Natural Resources and Mines
Ha	hectare
IEO	Index of Education and Occupation
IER	Index of Economic Resources
GRP	Gross Regional Product
GSP	Gross State Product
km ²	Square kilometres
LGA	Local government area
LVRC	Lockyer Valley Regional Council
LWUF	Lockyer Water Users Forum
ML	megalitre
NRMR	National Resource Management Region (ABS)
RDA	Regional Development Australia
SA	Statistical area
SEIFA	Socio-economic indicators for area
SRC	Somerset Regional Council

1 PROJECT BACKGROUND

1.1 BACKGROUND

Agriculture is the economic “lifeline” of the Lockyer Valley, with the region often being labelled the Food Bowl of Queensland (Regional Development Australia (RDA) - Ipswich and West Moreton Regional Roadmap 2016-2020). In terms of agricultural production, the area is regarded as one of the most fertile and productive, producing approximately 35% of Queensland’s vegetable supply from around 13,000 ha of irrigated land. Reliability of water supply has been cited as a major constraint to investment and diversification of agricultural production within the Lockyer Valley (SEQ Catchments n.d.) with the RDA – Ipswich and West Moreton Regional Roadmap 2016-2020 citing that “without regular water supply the production capacity of the Lockyer risks being compromised.”

In March 2017, WSP were commissioned by the Lockyer Valley Regional Council (LVRC), Somerset Regional Council (SRC) and the Lockyer Water Users Forum (LWUF) to undertake a preliminary study into the regional socio-economic benefits that could arise from increasing water supply to the region by 100,000 megalitres (ML). This report forms the output of that assessment.

It follows on from an earlier study undertaken in January 2016 by WSP | Parsons Brinckerhoff (now WSP) commissioned by the LVRC to prepare a preliminary socio-economic impact assessment of proposed amendments to the allocation and management of water in the Central Lockyer Valley Water Supply Scheme. The purpose of this earlier assessment was to support LVRCs submission to the Department of Natural Resources and Mines (DNRM) Statement of Proposals to amend the Water Resource (Moreton) Plan 2007 and Moreton Resource Operational Plan 2009.



*Significant water resources are available.
However, low reliability has been a
significant constraint to investment,
expansion and diversification of the food
bowl*

*Growing Opportunities: A strategy for sustainable
growth of South East Queensland Food Bowl, 2013*

1.2 PURPOSE

The objective of this updated Preliminary Socio-Economic Study for LVRC, SRC and LWUF is to provide a baseline of the current socio-economic context of the Lockyer Catchment (comprising the LVRC and a portion of the SRC) and identify the value that an additional supply of water would have to the region both in economic gross value terms as well as socially.

In undertaking this assessment, the unique social and economic aspects of the Lockyer Catchment area are highlighted and recognition is given to the integral role that water plays in sustaining the both the economic and social security of the businesses and community in the locality.

1.3 THE LOCKYER CATCHMENT

The Lockyer Catchment is in south-east Queensland, between Toowoomba and Ipswich. While predominantly located within the LVRC (76% of catchment), small sections of the catchment occur within the SRC (15% of catchment), Toowoomba Regional Council (8% of catchment) and Ipswich City Council (1% of catchment) local government areas (LGAs) (refer Figure 1.1).



Figure 1.1 Local government area boundaries in relation to the sub-catchments of the Lockyer Catchment

Source: Alluvium, 2015

The main stream system central to the Lockyer Valley is Lockyer Creek, which rises on the eastern slopes of the Great Dividing Range and flows in an easterly direction before joining the Brisbane River just below Wivenhoe Dam. The creek and its tributaries form a “bowl shaped” catchment, with an area of approximately 3,000 km². The underlying geology of the region has controlled the topography of the catchment, with weathering and erosion of the steep upper slopes resulting in the establishment of fertile floodplains in the lower catchment.

Land uses within the Lockyer Catchment are dominated by agriculture. The alluvial valley floor adjacent to Lockyer Creek and its southern tributaries in particular has been predominantly cleared for agricultural purposes (refer Figure 1.2). This area covers approximately 9% of the catchment and is used for irrigated agriculture, primarily irrigated horticulture. It is recognised that the Lockyer Catchment features some of the most valued and diversified agricultural land in Australia, supported by highly fertile soils on the valley floor.

Key assets and values within the Lockyer Catchment include:

- Highly fertile alluvial soils supporting a valuable irrigated horticultural industry resulting in an economy underpinned by agricultural commodities, particularly vegetables.
- High quality groundwater resources enhanced by a network of groundwater recharge weirs, used for irrigation. (note groundwater quality in terms of salinity varies across the catchment ranging from very low (<650 µS/cm) to very high (>8,000 µS/cm). This variation in groundwater salinity is primarily associated with the geological unit from which the groundwater drains and indicative of the natural salt content of the land units. In turn this water quality in part dictates the value of land across the catchment)
- Public and private infrastructure assets including social assets (community facilities, schools, hospitals); transport assets (roads, railways and in proximity to airports) and utility assets.
- Climate that is suitable not only for producing many different crops, with annual rainfall averaging 775 mm, but also providing counter-seasonal opportunities to competitors in southern regions (Alluvium 2015 and Mainstream Economics and Policy 2013).

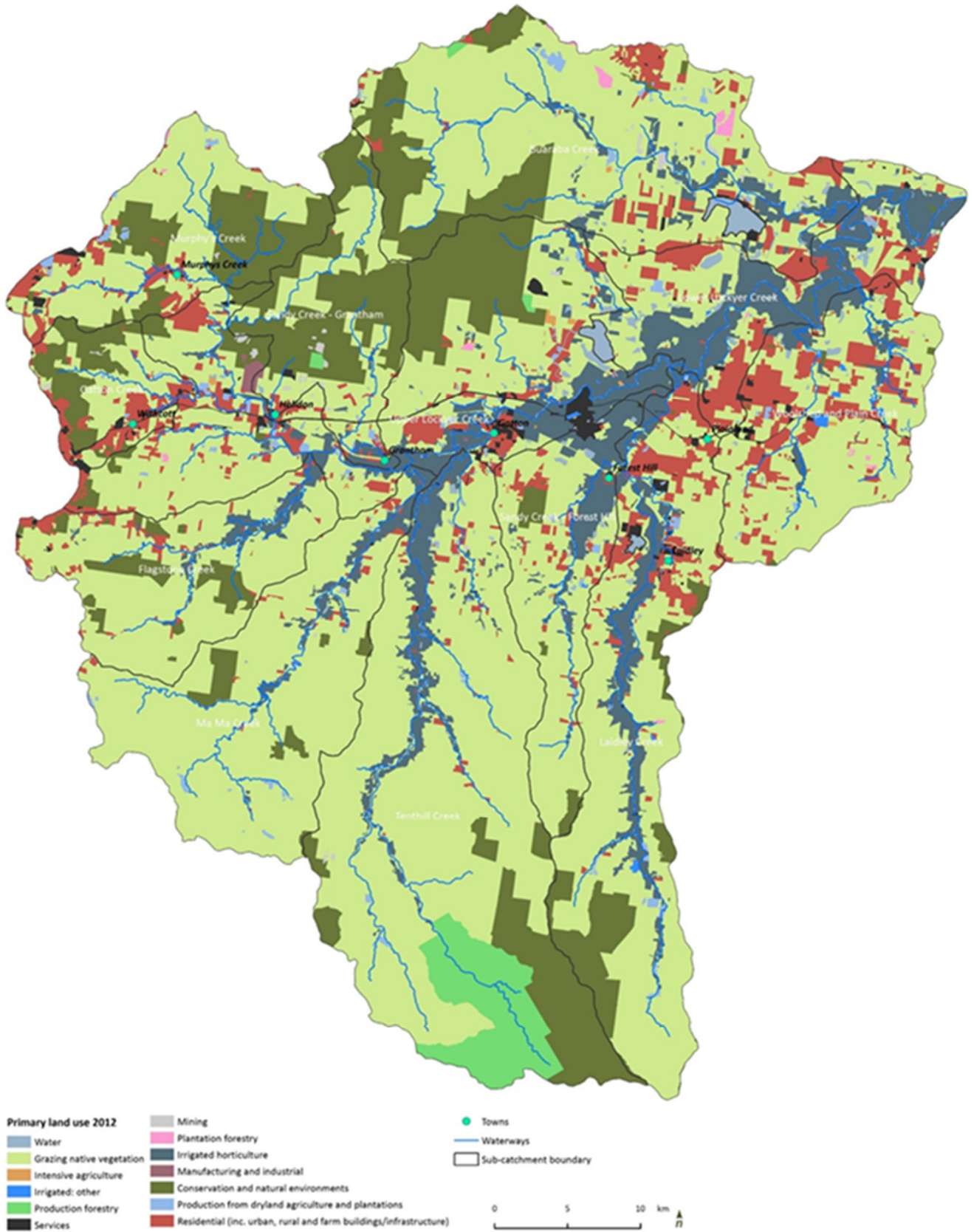


Figure 1.2 Land uses within the Lockyer Catchment

Source: Alluvium 2015

2 WATER RESOURCES

This section of the report provides an overview of water resources and water allocation within the Lockyer Catchment. It is worth noting that water allocation is subject to a high level of complexity and therefore the information presented within this section has not focused on this complexity but rather presents information of relevance to this study.

2.1 WATER SUPPLY SCHEMES

Water allocations available for irrigation purposes in the Lockyer Catchment are a mix of surface water allocations and groundwater resources.

Major water storages in the Lockyer Catchment are outlined in Table 2.1 along with their full supply level capacity. This infrastructure is supported by an associated irrigation distribution network, including engineered channels, natural channels as well as groundwater aquifers. This infrastructure is primarily administered through the Central and Lower Lockyer Water Supply Schemes and services around 530 irrigators. Both schemes are managed by Seqwater and together have a combined total capacity of approximately 65,000 ML (at full supply level) from 17 storage dams.

Table 2.1 Volume of major storages - Central and Lower Lockyer Water Supply Schemes

STORAGE	CAPACITY AT FULL SUPPLY LEVEL (ML)
Central Lockyer Water Supply Scheme	(33,073 ML)
— Bill Gunn Dam (Lake Dyer)	6,947
— Clarendon Dam (Lake Clarendon)	24,276
— Kentville Weir	484
— Jordan Weir I	456
— Jordan Weir II	30
— Wilson Weir	234
— Clarendon Weir	230
— Glenore Grove Weir	340
— Laidley Creek Diversion Weir	44
— Showgrounds Weir	24
— Crowley Vale Weir	8
Lower Lockyer Water Supply Scheme	(31,553 ML)
— Atkinson Dam	30,401
— Buaraba Creek Diversion Weir	74
— Brightview Weir	382
— Sippels Weir	25
— Potters Weir	60
— O'Reillys Weir	611
Total	64,954 ML

Source: Seqwater 2016e

Water allocation for agricultural purposes from these schemes, as well as unregulated groundwater is summarised in Table 2.2. This is based on information provided in the 2016-17 Network Service Plans for the Central Lockyer Valley and Lower Lockyer Valley Water Supply Schemes (Seqwater) as well as information provided by DNRM (unregulated groundwater).

Table 2.2 Water resources for irrigation (ML)

SUB-REGIONAL AND WATER ALLOCATION TYPE	ML ALLOCATION (ML/ANNUM)
Upper Lockyer Valley	
Groundwater – unregulated	Not measured (estimated 15,000 – 20,000)
Central Lockyer Valley	
<i>Central Lockyer Valley Water Supply Scheme</i>	
Surface water – medium priority water allocations (Morton Vale)	3,420
Surface water – Risk A and Risk B priority water allocations	3,115
Groundwater – medium priority interim water allocations	9,340
Lower Lockyer Valley	
<i>Lower Lockyer Valley Water Supply Scheme</i>	
Medium priority interim water allocations	11,110
<i>Gatton-Esk Road Implementation Area (Groundwater)</i>	Not measured (estimated 1,000)
<i>Groundwater unregulated</i>	Not measured (estimated 5,000-10,000)
Total	> 26,985 (estimated 47,985 to 57,985)

Source: Seqwater 2016d and i

Based on this data, current water allocation in the Lockyer Catchment is estimated to be in the order of 47,985 ML/annum to 57,985 ML/annum, of which regulated allocations for agriculture account for around 26,985 ML/annum. The volume of unregulated groundwater accounts for a similar portion, estimated between 20,000 to 30,000 ML/annum. As such, the current maximum capacity of irrigation water within the Lockyer Catchment is approximately 88,000 ML/annum.

Further information on water allocation within the Lower Lockyer Valley Water Supply Scheme and Central Lockyer Valley Water Supply Scheme is provided in the following sections.

2.1.1 LOWER LOCKYER VALLEY WATER SUPPLY SCHEME

The Lower Lockyer Valley Water Supply Scheme is located west of Lowood in the Lockyer Valley. The Scheme centres around Atkinson Dam, and was designed to supply surface water for irrigation purposes only. The scheme is regulated under the Moreton Resource Operations Plan 2009 which was amended in June 2014 to include the scheme.

Figure 2.1 shows the location of the Lower Lockyer Valley Water Supply Scheme.

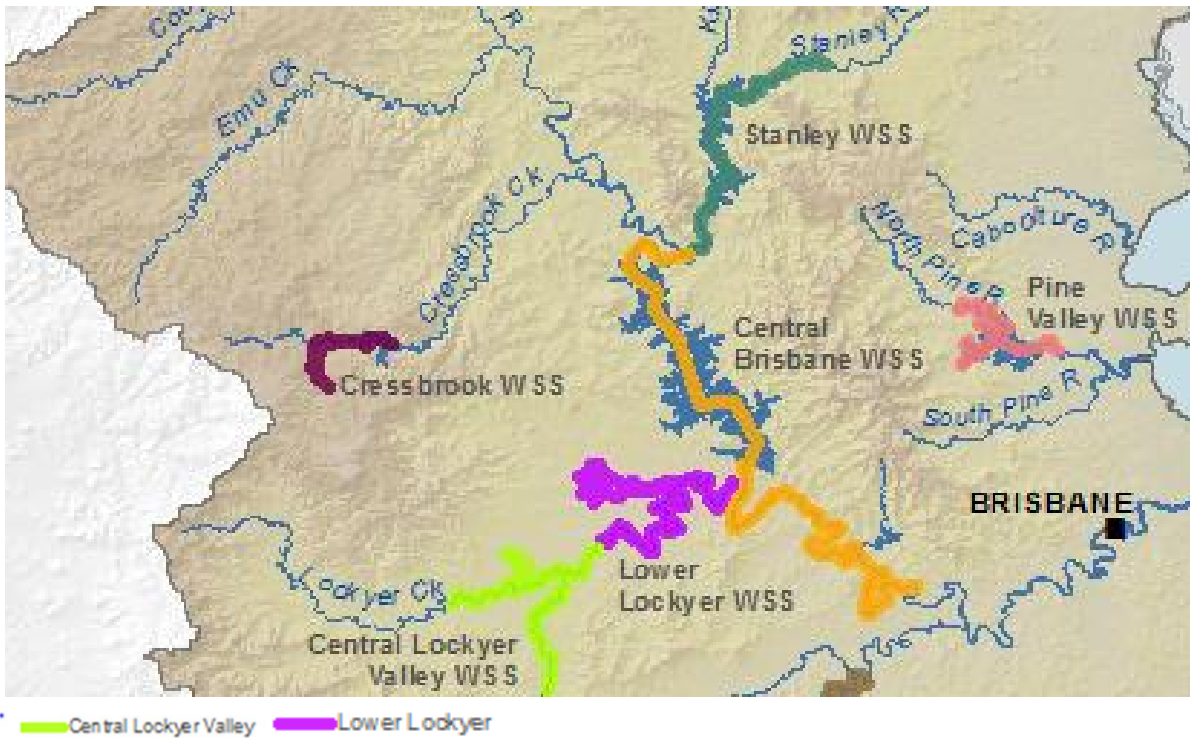


Figure 2.1 Lower Lockyer Valley Water Supply Scheme location map

Source: Bureau of Meteorology 2017

2.1.1.1 BULK ASSETS

Bulk water assets, owned and operated by Seqwater that comprise the Lower Lockyer Valley Water Supply Scheme are outlined in Table 2.3.

Table 2.3 Lower Lockyer Valley Water Supply Scheme – Bulk Water Assets

DAMS	WEIRS	OTHER BULK WATER ASSETS
Atkinson Dam	<ul style="list-style-type: none"> — Buaraba Creek Diversion Weir — Brightview Weir — Sippels Weir — Potters Weir — O'Reillys Weir 	<ul style="list-style-type: none"> — Gauging stations — Buaraba Creek Diversion Channel — Buaraba Creek Supply Channel — Seven Mile Lagoon Diversion Channel — Atkinson Pump Station — Atkinson Low Level Pump Station — Brightview Weir Supply Channel

Source: Seqwater 2016i

Atkinson Dam is an offstream storage that relies primarily of diversion of water from Buaraba Creek. The dam has a fully supply capacity of 30,401 ML and a catchment area of 32.7 km² (Seqwater 2016a). Water is released from the dam via two outlets: Brightview Channel and Buaraba Creek.

2.1.1.2 CUSTOMER AND WATER ENTITLEMENTS

Customers and water entitlements serviced under the Lower Lockyer Valley Water Supply Scheme are outlined in Table 2.4.

Table 2.4 Lower Lockyer Valley Water Supply Scheme – Customer and Water Entitlements

CUSTOMER TYPE	NUMBER OF CUSTOMERS	MEDIUM PRIORITY VOLUME (ML)
Irrigation	141	11,110
Seqwater	7	1,510
Total	148	12,620

Source: Seqwater 2016i

2.1.1.3 WATER ALLOCATIONS

Water release volumes from Atkinson Dam under the Lower Lockyer Water Supply Scheme for the past 10 years are presented in Table 2.5. This shows a decline in water releases from the dam since 2014, with releases for 2016 at 3% of design capacity. This low allocation level has been attributed to below average rainfall in the Buaraba Creek catchment since 2013 as well as the hot dry summer of 2016-17, which led to higher than average evaporation losses and resulted in water levels in Atkinson Dam being at critically low levels. As at 29 June 2017, Atkinson Dam had a capacity of 1,886 ML (6.2% of capacity) (Seqwater 2016f).

Table 2.5 History of Release Volumes – Lower Lockyer Water Supply Scheme

YEAR	RELEASE VOLUME (ML)	RELEASE VOLUME (% OF DESIGN CAPACITY)
2006	0	0%
2007	0	0%
2008	818	3%
2009	16,075	51%
2010	7,124	23%
2011	3,192	10%
2012	4,888	16%
2013	5,379	17%
2014	12,468	40%
2015	8,610	28%
2016	886	3%

Source: Compilation of data from DNRM and Seqwater

The current status of water allocations from the scheme is that Atkinson Dam is at critically low levels and Sippels Weir and Potters Weir are empty. As such customers on the Brightview Channel and BR1 supply channel are unable to be supplied with water. In addition, water cannot be supplied by the Buaraba Creek Pipeline. Brightview Weir has some capacity to release water and customers on O'Reilly's Weir with available allocation can take water until advised otherwise (Seqwater 2016h).

2.1.2.1 BULK ASSETS

Water is supplied primarily from the Lake Clarendon and Bill Gunn dams. These are off-stream storages and are filled by diverting water from nearby creeks during significant flow events. Lake Clarendon Dam has a catchment area of 3.4 km² and a full supply capacity of 24,276 ML (Seqwater 2016g). As of the 29 June 2017, water within the dam was at 2,158 ML (8.9% of full supply capacity) (Seqwater 2016f). Bill Gunn Dam has a catchment area of 3.0 km² and a full supply capacity of 6,947 ML. As of the 29 June 2017, water within the dam was at 653 ML (9.4% of full supply capacity) (Seqwater 2016f). Other bulk water assets within the scheme are outlined in Table 2.6.

Table 2.6 Central Lockyer Valley Water Supply Scheme – Bulk Water Assets

DAMS/OFF-STREAM STORAGES	WEIRS	OTHER BULK WATER ASSETS	DISTRIBUTION ASSETS
<ul style="list-style-type: none"> — Bill Gunn Dam (Lake Dyer) — Clarendon Dam (Lake Clarendon) 	<ul style="list-style-type: none"> — Kentville Weir — Jordan I and II Weirs — Wilson Weir — Clarendon Weir — Glenore Grove Weir — Laidley Creek Diversion Weir — Showgrounds Weir — Crowley Vale Weir 	<ul style="list-style-type: none"> — Redbank Creek Pump Station — Clarendon Pump Station — Clarendon Diversion Channels — Gauging stations 	<ul style="list-style-type: none"> — Morton Vale Pipeline

Source: Seqwater 2016d

The scheme is also located in the Clarendon Subartesian Area (Implementation Area 1) which is a benefitted groundwater area, with irrigators being licensed, metered and charged for their groundwater use (refer further to Section 2.1.3).

2.1.2.2 CUSTOMERS AND WATER ENTITLEMENTS

The Central Lockyer Valley Water Supply Scheme supplies water to 250 customers. An overview of these water entitlements is shown in Table 2.7.

Table 2.7 Summary of entitlements – Central Lockyer Valley Water Supply Scheme

INTERIM WATER ALLOCATION	USER/ CUSTOMER	NUMBER OF CUSTOMERS	MEDIUM PRIORITY WATER ALLOCATIONS (ML)	HIGH PRIORITY WATER ALLOCATIONS (ML)
Surface Water – Morton Vale	Irrigators	43	3,420	-
Surface Water – Central Lockyer	Irrigators	85	3,115	-
Groundwater – Central Lockyer	Irrigators	115	9,340	-
Risk A (medium priority)	Crowley Vale Water Board – Irrigation	1	325	-
Risk A (medium priority)	Stock and domestic	5	10	-
Risk A (medium priority)	Laidley Golf Club	1	60	-
Distribution losses	Seqwater	-	87	184
Total		250	16,357	184

Source: Seqwater 2016d

Water from the Central Lockyer Valley Water Supply Scheme is supplied to the following two tariff groups:

- Central Lockyer Valley tariff group which includes customers who have:
 - Risk A and Risk B priority surface water entitlements (85 customers)
 - Customers who have bore licences within the benefited groundwater areas (115 customers)
 - Laidley Golf Club
 - Crowley Vale Water Board
 - One non-riparian stock and domestic user
 - Seqwater
- Morton Vale Pipeline tariff group:
 - 43 irrigation entitlement holders who are supplied from the Morton Vale Pipeline.

2.1.2.3 WATER ALLOCATIONS

Water release volumes from Bill Gunn Dam and Clarendon Dam under the Central Lockyer Water Supply Scheme for the past 10 years are presented in Table 2.8. This shows that water releases from both storages have reduced since 2014.

Table 2.8 History of Water Release Volumes - Bill Gunn Dam and Clarendon Dam - Central Lockyer Water Supply Scheme

YEAR	BILL GUNN DAM		CLARENDON DAM	
	RELEASE VOLUME (ML)	RELEASE VOLUME (% OF DESIGN CAPACITY)	RELEASE VOLUME (ML)	RELEASE VOLUME (% OF DESIGN CAPACITY)
2006	0	0%	0	0%
2007	0	0%	0	0%
2008	894	12%	780	4%
2009	7,687	102%	0	0%
2010	6,290	84%	1,634	8%
2011	217	3%	575	3%
2012	1,275	17%	2,647	13%
2013	307	4%	2,442	12%
2014	3,580	48%	10,472	50%
2015	6,110	81%	6,907	33%
2016	1,263	17%	0	0%

Source: Compilation of data from DNRM and Seqwater

Critically low water levels in Bill Gunn and Clarendon dams has meant that Seqwater is currently unable to supply water to customers in the scheme along Laidley Creek below Showgrounds Weir. In addition, the water level in Clarendon Dam is below the level required to provide water to customers along Lockyer Creek via the Diversion Channel. Customers accessing water from the Morton Vale Pipeline are unaffected by these restrictions, with approximately 12 months of water supply along this part of the scheme (depending upon future weather conditions) (Seqwater 2016c).

2.1.2.4 TARIFFS

Water prices under the Central Lockyer Valley Water Supply Scheme for the 2016/17 year are as follows:

- Central Lockyer Valley Tariff Group (apply to Crowley Vale Water Board and Laidley Golf Club. Part B only will apply to groundwater and surface water users who do not have volumetric interim water allocations):
 - Fixed (Part A) - \$26.43 / ML
 - Variable (Part B) – \$10.65/ML
- Morton Vale Pipeline Tariff Group (apply to Morton Vale allocation holders):
 - Central Lockyer Valley:
 - Fixed (Part A) - \$26.43/ML
 - Variable (Part B) - \$5.32/ML
 - Morton Vale Pipeline:
 - Fixed (Part C) – \$9.60/ML
 - Variable (Part D) - \$8.79/ML
 - Morton Vale Pipeline (bundled):
 - Fixed (Part A + Part C) - \$36.03/ML
 - Variable (Part B + Part D) - \$14.11/ML (Source Seqwater 2016d).

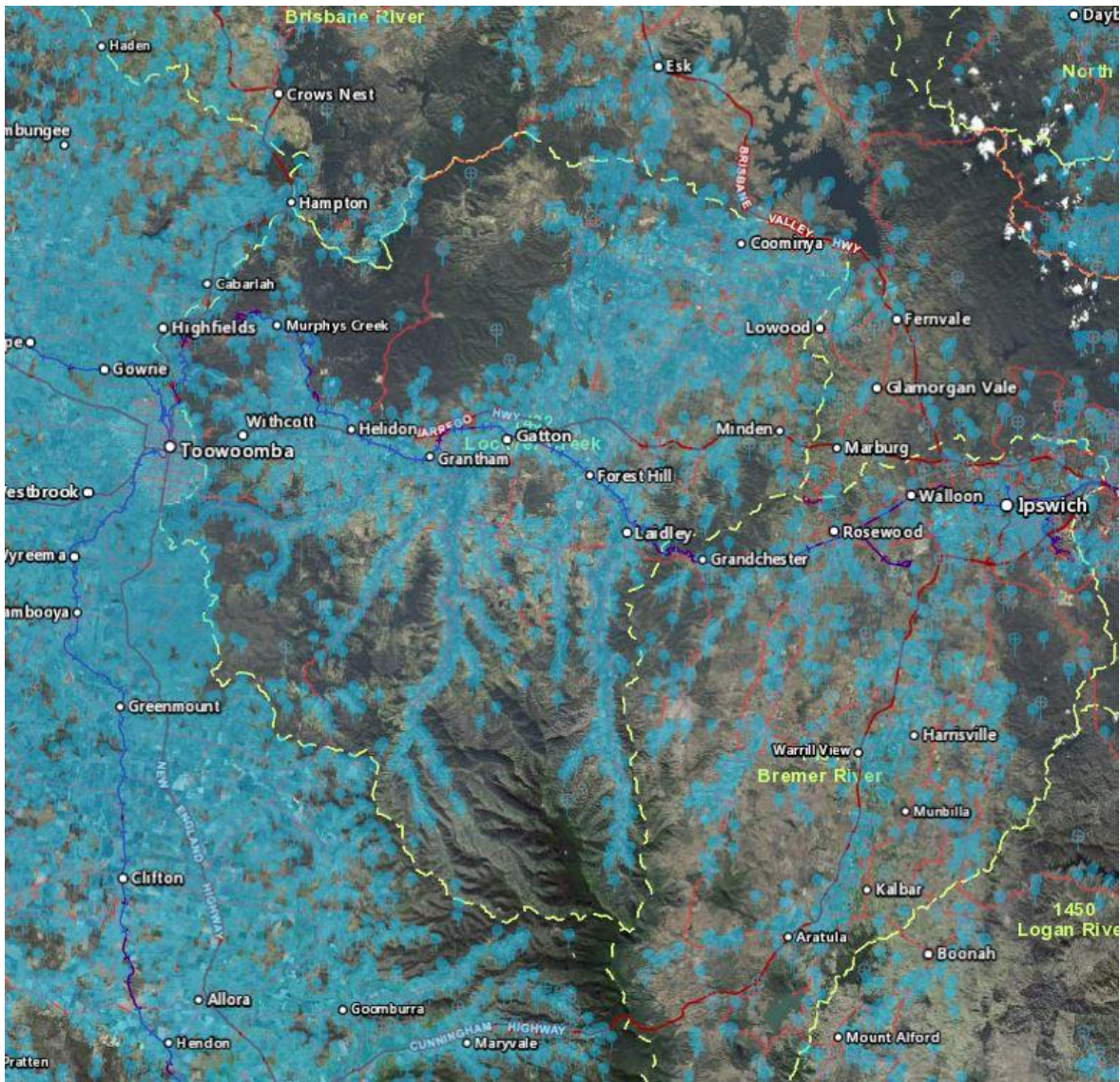
The price path at 30 June 2016 will be extended with prices being increased by \$2 plus CPI of 2.5% each year for Part A and by CPI only for Part B. For Morten Vale, Part A will be increased by \$2 plus CPI each year and Parts C and D will increase by CPI (Seqwater 2016b).

2.1.3 GROUNDWATER RESOURCES

In addition to surface water, groundwater resources provide a significant source of water for the Lockyer Catchment. Figure 2.3 shows the extent of registered groundwater bores (both DNRM and private) within the Lockyer Creek Catchment, illustrating the high concentration of bores within the alluvial plains where irrigated agriculture is undertaken. In 2013 it was estimated that there were over 5,000 bores accessing groundwater resources within the Lockyer Catchment (Mainstream Economics and Policy 2013).

Streamflow within the waterways of the Lockyer Catchment are intrinsically linked to groundwater resources. From the 1940's there was a rapid increase in the number of bores drilled in the catchment to access groundwater resources, resulting in a rapid increase in groundwater table drawdown in selected areas. In response to this, weirs were installed for groundwater recharge, storage of water for direct surface water access and management of releases from the dams (Wolf 2013).

Sustainable yields for groundwater extraction were estimated at 25,000 ML/year by the Queensland Water Resources Commission in 1987 based on estimated quantity of water available in each of the alluvial aquifers for each stream within the Lockyer Valley. The Queensland Department of Primary Industries revised this estimate to 27,000 ML/year in 1994 (Alluvium 2015). Historically average annual extraction rates have been reported to be as high as 46,500 ML/year (Wolf 2013 in Alluvium 2015).



Source: Queensland Globe

Figure 2.3 Groundwater bores (DNRM and private) within the Lockyer Catchment

Intensive use of groundwater for irrigation purposes, can result in decreases to water table levels, potentially resulting in an adverse impact on water quality, in terms of increased salinity, particularly during drier periods.

The alluvial aquifers are recharged by surface water in the creeks. As such it is only when there is sustained flow in the creeks that significant recharge occurs. Recent wet years, including the flood events in 2011 and 2013 have resulted in a major recharge of the groundwater system, resulting in groundwater levels returning close to long-term maximum levels. This demonstrates the ability of the system to recover with significant rainfall (Alluvium 2015).

2.1.3.1 GROUNDWATER MANAGEMENT AREAS

Groundwater resources within the Lockyer Catchment have been divided into implementation areas to allow a progressive management approach. These implementation areas are shown in Figure 2.4.

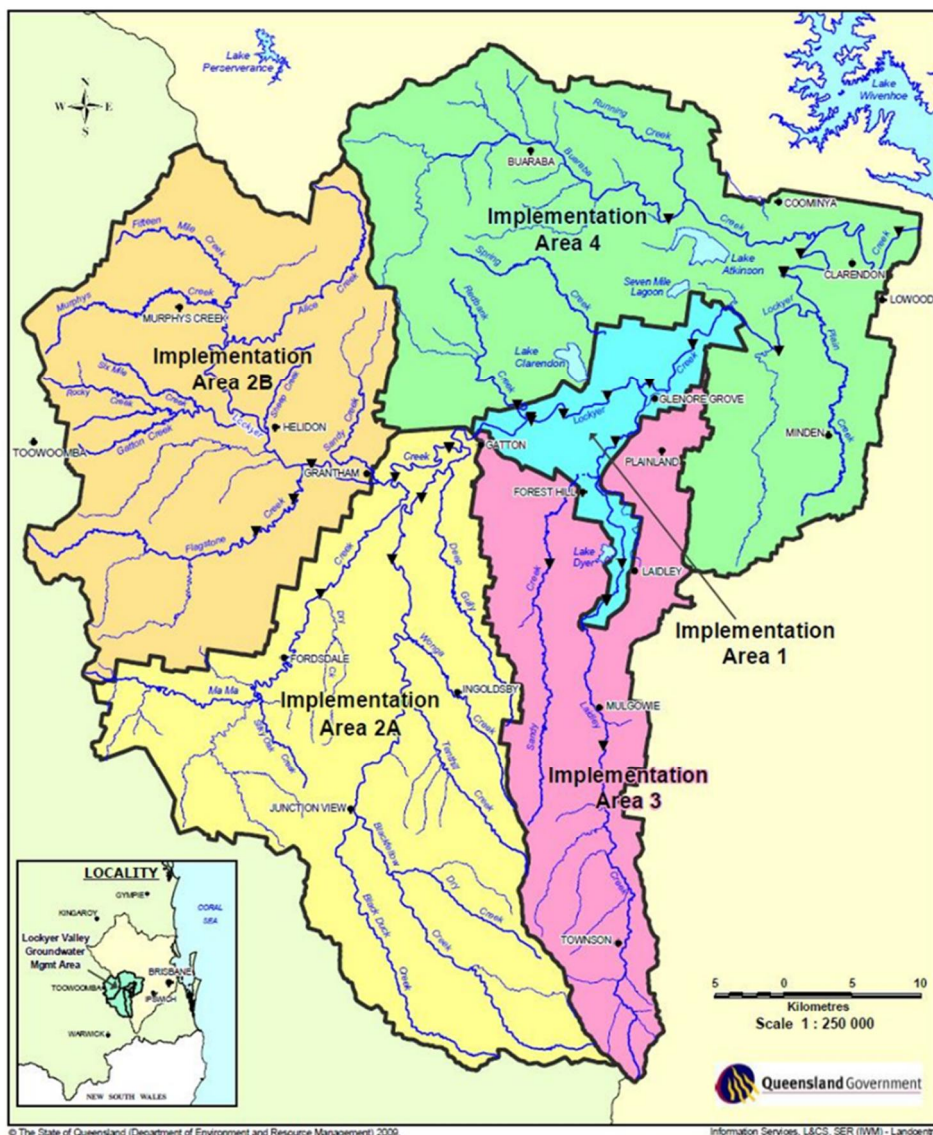


Figure 2.4 Lockyer Creek Catchment Groundwater Implementation Areas

Source: DNRM 2017

CENTRAL LOCKYER VALLEY (IMPLEMENTATION AREA 1)

In the past this was the only area in the catchment to be within a declared sub artesian basin (Clarendon Subartesian Area) and hence the only area where groundwater is licenced and metered. The intention however is that all groundwater use in the catchment will eventually be licenced and metered.

GATTON-ESK ROAD GROUNDWATER IMPLEMENTATION AREA

The Lower Lockyer Valley includes the Gatton-Esk Road Groundwater Implementation Area, the extent of which is shown in Figure 2.6. This area is within the Clarence Moreton Groundwater Management Area of the Great Artesian Basin. The sandstone aquifers of the Gatton-Esk Road Implementation Area have been identified as a high priority stressed groundwater area under the Great Artesian Basin water plan. Licensing of the take of groundwater from sandstone aquifers in this area has been completed.

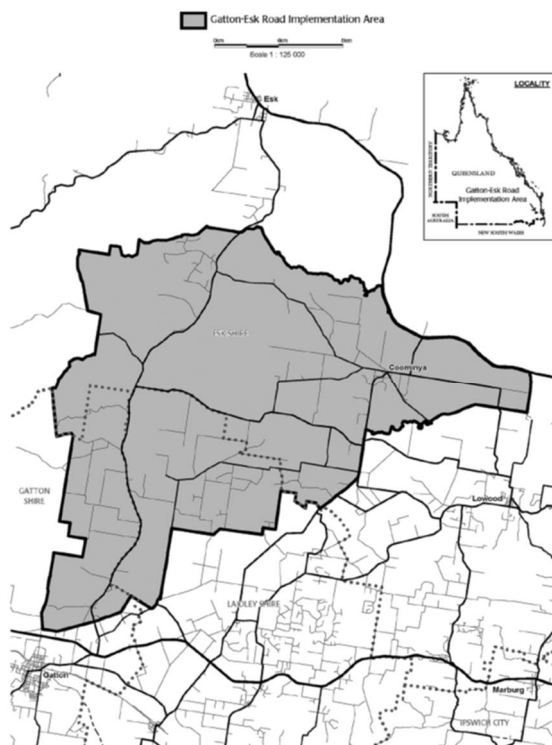


Figure 2.5 Gatton-Esk Road Groundwater Implementation Area

Source: *Water Plan (Great Artesian Basin) 2006, current as at 6 December 2016*

Installation of meters in the Gatton-Esk Road Implementation Area was completed in 2010. Under these metered entitlements, a total of 1,814 ML of water has reported to have been used between 2011/12 to 2013/14 comprising:

- 445 ML – 2011/12
- 574 ML – 2012/13
- 795 ML – 2013/14.

Groundwater use is considered to have been comparatively low during this period due to higher levels of rainfall. Since 2013, when below average rainfall has been recorded, it is estimated that groundwater extraction for irrigation has been in the order of 1,000 ML/year (DNRM 2015).

2.1.4 IRRIGATION

Significant hydrological changes have occurred in the Lockyer Valley over the past 100 years. Originally a system with perennial streamflow, the system today is one characterised by intermittent streamflow, with flows occurring after large rainfall events. This change can be attributed not only to changing rainfall patterns but also land use impacts, particularly the extent of irrigation.

Irrigated agriculture, particularly vegetable production, uses a significant amount of water. Actual water usage varies between producers and is dependent on a number of factors including:

- Local rainfall – use of water for irrigation purposes is likely to decline during period of local rainfall.
- Prolonged periods of dry weather – during prolonged dry periods, farmers are likely to increase their reliance on irrigation water
- Type of crop produced – different crops use different amounts of water
- Type of irrigation equipment.

A study by Mainstream Economic and Policy in 2013 into understanding development challenges for sustainable growth of the South-East Queensland Food Bowl, identified that water availability (both volume and reliability) remained a major constraint to long-term planning and investment into expanded horticulture production. Most crops require total water (rainwater and irrigation) of about 3-4 ML/ha, with efficient irrigation rates around 2.5ML/ha (Mainstream Economics and Policy 2013)

In times of drought both the groundwater levels and streamflow are impacted by water scarcity and hence the reliability of water supply is reduced.

Water releases from Atkinson Dam, Bill Gunn Dam and Clarendon Dam as a percentage of full supply capacity provides an indicator of reliability of water supply. Water releases from these storages for the last 10 years is shown in Figure 2.6. This illustrates that during the recent period of high rainfall events (2013, 2014) releases from all storages have increased however during the Millennium Drought (early to mid-2000's) releases were often at 0%. Recent years have seen a reduction in water releases, with water releases for 2016 at 0% for Clarendon Dam and 3% for Atkinson Dam.

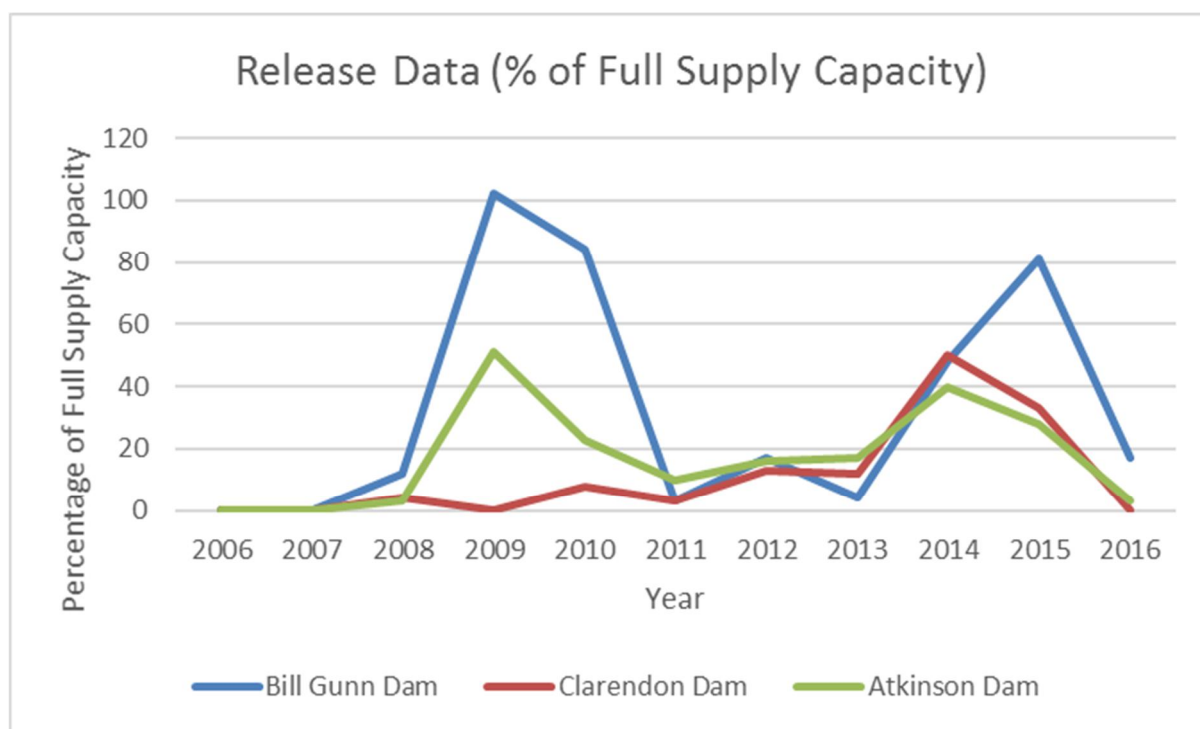


Figure 2.6 Water reliability - Release data (% of full supply capacity) from Bill Gunn Dam, Clarendon Dam and Atkinsons Dam

A survey of irrigators was undertaken to gauge the impact that additional water for irrigation would have on existing businesses (refer Section 3.4). The initial questions in this survey looked at current water usage (refer Appendix A).

This survey indicated that amongst respondents the most prominent source of current irrigation water was unregulated groundwater, followed by regulated surface water and benefited groundwater (refer Figure 2.7). It also indicated that the demand for additional water would increase during low rainfall periods.

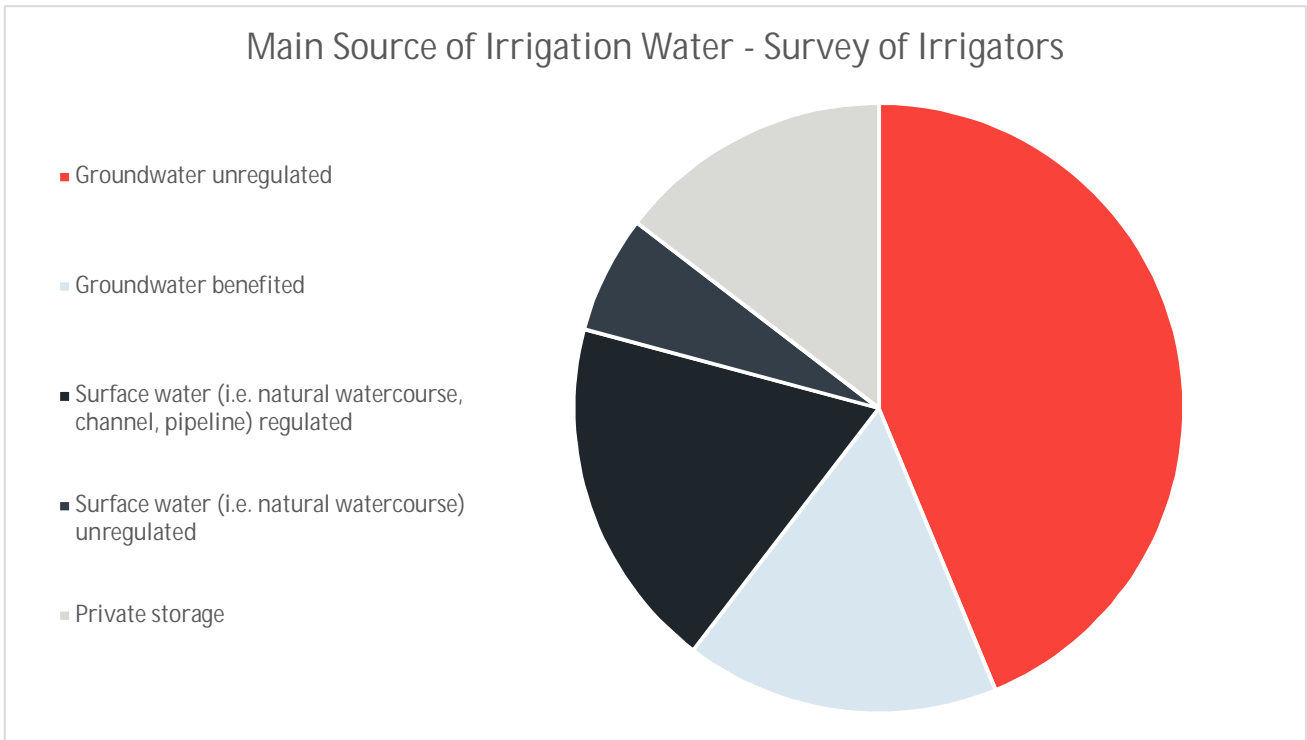


Figure 2.7 Source of irrigation water - Lockyer Creek Catchment irrigators

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) predicts the following trends in climate for the East Coast North Natural Resource Management zone (of which the Lockyer Catchment is part):

- similar or slight decreases in annual rainfall
- more occurrences of extreme rainfall events
- increase in average temperatures
- more occurrence of extreme temperature events (very hot days; decrease in frost days)
- increase in evaporation and longer periods of drought (Alluvium 2015).

This indicated that under such conditions, the Lockyer Valley system will require an input of water or higher efficiency in irrigation to sustain agricultural practices as they are now. In light of recent trends in climate variability, additional water is required to sustain current farming practice within the Lockyer Catchment.

3 METHODOLOGY

This section of the report provides an overview of the data sources and methodology used to undertake the socio-economic assessment. It also describes the Study Area used and the rationale for adopting this Study Area.

3.1 DATA SOURCES

Quantitative and qualitative information was gathered from a range of primary and secondary data sources to develop the initial socio-economic study including:

- statistical information from a range of sources including Australian Bureau of Statistics (ABS):
 - 2011 and 2016 Census of Population and Housing data
 - 2015-2016 data from the Agricultural Census
 - the Counts of Australian Businesses
 - statistical information from the Australia Bureau of Agricultural and Resource Economics (ABARE)
 - local and regional planning instruments such as community and social plans from local and state government levels
 - previously published reports on the importance of the agricultural industry to the Lockyer Valley regional economy.
-

3.2 STUDY AREA

3.2.1 SOCIAL ASSESSMENT

The Study Area used for compiling the community profile has been aligned with the following data collection areas released by the ABS:

- Lockyer Valley Regional Council LGA (Code LGA34580)
- Lowood Statistical Area Level 2 (SA2) (Code 310021281)
- Statistical Area Level 1 (SA1) (Code 3127808).

These areas are shown on Figure 3.1 in relation to the Lockyer Creek Catchment.

3.2.2 ECONOMIC ASSESSMENT

Economic profile of the Study Area has been aligned with the following data collection Statistical Area Level 2 (SA2) areas released by the ABS:

- Lockyer Valley West SA2 (Code 317011451)
- Lockyer Valley East SA2 (Code 310021280)
- Gatton SA2 (Code 317011448)
- Esk SA2 (Code 310021278)
- Lowood SA2 (Code 310021281).



Figure 3.1 Lockyer Creek Catchment: Social study area in relation to the Lockyer Creek Catchment

These areas are shown on Figure 3.2 in relation to the Lockyer Creek Catchment area. A slightly larger area was adopted for the economic profile due to limited data being available for SA1 areas (i.e. reporting of business data was at the SA2 level).

In addition, specific statistics related to agricultural statistics were compiled from the Statistical Area Level 4 (SA4) areas of Ipswich (Code – 310) and Toowoomba (Code - 317). These are the smallest areas for which current information from the Agricultural Census are reported. The extent of these areas in comparison to the Lockyer Catchment is also shown on Figure 3.2.

3.3 QUANTITATIVE ECONOMIC ASSESSMENT

3.3.1 SCOPE

In order to derive a quantitative estimate of the economic benefit (gross) resulting from an increase in water supply for irrigation purposes a desk-top assessment was undertaken. This assessment focused on providing a broad order estimate of the economic impact from a specified increase in water supply (100,000 ML/annum) in terms of output and employment.

The intent is to measure the local economic impacts of additional water supply through increased agricultural production including:

- Additional economic output encompassing the:
 - Direct (money initially spent in the region)
 - Indirect (additional business to business activity)
 - Induced (increased personal incomes through further spending and activity – household to business activity).
- Additional employment from this additional output.

The assessment utilised:

- publicly available information on current agricultural production and its economic impacts
- additional information relevant to the economic impacts collected through a survey of irrigators within the region (refer Section 3.4).

3.4 SURVEY OF IRRIGATORS

A survey of irrigator was completed to tap into the knowledge of growers operating in the Study Area. The survey was undertaken at the request of the LWUF representatives who were keen to engage growers in this process.

The survey was distributed to 118 irrigators within the Lockyer Valley via SurveyMonkey. This survey was active for a two week period between 17 July and 30 July 2017. In total, 36 responses were received from this survey of which 19 were completed surveys and the remaining 15 partially completed surveys.

A copy of the survey questionnaire is included as Appendix A.

Information obtained from the survey of irrigators has been used to supplement the assessment, where considered relevant.

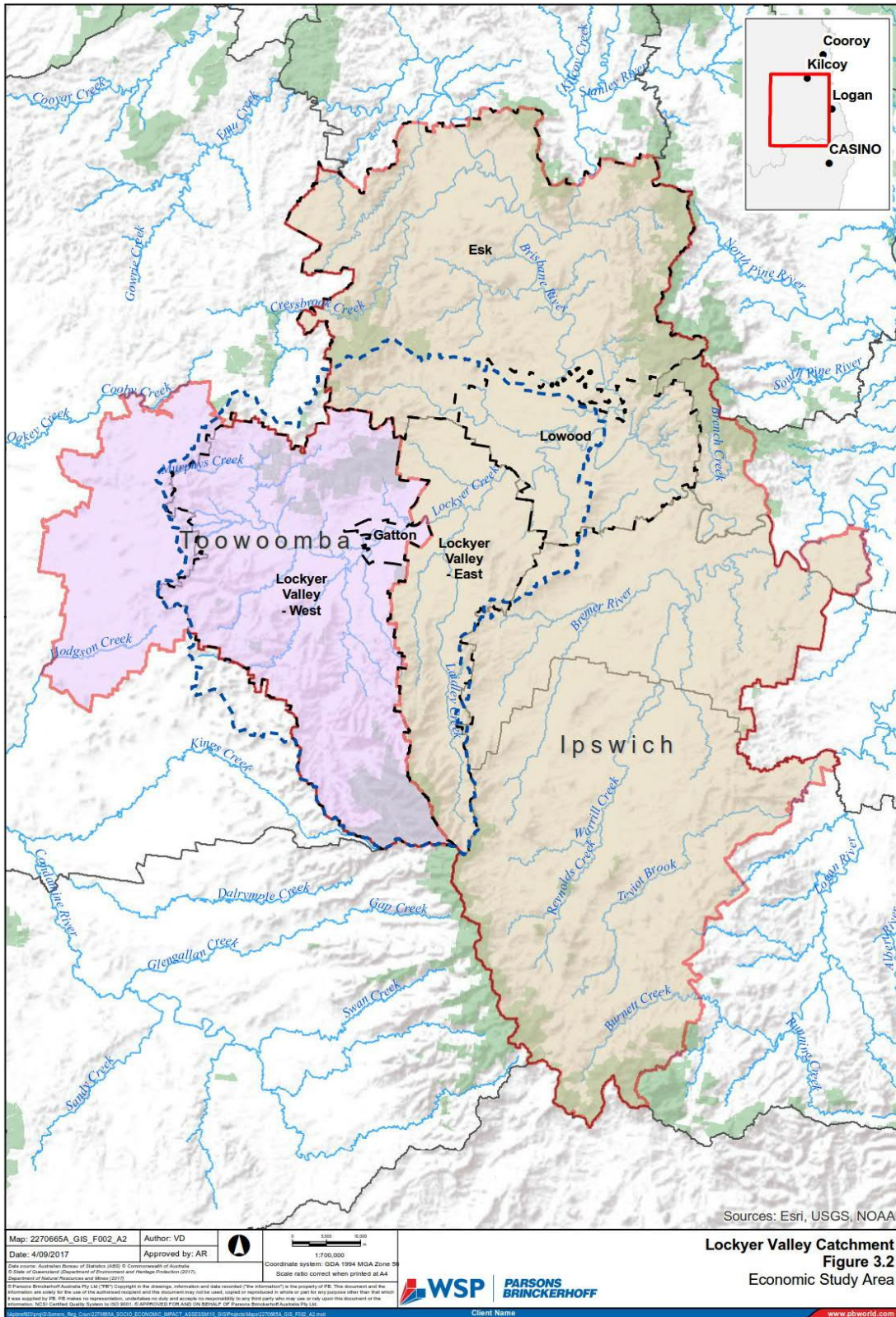


Figure 3.2 Lockyer Creek Catchment: Economic Study Area

3.5 LIMITATIONS

While all due care was taken during the preliminary socio-economic study, several unavoidable data-related limitations are present.

3.5.1 *COMMUNITY PROFILE*

It should be noted that at the time of preparing the socio-economic baseline, limited data from the 2016 Census had only been released. While QuickStats information was available for all areas comprising the Study Area, a basic Community Profile for SA1 3127808 had not been released. In addition, information around employment, education and population mobility from the 2016 Census had yet to be released. As such, the community profile is based on 2016 Census data where available and 2011 Census otherwise.

3.5.2 *ECONOMIC ASSESSMENT*

The scope and reliability of the analysis is dependent on the availability and suitability of appropriate data used to complete the impact calculations. The inputs and assumptions underpinning the results, have also been described for transparency.

It should be noted that this economic assessment is a high level indicative assessment, carried out using primarily publicly available sources of data. Information obtained from a survey of irrigators has been used to supplement the assessment, where considered relevant. Detailed information as to the exact amount, location and how the water will be made available as part of a full feasibility study to be undertaken in the near future.

4 COMMUNITY PROFILE

4.1 LOCKYER VALLEY REGIONAL COUNCIL

The LVRC area, a Local Government Area (LGA) in Queensland encompassing 2269.0 km² (ABS 2017a), is located approximately 90 km west of Brisbane, towards Toowoomba. The LGA is mostly located in a valley, hence its name, bordered by the Great Dividing Range. It is bounded by the SRC area in the north and north-east, the City of Ipswich in the east, the Scenic Rim Regional Council area in the south-east, the Southern Downs Regional Council area in the south, and the Toowoomba Regional Council area in the west (profile.id 2017).

The LGA is predominantly rural, with major town centres at Gatton and Laidley, and several smaller townships including: Hatton Vale; Plainland; Mulgowie; Thornton; Forest Hill; Grantham; Helidon; Withcott and Murphys Creek (Luvya Lockyer 2017).

4.1.1 COMMUNITY HISTORY AND CULTURE

European settlement of the area dates from 1829, with minimal population noted until the 1840s. The area has had a long history in the agricultural industry, initially dairy farming and sheep grazing until horticulture became more productive with the aid of irrigation. In the late 1800s, with the opening of the railway line from Ipswich to Toowoomba, the population grew and the establishment of smaller townships commenced. From approximately the 1960's significant residential development occurred (post-war) and the population has continued to increase and is expected to continue (profile.id 2017).

The LVRC LGA is now known as one of the top ten most fertile farming areas in the world and is a large contributor to the agricultural industry, specifically horticulture and vegetables, which has resulted in the area denoted as 'the food bowl of Australia'; 'Brisbane's Salad Bowl' or 'Salad Bowl of Queensland' (Luvya Lockyer 2017). The area supports a diverse range of fruit and vegetables, supplying not only commercial markets but also niche markets including organic farms, dairy and meat products, a winery and olive oil (Luvya Lockyer 2017).

4.2 SOMERSET REGIONAL COUNCIL AREA

SRC LGA encompasses an area of 5373.4 km² and includes both the Wivenhoe and Somerset Dams as well as high quality agricultural land. The SRC LGA was formed in 2008 following amalgamation of the former Esk Shire and Kilcoy Shire Councils. In promoting this amalgamation, the Local Government Reform Commission identified that the long-term future of Somerset would be as a major water catchment for the south-east Queensland region with farming being the main economic activity within a water catchment management regime. Major population centres within the Somerset Regional Council LGA include Esk, Fernvale and Kilcoy, Lowood and Toogoolawah.

The primary economic activity in the Somerset region is agricultural production, including food processing. The largest employers in the region (apart from the Somerset Regional Council) are the Greenmountain Trading Co abattoir and the Australian Food Corporation meat processing plant (which processes meat patties for McDonald's) both of which are located at Coominya. Tourism is also a significant contributor to the local economy major attractors being the scenic amenity of the area, water-based recreational activities offered by Somerset and Wivenhoe dams, along with the proximity of the LGA to Brisbane.

4.2.1 COMMUNITY HISTORY AND CULTURE

Key historical land uses within the SRC LGA comprised beef cattle pastoral activities, dairying and timber getting. Land fertility and proximity to Brisbane market and water resources made the region attractive for settlement, with towns developing to service initially the pastoral industry and later the dairying and timber industries. Settlement by Germans was a feature of the region from the 1850's, with large numbers settling in areas now known as Tarampa, Lowood, Minden, Marburg and Mount Beppo. Land settlement accelerated rapidly following opening of the railway line to Esk in 1886 and Toogoolawah in 1904 (Kerr 1988).

Whilst the region has remained largely rural in lifestyle, the dairying and timber industries have made way for lifestyle rural residential developments and as a consequence, an increase in commuters to major population centres of Ipswich and Brisbane. Government land resumptions in the 1960's and 1970's for the Wivenhoe Dam along with land subdivision for rural residential development has permanently altered land use within the southern sections of the LGA in particular.

4.3 LOCAL AREA

4.3.1 POPULATION AND DEMOGRAPHICS

At the time of the 2016 Census, the total population of the Local Area was 54,083 persons, of which 39,395 persons resided in the LVRC (an increase of 4,441 persons since 2011) (Table 4.1). The total population residing within the SRC portion of the Local Area (Lowood and 3127808 combined) in 2016 is estimated at 14,688 persons, an increase of 2,167 persons since the 2011 Census (Table 4.1).

Table 4.1 Total population of Local Area and State (2006, 2011 and 2016)

CENSUS YEAR	LVRC	SRC (PORTION)	LOCAL AREA	STATE
2006	31,305	-	-	3,904,533
2011	34,954	12,521	47,475	4,332,739
2016	39,395	14,688	54,083	4,703,193

Source: Australian Bureau of Statistics – Census of Population and Housing 2006, 2011, 2016

As shown in Table 4.2, the population of the Local Area is evenly distributed between males (50.1%) and females (49.9%). This is consistent with the overall State of Queensland with males accounting for 49.4% of the population and females accounting for 50.6% of the population. Moreover, at the time of the 2016 Census, the median age for the LVRC and Lowood (SA2) was 39 years, which is slightly higher than the median age for the State of 37 years. The median age for SA1 (3127808) was however significantly higher at 47 years.

The age groups comprising greatest representation within the Local Area included children between 5 to 19 years of age and adults between 45 to 59 years of age. There were more children aged between 5-9 years within the portion of the Local Area within the SRC (representing 8% of the population compared to 6.7% for both LVRC and the State).

For the Local Area, people aged between 45 and 74 years of age comprised a greater proportion of the population compared to the average for the State. In particular, people aged between 50 and 54 years of age comprised 7.1% of the population and people between 55 and 59 years of age represented 6.7% of the population compared to 6.6% and 6.2% within Queensland respectively. People aged between 60 and 64 years and 65 and 69 years comprised 6.1% and 5.9% of the population respectively compared to 5.5% and 5.1% for Queensland.

The dependency ratio (i.e. the proportion of people who are in dependent age groups (under 15 and 65 and over) compared with the number of working age people (aged 15 to 64 years of age)) provides an indication of the level of dependency within an area. At the time of the 2011 Census, SRC LGA had a dependency ratio of 57.5% compared to 54.2% for LVRC LGA; 48.7% for Queensland and 47% for south-east Queensland as a whole.

Of particular note is the Somerset dependency ratio which is predicted to increase significantly in the future based on an ageing population to a forecast 84.6% in 2036 compared to 59.8% for south-east Queensland and 59% for Lockyer Valley (2031). The impact of this will be that there will be fewer people in the Somerset workforce and a larger number not in the workforce. If not countered, this trend could have a negative impact on Somerset's economy and the ability to provide services to a larger 'dependent' group living in Somerset.

Table 4.2 Population and age distribution of the Local Area and State populations (2016 Census)

AGE CATEGORY	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	%	NO.	%	NO.	%	NO.	%
Males	19,298	50.0	7,385	50.3	26,683	50.1	2,312,889	49.4
Females	19,309	50.0	7,295	49.7	26,604	49.9	2,381,308	50.6
Median Age	39	-	n/a		n/a	-	37	-
0-4 years	2,324	6	1,038	7.1	3,362	6.3	296,466	6.3
5-9 years	2,586	6.7	1,172	8.0	3,758	7.0	317,138	6.7
10-14 years	2,637	6.8	1076	7.3	3,713	7.0	299,097	6.4
15-19 years	2,721	7	964	6.6	3,685	6.9	296,287	6.3
20-24 years	2,599	6.7	778	5.3	3,377	6.3	316,860	6.7
25-29 years	2,377	6.2	706	4.8	3,083	5.8	320,753	6.8
30-34 years	2,273	5.9	831	5.7	3,104	5.8	325,943	6.9
35-39 years	2,149	5.6	799	5.4	2,948	5.5	305,218	6.5
40-44 years	2,453	6.4	995	6.8	3,448	6.5	322,901	6.9
45-49 years	2,706	7	1032	7.0	3,738	7.0	322,982	6.9
50-54 years	2,736	7.1	1036	7.0	3,772	7.1	308,727	6.6
55-59 years	2,503	6.5	1082	7.4	3,585	6.7	292,198	6.2
60-64 years	2,305	6	969	6.6	3,274	6.1	260,685	5.5
65-69 years	2,250	5.8	872	5.9	3,122	5.9	242,192	5.1
70-74 years	1,698	4.4	626	4.3	2,324	4.4	180,406	3.8
75-79 years	1,056	2.7	377	2.6	1,433	2.7	126,084	2.7
80-84 years	660	1.7	199	1.4	859	1.6	83,731	1.8
85 years and over	587	1.5	149	1.0	736	1.4	85,528	1.8

Source: Australian Bureau of Statistics, Census of Population and Housing 2016

The higher median age of the population, the lower proportion of the population within the 25-44 years age bracket and the higher proportion of the population within the 45-74 years age brackets are all indicators of an ageing population with the Study Area.

Table 4.3 provides an overview of information regarding cultural diversity for the Local Area and the State. At the time of the 2016 Census, 3.9% of the Local Area population identified as Aboriginal and/or Torres Strait Islander, which is similar to the 4.0% identified in the State.

Table 4.3 also shows that in 2016, most persons in the Local Area identified as having Australian ancestry (42.2%), followed by English ancestry (36.6%) and German ancestry (12.3%). The proportion of people who identified as having German ancestry (12.3%) within the Local Area were significantly higher than that recorded within the State (4.5%) and is particularly high in the SRC portion (11.2%). This is not only a reflection of the early German agricultural settlers to the region but suggests that the strong ties and traditions to agricultural are still prevalent.

Table 4.3 Cultural diversity of the Local Area and State populations (2016 Census)

CATEGORY	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	% *	NO.	% *	NO.	% *	NO.	% *
Aboriginal and Torres Strait Islander people	1,508	3.9*	589	4.0	2,097	3.9*	186,482	4.0*
Ancestry – Australian	15,771	30.1**	6,514	44.3*	22,285	41.2*	1,649,284	25.3
Ancestry – English	14,071	26.9**	5,725	39.0*	19,796	36.6*	1,794,999	27.5
Ancestry - German	5,035	9.6**	1,644	11.2*	6,679	12.3*	296,387	4.5
Ancestry - Irish	3,978	7.6**	1,428	9.7*	4,985	10.0*	564,334	8.7
Ancestry - Scottish	3,537	6.8**	1,537	10.5*	4,215	9.4*	486,648	7.5
Total responses to B08	46,667	-				-	5,794,440	-

Source: Australian Bureau of Statistics, Census of Population and Housing 2016

*As a percentage of total population

** As a percentage of total responses to 'Question B08 – Ancestry by birthplace of parents' parent

4.3.2 EDUCATION

Table 4.4 provides an overview of the highest level of primary or secondary schooling within the Local Area and the State at the time of the 2011 Census. Detailed information from the 2016 Census related to education has yet to be released for all areas comprising the Local Area. As such, reference has been made to information from the 2011 Census.

At the time of the 2011 Census, the educational profile for the Local Area was lower than compared with Queensland, with only 41.1% of persons over 15 years of age having completed 'Year 11 or 12' (or equivalent) compared to the State average of 55.3%. Correspondingly more people in the Local Area indicated their highest level of education as being 'Year 10 or equivalent' (31.4%) or 'Year 8 or below' (10.8%) than compared with the State (24.6% and 6.1% respectively). Within the Local Area, a slightly higher percentage of persons in the LVRC indicated they had completed 'Year 12 or equivalent' (34.8%) than was identified in the SRC portion (33.6%). Accordingly, more persons aged 15 years and over in the SRC portion of the Local Area identified their highest level of education as being 'Year 10 or equivalent' (33.1%) compared to the LVRC (30.7%).

Table 4.4 Highest level of primary or secondary schooling completed (2011 Census)

CATEGORY	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	% *	NO.	% *	NO.	% *	NO.	% *
Year 12 or equivalent	9,075	34.8	3,092	33.6	12,167	34.5	1,595,327	48
Year 11 or equivalent	1,678	6.4	664	7.2	2,342	6.6	241,668	7.3
Year 10 or equivalent	8,016	30.7	3,052	33.1	11,068	31.4	815,723	24.6
Year 9 or equivalent	1,820	7.0	671	7.3	2,491	7.0	161,393	4.9
Year 8 or below	2,817	10.8	984	10.7	3,801	10.8	203,749	6.1
Did not go to school	135	0.5	44	0.5	179	0.5	15,353	0.5
Highest year of school not stated	2,547	9.8	708	7.7	3,255	9.2	287,548	8.7
Total	26,088	-	9,215	-	35,303	-	3,320,761	-

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

*As a percentage of persons aged 15 years and over who are no longer attending primary or secondary school

Table 4.5 provides an overview of the number of persons aged 15 years and over who stated a completed qualification within the Local Area and the State at the time of the 2011 Census.

Table 4.5 Persons aged 15 years and over who stated a completed qualification (2011 Census)

EDUCATION QUALIFICATIONS	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	% *	NO.	% *	NO.	% *	NO.	% *
Level of qualification adequately described	9,246	34.0	3,380	35	12,626	34.2	1,875,323	54.2
Level of qualification inadequately described	266	1.0	120	1.2	386	1.0	39,753	1.1
Level of qualification not stated	2,978	10.9	828	8.6	3,806	10.3	338,905	9.8
Total	12,490	45.9	4,328	44.8	16,818	45.6	2,253,981	65.2

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

*As a percentage of persons aged 15 years and over

Of the number of persons aged 15 years and over who adequately described their level of completed non-school qualification, 34.2% of the Local Area identified as having completed a qualification at the time of the 2011 Census. This is lower than the number of persons who stated a completed qualification across the State (54.2%). Only a slight difference was discernible between the number of persons aged 15 years and over who stated a completed qualification within the SRC portion of the Local Area (35%) and LVRC (34%).

Following on from the information provided above, details about the levels of the qualifications completed at the time of the 2011 Census are presented in Table 4.6.

Of the population aged 15 years and over within the Local Area who stated that they had completed a higher qualification, the majority held a qualification at the Certificate Level (incl. nfd, I, II, III, IV) (20.3%), which was slightly higher than the State average of 19.9%. Within the SRC portion of the Local Area there was a higher percentage of persons with Certificate Level qualifications (22.1%) compared to the LVRC (19.7%).

All other levels of qualifications in the Local Area were lower than the State average. At 6.3%, bachelor degrees within the Local Area were less than half the State average of 11.7%. The proportion of the population holding bachelor degrees within the LVRC was only slightly greater than the portion of the Local Area within SRC (6.6% and 5.4% respectively).

Table 4.6 Persons aged 15 years and over who stated a completed qualification (2011 Census)

EDUCATION QUALIFICATIONS	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	% *	NO.	% *	NO.	% *	NO.	% *
Postgraduate Degree Level	331	1.2	81	0.8	412	1.1	94,647	2.7
Graduate Diploma and Graduate Certificate Level	207	0.8	85	0.9	292	0.8	49,476	1.4
Bachelor Degree Level	1,799	6.6	522	5.4	2,321	6.3	404,771	11.7
Advanced Diploma and Diploma Level	1,554	5.7	558	5.8	2,112	5.7	260,778	7.5
Certificate Level (incl. nfd, I, II, III, IV)	5,355	19.7	2,134	22.1	7,489	20.3	686,993	19.9
Total	9,246	34.0	3,380	35.0	12,626	34.2	1,875,323	54.2

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

*As a percentage of persons aged 15 years and over

4.3.3 PEOPLE NEEDING ASSISTANCE

The Census of Population and Housing identify people within populations with profound or severe core activity limitation. This is defined as people with a disability who need assistance in their day to day lives with any or all of the following core activities: self care; body movement; or communication.

Detailed information from the 2016 Census relating to people needing assistance has yet to be released for all areas comprising the Local Area. As such, reference has been made to information from the 2011 Census.

ABS data from the 2011 Census shows the number of people requiring assistance within the Local Area (6.0%) was slightly higher than the State average of 4.4 % (refer to Table 4.7). The number of people requiring assistance was slightly higher for the SRC portion of the Local Area at 6.2% compared to 5.9% for LVRC. This slightly higher level of people requiring assistance is likely a direct correlation to the ageing population within the Study Area.

Of those requiring assistance within the Local Area, the greatest proportion were the in the 55-64 years age bracket (18.6%), followed by the 65-74 years age bracket (15.6%) (refer to Table 4.8). Within the SRC portion of the Local Area, the segment of the population requiring the largest assistance were persons aged 55-64 years (20.8%). For this age group, the percentage of persons requiring assistance was slightly less in the LVRC at 17.8%. By comparison, the largest segment of the population requiring assistance in the State of Queensland was persons aged 75-84 years (18.4%), followed by persons aged 85 years or more (16.9%). Interestingly, there was a higher percentage of persons aged 85 years and over requiring assistance within the LVRC than within the SRC portion of the Local Area, at 12.2% and 7.5%, respectively.

Table 4.7 Number of people needing assistance (2011 Census)

LEVEL OF ASSISTANCE	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	% *	NO.	% *	NO.	% *	NO.	% *
Has need for assistance	2,072	5.9	775	6.2	2,847	6.0	192,019	4.4
Does not have need for assistance	30,454	87.1	11,044	88.2	41,498	87.4	3,880,396	89.6
Need for assistance not stated	2,425	6.9	701	5.6	3,126	6.6	260,323	6.0

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

*As a percentage of the total population

Table 4.8 People needing assistance in the Local Area and the State by age group (2011 Census)

AGE BRACKET	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	%	NO.	%	NO.	%*	NO.	%
0-4	23	1.1	10	1.3	33	1.2	2,935	1.5
5-14	202	9.7	63	8.1	265	9.3	15,228	7.9
15-19	71	3.4	30	3.9	101	3.5	6,174	3.2
20-24	44	2.1	22	2.8	66	2.3	4,319	2.2
25-34	114	5.5	26	3.4	140	4.9	8,298	4.3
35-44	153	7.4	58	7.5	211	7.4	12,555	6.5
45-54	254	12.3	125	16.1	379	13.3	19,018	9.9
55-64	369	17.8	161	20.8	530	18.6	27,659	14.4
65-74	305	14.7	139	17.9	444	15.6	28,110	14.7
75-84	285	13.8	83	10.7	368	12.9	35,250	18.4
85+	252	12.2	58	7.5	310	10.9	32,473	16.9
Total	2,072	-	775	-	2,847	-	192,019	-

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

4.3.4 FAMILIES

Table 4.9 provides an overview of family characteristics for the Local Area and the State. Of the population in the Local Area aged 15 years and over, 47.8% were married and 18.59% were either separated, divorced or widowed. In contrast, there were slightly less married people within the State (46.9%), as well as less people who were either separated, divorced or widowed (17.8%). Correspondingly, there were less people that have never married in the Local Area (33.7%) compared to the State (35.4%). There was little difference between the percentage of persons married within the LVRC (47.9%) and SRC portion of the Local Area (47.5%). A slightly higher percentage of people within the SRC portion of the Local Area identified as being divorced however in comparison to the LVRC (10.5% compared to 9.3%)

At the time of the 2016 Census, there were 13,728 families in the Local Area and 1,221,151 families recorded in the State. Within the Local Area, the average household size was 2.7 persons, similar to the State average of 2.6 persons.

'Couples with no children' were the most common family type within the Local Area, constituting 41.5% of all families. This differed from the State where 'couple families with children' (42.5%) was identified as the most common family type. Interestingly, there was a higher proportion of 'couple families without children' in the LVRC (42.6%) than compared to the SRC portion of the Local Area (28.8%) and a lower portion of couple families with children (39.9% for LVRC compared to 42.1% for SRC portion).

The Local Area and the State recorded a similar average for the number of children per family at 2 and 1.9 respectively. The average number of children per family was the same across all areas comprising the Local Area.

Table 4.9 Family and household characteristics within the Local Area and State (2016 Census)

FAMILY CHARACTERISTICS	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	%	NO.	%	NO.	%*	NO.	%
Families	9,889	-	3,839		13,728	-	1,221,151	-
Married*	14,873	47.9	5,421	47.5	20,294	47.8	1,775,920	46.9
Separated*	1,235	4	515	4.5	1,750	4.1	134,953	3.6
Divorced*	2,877	9.3	1,201	10.5	4,078	9.6	354,382	9.3
Widowed*	1,515	4.9	533	4.7	2,048	4.8	184,671	4.9
Never married*	10,556	34	3,739	32.8	14,295	33.7	1,340,580	35.4
Average people per household	2.7	-	2.7	-	2.7	-	2.6	-
Couple families without children	4,212	42.6	1,490	38.8	5,702	41.5	481,451	39.4
Couple families with children	3,943	39.9	1,615	42.1	5,558	40.5	518,494	42.5
One parent families	1,595	16.1	683	17.8	2,278	16.6	201,308	16.5
Other family	139	1.4	51	1.3	190	1.4	19,898	1.6
Average children per family	2	-	2	-	2	-	1.9	-

Source: Australian Bureau of Statistics, Census of Population and Housing, 2016

*As a percentage of people aged 15 years and over

4.3.5 HOUSING AND ACCOMMODATION

At the time of the 2016 Census, the most prominent housing type in the Local Area was 'separate houses', which accounted for 93.7% of all housing types (refer to Table 4.10). The prominence of separate houses was slightly higher within the SRC portion of the Local Area (97.7%) than within the LVRC (99.2%). These figures were significantly greater than the Queensland average where 'separate houses' accounted for 76.6% of all housing types. By comparison the proportion of 'semi-detached houses' or 'flat, units or apartments' were significantly lower in the Local Area (at 1.9% and 1.4% respectively), compared to the State average of 10.2% and 11.3% respectively. Notably, there was a significantly higher number of 'flats, units or apartments' recorded within the LVRC [229 dwellings (1.8%)] than within the SRC portion of the Local Area [23 dwellings (0.5%)]. As a percentage, however, the number of 'flat, unit or apartment' type dwellings within the LVRC was still significantly lower than the State average of 11.3%.

The data further demonstrates that majority of dwellings within the Local Area were 'owned with a mortgage' (38.2%), which was slightly higher than the State average of 33.7%; followed by 'owned outright' (32%) which was also higher than the State average of 28.5%. The proportion of 'rental dwellings' within the Local Area (25.5%) was substantially less than the State average of (34.2%). Rental dwellings comprised a higher proportion of dwelling types within the SRC portion (27.1%) compared to within the LVRC of the Local Area (24.9%).

Table 4.10 also shows that the most prominent household type in the Local Area was 'family households', which accounted for 75.1% of all household types. This was slightly higher than the State average of 71.8%. The proportion of 'family households' within the portion of the SRC (76.9%) and the LVRC (74.4%) were also higher than the State average. Notably, the number of single (lone) person households and group households within the LVRC (20.8% and 4.8% respectively) were greater than the SRC portion of the Local Area (19.6% and 3.5% respectively).

Median weekly household income and other median costs within the Local Area and the State in 2016 are presented in Table 4.11. The median weekly household income for areas comprising the Local Area ranged from \$1,198 to \$1,207 compared with \$1,402 for the State.

Table 4.10 Dwelling and tenure characteristics within the Local Area and State (2016 Census)

DWELLING AND TENURE CHARACTERISTICS	LVRC		SRC (PORTION)		LOCAL AREA		STATE	
	NO.	%	NO.	%	NO.	%*	NO.	%
All private dwellings	13,818	-	5,254	-	19,072	-	1,852,398	-
Occupied private dwellings	12,869	93.1	4,830	91.9	17,699	92.8	1,656,828	88.8
Separate houses *	11,865	92.2	4,717	97.7	16,582	93.7	1,269,653	76.6
Semi-detached, townhouse *	322	2.5	16	0.3	338	1.9	174,984	10.6
Flat, unit or apartment*	229	1.8	23	0.5	252	1.4	186,780	11.3
Other dwellings	351	2.7	56	1.2	407	2.3	16,809	1
Family households*	9,577	74.4	3,715	76.9	13,292	75.1	1,189,859	71.8
Single (lone) person households*	2,682	20.8	946	19.6	3,628	20.5	389,076	23.5
Group households*	618	4.8	169	3.5	787	4.4	77,898	4.7
Owned outright*	4,137	32.1	1,532	31.7	5,669	32.0	471,407	28.5
Owned with a mortgage*	4,928	38.3	1,835	38.0	6,763	38.2	558,439	33.7
Rented*	3,206	24.9	1,309	27.1	4,515	25.5	566,478	34.2

Source: Australian Bureau of Statistics, Census of Population and Housing, 2016

*As a percentage of all occupied private dwellings

Table 4.11 Household income and median costs within Local Area and State (2016 Census)

CHARACTERISTIC	LVRC	SRC (PORTION)		STATE
		LOWOOD (SA2)	3127808 (SA1)	
Median total household income (\$/week)	\$1,198	\$1,202	\$1,207	\$1,402
Median monthly mortgage repayments	\$1,517	\$1,560	\$1,602	\$1,733
Median weekly rent	\$280	\$290	\$235	\$330

Source: Australian Bureau of Statistics, Census of Population and Housing, 2016

Median housing costs in the Local Area were also less than costs recorded for the overall State. As the Local Area is located in a rural area, median mortgage and rental prices were lower than the State, which is to be expected. Within SA1 (3127808) portion of SRC of the Local Area, median weekly rent was slightly lower at \$235 than median rent within Lowood SA2 (\$290) and the LVRC (\$280). Median monthly mortgage repayment costs across the Local Area ranged from \$1,517 to \$1,602 and lower than the State average of \$1,733.

4.3.6 EMPLOYMENT AND INCOME

Data from the 2016 Census relating to employment has yet to be released. As such, reference has been made to information from the 2011 Census. At the time of the 2011 Census, 19,840 persons within the Local Area reported to be in the labour force of which 93.1% were employed and 6.6% were unemployed. The unemployment rate was slightly higher for the SRC portion at 6.9% than for LVRC at 6.5%, and both were higher than the average for the State at 6.1% (Table 4.12).

Table 4.12 Labour force status within Local Area and State (2011 Census)

LABOUR FORCE STATUS	LVRC		SRC (PORTION)		LOCAL AREA		STATE
	NO.	%	NO.	%*	NO.	%	%
Employed	14,657	93.5	5,183	93.1	19,840	93.4	94
Full-time	8,991		3,328		12,319		
Part-time	4,686		1,505		6,191		
Unemployed	1,013	6.5	383	6.9	1,396	6.6	6.1
Total Labour Force	15,670		5,566		21,236		

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

Current employment statistics from the Commonwealth Department of Employment are presented in Table 4.13. These statistics are based on SA2 areas and show that the unemployment rate is currently at 4.4% in Lockyer Valley West extending up to 9.9% in Lowood.

Table 4.13 Labour force status for SA2 Areas (2017 March Quarter)

LABOUR FORCE STATUS	LOCKYER VALLEY WEST ¹	LOCKYER VALLEY EAST ¹	GATTON	LOWOOD	ESK
Unemployment Rate (%)	4.4	9.2	7.0	9.9	8.9
Total Labour Force	5,747	2,085	3,613	6,504	2,085

Source: SA2 Data tables – Small area labour markets – March quarter 2017 (7 June 2017 – Australian Government – Department of Employment

Notes: 1: Refer to Figure 3.2 for location

Table 4.14 indicates the proportion of employment by industry at the time of the 2011 Census in the Local Area and the State, with the largest industries of employment for each locality shaded red.

The data demonstrates that within the Local Area, the main industries of employment were 'Agriculture, Forestry and Fishing' and 'Retail Trade', providing 11% and 10.6% of total employment respectively. The high proportion of employment in the 'Agriculture, Forestry and Fishing' industry is reflective of the economy of the Lockyer Valley Region being largely driven by agriculture.

As discussed further in section 5.2, it is highly likely that the agricultural sector would drive employment within other industry sectors. For example, the employment associated with the transportation of agricultural produce and commodities is likely to dominate the transport, postal and warehousing sector; employment at the University of Queensland's Gatton Campus, with a strong focus on agricultural sciences would dominate the education and training sector; and a proportion of the employment in the construction industry would be associated with the construction of sheds and greenhouses for agricultural purposes.

Employment with the SRC portion and LVRC differed slightly, however. Within the SRC portion, the main industries of employment were 'Manufacturing' (12.4%) and 'Health Care and Social Assistance' (10.7%), while 'Agriculture, Forestry and Fishing' provided only 7.5% of the total employment. The prominence of Manufacturing in the SRC portion can be attributed to the agricultural processing facilities at Coominya (i.e. Greenmountain Food Processing and Australian Food Corporation). In contrast, the 'Agriculture, Forestry and Fishing' industry was the largest source of employment within the LVRC at 12.2%, followed by 'Retail Trade' at 10.8%. In addition to 'Agriculture, Forestry and Fishing', industries with higher levels of employment than the State average within both the SRC portion and the LVRC, included the 'Manufacturing' industry and the 'Transport, Postal and Warehousing' industry. Employment within the 'Education and Training' industry within the LVRC was also higher than the State average (8.2% compared to 7.9%).

Table 4.14 Industry of Employment (2011 Census)

INDUSTRY SECTOR	LVRC		SRC (PORTION)		LOCAL AREA		STATE
	NO.	%	NO.	%*	NO.	%	%
Agriculture, forestry and fishing	1,792	12.2	386	7.5	2,177	11.0	2.7
Mining	180	1.2	75	1.4	256	1.3	2.6
Manufacturing	1,412	9.6	640	12.4	2,053	10.3	8.4
Electricity, gas, water and waste services	160	1.1	91	1.8	246	1.2	1.2
Construction	1,127	7.7	469	9.0	1,599	8.0	9.0
Wholesale trade	667	4.6	205	4.0	875	4.4	3.6
Retail trade	1,589	10.8	514	9.9	2,106	10.6	10.7
Accommodation and food services	858	5.9	203	3.9	1,066	5.4	7.0
Transport, postal and warehousing	1,031	7.0	404	7.8	1,434	7.2	5.3
Information media and telecommunications	90	0.6	31	0.6	113	0.6	1.2
Financial and insurance services	216	1.5	77	1.5	293	1.5	2.7
Rental, hiring and real estate services	183	1.2	68	1.3	249	1.3	1.8
Professional, scientific and technical services	517	3.5	182	3.5	693	3.5	6.5
Administrative and support services	346	2.4	121	2.3	468	2.4	3.2
Public administration and safety	831	5.7	409	7.9	1,245	6.3	6.7
Education and training	1,198	8.2	389	7.5	1,585	8.0	7.9
Health care and social assistance	1,395	9.5	557	10.7	1,955	9.9	11.9
Arts and recreation services	125	0.9	59	1.1	184	0.9	1.4
Other services	528	3.6	190	3.7	722	3.6	3.9
Inadequately described/Not stated	405	2.8	114	2.2	523	2.6	2.4
Total	14,650	100	5,184	100	19,842	100	100

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

4.3.6.1 HOUSEHOLD WEEKLY INCOME

Detailed information from the 2016 Census relating to household weekly income has yet to be released for all areas comprising the Local Area. As such, reference has been made to information from the 2011 Census.

The weekly household income for the Local Area and State at the time of the 2011 Census is shown in Table 4.15. The data indicates that households living in the Local Area earned a lower income in comparison to the overall State average with 10.9% of households in the Local Area earning within the \$1-\$399 income bracket (9.7% for the State) and 31.6% within the \$400-\$999 income bracket (26% for the State). In contrast, only 15.8% of households earned \$2000 or more per week, significantly lower than the recorded average of the State of 25%.

Table 4.15 Weekly Household Income (2011 Census)

INCOME RANGE	LVRC		SRC (PORTION)		LOCAL AREA		STATE
	NO.	%	NO.	%*	NO.	%	%
Negative/Nil income	149	1.3	44	1.0	193	1.2	1.2
\$1-\$399	1,326	11.1	441	10.3	1,767	10.9	9.7
\$400-\$999	3,758	31.6	1,370	31.8	5,128	31.6	26
\$1000-1999	3,414	28.7	1,269	29.4	4,683	28.9	27.1
\$2000 or more	1,839	15.5	727	16.9	2,566	15.8	25
Partial income stated	970	8.2	342	7.9	1,312	8.1	8.3
All incomes not stated	443	3.7	116	2.7	559	3.5	2.7
Total	11,899	100.0	4309	100.0	16,208	100.0	100

Source: Australian Bureau of Statistics, Census of Population and Housing, 2011

The data also demonstrates that the LVRC recorded a higher proportion of households within the \$1-\$399 weekly income bracket than within the SRC portion of the Local Area (11.1% compared to 10.3%). The SRC portion of the Local Area also recorded a higher percentage of households within the \$2000 or more income bracket (16.9%) than within the LVRC (15.5%).

4.3.7 SOCIO-ECONOMIC INDICATORS FOR AREAS (SEIFA)

The ABS has developed the Index of Relative Socio-economic Disadvantage, an index that summarises key economic and social information about people and households within the relevant area. The index does not represent individual households, but rather the entire area and the availability of material and social resources to which people in that area have access. The index helps identify areas that require funding and services, new business opportunities and contributes to other research (ABS 2011).

Information considered in this index includes income, qualifications, low skilled jobs, and unemployment, among other factors. A low rank indicates relatively greater level of disadvantage.

Table 4.16. outlines the Index of Relative Socio-economic Disadvantage for the LVRC and SRC compared to other LGAs in Queensland at the time of the 2011 Census. This information demonstrates that the Local Area comprising LVRC and SRC is moderately disadvantaged compared to other Queensland LGAs, with the SRC being slightly more disadvantaged than LVRC. Weipa (the highest ranking and therefore least disadvantaged in Queensland) and Yarrabah (the lowest ranking and therefore highest disadvantaged in Queensland) have been included for comparison purposes. The SEIFA ranking within Australia suggests that the Local Area is more disadvantaged than areas such as Brisbane, Ipswich and Toowoomba which are geographically close.

The Index of Education and Occupation (IEO) is designed to reflect the education and occupational level of communities. LVRC is ranked 25 with a decile of 4 within the State, while SRC is ranked 18 with a decile of 3. This indicates a lower IEO in the Local Area when compared to Brisbane, the second highest scoring LGA (rank of 74 and decile of 10) and Yarrabah the lowest scoring LGA (rank of 1 and decile of 1). The IEO index indicates relatively lower education and occupation status of people in the Local Area, that is, fewer people have qualifications or have undertaken further education and/or people are in low skilled occupations. This is consistent with the type and level of education and occupations prevalent in the Local Area (refer to Sections 4.3.2 and 4.3.6).

Table 4.16 Index of Relative Socio-economic disadvantage for LVRC and SRC (2011 Census)

LOCAL GOVERNMENT AREA	RANK WITHIN AUSTRALIA (OUT OF 564)	DECILE ¹	RANK WITHIN STATE (OUT OF 74)	DECILE ¹
Brisbane	503	9	73	10
Ipswich	240	5	45	7
LVRC	172	4	37	5
SRC	147	3	29	4
Toowoomba	355	7	57	8
Yarrabah	1	1	1	1
Weipa	519	10	74	10

Source: Australian Bureau of Statistics 2013

Notes: 1: Deciles divide the distribution of scores into 10 equal groups. The lowest scoring 10% of areas are given a decile of 1, the second lowest 10% a decile of 2 etc.

The Index of Economic Resources (IER), focuses on the financial aspects of relative socio-economic advantage and disadvantage by summarising variables related to income and wealth. Within the State, the LVRC is ranked 52 with a decile of 7 and the SRC ranked 56 with a decile of 8. Although the Local Area is slightly lower compared to Brisbane, one of the higher scoring LGAs (ranked 66 and a decile of 9), the Local Area is relatively more advantaged in terms of economic resources compared to the lowest scoring LGA of Yarrabah (rank of 1 and decile of 1) and slightly more advantaged than Ipswich (rank of 44, decile of 6). The IER does not account for savings or equities however, this relatively higher score indicates greater access to economic resources in general, such as more households with higher incomes; increased home ownership; fewer low income households or fewer households paying low rent. This is noted by the higher number of people that own their own homes and low number of rental properties in the Local Area (Section 4.3.5).

Table 4.17 provides information on the IEO and IER for the LVRC and SRC at the time of the 2011 Census in comparison to other LGAs in Queensland. Interestingly, the disparity between the IEO and IER rankings for both the LVRC and SRC is reflective of the socio-economic environment, in that the education and occupations in the Local Area indicate a relatively lower level IEO, however they meet what is currently required and the area is relatively more advantaged economically. This is likely the reason for the moderate level of disadvantage indicated by SEIFA. However, if the economic situation was to be affected this could result in the SEIFA ranking decreasing further, resulting in a higher level of disadvantage.

Table 4.17 Index of Education and Occupation (IEO) and Economic Resources (IER) for the LVRC and SRC (2011 Census)

LOCAL GOVERNMENT AREA	IEO		IER	
	RANK WITHIN STATE (OUT OF 74)	DECILE	RANK WITHIN STATE (OUT OF 74)	DECILE
Brisbane	74	10	66	9
Ipswich	42	6	44	6
LVRC	25	4	52	7
SRC	18	3	56	8
Toowoomba	66	9	54	8
Yarrabah	1	1	1	1
Weipa	63	9	70	10

Source: Australian Bureau of Statistics 2013

4.3.8 SOCIAL INFRASTRUCTURE

The social infrastructure and services in the Local Area provide support for the community, with the provision of education, police, rural fire service, ambulance and health care and state emergency services. However, there is limited access to mobile and internet services and some people do not have a postal service.

The Local Area also provides community facilities to support recreational and educational requirements, including the community library, Lockyer Valley Cultural Centre, parks and reserves. In addition, there are more than 45 community run organisations in the Local Area.

What is notable about the social infrastructure and services in the Local Area is that they are geared towards the agricultural industry, the main economic driver in the area. For example, The University of Queensland Gatton Campus is located just off the Warrego Highway at Gatton and is world-renowned for its veterinary and agricultural courses, with 1,400 students with 500 staff researching or studying agriculture, animals, veterinary science and the environment.

In addition, community and industry organisations in the Local Area also have a strong focus to provide support, develop and implement strategies to grow and further enhance the agricultural industry. These groups also have connections to peak agricultural industry bodies for further support and advice. Some of the community organisations in the Local Area with a strong agricultural focus include but are not limited to:

- Lockyer Water Users Forum
- Lockyer Valley Growers
- Lockyer Valley Farmers Board
- Lockyer Valley Farmers United
- Lockyer Valley Young Growers Association
- Healthy Country Program
- AusIndustry
- Turf Queensland
- Australian Chicken Growers
- Growcom – Queensland Horticulture
- Ausveg
- Queensland Chamber of Commerce and Industry - Lockyer Better Business; Laidley Better Business
- Regional Development Australia – Ipswich and West Moreton region
- Queensland Farmers' Federation
- Agforce
- Australian Dairy Farmers.

4.4 COMMUNITY PERCEPTIONS

This section provides an overview of general concerns and perceptions around broader community-based social issues in the Lockyer Catchment. These concerns and perception were raised through community engagement undertaken by LVRC in relation to the Lockyer Catchment Action Plan.

4.4.1 WELFARE CONSIDERATIONS

The Local Area, has undergone significant population growth, in recent years, with the resident population increasing from by 6,608 persons between 2011 and 2016, an increase of 12.2% over the 5 year period (2.4% per annum). By comparison the population of Queensland as whole increased by 7.8% over the same 5 year period (1.5% per annum). In 2012-23 SRC experienced the fastest population growth (3.2%) of all local government areas in south-east Queensland, followed by LVRC (3.1%) and Ipswich (3.0%) (Queensland Treasury 2015).

The population of the local area (particularly SRC) is projected to continue increasing, fuelled in part by increasing demand for rural-residential developments, including small rural holdings on lifestyle blocks, which has been prompted by high population growth in south-east Queensland and the region's close proximity to the large urban centres of Brisbane and Ipswich in the south and Caboolture and Sunshine Coast to the east. With existing higher than average unemployment rates (9.9% for Lowood; 9.2 % for Lockyer Valley East; and 8.9% for Esk), finding work for these people within the region could prove challenging.

In addition, as outlined in Section 4.3.1 the dependence ratio of the SRC is currently higher than the average for south-east Queensland and Queensland as a whole, and predicted to increase significantly by 2036 as a result of an ageing population. The impact of this will be that there will be fewer people in the Somerset workforce and a larger number not in the workforce. If not countered, this trend could have a negative impact on Somerset's economy and the ability to provide services to a larger 'dependent' group living in Somerset.

New investment opportunities in the region (refer further to Section 6) would have associated flow on benefits to the region including the creation of employment opportunities, allowing employees and families to remain and invest in the region (i.e. through spending money in local towns and participating in community activities) in turn improving the overall general viability of the region. Establishment of a number of these proposed developments hinges on having a reliable supply of water.

4.4.2 HOUSING AND PROPERTY

Consultation for the Lockyer Catchment Action Plan identified there is a general concern about the change or increase in smaller property blocks and rural residential land. The emergence of lifestyle and hobby farmers and their limited understanding about stock, land, water, weed control, pest management and environmental management, is seen as creating additional risks to the local area, particularly neighbouring properties. Continuation of this 'sea change' trend is viewed as a potential impact to farm safety and management practices.

A key risk for the area, as highlighted through community feedback, is that the small and medium sized farms are bought out by big companies or alternatively prime agricultural land is subdivided and sold as rural residential allotments. With continued unreliability of water supply, there is a strong possibility for this to occur as farmers will likely reach a point where they are no longer able to meet the supply quotas in their contracts. This could then result in irrigators looking for other opportunities to derive income, which may not be in the best interests of the community or the environment.

Alternatively, people relocating to the Local Area, seeking a 'sea change', value the rural amenity which is largely attributed to the extensive agricultural landscape.

4.4.3 COMMUNITY WELLBEING

Community members have raised concerns about the current levels of individual and community distress currently being experienced in the Local Area. This stress and concern relates to current market changes and increased pressure to supply produce. Additionally recent natural disasters (fire, drought and flood) have had a negative impact on both the irrigators and the broader community.

Although the community has proved their resilience during extreme circumstances, these events are still prevalent and continue to impact the general wellbeing of the community. Consultation notes highlighted that irrigators, particularly small to medium sized businesses, are still dealing with the effects on their mental and physical health. Key issues include ongoing stress, their financial situation, reduced profit/income, reduced quality of life due to increased working hours and general concerns for their future, the future of their families and the continuation of their lifestyle.

Many people are not aware of the inherent issues associated with living in remote or rural areas and the everyday risks associated with the lifestyle. Through consultation, undertaken by LVRC for the Lockyer Catchment Action Plan, it was highlighted that there is a need for education, specifically for newer residents, about living in remote areas, and the risk of isolation and particularly the importance of community networks and self-sufficiency for short periods (water, food, power, communications etc.).

There is also strong concern within the community for many long-term farmers as they are likely to be more at risk in terms of social and economic influences affecting their mental and physical wellbeing. LVRC informed that these issues are occurring already, with people in the community on suicide watch and farmers selling their properties. Statistics from 2011 Census on people needing assistance (refer Section 4.3.3) also indicates that there are more people needing assistance in the Local Area than the State.

4.4.4 LIFESTYLE

The main change to lifestyle for farmers has been attributed to the change in the wholesale and retail markets. It was noted, as a consequence of consumer demand for lower prices, that supermarket chains (Aldi, Coles and Woolworths) have strengthened, leading to a continual decline of co-op and local business retailers. With the loss of the smaller retailers, irrigators have fewer options for selling their produce, and many have signed up to contractual arrangements to supply wholesalers or commercial supermarket chains. This has resulted in additional pressure on farmers to meet supply quotas and a reduction in profits, or in some cases they only receive enough income to break even.

Consultation provided some key insights into the previous farming lifestyle and changes that irrigators in the Local Area have faced in more recent years. Consultation participants noted that farmers used to have a good work/ life balance, and although during planting and harvesting seasons it was labour intensive, there was downtime to help manage fatigue, reconnect with families and communities and enjoy recreational activities. This view was supported by a local farmer who commented, "the farming lifestyle has changed, 25 years ago farmers had a bit of money and were comfortable, whereas now days there is so much pressure to produce, farmers have no downtime, there are reduced prices that force us to push land and water in order to break even".

The change in 'farming lifestyle' has resulted in a change in the profile of irrigators in the Local Area, as there is an increased number of larger irrigators who either own and/or lease land. The smaller to medium irrigators in the Local Area are an aging demographic, with many younger people and children of farmers leaving to seek work elsewhere, either because they do not want the current farm lifestyle or require help supplementing the farm income.

In addition, there are also smaller rural residential blocks emerging and a growing number of 'hobby farmers' relocating to the Local Area. However, many do not contribute significantly to the agricultural industry and also work elsewhere to supplement their farm lifestyle.

4.4.5 FUTURE OF THE LAND

LVRC's consultation with irrigators also indicated that there is a lot of concern for the future of the land and that irrigators support the implementation of sustainable farming practices to ensure the future of their land, business and livelihood will continue to be able to meet the ever increasing demand from supermarkets and wholesalers.

Local farmers have a strong connection to place, and many have held property for generations. However, under the current economic circumstance, it has been noted that farming is becoming less viable in terms of continuing to make a living. As a consequence, historical information about the land and the changes in the environment that has been passed down for generations, both as a result of nature and settlement influences, could potentially be lost.

This situation is intensified by the number of ageing farmers, who are seeking to retire but cannot afford to gift their property to their children or in many cases the children would only use it as a hobby farm and lose income and increase the potential for poor land management. This situation highlights reduction in generational farming in the Local Area and the loss of knowledge being passed on.

If existing farms are replaced with hobby famers and rural residential properties, the number of new people without education on property management skills will continue to increase leading to consequences for the preservation of the land and environment. Further, once agricultural land is sub-divided for residential it is extremely difficult to convert back to farmland. If this was to occur, it would see a loss in prime agricultural land that contributes significantly to the horticultural and vegetable produce and potentially consequential impacts to long-term food security in Australia.

Consultation identified some irrigators have been contemplating what the future holds in the current environment.

4.4.6 SUMMARY

Improving water availability and reliability to the region has the potential to address some of these broader community issues. As noted throughout this report, a limiting factor to increasing irrigation production in the region is water. Increasing water availability and reliability will enable irrigators to invest, expand and diversify not only by enabling additional agricultural land to be irrigated but also would allow for more intensive production (i.e. multiple crops in the one year) or diversification of production. Increased production would allow growers to develop a viable income base which in turn could assist with:

- stemming relocation of famers off the land
- enabling smaller and medium sized irrigators to remain in business
- improving the overall well-being of growers by improving their "economic" outlook
- reducing to need for growers to look for a second source of income
- retaining growers and their families in the region along with the retention of local knowledge and personal history that contributes to the Local Area presently and, provides individuals with a sense of place and connection to the area.

These benefits are explored further in the following section of the report.

5 ECONOMIC PROFILE

5.1 LOCKYER VALLEY OVERVIEW

The Lockyer Valley is regarded as one of the ten most fertile valleys in the world (RDA 2016) and identified by the Queensland Agricultural Land Audit as one of the important agricultural areas in Queensland for growing vegetables (Queensland Government 2013). The Agricultural Land Audit notes that the deep alluvial soils, which enable it to support a wide variety of crops means it is one of the major annual horticulture (vegetable) growing areas in Australia, particularly during winter months. Figure 5.1 shows the extent of land throughout the Lockyer Catchment subject to irrigated seasonal horticulture at the time of the 2012 Agricultural Land Audit, while Figure 5.2 illustrates the scale of irrigated agriculture in the area. In addition to vegetable production, the Lockyer Valley is also a significant producer of hay and silage and nurseries, cut flowers or cultivated turf (refer Section 5.3).

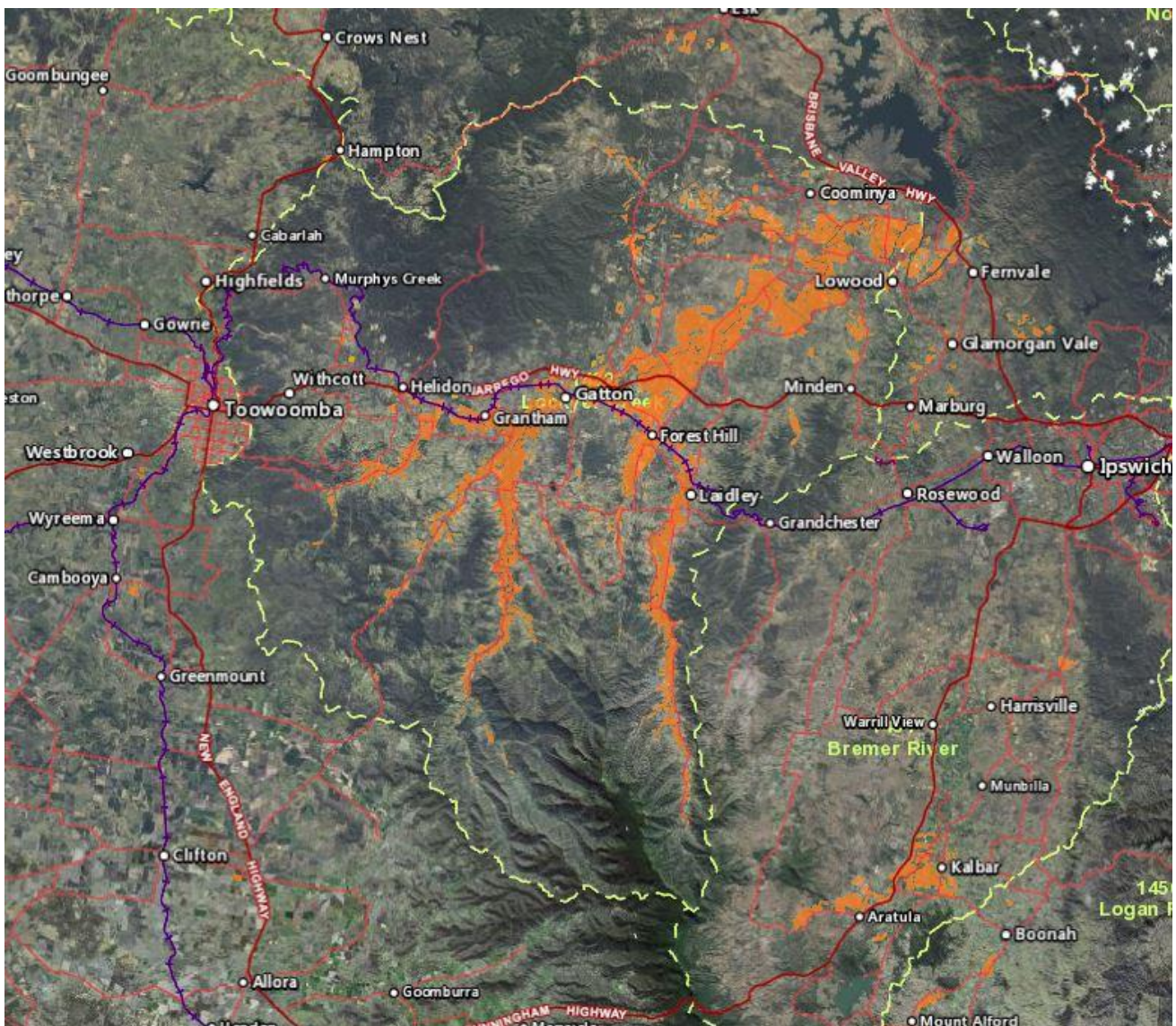


Figure 5.1 Land subject to irrigated seasonal horticulture - Lockyer Catchment (2012)

Source: Queensland Globe

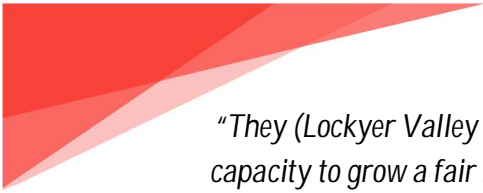


Figure 5.2 Irrigation farmland of the Lockyer Valley

Source: Queensland Places: Gatton Shire (<http://queenslandplaces.com.au/gatton-shire>)

The vegetable industry also supports several processing enterprises (mainly sorting, washing and packaging) as well as supplying major supermarkets and the food service industry along the east coast of Australia. The proximity to the markets in Brisbane and locally as well as major highways and the Port of Brisbane and the Airports at Brisbane and Toowoomba give the Lockyer Valley a significant locational advantage for growing vegetables. The Agricultural Land Audit makes the following assessment of the agriculture in the Lockyer Valley:

"The Lockyer Valley has a unique climate (situated at the foothills of the Great Dividing Range), underground water supply, fertile soils and extensive farming history. The combination of these features enables the area to be a significant winter, autumn and spring vegetable production area, supplying large quantities of produce to the Australian domestic market as well as exporting on a demand-based basis..... Reliable transportation infrastructure, technical support and professional services are readily available in this region for agricultural development." (Queensland Government 2013 p693).



"They (Lockyer Valley farmers) have the capacity to grow a fair bit more, our only limiting factor at the moment is not the land or the labour but the water availability. We're governed by what water availability we have"
Michael Sippel, Lockyer Valley Growers Group – The Queensland Times February 2017

Recent Free Trade Agreements with China, Japan and South Korea (such as Japan-Australia Economic Partnership Agreement) provide enormous potential for growers to expand horticulture exports. While some Lockyer Valley growers are already capitalising on exporting opportunities in Asia (i.e broccoli to Japan and China) it is noted that there are substantial additional opportunities. The Lockyer Valley agricultural sector has most of the inputs needed to realise this potential in terms of land, a source of labour supply and farming knowledge. In addition, Queensland's proximity to Asian markets, a lower Australian dollar, drought in the US – Australia's key competitor for broccoli exports and counter-seasonal production offers growers exceptional opportunities to increase exports. However, access to additional, reliable water supply is a potential constraint to meeting increased export demand (The Queensland Times, 2017).

5.2 INDUSTRY STRUCTURE

As outlined previously in Section 4.3.6, the main industry of employment within the Local Area was 'Agriculture, Forestry and Fishing, providing 11% of total employment. This was followed by the Retail Trade sector employing 10.6% of the workforce; Manufacturing sector (which would include food processing) (10.3%); health care and social sector (9.9%) and the Education and Training sector (8%).

The high proportion of employment in the 'Agriculture, Forestry and Fishing' industry is reflective of the economy of the Lockyer Valley Region being largely driven by agriculture. The other industry sectors within the region are highly likely to be dependent on agriculture to some extent. While verifying the exact contribution that agriculture makes to these other sectors of the economy would require detailed discussion with local industry sectors which is beyond the scope of this assessment, some parallels can be drawn. For example:

- the transport, postal and warehousing sector, is likely to be dominated by businesses involved in the transportation of agricultural produce and commodities
- the substantial focus the University of Queensland Gatton Campus places on agricultural and veterinary science courses would influence the education and training sector
- it is highly likely that some of the professional, scientific and technical services would be providing consulting services to the agricultural sector
- the manufacturing and retail sectors would also be dependent on agriculture to some degree as illustrated by the agricultural processing facilities such as Greenmountain Food Processing and Australian Food Corporation at Coominya.

The ABS Counts of Australian Businesses database tallies the number of businesses with an Australian Business Number (ABN). Table 5.1 shows that as at 30 June 2016, there were 4,494 businesses in the Study Area (comprising the SA2 areas of Lockyer Valley West, Lockyer Valley East, Gatton, Esk and Lowood). Of these businesses, 30.3% are in the Agricultural sector, followed by Construction (15.7% of all businesses); Transport, Postal and Warehousing (9% of all businesses); Rental, Hiring and Real Estate Services (7% of all businesses) and Professional, Scientific and Technical Services (6% of all businesses).

Table 5.1 Number of businesses - 30 June 2016

INDUSTRY SECTOR	NUMBER OF BUSINESS						
	LOCKYER VALLEY WEST	LOCKYER VALLEY EAST	GATTON	ESK	LOWOOD	TOTAL (NO.)	TOTAL (%)
Agriculture, forestry and fishing	357	347	136	227	295	1362	30.3
Mining	6	3	0	5	7	21	0.5
Manufacturing	43	58	19	23	36	179	4.0
Electricity, gas, water and waste service	3	5	3	3	3	17	0.4
Construction	209	224	71	51	150	705	15.7
Wholesale trade	27	32	21	7	20	107	2.4
Retail trade	50	62	43	30	39	224	5.0
Accommodation and food services	25	33	29	22	17	126	2.8
Transport, postal and warehousing	89	158	33	32	92	404	9.0
Information media and telecommunications	3	3	0	3	0	9	0.2
Financial and insurance services	56	35	42	23	31	187	4.2
Rental, hiring and real estate services	62	82	83	27	61	315	7.0
Professional, scientific and technical services	85	67	34	21	63	270	6.0
Administrative and support services	24	29	33	11	25	122	2.7
Public administration and safety	3	3	3	3	0	12	0.3
Education and training	10	7	3	12	6	38	0.8
Health care and social assistance	20	28	18	8	37	111	2.5
Arts and recreational services	13	13	4	3	17	50	1.1
Other services	51	59	25	24	39	198	4.4
Currently unknown	8	7	9	4	9	37	0.8
Total	1,144	1,255	609	539	947	4,494	100

The ABS Counts of Australian Businesses database also shows the number of employees for each of the sectors and this is shown in Table 5.2. From this it can be seen that within the Agricultural sector:

- 81.6% of businesses are non-employing (or self-employed)
- 12.3% of businesses have between 1-4 employees
- 4.7% of businesses have between 5-19 employees
- 1.5% of businesses have between 20-199 employees.

The Construction sector has 61.9% of business that are non-employing; 33.7% employing 1-4 employees; and 4.4% with 5-19 employees. The Transport, Postal and Warehousing sector has 57.5% of businesses as non-employing; 35.3% employing 1-4 persons; 5.8% employing 5-19 persons and 1.5% of business employing between 20-199 employees.

Table 5.2 Businesses by number of employees – 30 June 2016

INDUSTRY SECTOR	NUMBER OF BUSINESSES (TOTAL)	NUMBER OF EMPLOYEES (%)				
		NON-EMPLOYING	1-4	5-19	20-199	200+
Agriculture, forestry and fishing	1,362	81.6%	12.3%	4.7%	1.5%	0.0%
Mining	21	40.9%	45.5%	0.0%	13.6%	0.0%
Manufacturing	179	64.0%	24.2%	10.1%	1.7%	0.0%
Electricity, gas, water and waste service	17	80.0%	0.0%	20.0%	0.0%	0.0%
Construction	705	61.9%	33.7%	4.4%	0.0%	0.0%
Wholesale trade	107	51.3%	28.3%	12.4%	8.0%	0.0%
Retail trade	224	45.5%	28.2%	21.5%	4.8%	0.0%
Accommodation and food services	126	29.2%	35.8%	32.5%	2.5%	0.0%
Transport, postal and warehousing	404	57.5%	35.3%	5.8%	1.5%	0.0%
Information media and telecommunications	9	100.0%	0.0%	0.0%	0.0%	0.0%
Financial and insurance services	187	87.0%	11.4%	1.6%	0.0%	0.0%
Rental, hiring and real estate services	315	78.7%	16.2%	5.1%	0.0%	0.0%
Professional, scientific and technical services	270	59.9%	33.5%	6.6%	0.0%	0.0%
Administrative and support services	122	51.6%	31.7%	10.3%	6.3%	0.0%
Public administration and safety	12	33.3%	33.3%	33.3%	0.0%	0.0%
Education and training	38	52.6%	15.8%	15.8%	15.8%	0.0%
Health care and social assistance	111	41.4%	41.4%	17.2%	0.0%	0.0%
Arts and recreational services	44	67.4%	26.1%	6.5%	0.0%	0.0%
Other services	198	52.9%	42.9%	2.9%	1.4%	0.0%
Currently unknown	37	85.0%	7.5%	0.0%	7.5%	0.0%
Total	4,488	66.7%	24.4%	7.2%	1.7%	0.0%

Farm management and demographic statistics released by the ABS for the 2015-2016 period indicates that the average age of agricultural providers in Ipswich SA4 area is 57 years and 56 years in the Toowoomba SA4 area.

5.2.1 BUSINESS TURNOVER

Figure 5.2 illustrates the annual turnover of businesses within the Study Area operating in the Agricultural Sector for the 2015-16 financial year. As can be seen from this figure most of the businesses within the agricultural sector of the Study Area recorded an annual turnover of less than \$50,000 (45.6%) for the financial year 2015-16. A further 15.8% of agricultural businesses recorded a turnover of between \$50,000 and \$100,000 and an additional 13.7% recording an annual turnover between \$100,000 and \$200,000.

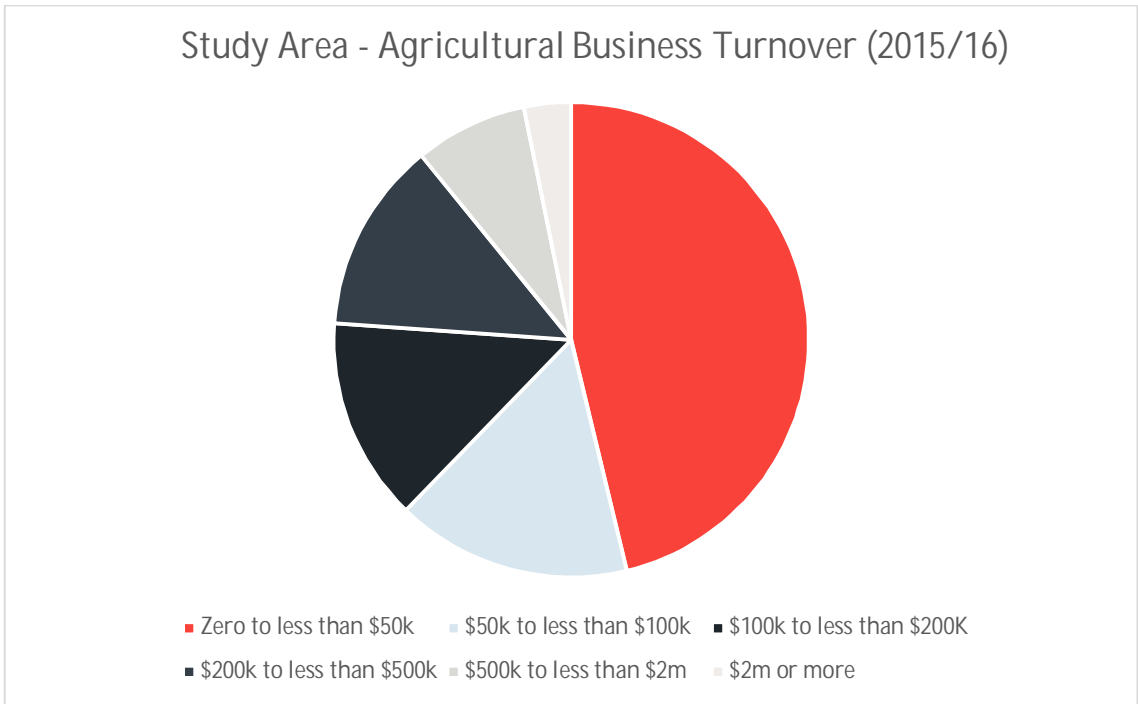


Figure 5.3 Agricultural Business Turnover – Study Area (2015/16)

5.3 VALUE OF AGRICULTURAL PRODUCTION

The smallest area for which current value of agricultural production data is available from the ABS is SA4 areas. The Lockyer Valley falls within two SA4 areas namely Toowoomba and Ipswich as shown in Figure 3.2. For the purposes of this assessment the area comprising Toowoomba and Ipswich SA4’s has been termed the Study Region. Data from the Study Region has been compared to data for the ABS National Resource Management Region (NRMR) of South-East Queensland, the State of Queensland and Australia. It is worth noting that while the NRMR region of South-east Queensland, covers a broader area than the Study Region, it excludes a portion of Study Region to the west of Toowoomba accounting for minor statistical inconsistencies.

The gross value of agriculture commodities produced in the Study Region (comprising Toowoomba SA4 and Ipswich SA4) for the year ended 30 June 2016 was \$673.2 million (ABS 2017). This represents an increase of 11.3% from the year ending 20 June 2015 when the gross value of agricultural production for the region was \$596.6 million (ABS 2016 – 7503.0 – Value of Agricultural Commodities Produced, Australia 2014-15 – released 23 March 2016)).

A breakdown of this value of agricultural production by commodities for the Study Region is shown in Table 5.4. This table shows the value of the various commodities produced in the Study Region along with its percentage contribution to South-east Queensland, Queensland and Australia.

This data demonstrates that the main contributors in terms of overall value are vegetables for human consumption which contributed \$355.8 million to gross value within the Study Region followed by livestock slaughtered and other disposal contributing \$200.8 million to gross value of the Study Region. It also indicates that:

- 32.7% of Queensland’s production of vegetables for human consumption is produced in the Study Region
- 19.2% of Queensland’s production of hay and silage is produced in the Study Region
- 13.8% of Queensland production of cut flowers or cultivated turf is produced in the Study Region.

Table 5.3 Value of agriculture - Study Region (Toowoomba (SA4) and Ipswich (SA4)) - 2015-16

COMMODITIES	TOOWOOMBA (\$M)	IPSWICH (\$M)	STUDY REGION TOTAL (\$M)	SE QLD (\$M)	% OF SE QLD	STATE (\$M)	% OF STATE	% OF AUST
Total agriculture	\$260.9	\$412.4	\$673.2	\$1,533.7	43.9%	\$13,216.9	5.1%	1.2
Total value of crops	\$197.7	\$245.6	\$443.3	\$856.7	51.7%	\$5,829.0	7.6%	1.6
Broadacre crops	\$7.0	\$8.4	\$15.4	\$34.8	44.2%	\$2,992.4	0.5%	0.1
Hay and silage	\$9.2	\$17.5	\$26.7	\$32.2	83%	\$139.0	19.2%	1.7
Nurseries, cut flowers or cultivated turf	\$19.8	\$18.0	\$37.9	\$164.5	23%	\$273.5	13.8%	2.9
Fruit and nuts (excluding grapes)	\$4.5	\$2.8	\$7.3	\$194.3	3.8%	\$1,303.4	0.6%	0.2
Fruit and nuts (grapes)	-	\$0.1	\$0.1	\$0.1	94.3%	\$33.4	0.4%	0
Vegetables for human consumption	\$157.1	\$198.7	\$355.8	\$430.7	82.6%	\$1,087.3	32.7%	9.9
Livestock products	\$9.6	\$19.6	\$29.1	\$82.5	35.3%	\$509.1	5.7%	0.4
Livestock slaughtered and other disposals	\$53.6	\$147.2	\$200.8	\$594.5	33.8%	\$6,878.8	2.9%	1.0

Source: ABS 2017 2015/16 Value of Agricultural Commodities Produced State, and SA4 region – Queensland 2015-16 Released July 2017

5.3.1 VALUE OF VEGETABLE PRODUCTION

The value of vegetables for human consumption to the Study Region for the year ending 30 June 2016 was \$355.8 million, representing 82.6% of the value of vegetable production in South-east Queensland and 32.7% of the value of vegetable production in Queensland as whole. This points to the significance of the vegetable produced from the Study Region to both South-east Queensland and Queensland. The value of vegetable production from the Study Region to Queensland is illustrated in Figure 5.3 which shows that Toowoomba and Ipswich SA4 areas combined account for 32% of vegetable production in Queensland.

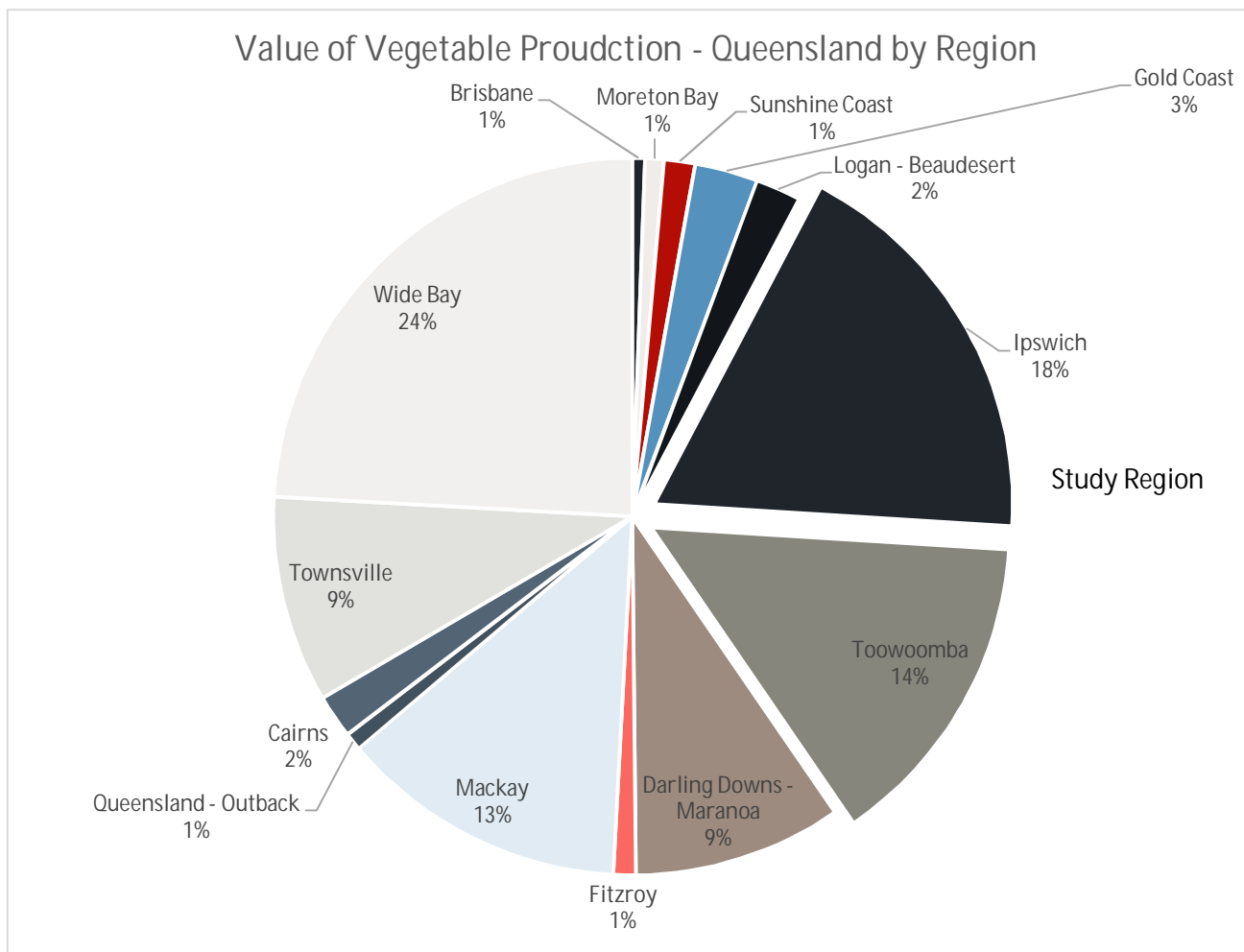


Figure 5.4 Value of vegetable production - Queensland by region

The contribution of various vegetables produced in the region to South-east Queensland and Queensland for the year ending 30 June 2016 is shown in Table 5.5 and illustrated in Figure 5.4. The region produces 32.7% of Queensland vegetables grown for human consumption and 82.6% of vegetables grown in South-east Queensland for human consumption.

Significant crops in terms of gross value produced include:

- Carrots – 95% of State and 14.8% of Australia
- Cabbages – 93.2% of State and 22.3% of Australia
- Broccoli – 82.6% of State and 24.4% of Australia
- Onions – 75.2% of State and 9.7% of Australia
- Sweet corn – 72.9% of State and 50.9% of Australia
- Lettuces – 70.4% of State and 18.6% of Australia
- Beans – 5.29% of State and 36.8% of Australia (Source ABS 2017).

Table 5.4 Value of vegetable production - Toowoomba (SA4) and Ipswich (SA4) - 2015-16

VEGETABLES FOR HUMAN CONSUMPTION	TOOWOOMBA (\$M)	IPSWICH (\$M)	REGION TOTAL (\$M)	SE QLD (\$M)	% OF SE QLD ¹	STATE (\$M)	REGION AS % OF STATE	REGION AS % OF AUST
Beans (including french and runner)	22.3	29.1	51.4	51.8	99.3	97.2	52.9	36.8
Broccoli	17.4	14.4	31.8	31.4	101.3	38.6	82.6	24.4
Brussels sprouts	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Cabbages	7.0	9.0	16.0	16.1	99.6	17.2	93.2	22.3
Capsicum - (excluding chillies)	0.0	0.1	0.1	0.8	15.0	55.6	0.2	0.1
Carrots	1.6	27.7	29.4	29.4	100.0	30.9	95.0	14.8
Cauliflowers	7.3	0.6	7.9	7.3	108.6	12.0	66.3	14.9
Lettuces – Total	25.3	9.5	34.8	34.5	101.0	49.5	70.4	18.6
Melons	2.3	0.4	2.7	2.9	91.4	64.1	4.2	1.3
Mushrooms	0.0	np	0.0	60.3	0.0	np	0.0	0.0
Onions	2.7	17.7	20.4	20.7	98.7	27.1	75.2	9.7
Peas - green processing	0.0	0.0	0.0	0.0	97.7	0.0	62.4	0.0
Peas - fresh market	0.0	0.0	0.0	0.2	14.9	2.4	1.5	0.4
Potatoes - Fresh market and processing	9.6	2.0	11.6	11.5	100.5	39.8	29.1	2.2
Pumpkins	4.1	9.1	13.2	13.5	97.8	35.5	37.1	16.7
Sweet corn	35.5	27.7	63.2	63.2	99.9	86.7	72.9	50.9
Tomatoes – Processing	0.0	0.0	0.0	0.3	7.7	0.6	3.9	0.1
Tomatoes - Fresh Market (outdoor and undercover)	5.7	1.3	7.0	10.1	69.3	122.8	5.7	2.5
All other vegetables n.e.c.	16.4	np	16.4	76.8	21.3	np	np	1.9
Total	157.1	198.7	355.8	430.7	82.6	1,087.3	32.7	9.9

Notes 1. Values in excess of 100% are due to a section of the Toowoomba SA4 (to the west of Toowoomba) not being included in the South-East Queensland region.

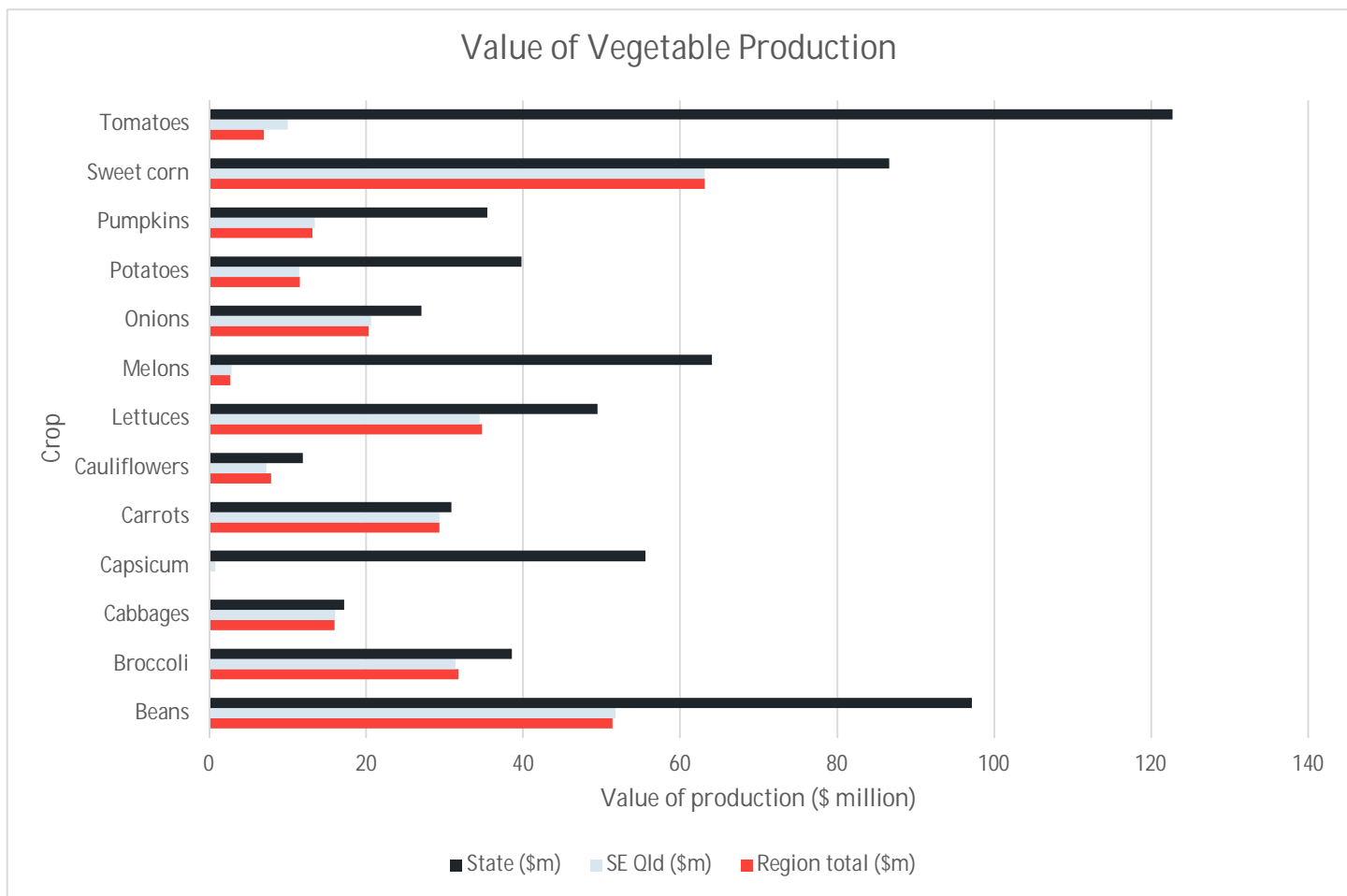


Figure 5.5 Value of vegetables crops to Study Region, South-east Queensland and Queensland (2015-2016)

The ABS Agricultural census identified that 38,337 ha of land (601 businesses) within the Study Region was allocated to cropping (including broadacre, hay, silage and horticulture). Of this:

- 14,127 ha were allocated to vegetable production (208 businesses)
- 11,393 ha were allocated to broadacre cropping (182 businesses)
- 9,969 ha were allocated to hay and silage (372 businesses).

Table 5.6 shows this breakdown.

Table 5.5 Number of businesses and allocation of land to cropping – Study Region (Toowoomba and Ipswich SA4s) – 2015-16

COMMODITIES	TOOWOOMBA		IPSWICH		STUDY REGION	
	AREA (HA)	NO. OF BUSINESSES	AREA (HA)	NO. OF BUSINESSES	AREA (HA)	NO. OF BUSINESSES
Broadacre crops	5864.7	64	5528.0	118	11392.7	182
Hay and silage	3068.4	109	6900.9	263	9969.3	372
Nurseries, cut flowers, cultivated turf	150.7	14	432.6	34	583.3	48
Fruit and nuts - Orchard fruit and nuts	-	-	435.7	15	435.7	15
Fruit and nuts (excluding grapes)	192.0	9	444.6	19	636.6	28
Fruit and nuts - Grapes	-	-	5.7	3	5.7	3
Vegetables for human consumption	6971.2	68	7155.9	140	14127.1	208
Total crops area	16746.6	192	21590.8	418	38,337.4	610

Source: ABS 2017 Agricultural Commodities, Australia 2015-16

Table 5.7 shows the main vegetable crops grown within the Study Area along with production values and yields. For the year ending 30 June 2016, the main vegetable crops grown in terms of land allocation in the Study Region included:

- Sweet corn – 3,852 ha from 22 holdings
- Beans – 2,176 ha from 25 holdings
- Broccoli – 1,782 ha from 28 holdings
- Lettuces – 1,094 ha from 36 holdings
- Carrots – 909 ha from 18 holdings.

Table 5.6 Vegetable Production – Study Region (Toowoomba (SA4) and Ipswich (SA4)) – 2015-16

COMMODITIES	STUDY REGION				IPSWICH				TOOWOOMBA			
	AREA (HA)	NO.	PRODUCTION	YIELD	AREA (HA)	NO.	PRODUCTION	YIELD	AREA (HA)	NO.	PRODUCTION	YIELD
Beans	2,176	25	10,990,357.0 kg	5049.9 kg/ha	1,167	21	6,218,017 kg	5,327.9 kg/ha	1,009	4	4,772,340 kg	4,728.5 kg/ha
Broccoli	1,782	28	13,494,416.7 kg	7570.7 kg/ha	795	10	6,125,444 kg	7,706.0 kg/ha	988	18	7,368,973 kg	7,461.9 kg/ha
Cabbages	432	31	17,908.9 t	41.4 t/ha	182	20	10,050 t	55.3 t/ha	251	11	7,859 t	31.4 t/ha
Capsicums (excluding chillies)	22	4	50,954.5 kg	2353.6 kg/ha	21	3	44,608 kg	2,135.1 kg/ha	1	1	6,347 kg	8,333.3 kg/ha
Carrots	909	18	41,563.7 t	45.7 t/ha	856	15	39,257 t	45.9 t/ha	53	3	2,306 t	43.3 t/ha
Cauliflowers	391	21	9,048.6 kg	23.2 kg/ha	51	6	726 kg	14.2 kg/ha	340	16	8,322 kg	24.5 kg/ha
Green peas	5	4	9,587.0 kg	1936.8 kg/ha	5	4	9,587 kg	1,935.7 kg/ha	-	-	-	-
Lettuces	1,094	36	28,260,428.5 kg	25832.2 kg/ha	341	13	7,747,100 kg	22,686.9 kg/ha	753	23	20,513,329 kg	27,259.4 kg/ha
Melons	112	25	3,238.4 t	28.9 t/ha	28	13	471 t	16.8 t/ha	84	11	2,767 t	32.9 t/ha
Onions	491	35	24,358.8 t	49.6 t/ha	385	22	21,101 t	54.8 t/ha	106	13	3,258 t	30.7 t/ha
Potatoes	665	24	19,909.0 t	29.9 t/ha	126	8	3,477 t	27.6 t/ha	539	16	16,432 t	30.5 t/ha
Pumpkins	867	77	16,324.2 t	18.8 t/ha	601	53	11,305 t	18.8 t/ha	267	24	5,019 t	18.8 t/ha
Sweet corn	3,852	22	40,460.7 t	10.5 t/ha	1,654	15	17,728 t	10.7 t/ha	2,199	7	22,733 t	10.3 t/ha
Tomatoes	96	16	3,815.0 t	39.6 t/ha	18	2	728 t	40.4 t/ha	78	4	3,087 t	39.5 t/ha

Source ABS 2017: Agricultural Commodities Australia 2015-16 71210D0002-201516, Released 31 July 2017

5.3.2 HORTICULTURAL SUPPLY CHAIN

A representation of the irrigated horticultural supply chain is shown in Figure 5.5 illustrating the extensiveness and complexity of the industry linkages.

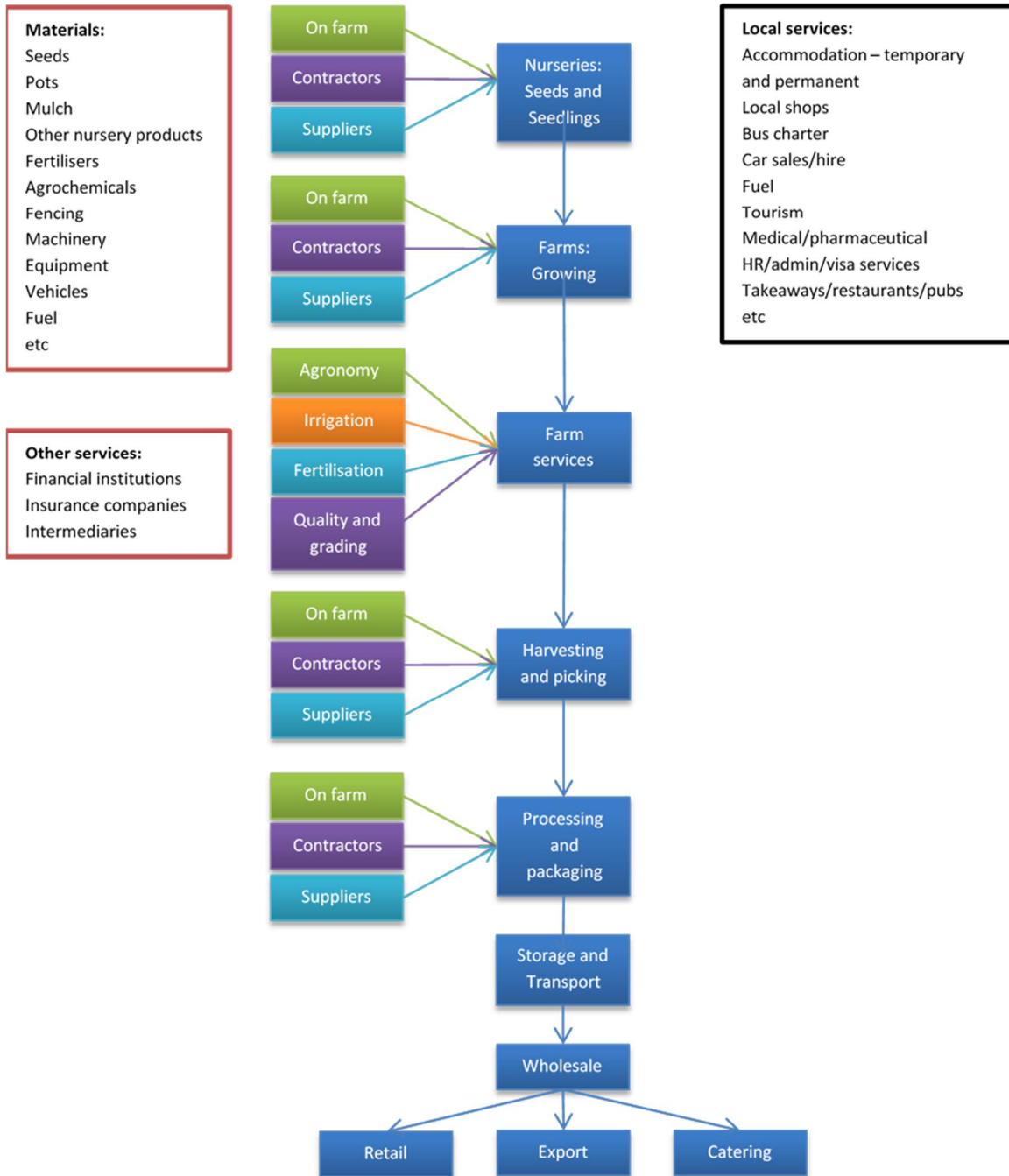


Figure 5.6 Irrigated horticulture supply chain

Source: Lockyer Valley Regional Council 2016.

6 OPPORTUNITIES AND CHALLENGES

A number of studies have identified significant challenges and opportunities to the sustainable development of the vegetable industry within the Lockyer Valley including (but not limited to):

- Henderson 2006, Maximising returns from water in the Australian vegetable industry: Queensland, Department of Primary Industries and Fisheries, Queensland
- Mainstream Economic and Policy 2013, *A strategy for sustainable growth of the South East Queensland Food Bowl – Information Report*, December and *Growing Opportunities: A strategy for sustainable growth of the South East Queensland Food Bowl – A report for Regional Development Australia – Ipswich and West Moreton Inc.*
- The Stafford Group 2013, *Regional Food Sector Strategy*, prepared for Lockyer Valley Regional Council, August 2013.

Key amongst the challenges identified for the region was the availability of a reliable and affordable water supply. Low reliability of water resources, has been identified as a significant constraint to the expansion and diversification of the agricultural sector within the Study Area.

While land availability is not seen as a major impediment to future expansion and diversification of horticultural production within the Lockyer Valley, the volume and reliability of rainfall within the region is. Surface water in the region is relatively unreliable increasing the commercial risk of long-term planning and investment decisions. In addition, significant pressure has been placed on groundwater resources. Any increases in temperature or a decline in rainfall due to recent trends in climate variability will further impact on the volume and reliability of water within the region.

Investment in water supply services and water use efficiency will be required to achieve future expansion and diversification in the agricultural section of the region. This was reflected through a number of comments made in responses to the survey of irrigators, whereby they noted the difficulty in making future business decisions when dealing with unreliable supply of water and that future investment decisions would be dependent on the price of water.

In addition to constraints, the strengths and advantages of the region with respect to agricultural production have also been highlighted and include:

- Quality and quantity of suitable agricultural land, with the rich alluvial soils in particular providing some of the most fertile land for agricultural production.
- The region's land and climate and its ability to support multiple crops with multiple, year-round production and harvest cycles.
- The proximity of the area to national and international markets. The proximity of the region to Greater Brisbane provides an important advantage by facilitating access to not only a rapidly growing domestic consumer market but also access to key trade facilities through the national road network, airport services and the Port of Brisbane.
- The ability of road infrastructure and road transport services to provide rapid and reliable market access.



There are significant commercial risks for the Lockyer if reliable ongoing water supply is not able to be guaranteed and secured.

The Stafford Group 2013

- The extensive farming knowledge which exists in the region and which is often the result of farms being held in family ownership for generations. This extensive farming history translates to significant and very specialised knowledge, specific to the area and highlights the importance of retaining this knowledge and history in the valley.
- These agricultural strengths of the region are supported by university education and research facilities especially at the University of Queensland's Gatton campus. The university undertakes world leading research into agricultural and natural resource sciences and is a training ground for agriculturalists, agribusiness operators, veterinary scientists, and natural resource scientists. The extension of this research and development knowledge into practical investment decisions is vital to the future success of the Food Bowl.

In light of these strengths and advantages, local government has recognised the value of agriculture to the region and identified a number of economic priorities for the food and agricultural sector, these being:

- industry growth - food value adding and innovation
- export growth
- regional collaboration to boost industry capability and growth
- industry promotion and regional development
- development of large scale food production and packaging facilities (Lockyer Valley Regional Council – Lockyer Valley Regional Development Framework 2013-2023).

6.1 VALUE-ADD THROUGH PRODUCT TRANSFORMATION

While the value of agricultural production to the region is recognised, the long-term sustainability of the region hinges on its ability to capitalise on these advantages especially through value-adding through product transformation and diversification. In addition to the provision of raw produce, it has been estimated that approximately half of Australia's domestic demand for fruit and vegetables is for products that have either been transformed or processed. It is considered likely that this demand for transformed and processed product will continue to grow along with population growth. In addition, as populations become more urbanised and incomes rise, international demand for transformed and process product is also likely to increase, potentially at a faster rate than population growth.

While the Lockyer Valley region has been recognised as having a natural advantage in its ability to produce high quality vegetables for both the domestic market and potentially export market, there are currently very few processing facilities in the region that undertake any major form of product transformation beyond, sorting, washing and packaging. Examples of operations where some form of product transformation of raw produce is currently undertaken or is being developed include:

- Comvita Olive Leaf Operations at Coominya which make olive leaf extract liquid as well as powder for capsules. This operation involves growing olive trees in hedge rows with the use of irrigation water (refer Figure 6.1).
- Brisbane Valley Protein – has sought preliminary approval for a multi-million dollar master planned protein production hub at Coominya, exporting poultry, quail and game bird products. The development, which would be undertaken in stages would be the first dedicated protein hub in Australia including intensive livestock production (poultry, game birds and beef), processing, training research and hospitality facilities. The first stage of the development was granted approval in May 2017. This stage involves developing to RSPCA standards, eight poultry sheds and a hatch to dispatch quail operations, including nine quail sheds and an export-accredited quail processing facility with the capacity to process up to 15,000 birds per week (Somerset Regional Council http://www.somerset.qld.gov.au/home/-/asset_publisher/z7GAyEvgLgrm/content/green-light-given-to-first-stage-of-major-protein-precinct)

- the Australian Food Corporation meat processing plant at Coominya, which processes meat patties for McDonald's in Australia, Japan, the Middle East and Indonesia.



Figure 6.1 Comvita Olive Leaf Operations, Coominya

The Lockyer Valley Fruit and Vegetable Company also has plans to establish a cannery at Grantham, focussing on the processing of pineapple, beetroot and tomatoes. Development of this project has yet to commence.

In addition the Lockyer Valley Foods Project, plans to establish a fruit and vegetable processing factory which would be aimed at absorbing the excess fruit and vegetables from the Lockyer Valley which currently have no local market. This excess produce, which has been valued at \$20 million would be transformed into create consumer-ready high-value natural products with a longer shelf life. <http://seqinvest.com.au/story/lockyer-valley-foods/>

While both of these proposed developments are still within the planning phases, they highlight the potential for the region to move into this high-value production. Opportunities also exist for boutique smaller-scale food processing utilising the vegetables and other products grown in the Lockyer Valley.


Processing of vegetables (either for canning or transformation) generally requires large volumes of water (i.e. for removing soil from unpeeled vegetables, for cleaning, rinsing and cooling of processed vegetables and also for cleaning of surfaces in the processing plants). Improved water supply and reliability within the region will aid in facilitating such development by reducing risk.

The establishment of such developments aimed at product transformation would have associated flow on benefits to the region including the creation of employment opportunities, allowing employees and families to remain and invest in the region (i.e. through spending money in local towns and participating in community activities) in turn improving the overall general viability of the region

6.2 EXPORT

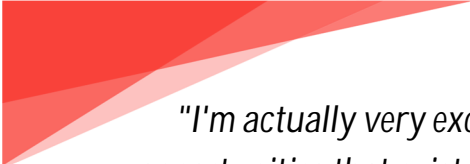
Australia's global reputation as a producer of clean green fruit and vegetables to high horticultural standards has international markets, particularly in Asia demanding Australian produce. Over the past 5 years exports to Asia, particularly China, Hong Kong and Japan have increased by almost 170 %. While some producers in the Lockyer Valley are exporting broccoli, pumpkins, cauliflower and onions to international markets, the potential exists for many more growers to export produce internationally. China in particular with its large population base and increasing wealth provides a huge opportunity for Australian exporters.

Lockyer Valley growers have land, labour and the knowledge to make the most of international exports. Capacity exists within the region for growers to produce more, however at the moment the ability to do so is limited by water availability. Water available dictates the level of production that can be achieved.



"Our vegetable producers in Queensland are gaining an international reputation as producers of high-quality clean, green and safe vegetables."

Michael Sippel, Lockyer Valley Growers Media
Release, 1 September 2017



"I'm actually very excited about the opportunities that exist with the Asian market. Globally, protein production is predicted to increase by 20% over the next 50 years" Duncan Brown – Director
Brisbane Valley Protein – The Queensland Times
12 May 2017

Tapping into lucrative Asian export markets would give growers options not only for finding markets for produce in times of overproduction but also by providing them with choices on where to supply their produce (i.e. wouldn't be forced into contracts with supermarket chains).

The Queensland Government Department of Agricultural and Fisheries, recently announced a national four-year, \$16.5 million strategy with Horticultural Innovation Australia animated at exploring ways to improve export operations at all stages (from packaging, storing and delivery), ensuring that buyers are getting the best produce possible.

7 ECONOMIC ASSESSMENT

7.1 OVERVIEW AND SUMMARY OF RESULTS

This chapter presents findings from the assessment undertaken to assess the economic impacts resulting from an increase of water supply for irrigation purposes to the Study Region of 100,000 ML/annum. Where possible, quantitative estimates have been presented.

It is noted that the value of 100,000 ML/annum of additional water was provided by the Client Group for the purpose of this analysis. It is assumed that demand for this increased water supply exists, and growers have no constraints in accessing this supply. An analysis of whether there is land availability or other supply or demand side constraints to accommodate the increase/additional crops expected to be produced due to this increased water supply has not been undertaken. As such, for the purpose of the economic analysis, it has been assumed that there are no land constraints (i.e. there is availability of land for additional/increased crop production due to the increased water supply) or other constraints for accessing the 100,000 ML/annum of water supply.

The assessment involves a desk-based analysis designed to provide a broad order estimate of the economic impacts in terms of output (production) and employment based on:

- publicly available information/data on current agricultural production, including the ABS and prior studies
- results from the survey of irrigators conducted as part of this assessment.

Based on the baseline economic data presented in Chapter 5 of this report, three crop categories have been selected for inclusion in the economic impact analysis. The three crop categories are:

- vegetables for human consumption
- hay and silage
- nurseries, cut flowers and cultivated turf.

These three crop categories represent the main contributors to the State of Queensland in terms of gross value, relative to other crop categories within the agricultural sector: vegetables for human consumption (32.7%); hay and silage (19.2%) and nurseries, cut flowers or cultivated turf (13.8%).

The results indicate that an additional 100,000 ML/annum of water to the region is estimated to:

- generate approximately \$640 million in additional gross value (direct impact) an increase of 28.59% on current GRP (equivalent to approximately \$6,400 per additional megalitre of water)
- generate approximately 1,409 additional jobs in the region (direct impact)
- generate an additional \$73 million in terms of annual wages.

The approach and specific calculations used to obtain these results are presented in the following sections.

7.1 APPROACH

The increase in water supply of 100,000 ML/annum is expected to support the production of additional irrigated crops from what is currently being produced in the Study Region. The production of additional crops indicates additional gross value for the State and employment to accommodate the production of the additional crops.

The economic assessment has therefore been undertaken through an assessment of output (i.e. in terms of gross value or revenue) and employment impacts resulting from the increased supply of water for irrigated crops.

7.1.1 ESTIMATION OF OUTPUT IMPACT

To estimate the output impact, an estimate of the additional revenue generated from the increase in water supply of 100,000ML/annum was firstly required. For the purpose of the assessment, it was assumed that gross value of crop is equivalent to revenue for the growers.

It was also assumed that the 100,000 ML/annum of water is allocated proportionally across the three high value categories of crops in Study Region (Ipswich and Toowoomba SA4 areas): vegetables for human consumption, hay and silage, and nurseries, cut flowers and cultivated turf. The allocation was attributed on the basis of each of the three crop categories' share of the total gross value (i.e. gross value of the three crop categories).

For the output impact (i.e. output impact), the additional gross value of the three crop categories, has been estimated by estimating:

- the additional hectares that can be supported by the increase in water supply (based on survey responses from irrigators that specified the additional water they would take and their estimates of the additional land area this water supply would support by crop type). These ratios were applied to the full 100,000 ML allocation to estimate the increase in land under these crops across the whole Study Region
- the additional revenue generated per hectare for each crop category (sourced from the ABS agricultural commodities data as noted in Table 5.3 and Table 5.5) and applying these values per hectare to the increase in hectares under cultivation resulting from the additional 100,000 ML allocation.

Multiplying the additional hectares with the \$/hectare provides an estimate for the additional gross value of the three crop categories. It is assumed this incremental gross value is the incremental revenue, and is equivalent to additional Gross Regional Product (GRP) for Lockyer Valley and Somerset local government areas.

7.1.2 ESTIMATION OF EMPLOYMENT IMPACT

This involves estimating the additional employment that is likely to result from an additional 100,000 ML/annum of water supply and the percentage increase in employment for the Study Region. This calculation involved:

- Assuming current employment to those employed in the agriculture, forestry and fishery sector for Lockyer Valley and Somerset (refer Table 4.13).
- Dividing this employment by the total land area used for agricultural crops for Lockyer Valley and Somerset local areas (the value of the total land area is obtained from Table 5.5) to obtain employment per hectare.
- Multiplying employment per hectare by the additional hectares for the three crop categories to estimate the additional employment generated.

The employment impact is presented as the estimated percentage increase in employment for the Study Region.

7.1.3 SUMMARY

In summary, estimating the output and employed impacts involved the following steps:

- Estimate \$ per hectare (within the Toowoomba and Ipswich SA4) for selected crop categories
- Allocate 100,000ML of water (across the three crop categories)
- Estimate additional hectares supported by the additional water allocated (from survey results and 100,000 ML water allocation)
- Estimate additional gross value generated (\$/hectare * additional hectares) for Toowoomba and Ipswich SA4
- Estimate output impact (additional gross value divided by GRP for Lockyer Valley and Somerset local government areas)

- Estimate labour per hectare
- Estimate additional employment level (labour/hectare * additional hectares)
- Estimate employment impact (additional employment divided by local jobs in Locker Valley and Somerset local government areas)
- Estimate the increase in labour income (annual) based on weekly wage rates
- Sensitivity testing (with ± 20% \$/hectare) for additional gross value estimates
- Undertake a flow-on and total impact analysis based on publicly available information.

7.2 ECONOMIC IMPACT

7.2.1 GROSS VALUE OF THE CROP CATEGORIES

The gross value per hectare for the top three high value crop categories was estimated using the information on crops values presented in Tables 5.3 and 5.5. The results are presented in Table 7.1.

Table 7.1 \$/hectare - Top Three Crop Categories in Study Region (Ipswich and Toowoomba combined)

CROP CATEGORY	TOTAL HECTARE (STUDY REGION)	TOTAL GROSS VALUE (STUDY REGION) \$	\$/HA (2015-16)	\$/HA (2017-18) ¹
Vegetables for human consumption	14,127	355,800,000	25,186	26,030
Hay and silage	9,969	26,700,000	2,678	2,768
Nurseries, cut flowers and cultivated turf	583	37,900,000	64,975	67,153

Notes (1) Refer to Tables 5.3 and 5.5.

Source for CPI data: ABS (2017), 6401.0 Consumer Price Index, Australia, TABLES 1 and 2. CPI: All Groups, Index Numbers and Percentage Changes - Index Numbers; All groups CPI; Brisbane.

For escalation purposes, the June 2015 Consumer Price Index (CPI) has been used as the index for FY2015-16 and the June 2017 CPI as the index for FY2017-18. Note that while June 2017 is not within FY2017-18; however, June 2017 is the closest data point for the CPI estimate for FY2017-18.

The gross value/hectare (for 2017-18) of the three categories in the Study Region of Toowoomba and Ipswich are estimated to be:

- \$26,030/ha
- \$2,768/ha
- \$67,153/ha.

7.2.2 ADDITIONAL GROSS VALUE IMPACT

7.2.2.1 ADDITIONAL HECTARES FROM 100,000 ML OF WATER

The increase in water supply of 100,000ML/annum is expected to support the production of additional irrigated crops from what is currently being produced. The additional 100,000 ML/annum of water is allocated proportionally across the top three high value categories of crops - vegetables for human consumption, hay and silage, and nurseries, cut flowers and cultivated turf. This allocation has been based off the share of the total gross value for each of the three crop categories, as presented in Table 7.2.

Table 7.2 Allocation of 100,000 ML of Water Across the Top Three Crop Categories

CROP CATEGORY	GROSS VALUE (STUDY REGION TOTAL) \$M	SHARE OF TOTAL VALUE OF \$420.40M	WATER SHARE (ML)
Vegetables for human consumption	\$355.80	85%	84,634
Hay and silage	\$26.70	6%	6,351
Nurseries, cut flowers or cultivated turf	\$37.90	9%	9,015
Total	\$420.40	100%	100,000

The ABS derives the gross value estimates by the multiplying the price and quantity estimates of agricultural commodities. This, effectively, can be assumed to be the revenue generated from crop production¹.

Table 7.3 presents the estimated additional hectares likely to be supported by the increase in water supply for each crop category. The information presented in this table has been derived from responses received to the survey of irrigators in the region. Responses to the type of crops that would be grown should more water become available were distributed across a number of the crop groups, predominantly vegetables for human consumption and hay and silage. It was not possible to conclusively determine a third crop group from the survey as responses were distributed relatively evenly among the remaining categories. As such nurseries, cut flowers and cultivated turf was chosen based on its value contribution to the State.

With regard to additional hectares/annum for each of these three crop categories, the average figures are reported in Table 7.3. Similarly, for the increase in water demand/annum associated with these three crops, the average figures are also reported in Table 7.3.

Table 7.3 Additional hectares supported with increase in water supply of 100,000ML/annum

CROP CATEGORY	INCREASE IN WATER DEMAND/ANNUM FROM SURVEY RESULTS	ADDITIONAL HECTARES/ANNUM FROM SURVEY RESULTS	ADDITIONAL WATER SUPPLIED FOR IRRIGATION	ADDITIONAL HECTARES WITH ADDITIONAL ML OF WATER
Vegetables for human consumption	412	109	84,634	22,473
Hay and silage	115	29	6,351	1,581
Nurseries, cut flowers and cultivated turf	600	50	9,015	751

Source: Survey results and allocation of 100,000ML water across the three crop categories.

From the survey results, the responses were first grouped according to the three crop categories. Then, the respondents' water demand and additional hectare requirements as they indicated in the survey were averaged for each crop category (averages are presented in column 2 and column 3 of Table 7.3).

Column 4 of Table 7.3 shows the allocated water (i.e. the 100,000ML across the three crop categories) as noted earlier in Table 7.2 above. Given this, the next step was to use a proportionate rule to estimate the additional hectares that are likely to be supported with the additional water noted in column 4. For example, $109/412 * 84,634 = 22,473$ hectares.

¹ For detail on how gross value is estimated by the ABS, please see <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/7503.0Explanatory%20Notes12015-16?OpenDocument>

7.2.2.2 VALUE OF ADDITIONAL OUTPUT (GROSS VALUE)

An additional 100,000 ML/annum of water for irrigation purposes was estimated to generate approximately \$640 million in additional gross value. Of this approximately \$585 million was attributed to vegetables for human consumption, \$4.4 million to hay and silage and \$50 million to nurseries, cut flowers and cultivated turf. The estimated additional gross value of the additional crops is presented in Table 7.4.

Table 7.4 Value of additional production (\$), 2017-18

CROP CATEGORY	HECTARE	\$/HECTARE	TOTAL GROSS VALUE (\$) (2017-18)
Vegetables for human consumption	22,473	26,030	584,977,196
Hay and silage	1,581	2,768	4,376,924
Nurseries, cut flowers and cultivated turf	751	67,153	50,450,002
Total			\$639,804,122

This estimated additional gross value is assumed to be the estimated incremental revenue for the respective producers and as such is assumed to be equivalent to additional Gross Regional Product (GRP).

In terms of overall output impact this represents an increase of approximately 27% on current GRP. Estimates for current GRP for the region (in 2017-18 terms) are presented in Table 7.5. These are based on publicly available sources. A breakdown of the increase to GRP for the three crop categories is present in Table 7.6.

Table 7.5 Gross Regional Product (2017-18) \$million

LOCAL GOVERNMENT AREA	GROSS REGIONAL PRODUCT (\$M)
Lockyer Valley	1,453
Somerset	885
Total	2,238

Source: National Economic Indicators Series, 2015-16, available at <http://economic-indicators.id.com.au/?Stateld=3>

Table 7.6 Output impact

CROP CATEGORIES	IMPACT ON GRP
Vegetables for human consumption	25.02%
Hay and silage	0.19%
Nurseries, cut flowers and cultivated turf	2.16%
Total	27.37%

The output impact for each crop category was estimated as the change in gross value (i.e additional gross value) divided by the total GRP values for Lockyer and Somerset, as presented in Table 7.5.

7.2.3 ADDITIONAL EMPLOYMENT IMPACT

As demonstrated in the previous section, an increase in water supply results in the use of additional hectares for crop production (of the three categories). As such, the estimated additional hectares form a basis for estimating the employment impact in the Lockyer Valley and Somerset region.

Current labour/hectare of irrigated production for the Study Region was estimated using information presented in Tables 4.13 and 5.5. This factor was used to generate estimates for the employment level likely to result from the increased hectares resulting from the additional water supply.

Table 7.7 Labour per hectare – Study Region (Ipswich and Toowoomba)

	TOTAL EMPLOYMENT LEVEL (NUMBER) IN AGRICULTURAL SECTOR FOR THE STUDY AREA	TOTAL CROP AREA (HECTARES) USED FOR AGRICULTURAL COMMODITIES ²	ESTIMATE OF LABOUR/HA
Labour/ha	2,177	38,337	0.057

Source: Refer to Tables 4.13, 5.5, ABS 2017 Agricultural Commodities, Australia 2015-16.

7.2.3.1 ADDITIONAL EMPLOYMENT

Estimated additional employment (number of employees/annum) resulting from the increase in additional hectares supported (and increase in gross value) by the additional water supply, are presented in Table 7.8. These results suggest that the 100,000 ML/annum would result in 1,409 additional jobs within the region, the majority of which (1,276) would be associated with vegetables for human consumption.

Table 7.8 Additional labour (employment level) per annum

CROP CATEGORY	ADDITIONAL HA	LABOUR/HA	ADDITIONAL LABOUR
Vegetables for human consumption	22,473	0.057	1,276
Hay and silage	1,581	0.057	90
Nurseries, cut flowers and cultivated turf	751	0.057	43
Total			1,409

In terms of overall employment impact this represents an employment increase of 7.21% in the region. Estimates for current employment (number of jobs) in the agricultural sector for the Lockyer Valley and Somerset region are presented in Table 7.7. These are based on publicly available sources. A breakdown of the employment increase for the three crop categories is present in Table 7.10.

Table 7.9 Local jobs (in local government area, 2015-16)

LOCAL GOVERNMENT AREA	JOBS (NUMBERS)
Lockyer Valley	12,400
Somerset	7,144
Total	19,544

Source: National Economic Indicators Series, 2015-16, available at <http://economic-indicators.id.com.au/?Stateld=3>. Local jobs data are not available for 2017-18.

Table 7.10 Employment impact (i.e. number of local jobs) 2015-16*

CROP CATEGORIES	JOBS (NUMBERS) (2015-16)	EMPLOYMENT IMPACT
Vegetables for human consumption	1,276	6.53%
Hay and silage	90	0.46%
Nurseries, cut flowers and cultivated turf	43	0.22%
Total	1,409	7.21%

7.2.3.2 INCREASE IN LABOUR INCOME (WAGE)

The increase in labour income is likely to result from the additional employment generated, was also estimated and is presented in Table 7.11 and 7.12.

It is estimated that the additional 1,409 jobs created by the 100,000 ML/annum increase in water would result in an increase in approximately:

- \$58,176,021 in annual income, assuming award wage rates (see Table 7.11)
- \$73,268,000 in annual income, assuming \$52,000/year wage per employee based on pay slips from four farms in Lockyer Valley (Table 7.12)

Table 7.11 Estimated increase in annual wage* (2017-18)

CROP CATEGORIES	TOTAL ANNUAL INCOME	TOTAL ANNUAL INCOME (INCL SUPER) ¹
Vegetables for human consumption	48,133,010	52,705,646
Hay and silage	3,386,721	3,708,460
Nurseries, cut flowers and cultivated turf	1,609,055	1,761,916
Total	53,128,787	58,176,021

It was assumed that employees would earn \$701.80²/week based on FHL 4 rates, sourced from Rural Wage Guide 2015-16, NSW Farmers Industrial Association³, and escalated with CPI to present this in 2017-18. ¹ Assumed 9.95% superannuation.

Annual increase in labour income has been also estimated based on pay slips from Lockyer Valley farms. That is, as part of estimating the increase in labour income, the client groups provided WSP with pay slips for jobs in agriculture in the Lockyer Valley were also considered. Pay slips were collected from four farms⁴, where labourer/tractor level employees' annual salary level averages to approximately \$47,000 (excluding super) and \$52,000 (including super) per employee as presented in Table 7.12. If \$52,000 per year per employee is considered, this leads to a total annual increase in income of \$73,268,000. The wage level may be higher than this, for example, for managers/supervisors.

Table 7.12 Estimated annual wage per employee and increase in total income (2017-18)

FARM	TOTAL ANNUAL INCOME	TOTAL ANNUAL INCOME (INCL SUPER) ¹	TOTAL INCREASE IN ANNUAL INCOME FOR 1,409 EMPLOYEES
Farm 1	\$45,982	\$50,350	
Farm 2	\$49,657	\$54,374	
Farm 3	\$45,171	\$49,463	
Farm 4	\$49,756	\$54,482	
Total			\$73,268,000

² This is the escalated (by CPI) figure from 2015-16.

³ https://www.nswfarmers.org.au/__data/assets/pdf_file/0003/44625/Rural-Wage-Guide-2015-2016-Broadacre-and-Livestock-sml.pdf

⁴ Due to confidentiality reasons, the names of the farms cannot be disclosed.

7.2.4 SENSITIVITY ANALYSIS

A sensitivity analysis was undertaken to test the results by varying key assumptions or parameters underpinning the estimates. For the purposes of the sensitivity analysis a $\pm 20\%$ change in cost/price (i.e. revenue per hectare) was assumed to generate a reasonable range to account for the uncertainties in \$/ha. A $\pm 20\%$ was considered to be a reasonable range of possible values for revenue per hectare that could affect production levels. It is noted that there are other factors (besides revenue per hectare) that can influence the additional output (additional gross value of the three crop categories), but considered the change in revenue per hectare on output/gross value for our sensitivity testing. We suggest that further sensitivity testing should be considered as part of detailed economic analysis in the future.

Based on a $\pm 20\%$ change in \$/ha the estimated additional gross value which could be realised from an increase of 100,000 ML/annum of water ranges from approximately \$512 million to \$768 million, representing a 22% to 33% increase in gross value. These results are presented in Tables 7.13 and 7.14.

Table 7.13 Changes in the additional gross value due to changes in \$/ha

CROP CATEGORIES	ADDITIONAL GROSS VALUE (2017-18) (CENTRAL ESTIMATE)	WITH 20% INCREASE IN \$/HA	WITH 20% DECREASE IN \$/HA
Vegetables for human consumption	\$584,977,196	\$701,972,635	\$467,981,756
Hay and silage	\$4,376,924	\$5,252,309	\$3,501,539
Nurseries, cut flowers and cultivated turf	\$50,450,002	\$60,540,002	\$40,360,002
Total	\$639,804,122	\$767,764,946	\$511,843,297

Table 7.14 Changes in output impact due to changes in \$/ha

CROP CATEGORIES	OUTPUT IMPACT (CENTRAL ESTIMATE)	WITH 20% INCREASE IN \$/HA	WITH 20% DECREASE IN \$/HA
Vegetables for human consumption	25%	30.03%	20.02%
Hay and silage	0.19%	0.22%	0.15%
Nurseries, cut flowers and cultivated turf	2.16%	2.59%	1.73%
Total	27%	33%	22%

7.3 FLOW-ON AND TOTAL IMPACT

Multipliers summarise the results for predicting the total impact on all industries in an economy from changes in the demand for the output/employment of any one industry. For example, multipliers would present the impact on all industries when the agricultural sector experiences a change in its output and employment.

There are different types of multipliers, including as output and employment multipliers.

The total impact of the additional output and employment includes the direct impact as well as the flow-on impact. The importance/magnitude of total impact and flow-on impact to the wider economy can be demonstrated through the use of multipliers.

The scope of the economic analysis specifically excluded estimating or determining industry-specific regional, but rather relied on available public information that have used multipliers in other studies. It is noted that it is difficult to obtain reliable estimates for industry-specific regional multipliers.

According to Horticulture Australia Council and Horticulture Australia Limited (2009)⁵, the average multiplier for horticulture in regional and rural Australia is a factor of 5. A study by RM Consulting Group (2006)⁶ suggested using a multiplier of 2. While it is not entirely clear from these studies, it is considered that these multipliers reflect output multipliers for understanding the total impact on the Australian economy. Both these multipliers (2 and 5) have been applied as the output multiplier to present a range for the likely output impact (Table 7.14).

An employment multiplier of 1.828⁷ has been adopted for the flow-on impact of employment (see Table 7.15).

The results for total impact (output) and flow-on and total impact (employment) are provided in Table 7.15 and Table 7.16.

Table 7.15 Total impact - output (direct + flow-on)

CROP CATEGORY	INCREASE IN GROSS VALUE (\$) (DIRECT)	TOTAL IMPACT WITH OUTPUT MULTIPLIER 2 (\$)	TOTAL IMPACT WITH OUTPUT MULTIPLIER 5 (\$)
Vegetables for human consumption	\$584,977,196	\$1,169,954,391	\$2,924,885,978
Hay and silage	R4,376,924	\$8,753,848	\$21,884,620
Nurseries, cut flowers and cultivated turf	R50,450,002	\$100,900,004	\$252,250,010
Total	\$639,804,122	\$1,279,608,243	\$3,199,020,608

Table 7.16 Total impact - employment (direct + flow-on)

CROP CATEGORY	INCREASE IN EMPLOYMENT LEVEL (NUMBER) (DIRECT)	EMPLOYMENT MULTIPLIER 1.828 (FLOW-ON) (NUMBER)	EMPLOYMENT TOTAL IMPACT (NUMBER)
Vegetables for human consumption	1,276	2,333	3609
Hay and silage	90	164	254
Nurseries, cut flowers and cultivated turf	43	78	121
Total	1,409	2,575	3,984

⁵ Horticulture Australia Council and Horticulture Australia Limited (2009), Submission to the House of Representative's Standing Committee on Primary Industries and Resources Inquiry into the role of Government in assisting Australian farmers to adapt to the impacts of climate change, available at:

⁶ RM Consulting Group (2006), Irrigation knowledge exchange program for horticultural industries, available at: <http://apal.org.au/wp-content/uploads/2013/11/HG04007-Irrigation-knowledge-exchange-program-for-horticultural-industries.pdf>

⁷ Ray, T (2010), The Australian fertilizer industry - values and issues, available at: <https://www.iama.org.au/sites/default/files/Australian%20Fertilizer%20Industry%20Value%20and%20Issues%20August%202010.pdf>

We note it is unclear from the article if this multiplier is for Australia wide or NSW specific. However, due to lack of relevant and reliable multipliers that can be used for this report, we are using 1.828 as the employment multiplier.

Based on these assumptions it is estimated that the total flow on impacts to the Australian economy from an additional 100,000 ML /annum of water would be approximately \$1.3 billion to \$3.2 billion in output (including direct impacts of \$640 million) and create 3,984 additional jobs (of which 1,409 are direct).

As these results are not based on industry-specific regional multipliers, these estimates should be used with caution. It is recommended that any future studies investigate the flow-on and total impact in detail using multipliers developed for the region that are industry-specific.

8 CONCLUSIONS AND RECOMMENDATIONS

The Lockyer Valley is regarded as one of the most fertile and productive areas in Australia, producing approximately 35% of Queensland's vegetable supply from around 13,000 ha of irrigated land. The irrigation industry within the Lockyer Valley is dependent on a significant amount of water that is currently predominantly sourced from underground aquifers. Reliability of water supply has been cited as a major constraint to investment and diversification of agricultural production within the Lockyer Valley.

While land availability is not seen as a major impediment to future expansion and diversification of horticultural production within the Lockyer Valley, the volume and reliability of rainfall within the region is. Surface water in the region is relatively unreliable increasing the commercial risk of long-term planning and investment decisions. In addition, significant pressure has been placed on groundwater resources, with periods of over-extraction. Any increases in temperature or a decline in rainfall due to climate change will further impact on the volume and reliability of water within the region.

This study has been undertaken to identify the additional benefits that could be realised should an additional 100,000 ML/annum of water be available to the region. The value of 100,000 ML/annum was identified by the Client Group. No analysis has been undertaken associated with verifying this amount in terms of either demand for water or whether sufficient land is available to support the additional irrigated agriculture this water would produce. In addition, no discussion on the price of this additional water has been presented. Through responses obtained from the survey of irrigators in the region, it was highlighted that price would be a key determinant of demand for this additional water. As such the assessment undertaken needs to be considered as indicative only, with further detailed economic assessment undertaken in the future.

The results of the analysis suggest indicate that an additional 100,000 ML/annum of water to the region could lead to the generation of:

- around \$640 million in additional gross value to the regional (direct impact) an increase of 28.59% on current GRP (equivalent to \$640 per megalitre of water)
- approximately 1409 additional jobs in the region (direct impact)
- an additional \$73 million in annual wages.

While these results are indicative only, they do highlight that the supply of additional water resources to the region could have substantial socio-economic benefits including:

- greater certainty around production and output, particularly when facing increased variability in climate conditions such as increased temperatures and declining rainfall.
- reduced commercial risk associated with long-term planning and investment decision allowing for expansion and diversification of the industry
- increased employment opportunities and potential to retain younger generations in the region.

Given the indicative nature of the study undertaken (which provides broad order estimates only), it is recommended that once further information is known about the source, quantity and distribution of the water, a detailed economic assessment is undertaken which investigates the region-specific impacts in more details. Such studies could potentially include input-output analysis (including compilation of a regional input/output analysis table), and general equilibrium analysis to understand regional impacts including impacts on other industries within region.

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APPENDIX A

SURVEY OF IRRIGATORS



WSP (formerly WSP / Parsons Brinckerhoff) has been commissioned by Lockyer Valley Regional Council (LVRC); Somerset Regional Council (SRC) and the Lockyer Water Users Forum (LWUF) to complete a socio-economic assessment of increasing water supply to the Lockyer Valley. The objective of this study is to provide a baseline of the current socio-economic context in the area to aid in understanding the effect additional water resources (including reliability of supply) have on the economy in the region.

As part of this assessment, WSP is seeking input from irrigators in the Lockyer Valley to inform the socio-economic assessment.

The survey should take approximately 15 - 20 minutes to complete. Please note that all responses will be kept confidential. This survey will close mid-night 30 July 2017.

Should you have any questions or concerns please do not hesitate to contact the WSP project team using the following email address ProjectsQLD@wsp.com.

We thank you for taking the time to complete this survey.

1. In which Lockyer Catchment Management Areas is your enterprise located? In the event that you operate multiple enterprises over different catchment management areas, please choose more than one response.

Flagstone Creek

Ma Ma Creek

Upper Tenthill

Upper Laidley

Mulgowie

Sandy Creek

Lower Tenthill

Coominya

Gatton

Redbank Creek

Atkinson Buaraba

Central Lockyer North

Lower Lockyer

Central Lockyer South

Laidley South

Moreton Vale

Other (please specify)

* 2. Do you currently access water for irrigation / production purposes?

Yes

No

3. If you answered Yes to Q2: what is your main source of water for irrigation / production?

- Groundwater unregulated
- Groundwater regulated
- Surface water (i.e. natural watercourse, channel, pipeline) regulated
- Surface water (i.e. natural watercourse) unregulated
- Private storage

Other (please specify)

4. If your answer to Q3 was either regulated groundwater or surface water allocation, please identify the relevant Water Supply Scheme from which you receive your water.

- Lower Lockyer Valley Catchment Water Supply Scheme
- Central Lockyer Valley and Moreton Vale Pipeline Water Supply Scheme
- Lockyer Valley Groundwater Management Area - Implementation Area 1 - Water Resource (Moreton) Plan 2007
- Gatton-Esk Road Implementation Area - Water Resource (Great Artesian Basin) Plan 2006
- Other (please specify)

5. If you answered Yes to Q2: On average how may ML/annum of water do you currently access from each water source identified in Q3?

Groundwater unregulated

Groundwater regulated

Surface water (i.e. natural watercourse, channel, pipeline) regulated

Surface water (i.e. natural watercourse) unregulated

Private storage

Other

6. In addition, please specify:

How many ML/annum do you access when the water source is fully available (i.e. maximum water currently used)

How many ML/annum do you access during the driest year (water source restricted) (i.e. minimum water currently used)?

7. If you answered Yes to Q2: What is the main category/categories of use of this irrigation / production water? Please specify the top 3 irrigated crops produced per category identified, along with the hectares of land allocated to each. For example if you are producing vegetables for human consumption your main crops may be - lettuce (5 ha); tomatoes (3 ha) etc.

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc)

Hay and silage (includes pasture)

Nurseries, cut flowers and cultivated turf

Fruit and nuts

Vegetables for human consumption

Livestock

Other

8. For each irrigated production identified in Q7, please specify the current production level in relevant units per year (examples of appropriate unit of measurements are provided below)?

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc) (e.g. tonnes/year)

Hay and silage (includes pasture) (e.g. tonnes/year)

Nurseries, cut flowers or cultivated turf (e.g. m²/year or other relevant unit)

Fruit and nuts (e.g. tonnes/year or kg/year)

Vegetables for human consumption (e.g. tonnes/year or kg/year)

Livestock (e.g. number/year)

Other

9. For each irrigated production identified in Q7, please specify the current estimated revenue received in relevant units (e.g. \$/tonne; \$/head etc)?

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc)

Hay and silage (includes pasture)

Nurseries, cut flowers or cultivated turf

Fruit and nuts

Vegetables for human consumption

Livestock

Other

10. For each irrigated production identified in Q7 please specify, how many full-time equivalent (FTE) employees are currently required per annum (FTE / year).

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc)

Hay and silage (includes pasture)

Nurseries, cut flowers or cultivated turf

Fruit and nuts

Vegetables for human consumption

Livestock

Other

11. If a new source of water was available at current prices, would your demand for water increase?

Yes (please specify your additional demand (ML/annum))

No (please specify why)

Unsure (please specify why)

12. If you answered Yes to Q11, please indicate your demand for water (ML/annum) under the following scenarios.

When water supply is at full capacity, would you use any additional water?

If current supply is at the driest on record, would you use up to maximum volume or use additional water?

13. If you answered yes to Q11, how many additional hectares per irrigated production identified in Q7 would this additional water support?

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc)

Hay and silage (includes pasture)

Nurseries, cut flowers or cultivated turf

Fruit and nuts

Vegetables for human consumption

Livestock

Other

14. If you answered Yes to Q11, please specify the approximate increase in annual production in relevant units (examples of appropriate unites of measurement are provided below) for each irrigation production you would produce with this additional water.

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc) (e.g tonnes/year)

Hay and silage (includes pasture) (e.g. tonnes/year)

Nurseries, cut flowers or cultivated turf (e.g. m2/year or other relevant unit)

Fruit and nuts (e.g. tonnes/year or kg/year)

Vegetables for human consumption (e.g. tonnes/year or kg/year)

Livestock (e.g. number/year)

Other

15. If you answered Yes to Q11, please specify how much additional employment (Full-time equivalent / year) could be generated as result of this increased production.

Broadacre crops (Wheat, oats, barley, sorghum, peanuts, oilseed etc)

Hay and silage (includes pasture)

Nurseries, cut flowers or cultivated turf

Fruit and nuts

Vegetables for human consumption

Livestock

Other

16. Would you be willing to have someone from WSP contact you should additional information or clarification be required around any of the information you have provided?

Yes: Please provide
contact name and email
address

No