Penrith Rural Land Use and Economic Analysis Study

EDGE
LAND PLANNING

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Penrith Rural Land Use and Economic Analysis Study

Prepared for Penrith City Council
by

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Chapter 1: Introduction

1.1 Introduction

The rural lands of Penrith Local Government Area (LGA) are an important part of the City and the wider metropolitan region. They contain agricultural activities, scenic rural landscapes, native vegetation, biodiversity corridors and areas for rural living.

Agriculture has long been identified by the Council and the community as being an unique component of the economy. The agricultural businesses in Penrith City still have a key role to play both in the local economy and that of Greater Sydney. With a value of $109,654,198 in 2016, Penrith's agricultural output is the third highest in the Greater Sydney Peri-Urban area after Central Coast ($161,449,035) and Hawkesbury ($158,670,281).

This study analyses the land use and rural economy of the LGA. It provides a detailed investigation of the rural economy as well as the land use.

1.2 Location and Study Area

The study area covers rural zoned land across the whole of the Penrith LGA. It does not cover the urban areas or land contained within State Forests, National Parks or State Conservation areas. The study area is shown on Map 1.
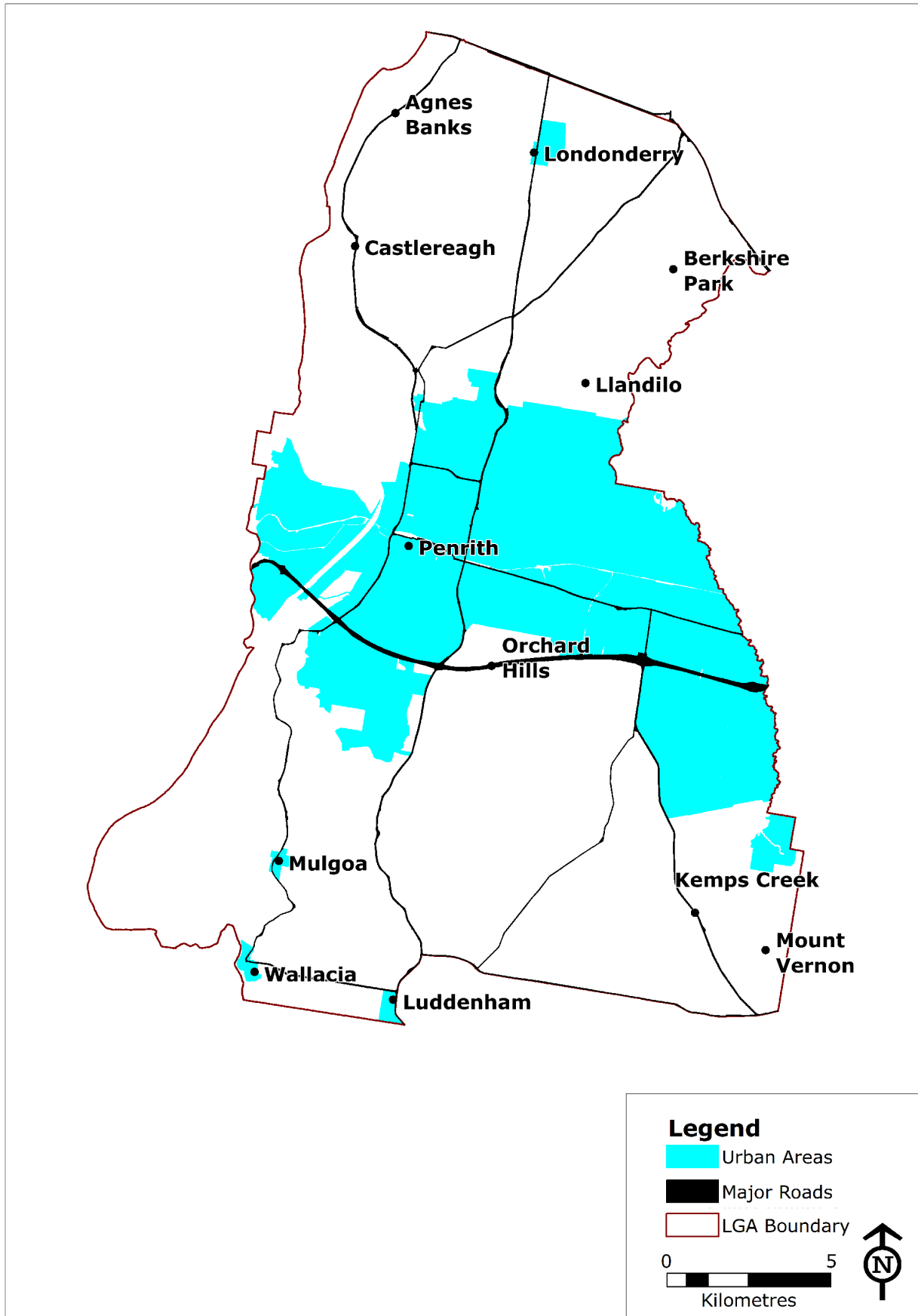
Map 1: Study Area

1.3 Methodology

This study has been prepared in accordance with the brief issued by Penrith City Council.

The document has been prepared by the Edge Land Planning based on discussions held with Council Officers, Government Departments and the members of the rural community.

A detailed literature review has been carried out of studies and issues relevant to local and regional planning. Australian Bureau of Statistics census information was used to provide a population and demographic profile of the LGA. The economic analysis relied on data gathered from a range of secondary sources.

A detailed land use survey and lot and holding size analysis was carried out in 2022 by Edge Land Planning. It entailed utilising aerial photography to gain an appreciation of the land use, which was then field checked by a survey of all roads and properties in the LGA. This information was then coded and entered into Council's property database, which enabled it to be mapped using a Geographical Information System (GIS). The holding sizes within the LGA were categorised and mapped. A detailed description of the methodology for the land use survey is contained in Appendix 1.

1.4 Structure of the report

Chapter 2 provides an analysis of the economic value of Penrith's rural lands and describes its regional significance in comparison to other peri-urban areas of Greater Sydney. It details the nature of agricultural production in Penrith and how this has changed over time.

Chapter 3 provides an overview of the characteristics of the population of the rural lands in comparison to the demography of Penrith's urban areas.

The analysis of the detailed land use survey is presented in Chapter 4. It includes an analysis of various types of agricultural and other commercial activities by lot, holdings by lot size and a consideration of uses on land zoned rural residential.

Chapter 2: Rural Economy

2.1 Introduction

Agricultural production is a mainstay of the rural economy, but Penrith's rural areas include a great diversity of economic activities, including processing, transporting and marketing of agricultural products, tourism, mining and services. Penrith's rural lands comprise a significant part of Greater Sydney's metropolitan rural area. This chapter discusses Penrith's rural economy, with particular focus on the value of its agricultural production and its contribution to its agricultural output in the Greater Sydney region.

2.2 Rural Economy

The Penrith economy has a total value added estimated to be $8.91 billion (.id Informed Decisions, 2022) The agriculture sector is estimated to have a value added of $69.5 million which is second lowest. The top five are as follows:

1. Construction: $1,332.8
2. Health Care and Social Assistance: $984.8
3. Manufacturing: $820.0
4. Education and Training: $762.7
5. Transport, Postal and Warehousing: $747.4

It is significant to note that a number of these top five sectors have rural components to them. This will be discussed later in this section.

In 2016 the Penrith LGA produced a total of $109,654,198 value of agricultural production (ABS, 2018a). This is equivalent to 13.6% of Peri-Urban Sydney, 0.8% of the NSW value of production and 0.2% of Australia's total value of agricultural production. It is number three in the Sydney Peri-Urban Area behind Central Coast which has $161,449,035 and Hawkesbury $158,670,280.

The top five agricultural commodities produced in Penrith LGA are eggs, poultry meat, vegetables, flowers and turf. The details of the value of production can be seen from Table 1, and Figure 1 shows the percentage of the value of each commodity for the LGA. Egg production is $45,350,725 (ABS, 2018a) which makes up 41.4% of the total LGA value of agricultural production. Poultry meat production is $36,998,952 (33.7%), vegetable production has a value of $16,135,725 (14.7%).

These commodities are among the main agricultural commodities produced in the Greater Sydney region. The top five LGAs for each of the main commodities grown in the Sydney region have been highlighted in the next section. Penrith's LGA rankings in terms of value of production of these commodities are as follows:

- Nurseries: Number 5
- Flowers: Number 7
- Turf: Number 1
- Vegetables: Number 1

- Eggs: Number 2
- Poultry Meat: 6

This makes Penrith the second highest ranking LGA behind the Central Coast when the rankings are combined, in terms of the value of its agricultural production

Table 1: Value of Agriculture in the Penrith LGA

Commodity	Penrith	% of Penrith	% of Sydney Peri-Urban	% of NSW	% of Australia
Broadacre Crops	$48,848	0.0%	0.8%	0.0%	0.0%
Hay	$19,295	0.0%	0.3%	0.0%	0.0%
Nurseries	$1,244,204	1.1%	2.0%	0.8%	0.2%
Flowers	$2,951,133	2.7%	6.1%	4.1%	0.9%
Turf	$2,733,118	2.5%	4.6%	3.3%	1.1%
Total Nurseries, Flowers & Turf	$6,928,455	6.3%	4.1%	2.3%	0.5%
Fruit & Nuts	$1,399,051	1.3%	10.4%	0.2%	0.0%
Perishable Vegetables	$12,481,984	11.4%	12.4%	8.1%	1.0%
Total Vegetables	$16,135,725	14.7%	10.7%	3.8%	0.5%
Total Crops	$24,531,373	22.4%	7.1%	0.4%	0.1%
Wool	$152,540	0.1%	15.1%	0.0%	0.0%
Milk	$1,030,985	0.9%	5.5%	0.2%	0.0%
Eggs	$45,350,725	41.4%	47.7%	17.6%	5.8%
Total Livestock Products	$46,534,250	42.4%	40.5%	2.6%	0.6%
Sheep	$130,476	0.1%	14.5%	0.0%	0.0%
Cattle	$1,084,021	1.0%	4.3%	0.0%	0.0%
Goats	$148	0.0%	1.0%	0.0%	0.0%
Pigs	$374,979	0.3%	23.1%	0.2%	0.0%
Poultry Meat	$36,998,952	33.7%	11.7%	4.2%	1.3%
Other	$0	0.0%	0.0%	0.0%	0.0%
Total Livestock Meat	$38,588,575	35.2%	11.2%	0.9%	0.2%
Total Crops	$24,531,373	22.4%	7.1%	0.4%	0.1%
Total Livestock	$85,122,825	77.6%	18.5%	1.4%	0.3%
Total Agriculture	**$109,654,198**	**100%**	**13.6%**	**0.8%**	**0.2%**

Source:(ABS, 2018b)
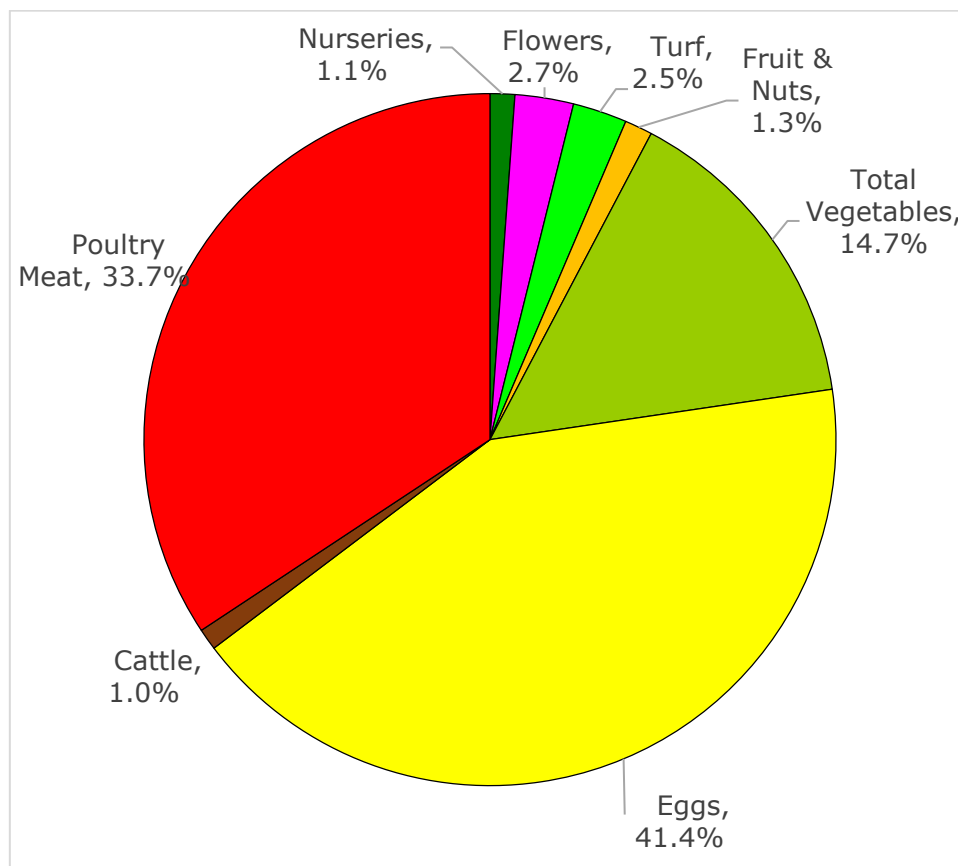
Figure 1: Penrith Agricultural Commodities
Source: (ABS, 2018b)

The agricultural commodity production data has also been analysed and will be discussed in more detail in the next section. It should be noted that this is the production data (area of cropping, kilograms of vegetables, number of chickens and number of dozen eggs) and is different from the value of production data in Table 1. It is significant to note that the Penrith LGA contributes to the State and National production of the following commodities:

- Egg production: 47.7% of Sydney Peri-Urban Area, 17.6% of NSW and 5.5% of Australia's egg production, which makes it number one in Sydney, number two in NSW and number three in Australia.
- Meat Chickens: 6.5% of Sydney Peri-Urban Area, 2.4% of NSW and 0.8% of Australia's total number of birds;
- Perishable Vegetables: 8.7% of Sydney Peri-Urban Area, 4.3% of NSW and 0.5% of Australia's total production;
- Other Poultry: 7.5% of Sydney Peri-Urban area, 4.8% of NSW and 2.6% of Australia's total number of birds;
- Turf: 4.6% of Sydney Peri-Urban Area, 3.3% of NSW and 1.1% of Australia's total area;
- Flowers: 2.7% of Sydney Peri-Urban Area, 1.4 % of NSW and 0.2% of Australia's total area;
- Nurseries: 1.9% of Sydney, 1.5% of NSW and 0.3% of Australia's total area;

2.2.1. Value of agriculture by area

Data on the value of agriculture is available at smaller areas identified by the Australian Bureau of Statistics (ABS) as Statistical Area Level 2 (SA2). The ABS describe these as "…medium-sized general-purpose areas built up from whole Statistical Areas Level 1. Their purpose is to represent a community that interacts together socially and economically" (ABS, 2016). A map of the SA2 level areas for the rural parts of the Penrith LGA is shown as Map 2. These cover the urban and rural areas, and the rural ones are as follows:

- Yarramundi - Londonderry
- Castlereagh - Cranebrook
- Mulgoa – Luddenham – Orchard Hills
- Horsley Park – Kemps Creek

Table 2 shows the details of each rural SA2 area and how it contributes to the total value of production. It needs to be noted that the total of the value is more because the boundaries of the SA2 areas goes outside the LGA in Yarramundi – Londonderry and Horsley Park Kemps Creek. It can be seen that Castlereagh - Cranebrook has by far the highest value of production with $65,731,869 (Eggs, Poultry Meat and Nurseries), followed by Horsley Park Kemps Creek (Eggs, Poultry Meat, Vegetables, Cut Flowers and Nurseries), Yarramundi – Londonderry (Vegetables, Turf, Poultry Meat, Cattle and Cut Flowers), Mulgoa – Luddenham – Orchard Hills (Poultry Meat, Vegetables, Fruit and Nuts, Nurseries and Cattle).

Table 2: Value of Agriculture in the Penrith SA2 Areas

Commodity	Yarramundi-Londonderry	Castlereagh - Cranebrook	Mulgoa - Luddenham - Orchard Hill	Horsley Park - Kemps Creek
Broadacre Crops			$7,381	
Hay		$19,295		
Nurseries		$256,459	$309,557	$1,460,809
Cut Flowers	$376,178			$5,368,862
Turf	$3,358,821			
Fruit and Nuts	$203		$1,455,058	$281,909
Vegetables	$14,433,296	$746,201	$1,431,631	$4,882,143
Wool		$6,283		$1,065
Eggs	$11,067	$38,323,007	$632,426	$13,134,914
Sheep		$4,549		$407
Cattle	$685,669	$37,294	$287,051	$42,763
Goats				$300
Pigs				$761,129
Poultry Meat	$2,416,216	$26,338,780	$4,480,420	$9,771,954
Total	**$21,281,451**	**$65,731,869**	**$8,603,524**	**$35,706,254**

Source: (ABS, 2017e)

Agnes Banks

Yarramundi - Londonderry
$21,281,451
Londonderry

Castlereagh

Berkshire Park

Castlereagh - Cranebrook
65,731,869

Llandilo

Penrith

Orchard Hills
< Extent >

Mulgoa - Luddenham - Orchard Hills
$8,603,524

Kemps Creek
Horsley Park - Kemps Creek
$35,706,254

Mount Vernon

Wallacia

Luddenham

Legend
- SA2 Region
- Urban Areas
- LGA Boundary
- Major Roads

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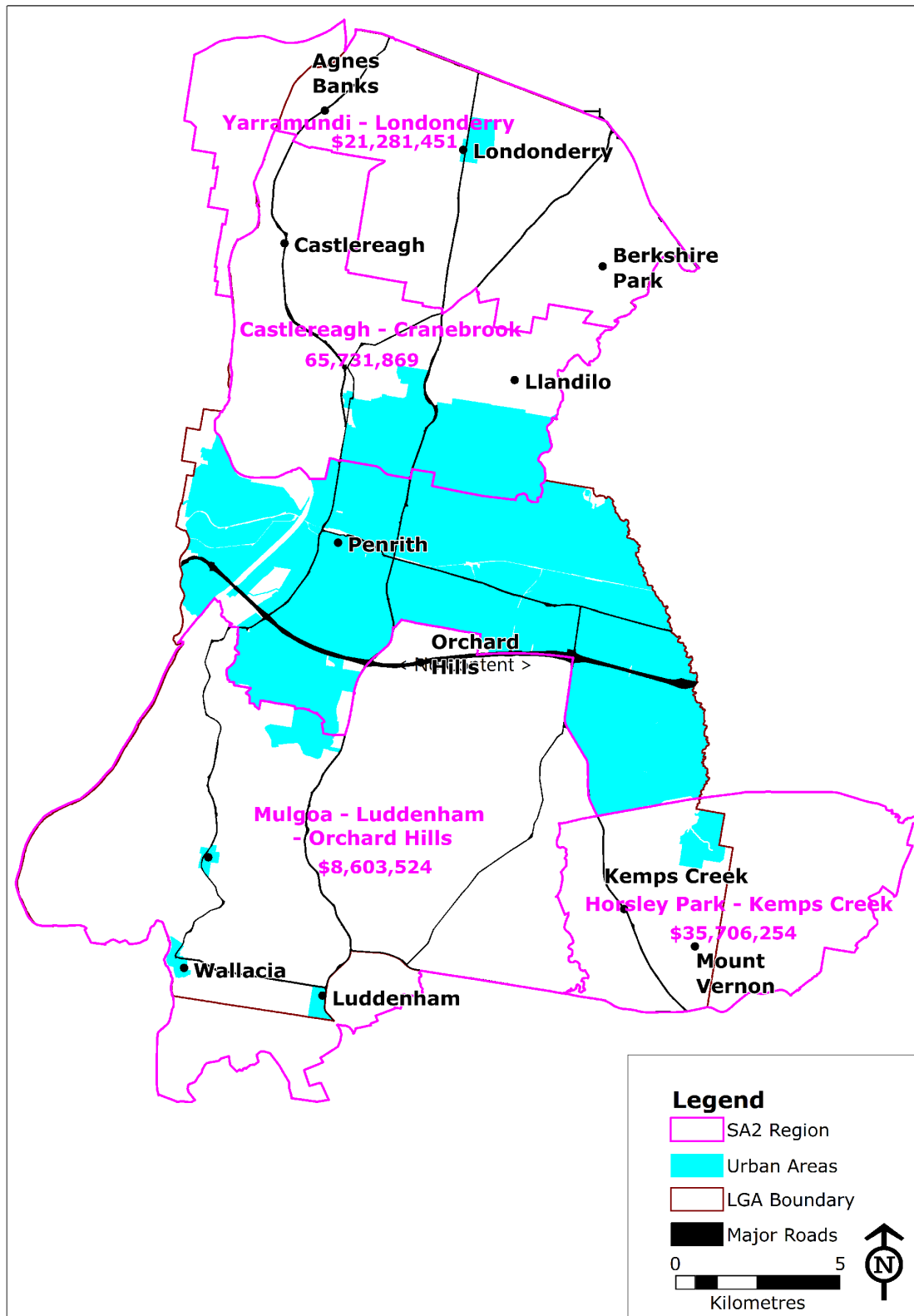
Map 2: Value of Agriculture SA2 Regions

2.2.2. Industry location quotients

Location quotient is an economic development tool that is a ratio used to compare the dominance or specialisation of a particular industry in the local economy. The ratio compares the importance or specialisation of the industry to the LGA relative to Australia. A Location Quotient of 1 indicates the same level of importance and generally, a ratio of greater than 1.5 indicates that there is a degree of specialisation in that particular industry within the LGA and the higher the ratio, the more important it is to the LGA.

The location quotient has been calculated for the Penrith rural lands and the LGA compared to Australia shown in Figure 2. It can be seen that Construction has the highest location quotient being 2.3 followed by agriculture with 1.6 and retail trade 1.5. When this is compared to Regional NSW it is significant because Regional NSW has a location quotient of 2.3 for agriculture. This shows the strength of the construction and agriculture sectors as an economic driver for the rural part LGA. From an LGA perspective, agriculture is not the largest driver of Penrith's rural economy.
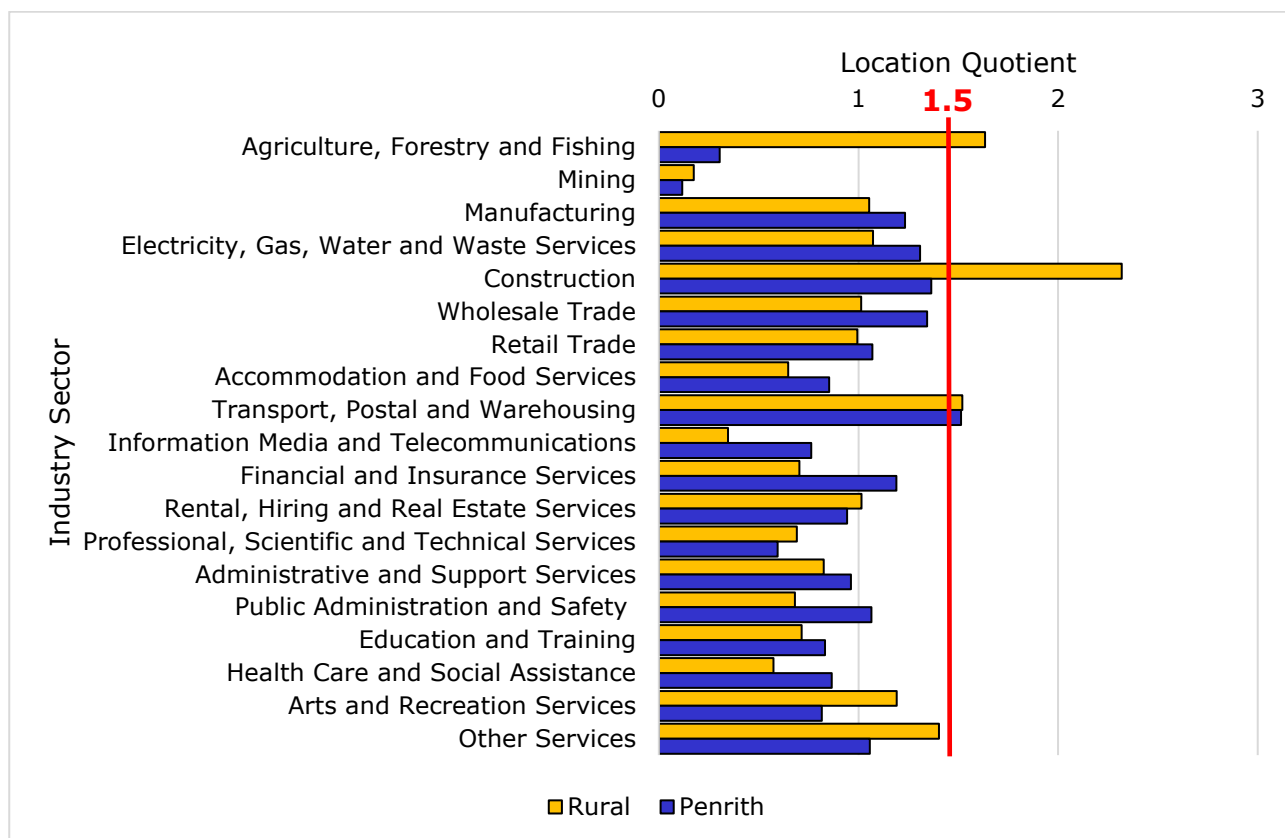
Figure 2: Location Quotient LGA and Rural Land
Source: (ABS, 2019b)

The growth of an industry sector can also be factored into the Location Quotient to see if the industry sectors are increasing or decreasing over the past 5 years. This can be seen from Figure 3. This shows that agriculture is growing as well as having the second highest location quotient behind construction and also that transport, postal and warehouse and other services are also growing. It is significant to note that construction, postal transport and warehouse and other services are home based businesses in the rural areas. The other industry sectors are all people who live in the rural areas but would work in other places.
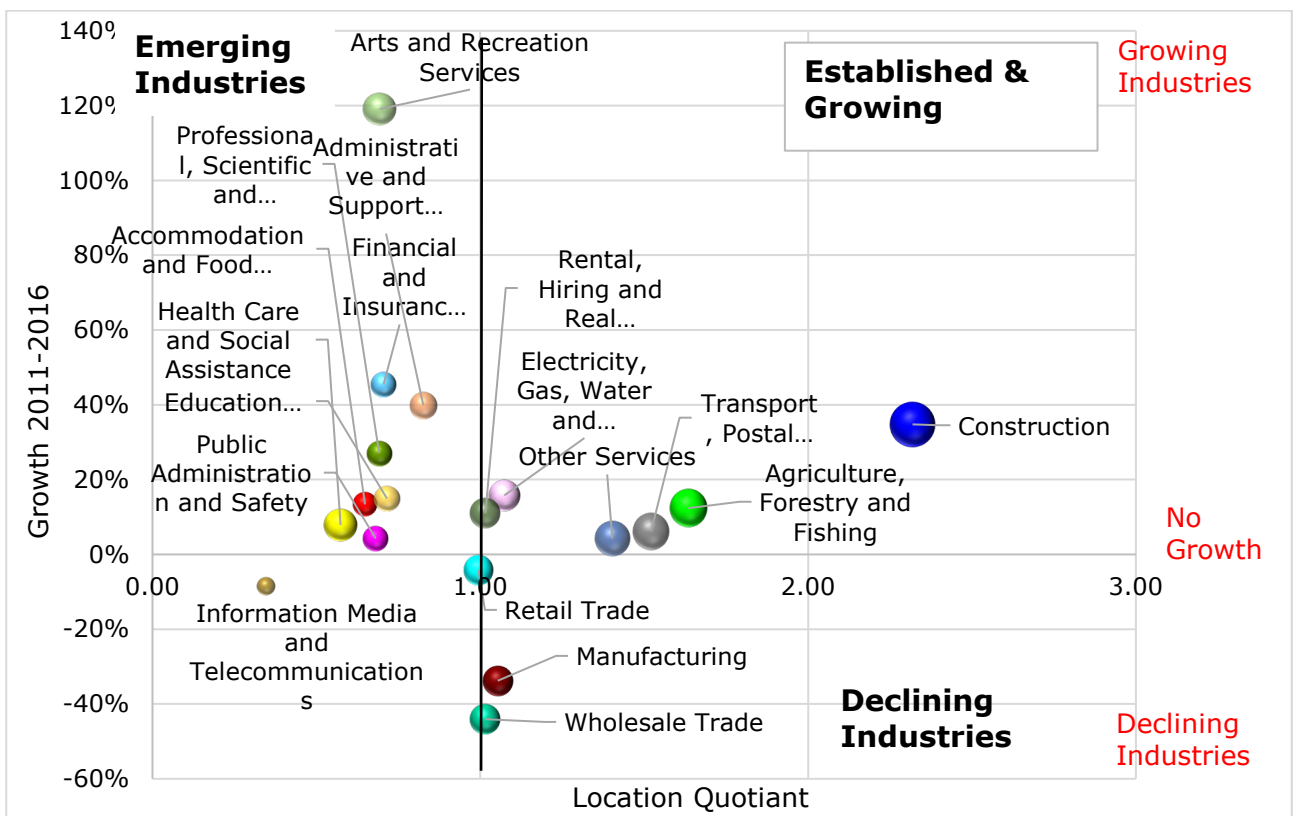
Figure 3: Location Quotient 2011 – 2016 Change LGA
Source: (ABS, 2019b)

A more detailed picture of the significance of the agriculture sector is evident by looking at the different commodities that contribute to the sector in the LGA. This is done by examining the 4-digit level of industry data as opposed to the 1 digit which is that used for Figure 2 and Figure 3. This shows the number of employees in each of the key commodities in Table 2 and this can be converted to the location quotient. The results of this analysis is shown in Figure 4. It can be seen that poultry farming (eggs and meat) both have high location quotients followed by vegetable farming all having greater than 10.   It is also noted that flowers (4.9), pigs (3.0) nurseries (2.6), mushrooms (2.4) and horse farming (1.6) and are also important.
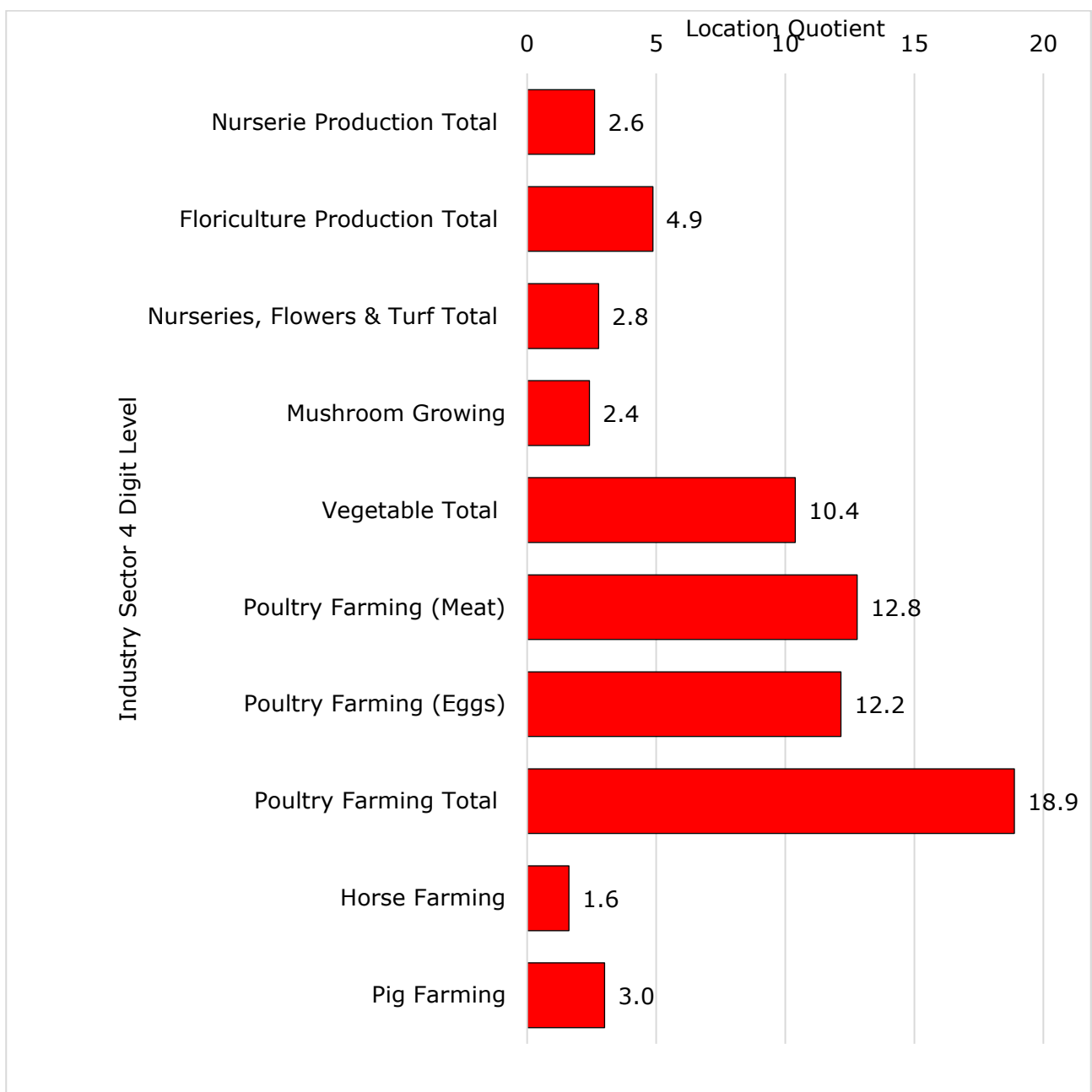
Figure 4: Location Quotient Detailed
Source: (ABS, 2019b)

Analysis has also been carried out of the location quotients for the Central Coast and Hawkesbury LGAs to provide some level of comparison and this shows that Hawkesbury is significant in turf and vegetables as well as apples and stone fruit but in the other commodities it is not as significant as the Central Coast relative to its economy. This can be seen from Figure 5.
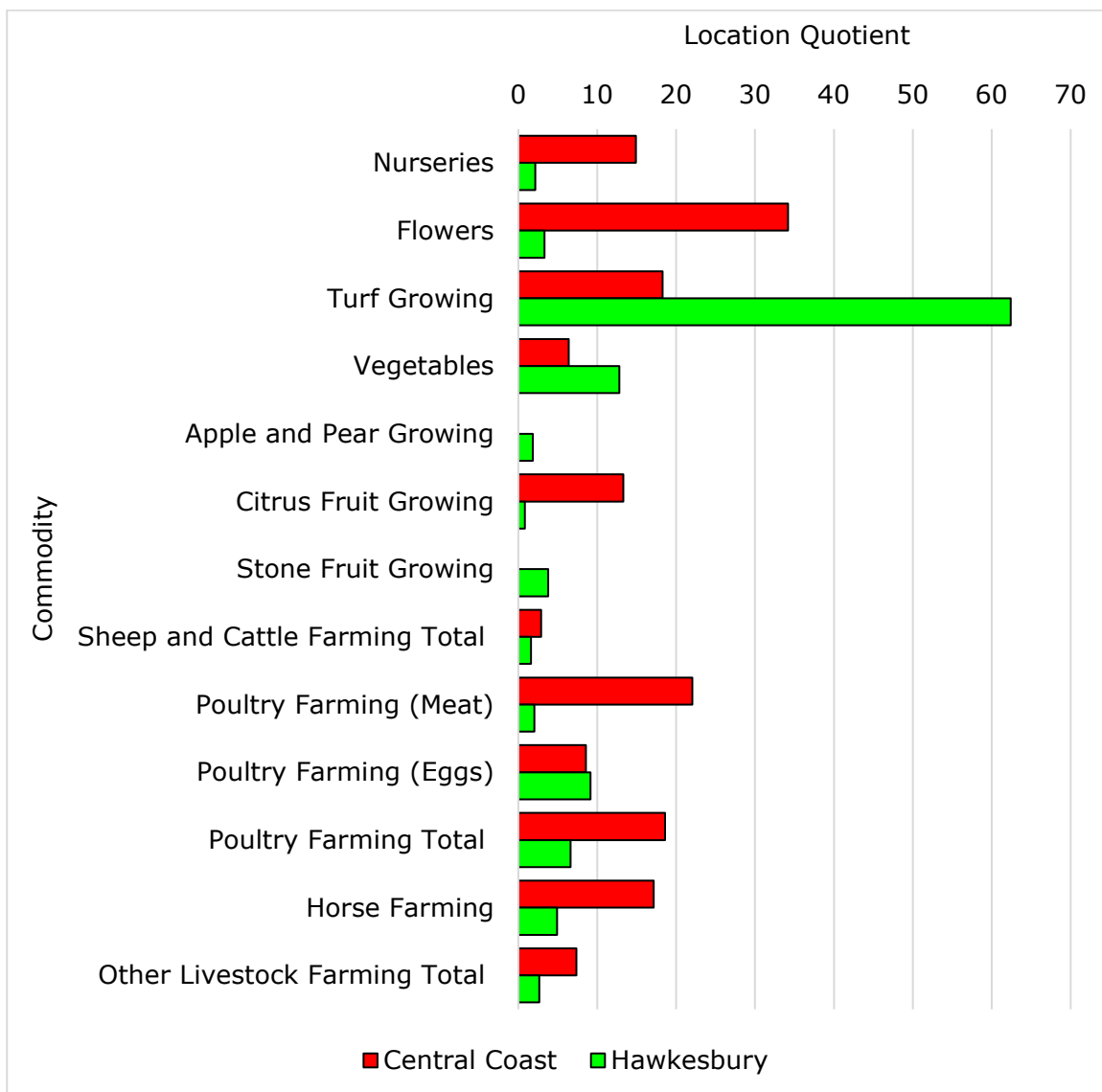
Figure 5: Location Quotient Hawkesbury and Central Coast
Source: (ABS, 2019b)

Another indicator of the strength of an economy is to look at the number of people who are employed growing each of the commodities shown in the location quotient data. This has been done for each of the top five LGAs in Sydney for the value of agriculture. These are as follows:

1. Central Coast ($161,449,035)
2. Hawkesbury ($158,670,281)
3. Penrith ($109,654,198)
4. Wollondilly ($97,256,959)
5. Liverpool ($86,066,555)

The data has been graphed for the total employed in growing each of the commodities and this is shown in figure 6. This shows that Hawkesbury has the most employees in vegetables and turf, Central Coast has the most employees in nurseries, flowers, and poultry meat, Penrith has the most employed in eggs ad total poultry and Wollondilly has the most employees in sheep and cattle farming. It should be noted that this is

most likely to be in conjunction with a rural residential use of the land because there are not large enough properties to make a full-time income from cattle grazing. The high numbers in Liverpool should be noted because the land that is growing vegetables in the Liverpool LGA is part of the South Creek West Growth Area and Aerotropolis Growth Areas and this will not be growing vegetables in the future.
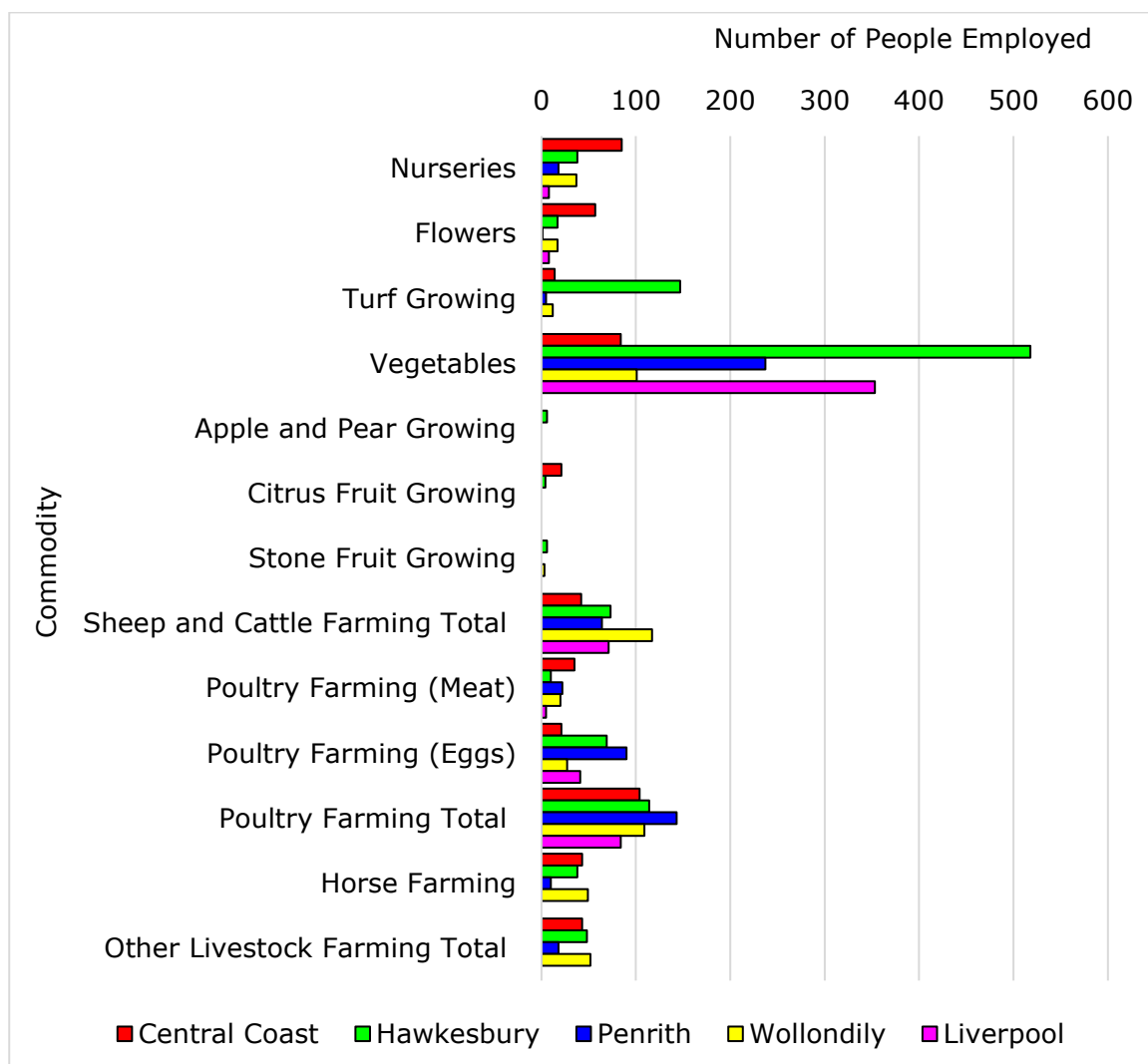
Figure 6: Number of People Employed Sydney Peri-Urban
Source: (ABS, 2019b)

The drivers of the rural economy can be ascertained from the same data base as the location quotients; however, they are grouped into the following industry sectors:

- *Industry* – Manufacturing; Electricity, Water & Gas; Wholesale Trade; Transport, Postal and Warehousing
- *Population Serving* – Construction; Retail Trade; Accommodation & Food Services (tourism); Arts & Recreation Services; Other Services
- *Knowledge Intensive* – Information, Media & Telecommunications; Financial & Insurance Services; Rental, Hiring & Real Estate Services; Professional, Scientific & Technical Services; Administrative & Support Services; Public Administration & Safety
- *Health and Education* – Health Care & Social Assistance; Education & Training
- *Agriculture* – Agriculture, Forestry & Fishing

- *Mining* – mining
- *Not Stated* – not stated

It can be seen from Figure 6 that the drivers of the rural economy are broadly similar to the drivers of the LGA economy with some slight differences. There are less in the industrial, knowledge intensive and health and education sectors but more in the population serving and agriculture sectors.
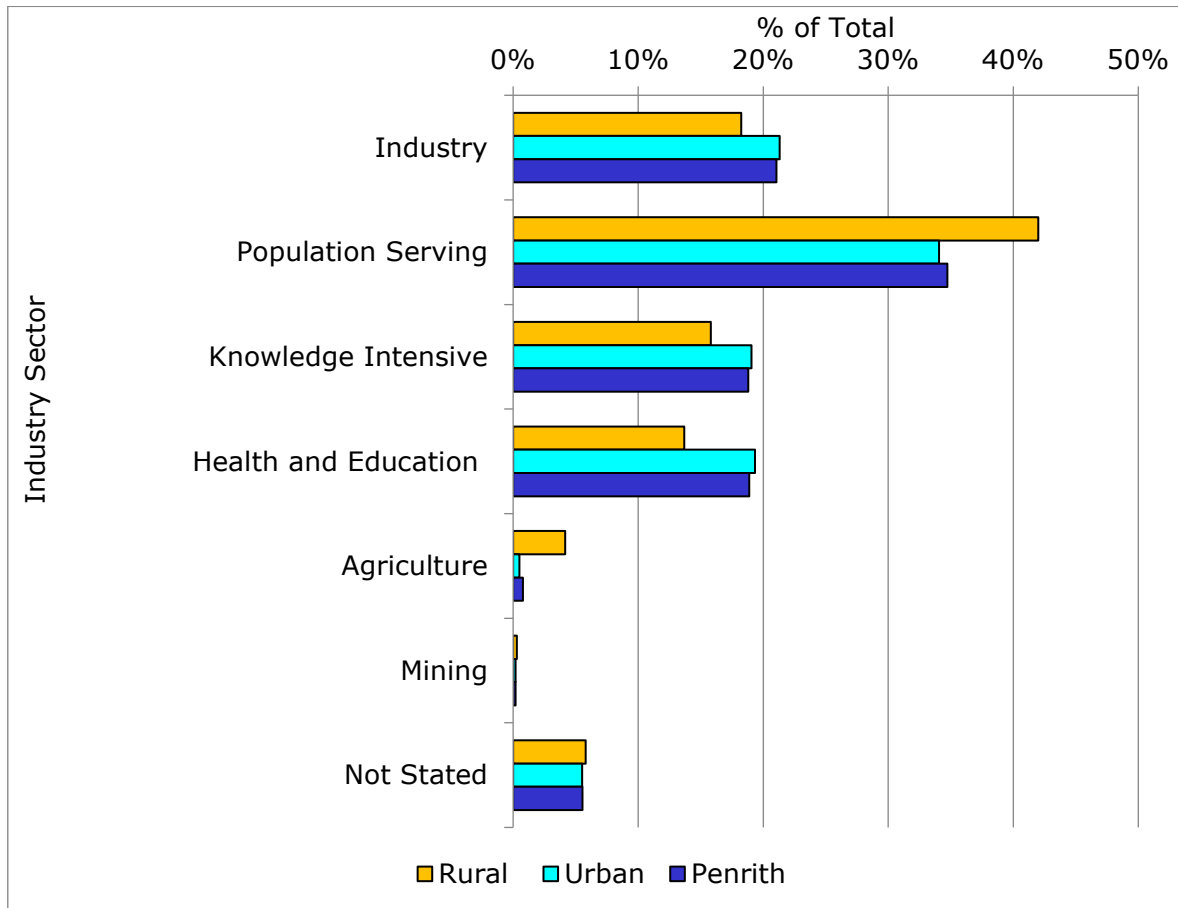
Figure 6: Drivers of the Economy
Source: (ABS, 2019b)

The overall industry of employment figures show a more detailed picture of the economy. This can be seen from Figure 7. This shows that the construction sector is the largest employer in the rural area, followed by retail trade, health care and social assistance, transport, postal and warehousing and manufacturing being the top five. Agriculture is number twelve at 4.1% of the rural workforce. This is not unusual for the peri-urban area where agriculture is not a high industry sector.
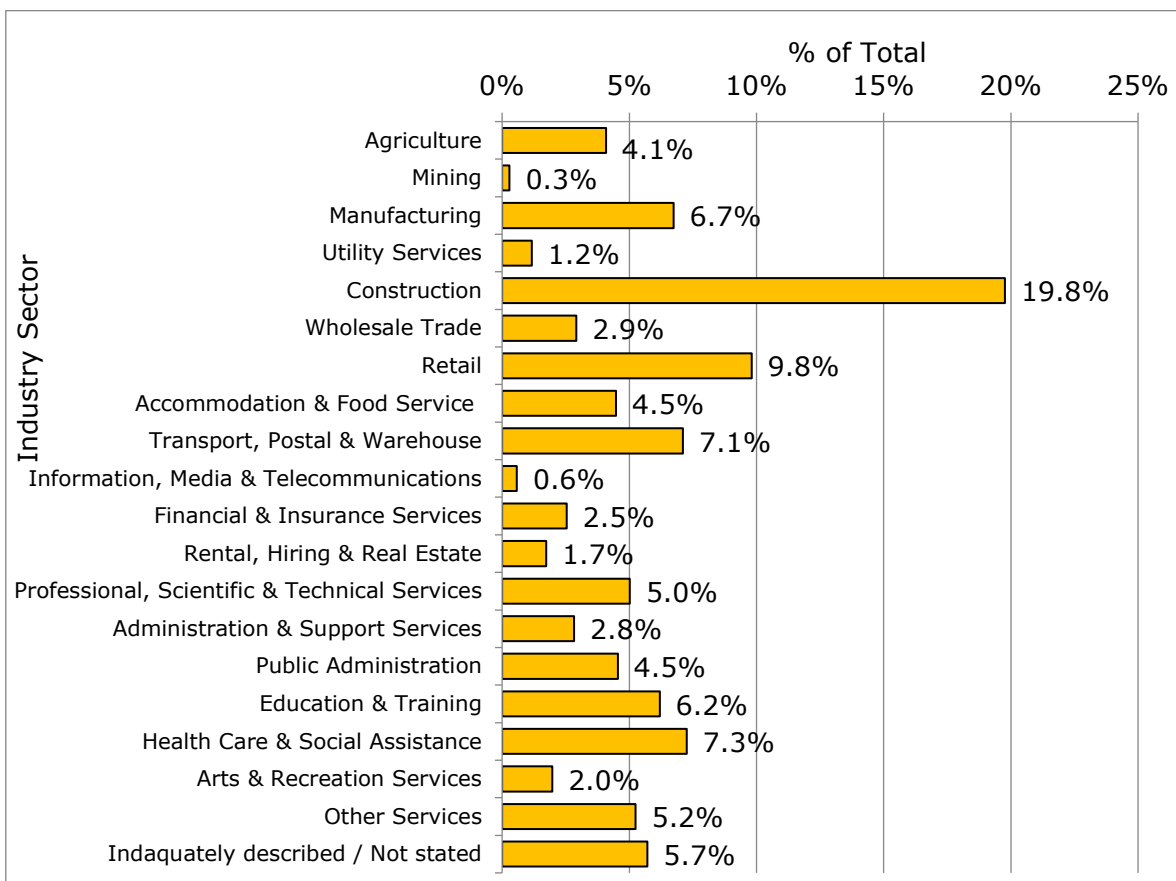
Figure 7: Industry of Employment in Penrith rural area

Further analysis of industry of employment has been carried out using the 4-digit industry database. The top twenty employment sectors can be seen in Figure 8, which shows that the number one sector is road freight transport, followed by site preparation services, hospitals, electrical services, and primary education. However, when the construction sector jobs are totalled it is 818 people employed. The top agriculture sector job is vegetable growing which is number twelve. The main reason for the construction and transport sector being the top employers is the fact that it is illegal to park a truck on a residential street and so they are parked in the rural areas mostly on two hectare lots in the north of the LGA.

Further analysis of this shows that the construction sector has a high location quotient for the different parts of it as can be seen from Figure 9 that site preparation services are the highest followed by concreting services and hire of construction machinery and electrical services.
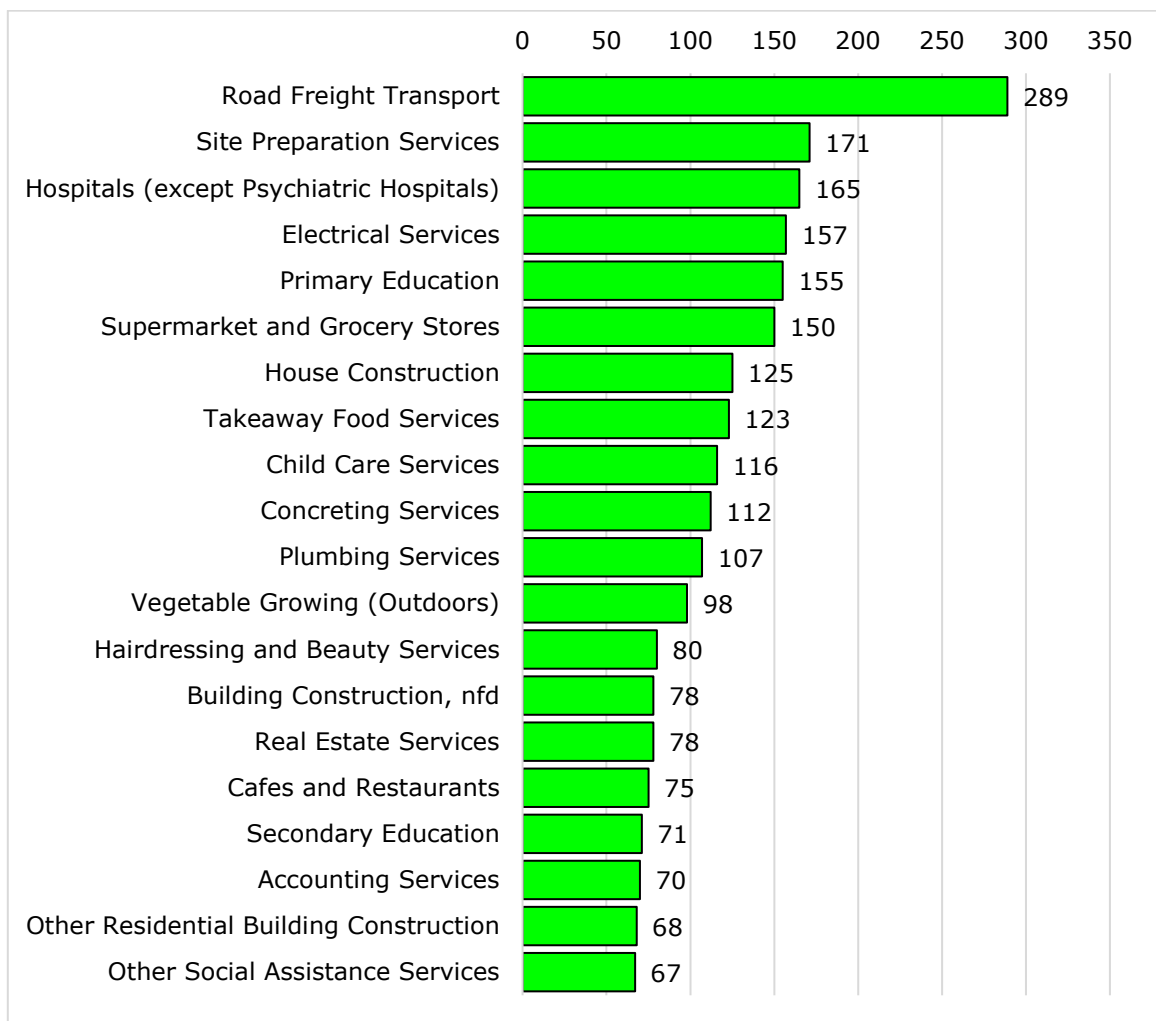
Figure 8: Top Twenty Industry of Employment Detail
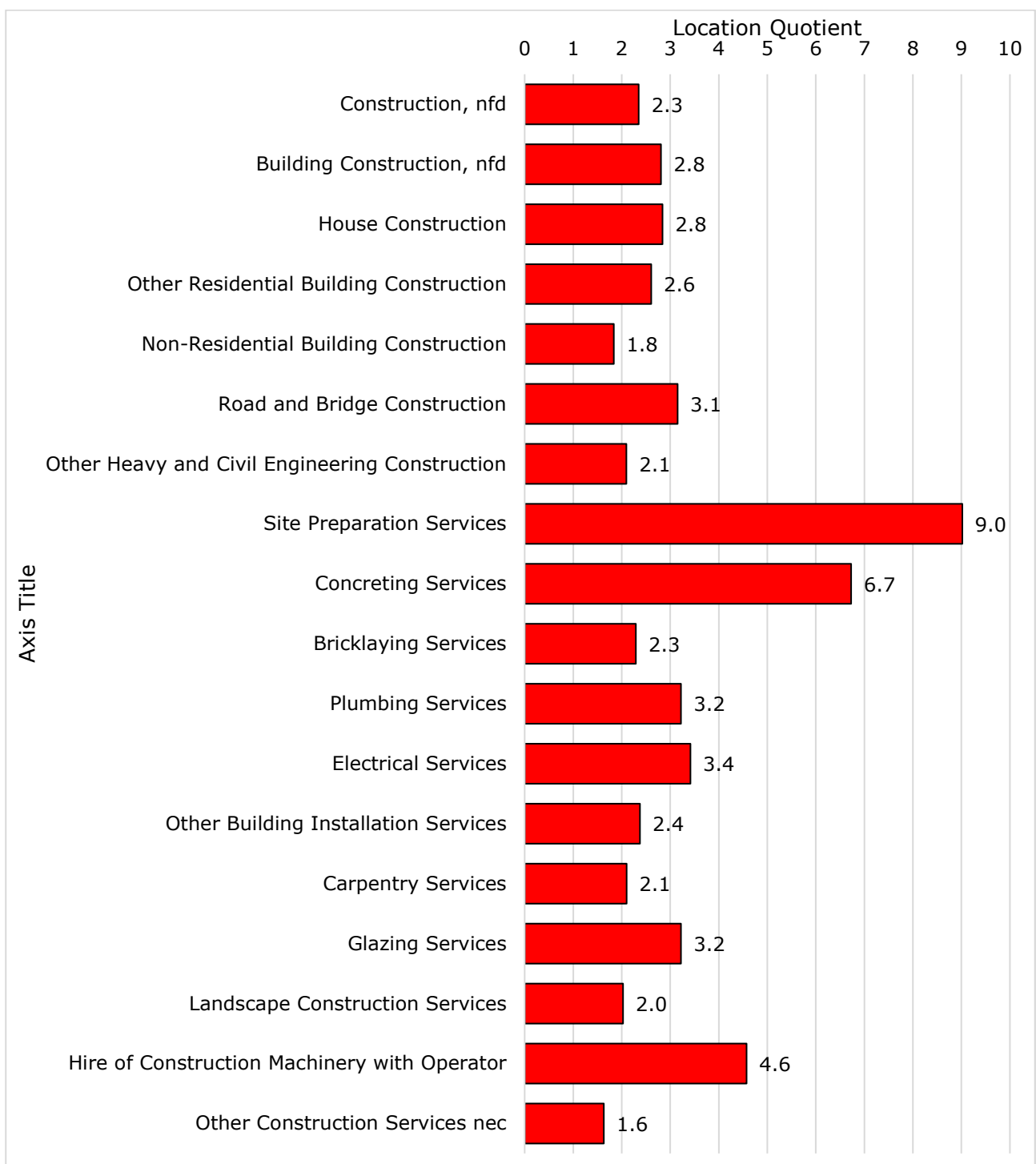
Figure 9: Construction Sector Location Quotient

2.3 Agriculture in Greater Sydney's Peri-Urban Area

In order to gain an insight into the comparison with the other parts of the peri-urban area, this section provides data on the actual production of agriculture – number of animals, area of ornamental plants and kilograms of vegetables, and totals them for the entire peri-urban area. These are then compared to the rest of NSW to show the dominance of the peri-urban area, and then the SA4 regions within the peri-urban area are graphed to show how the Penrith LGA compares with the others.

The Statistical Level 4 (SA4) areas cover regions of the State and have been designed for the output of a variety of regional data. There are a number of SA4s in NSW and they are shown on Map 3. The boundaries are based on population and there are fourteen within the Sydney Region and a further fourteen in the rest of the State. For the purposes of this analysis, the SA4s within the Sydney Region have been agglomerated. The Central Coast SA4 and the Sydney Region SA4 combined make up the Sydney Peri-Urban Area for the purposes of this discussion. The Penrith LGA is in the Outer West and Blue Mountains SA4 region.

Agriculture is a significant land use in the Sydney Peri-Urban Area and in 2016, it had a value of $806,400,574 which represents 6.2% of NSW value of production from 1.5% of the land area of the combined Sydney and Central Coast SA4 regions. Table 3 shows the total value for the main commodities and the percentage contribution to NSW. It can be seen that the significant commodities are turf (71.9% of NSW value), flowers (68.2%), perishable vegetables (65.0%), nurseries (42.1%), poultry eggs (36.8%), poultry meat (36.3%) and total vegetables (36.2%).

The value of agriculture shown in Table 3 is calculated from the Agricultural Census carried out every five years. Analysis of the actual production points to a similar outcome to that of the value of the key agriculture commodities. Analysis has been carried out using the 2015-16 Agricultural census to show the dominance of the Sydney Peri-Urban Area in the key commodities of vegetables (particularly perishable vegetables), nurseries, flowers, turf, eggs and poultry meat – all commodities that need to be close to the markets or the processors. Table 3 also shows the percentage of the value of production as a proportion of Australia. It can be seen that the Sydney Peri-Urban Area provides 23.6% of Australia's turf value, 15.3% of the flowers, 12.1% of Eggs, 11.5% of Poultry Meat, 8.5% of Nurseries, 7.7% of perishable vegetable value and 4.2% of the total value of Australia's vegetables.

Legend

NSW SA4 Regions

Sydney Region SA4

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Kilometres

Map Prepared by Edge Land Planning

Map 3: NSW SA4 Regions

Table 3: Value of Agriculture in Sydney Peri-Urban Area

Commodity	Sydney Peri-Urban Area	% of NSW	% Of Australia
Broadacre Crops	$5,798,758	0.1%	0.0%
Hay	$5,795,331	1.8%	0.4%
Nurseries, Flowers & Turf Total	$169,262,986	56.4%	13.1%
Nurseries	$61,792,623	42.1%	8.5%
Flowers	$48,619,655	68.2%	15.3%
Turf	$58,850,707	71.9%	23.6%
Fruit and Nuts	$13,341,763	2.2%	0.3%
Total Vegetables	$152,041,059	36.2%	4.2%
Perishable Vegetables	$99,634,410	65.0%	7.7%
Livestock Products	$114,932,059	6.4%	1.4%
Wool	$1,010,263	0.1%	0.0%
Milk	$18,914,267	3.2%	0.4%
Eggs	$95,007,529	36.8%	12.1%
Livestock Slaughtered	$345,215,951	7.9%	1.7%
Poultry Meat	$317,434,918	36.3%	11.5%
Sheep & Lambs	$899,682	0.1%	0.0%
Cattle & Calves	$25,240,673	1.0%	0.2%
Goats	$14,525	0.2%	0.0%
Pigs	$1,626,154	0.8%	0.1%
Total value of Agriculture	**$806,400,574**	**6.2%**	**1.4%**

Source: (ABS, 2017d)

Table 4 shows the value of agriculture for the top five Sydney Peri-Urban LGAs.
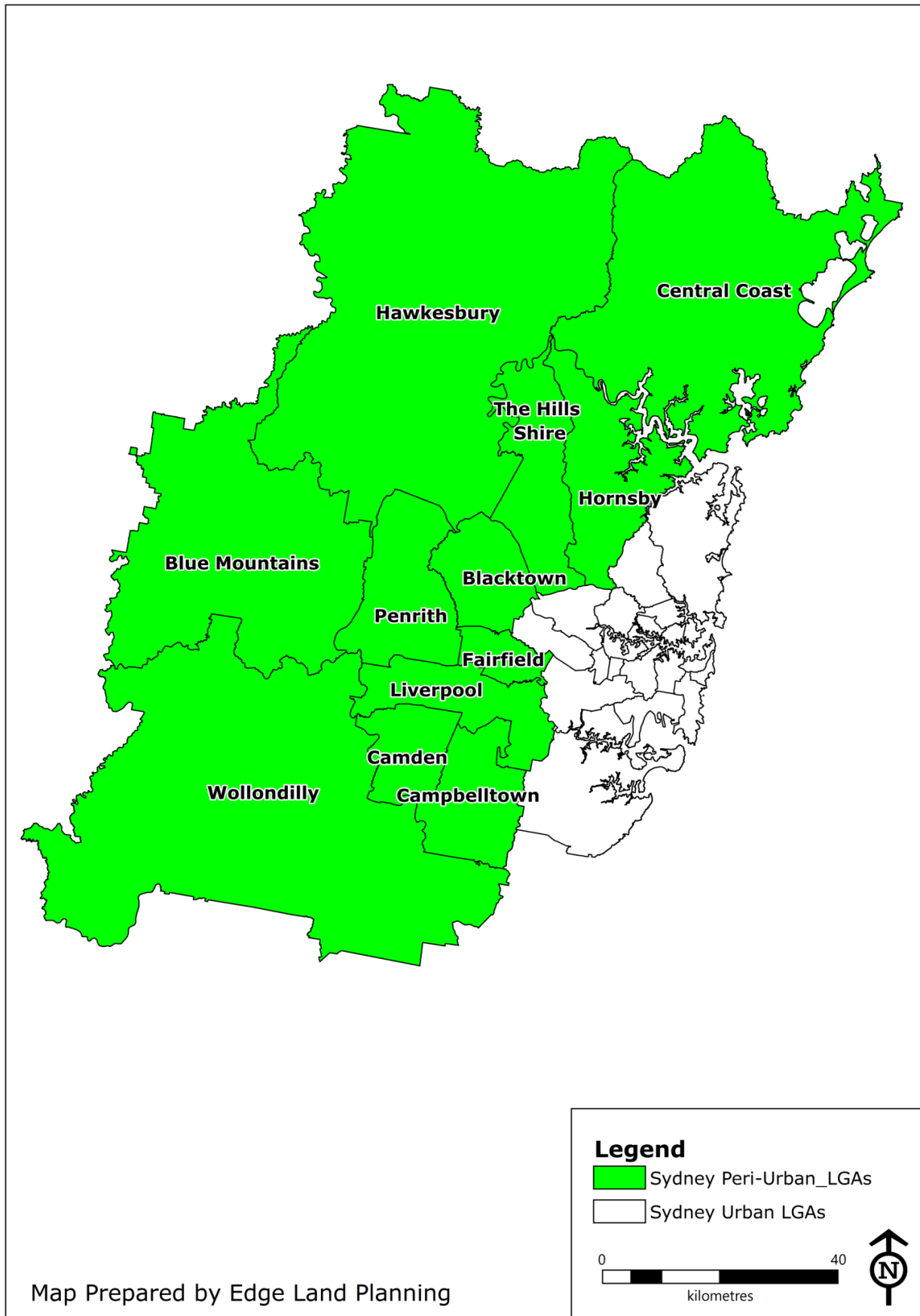
Map 2.9: Sydney Peri-Urban Area

Table 4: Value of Agriculture in the Top 5 Sydney LGAs

Ranking	Total Agriculture		Nurseries		Flowers		Turf	
	LGA	Value	LGA	Value	LGA	Value	LGA	Value
1	Central Coast	$161,449,035	Central Coast	$17,935,549	The Hills	$15,131,355	Hawkesbury	$48,534,440
2	Hawkesbury	$158,670,281	The Hills	$13,574,797	Central Coast	$14,645,864	Central Coast	$3,477,356
3	Penrith	$109,654,198	Hornsby	$8,258,106	Hornsby	$5,440,030	Penrith	$2,733,118
4	Wollondilly	$97,256,959	Wollondilly	$5,670,429	Penrith	$2,951,133	The Hills	$1,770,948
5	Liverpool	$86,066,555	Hawkesbury	$3,720,048	Fairfield	$2,723,830	Camden	$1,579,976
6					Wollondilly	$2,691,764		
7					Hawkesbury	$1,680,436		

Ranking	Vegetables		Eggs		Poultry Meat	
	LGA	Value	LGA	Value	LGA	Value
1	Hawkesbury	$63,686,875	Penrith	$45,350,725	Central Coast	$102,354,094
2	Liverpool	$21,078,665	Hawkesbury	$18,728,663	Liverpool	$49,680,311
3	Wollondilly	$18,186,167	Camden	$6,694,855	Wollondilly	$49,469,070
4	Penrith	$16,135,725	Fairfield	$6,663,846	Penrith	$36,998,952
5	Central Coast	$10,318,398	Central Coast	$5,592,683	Camden	$26,303,846
6					Hawkesbury	$19,120,857

Source: (ABS, 2017d)

2.3.1. Vegetables

According to the Australian Horticulture Statistics Handbook 2017-18 for Vegetables, the Sydney Peri-Urban Area is one of Australia's major growing areas for broccoli, cabbages, egg plants, parsley, basil and other herbs, fresh head lettuce, leafy Asian vegetables, mushrooms and sweet corn (Horticulture Innovation Australia, 2019).

In 2015-16, the Sydney Peri-Urban Area produced 50.2% of NSW perishable vegetables (beans, broccoli, cabbages, capsicums, cauliflowers, lettuces, mushrooms and fresh tomatoes) and 15.2% of its total vegetable production (ABS, 2017b).

In NSW, the Sydney peri-urban area grows 40.1% of the irrigated vegetables and is number one, followed by the Northern Tablelands (11.3%), the Riverina with 10.9%, Central West (7.6%) and Murray at number five with 7.3%.

The significance of the Sydney Peri-Urban Area for vegetable and perishable vegetable production can be seen from Figure 9 which shows it compared to the rest of NSW. It should be noted that the data in Table 2 refers to the value of agricultural produce whilst the data in Figure 9 refers to the actual production – kilograms of vegetables, area of nurseries, flowers and turf as well as the number of chickens and dozens of eggs. For this reason, the figures shown in Table 2 will be different to those shown in Figure 9.

Whilst the inland irrigation areas of the Murray, Riverina and Central west are significant in total vegetable production, the Sydney Peri-Urban Area, with its favourable climate and good soils, is significant in perishable vegetable production, that is, the commodities that have to be close to the market because of their short shelf life. It can be seen that the Sydney Peri-Urban Area is the number one perishable vegetable region in NSW and the number four total vegetable producing region. It is significant to note that the value of production for perishable vegetables in the Sydney Peri-Urban Area is 65.0% of the total NSW value of perishable vegetables and also the total vegetable production in the peri-urban area is 36.2% of NSW. This makes it the number one region for total value of production with Riverina coming in second with 18.3% and Murray third at 13.1%. Whilst this seems to be at odds with the data shown in Figure 9, it is explained by the higher value of the commodities produced as well as the larger number of kilograms of these commodities produced in the Sydney Peri-Urban Area compared to other regions of NSW. These two factors combined illustrate the significance of the peri-urban area as a producer of vegetables and particularly perishable vegetables.

Based on kg of production.
Perishable Vegetables: Beans, Broccoli, Cabbages, Capsicums,
Cauliflowers, Lettuce, Mushrooms & Fresh tomatoes
Source: ABS 7121.0, Agriculture Commodities 2015-16

Figure 10: NSW Vegetable Production
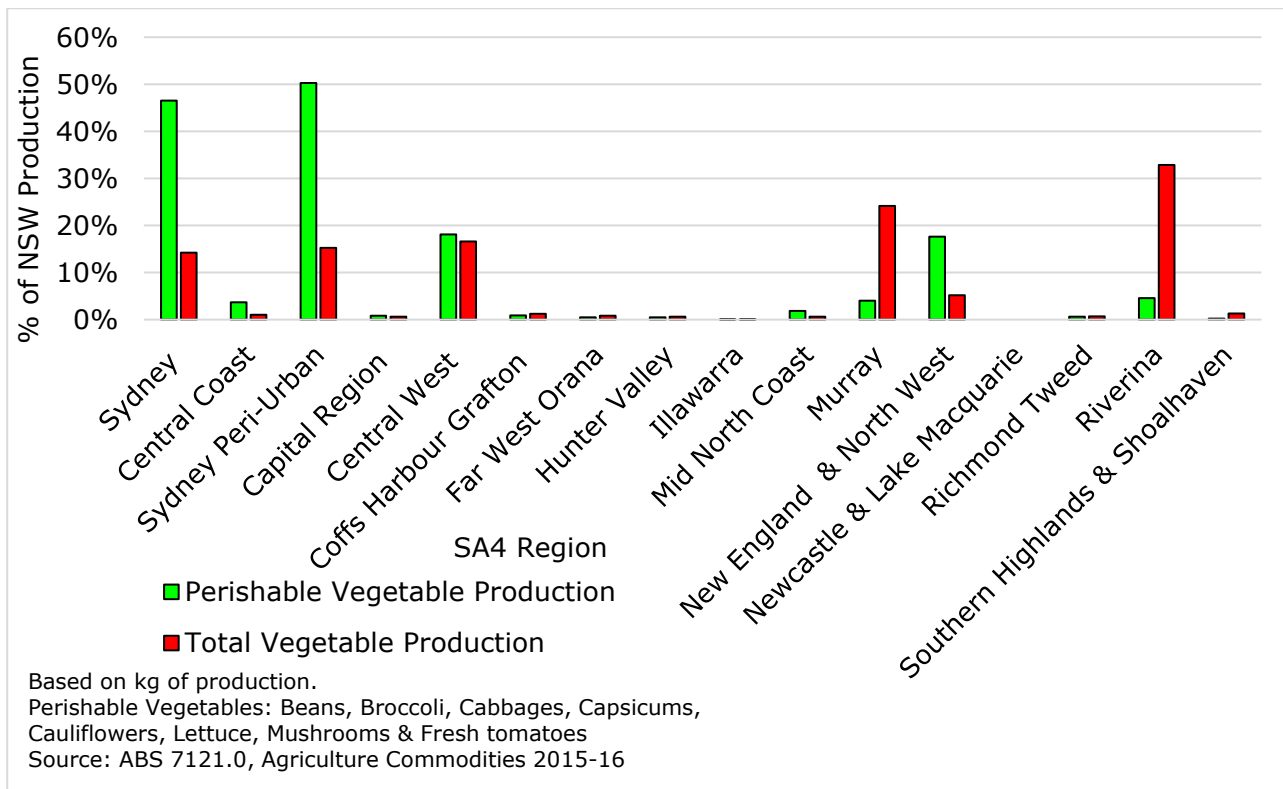Source: (ABS, 2017c)

The vegetable production across different regions in the Sydney Peri-Urban Area is shown in Figure 11. which shows the and it can be seen that the number one region for vegetable and perishable vegetable production is Baulkham Hills and Hawkesbury, followed by Outer Southwest, Outer West and Blue Mountains (including Penrith), the Southwest, the Central Coast and Blacktown.
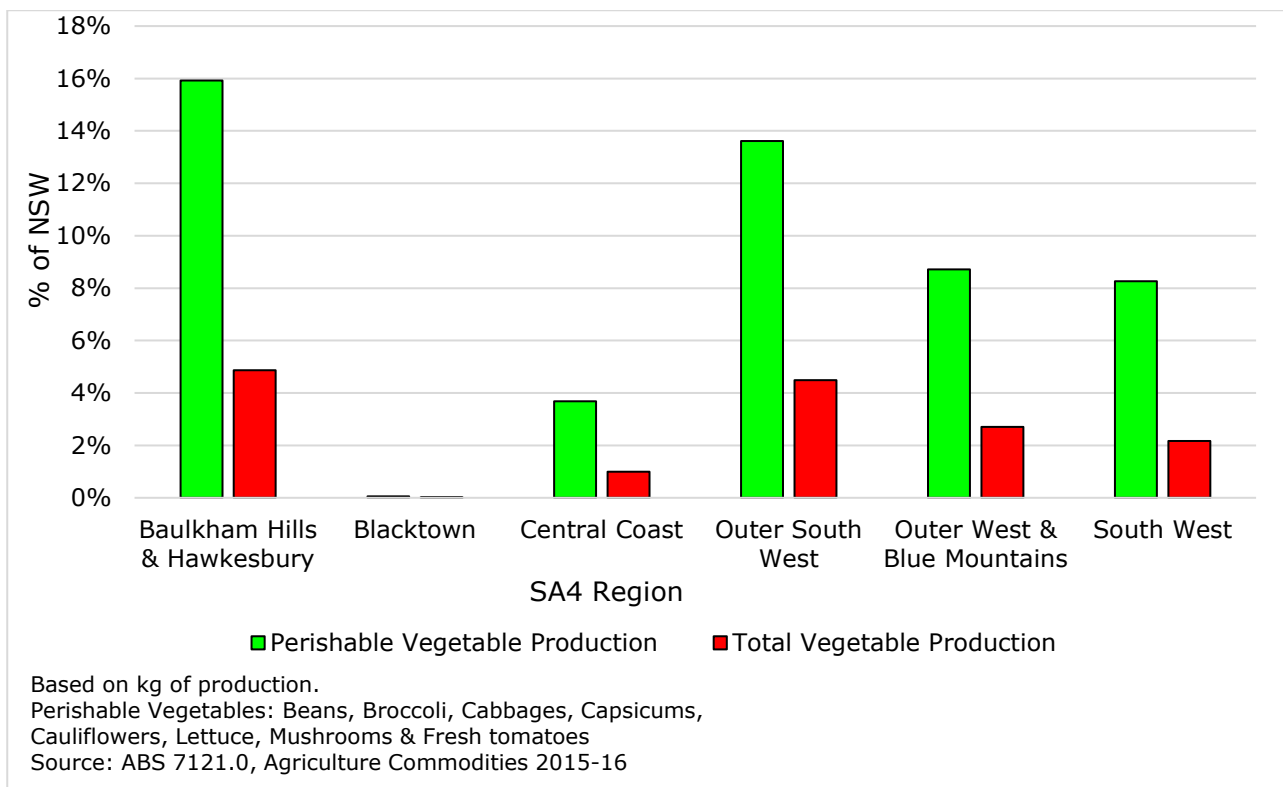
Figure 11: Sydney Vegetable Production
Source: (ABS, 2017c)

Data on the value of irrigated vegetables in NSW also paints a picture of the significance of the Sydney Peri-urban area. Figure 11 shows the dominance of the Sydney Peri-Urban area which is shown as the Hawkesbury Nepean Natural Resources Management Region. There is a lot of commentary about the Murray-Darling Basin being 'Australia's food bowl' (Murray-Darling Basin Authority, 2014) but this is not true for irrigated vegetables. The ABS data shows that the value of irrigated vegetables in the Murray Darling Basin is $884,407,672 and the value of irrigated vegetables grown outside the Murray-Darling Basin is $2,534,627,514 (ABS, 2019a) which means that 75% of irrigated vegetables are grown outside of the Murray-Darling Basin and in NSW that is predominately in the Sydney Peri-Urban Area.
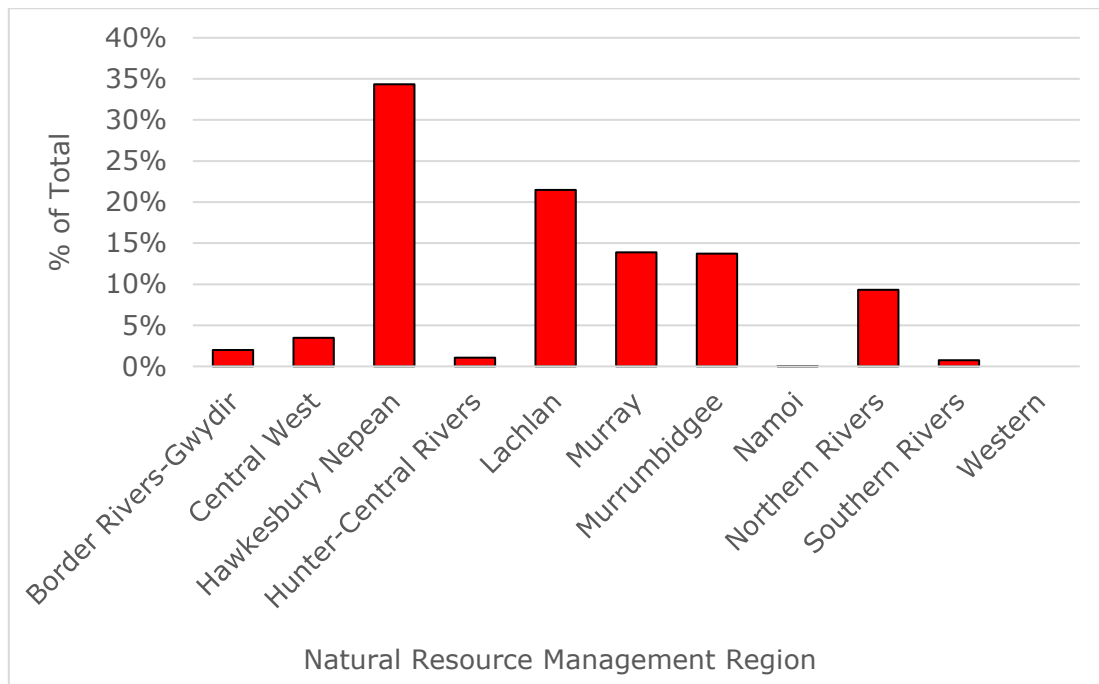
Figure 12: NSW Value of Irrigated Vegetables
Source: (ABS, 2019a)

2.3.2. Poultry

Poultry production in the Sydney Peri-Urban Area is significant for chicken meat, other poultry (ducks, turkeys, etc.) and eggs. In 2015-16 it produced 11.9% of Australia's meat chickens, 27.5% of other poultry and 11.6% of the eggs. It is the number two chicken meat producing region in Australia behind Melbourne's peri-urban area. It is also the number one region for other poultry in Australia and the number three egg producing region in Australia behind the Toowoomba in the Darling Downs and Melbourne's peri-urban area.

The figures for the NSW production are also significant with 35.6% of the meat chickens, 54.5% of the other poultry and 36.8% of the eggs being produced in the Sydney Peri-Urban Area. The distribution across NSW for poultry meat, number of birds and value can be seen from Figure 12 which shows the dominance of Sydney for both chicken meat and other poultry, where it is the number one region in NSW followed by Riverina and New England Northwest. Egg production follows the trend of the poultry meat and Figure 13 shows that the Sydney Peri-Urban Area is number one with 71% of the eggs produced in NSW, followed by Newcastle & Lake Macquarie and the Central West.
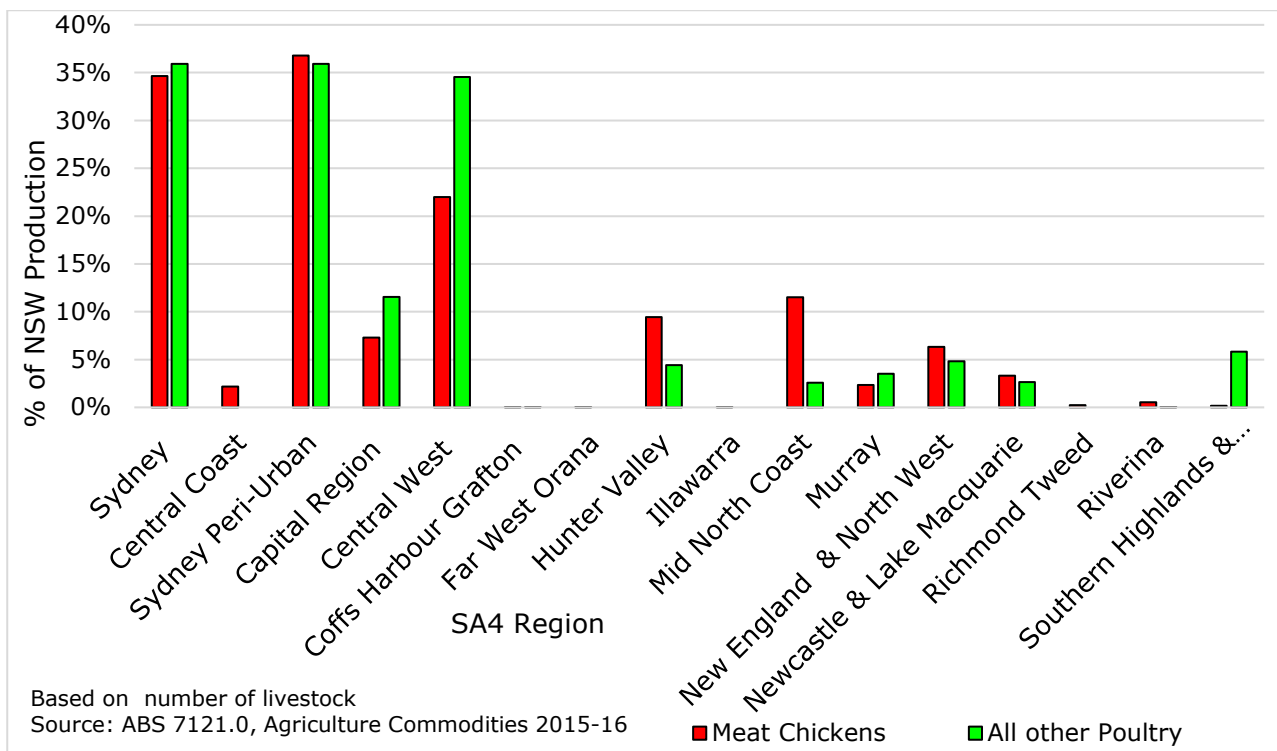
Figure 13: NSW Poultry Production
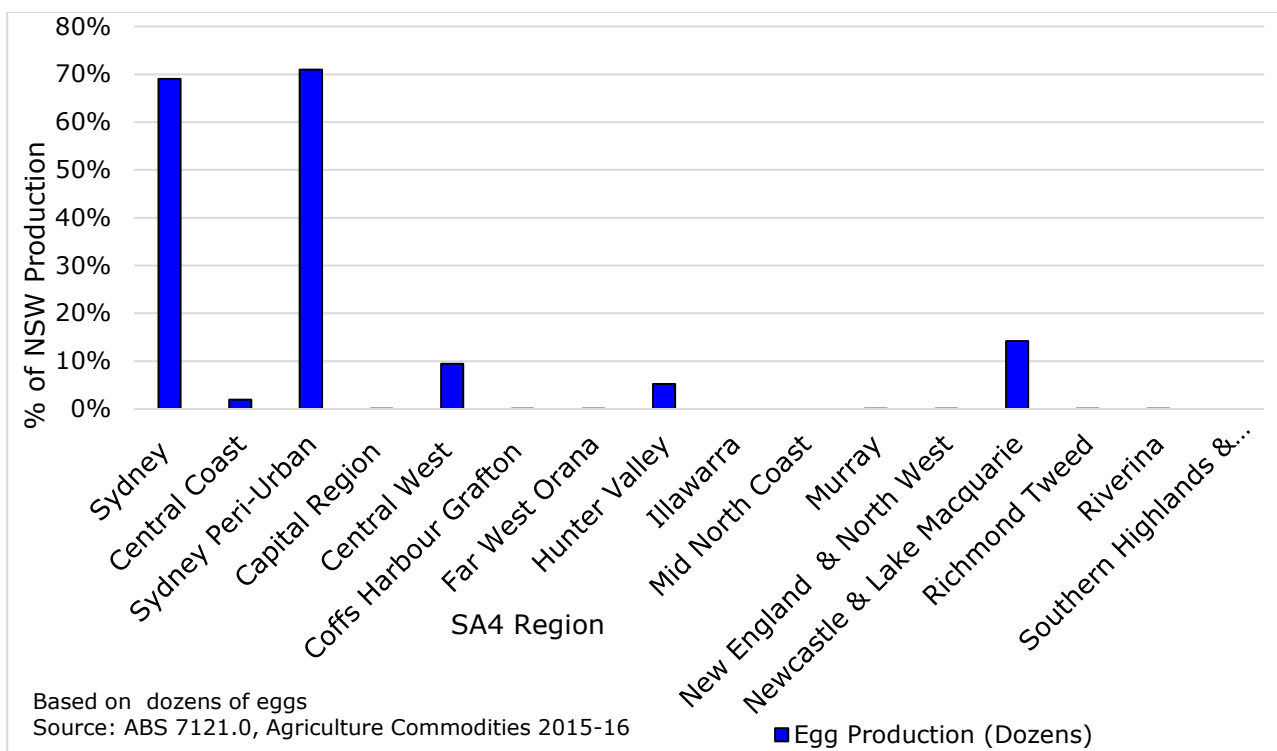
Source: (ABS, 2017c)

Figure 14: NSW Egg Production

Source: (ABS, 2017c)

The poultry meat and egg production for the Sydney peri-urban area can be seen from Figure 14. These show that the Central Coast has the highest number of Meat Chickens followed by the Southwest Sydney, Outer Southwest, Outer West and Blue Mountains,

Blacktown, and Baulkham Hills and Hawkesbury. For Other Poultry it is the Outer Southwest region that has the most, followed by the Southwest, Baulkham Hills and Hawkesbury, as well as the Outer West and Blue Mountains, then the Central Coast. No Other Poultry is recorded for Blacktown. Egg production is highest in the Outer West and Blue Mountains followed by the Southwest, Baulkham Hills and Hawkesbury, then the Central Coast, Outer Southwest and Blacktown.

Of note, a large proportion of the total value of egg production is located within Kemps Creek and Horseley Park, that will be impacted upon the rezoning of Aerotropolis. This accounts for up to $13,134,914 out of the total value of agricultural production of $35.4 million in the same region
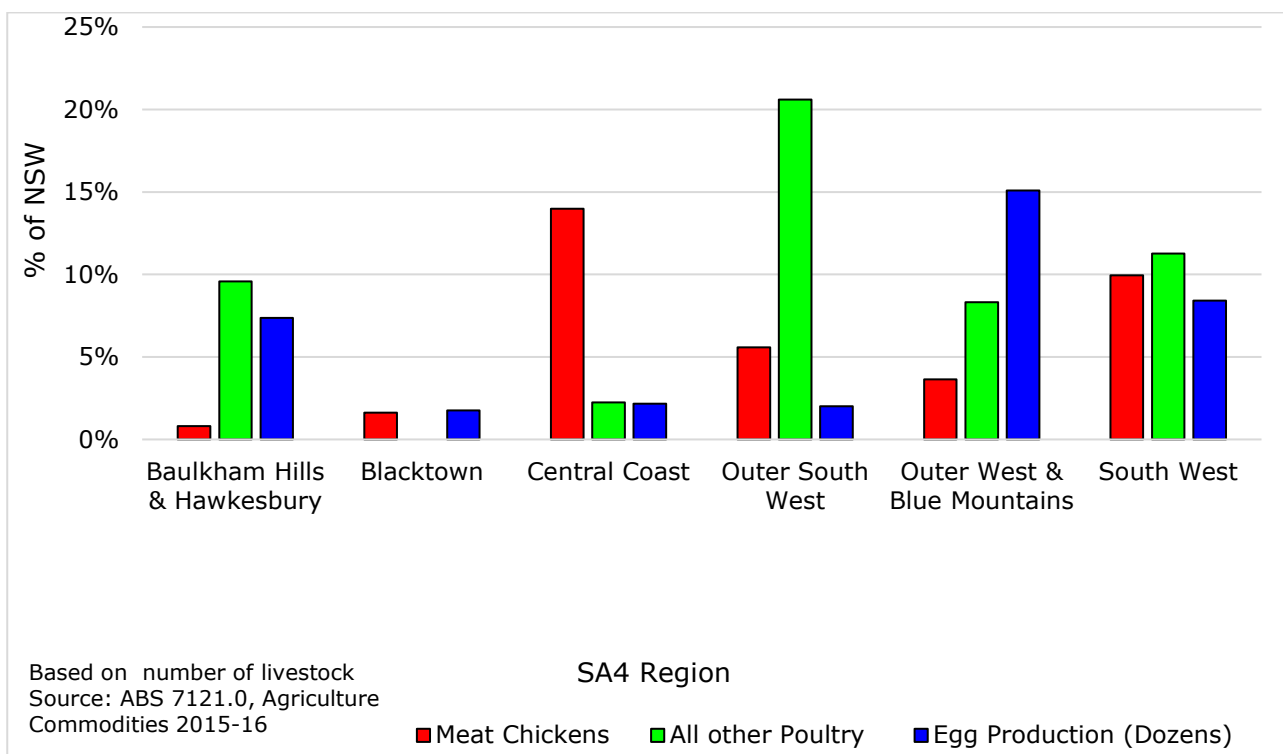
Figure 15: Sydney Poultry Production

Source: (ABS, 2017c)

2.3.3. Nurseries, Flowers and Turf

The Sydney Peri-Urban Area has 15.1% of Australia's total area of the category Nurseries, Flowers and Turf. This can be broken down to 8.8% of all nurseries in Australia (11.3% of Australia's undercover and 8.5% outdoor), 7.1% of all flowers (20.1% Australia's undercover and 6.1% outdoor) and 24.0% of the area of all turf farms Australia-wide. It is the number two region in Australia for Nurseries, Flowers and Turf behind Melbourne's peri-urban area. It is also the number two region in Australia for nurseries behind Melbourne peri-urban area, and number three for cut flowers behind Victoria Northwest and Melbourne peri urban. The Sydney Peri-Urban Area is the number one region in Australia for the area of turf farms.

The figures for NSW are also significant, where the Sydney Peri-Urban Area has 61.5% of Nurseries, Flowers and Turf combined, comprising 40.4% of NSW nurseries (46.6% of NSW undercover and 39.6% outdoor), 54.3% of NSW flowers (77.0% of NSW undercover and 50.4% outdoor) as well as 71.9% of the turf produced in NSW. Figure 15 shows the distribution of the nurseries, flowers and turf category across NSW regions, which shows that the Sydney Peri-Urban Area is the number one region.
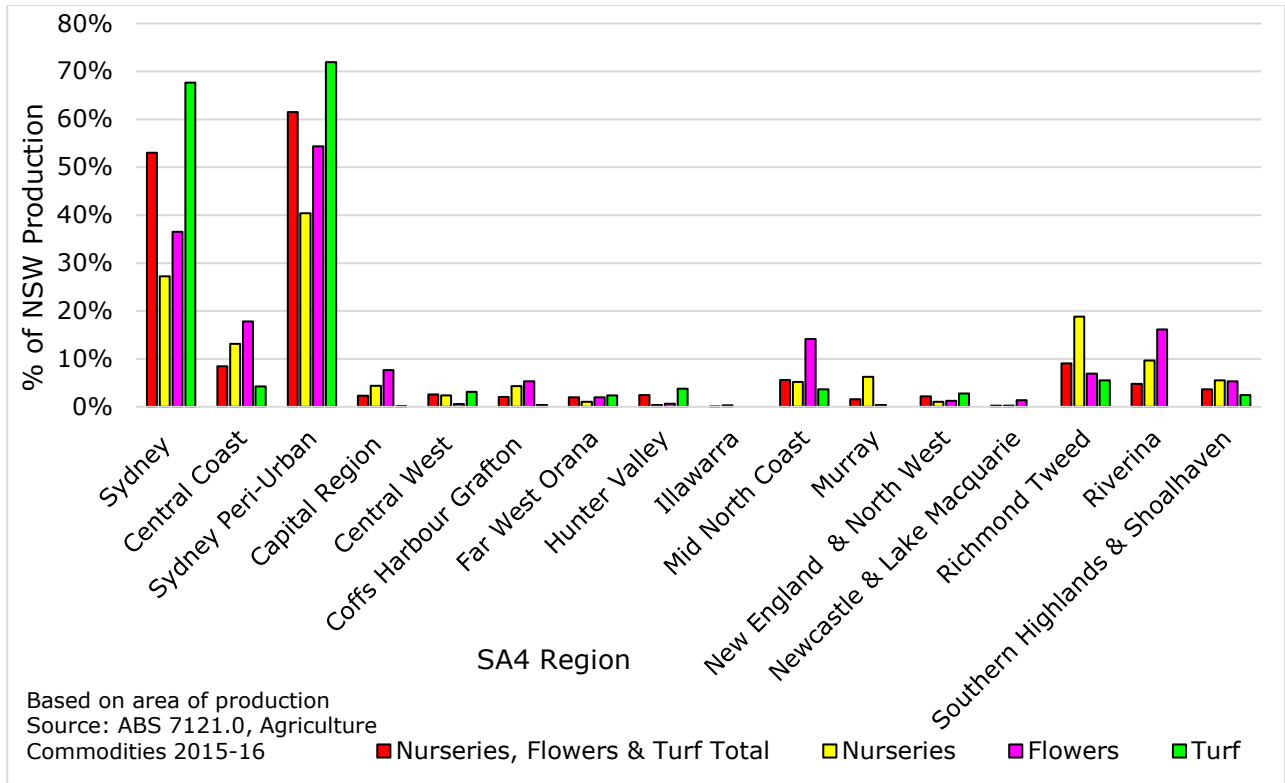
Figure 16: NSW Nurseries, Flowers and Turf Production

Source: (ABS, 2017c)

Figure 16 shows the distribution of the areas where nurseries, flowers and turf are grown in the Sydney Peri-Urban Area. This shows that nurseries, flowers and turf are significant in Baulkham Hills and Hawkesbury as well as the Central Coast and Outer West and Blue Mountains. The highest concentration of nurseries is in Baulkham Hills and Hawkesbury (14.7%), followed by the Central Coast (13.1%), Southwest (3.9%), Outer Southwest, Outer West and Blue Mountains, and then North Sydney and Hornsby, and Blacktown. Baulkham Hills and Hawkesbury also have the highest concentration of flower growers with 26.8% of NSW, followed by the Central Coast with 17.8%, then Outer Southwest region, Southwest, Outer West and Blue Mountains, and Blacktown. The largest area of Turf is grown in Baulkham Hills and Hawkesbury, closely followed by the Outer West and Blue Mountains, followed by the Central Coast and Outer Southwest region.

Figure 17: Sydney Nurseries, Flowers and Turf Production

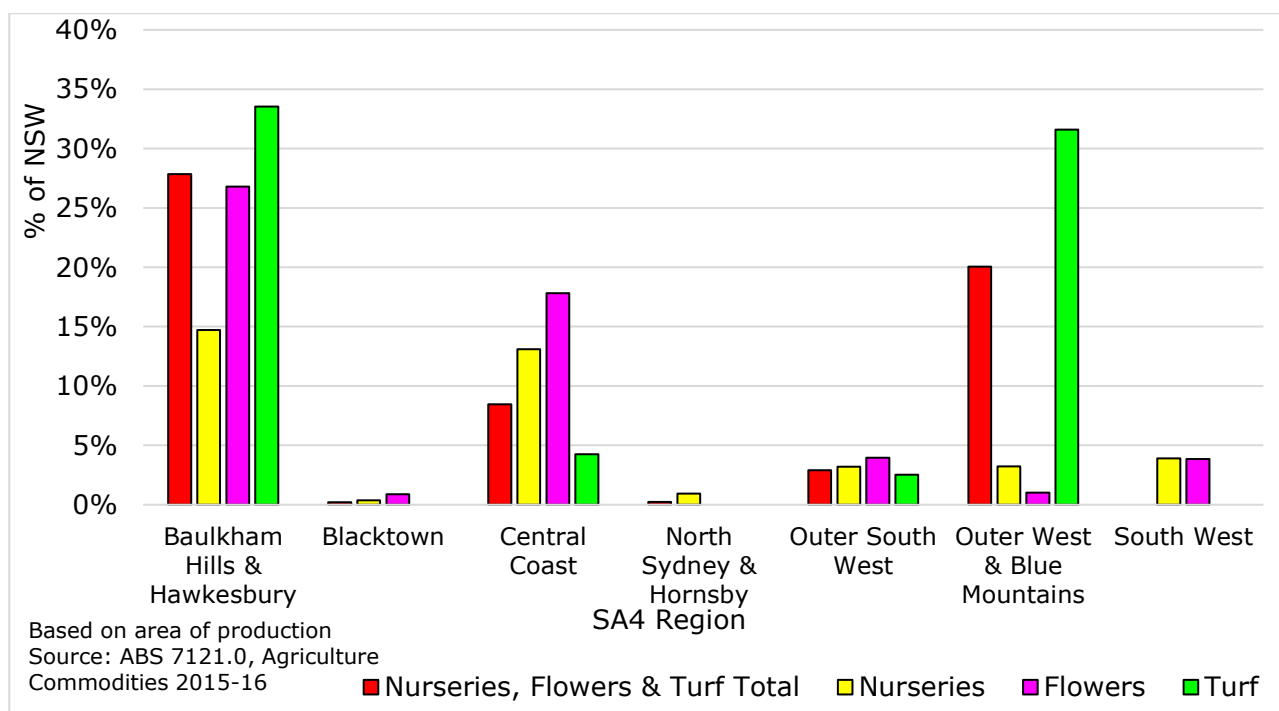Source: (ABS, 2017c)

2.3.4. Change in Agriculture Production

To gauge an indication of the growth or decline of these commodities, comparison can be made with the 2010-11 Agriculture Census data. However, a direct comparison cannot be made because of the change in the methodology for carrying out the Census. The value of farm gate production required to be included in the census has changed from $5,000 in 2010-11 to $40,000 in 2015-16. This had the result of changing the number of farms surveyed Australia-wide from 145,200 (ABS, 2012b) to 87,890 farms (ABS, 2017c) respectively. It was done by the ABS to provide more accurate data on commercial farms as opposed to part-time farmers (whose main use is rural residential).

The value of production actually rose in the period from $749.2.9m in 2010-11 (ABS, 2008) to $806.4m in 2015-16 (ABS, 2017d). Whilst this cannot be directly compared because of the change in collection methodology, it is significant that the value increased when the number of farms decreased, when it would have been expected that the value might have gone down.

The commodities that Sydney is significant for are shown in Table 5 where it can be seen that there was a modest rise in all commodities except for nurseries, meat chickens and total vegetables, which saw a modest decrease in the proportion of NSW and Australia. This too cannot be directly compared; however, it can be said that agriculture did not decrease during the period and could have in fact increased in both value and production.

Table 5: Change in Agricultural Production 2010-11 to 2015-16

Commodity	2010-11		2015-16		Change 2010-11 to 2015-16	
	% of NSW	% of Australia	% of NSW	% of Australia	% of NSW	% of Australia
Nurseries, Flowers & Turf Total	56.5	14.8	61.5	15.1	5.0	0.3
Nurseries	41.0	10.3	40.4	8.8	-0.6	-1.5
Flowers	45.6	6.4	54.3	7.1	8.7	0.7
Turf	67.4	23.3	71.9	24.0	4.5	0.7
Perishable Vegetables	45.8	5.2	50.2	5.9	4.4	0.7
Total Vegetables	14.1	1.8	15.2	1.7	1.1	-0.1
Meat Chickens	46.1	17.6	35.6	11.9	-10.5	-5.7
Other Poultry Meat	34.6	16.5	52.0	27.5	17.4	11.0
Eggs (Dozens)	31.2	9.9	36.8	11.6	5.6	1.7
Number of Businesses Surveyed Australia wide		145,200		87,890		-57,310

Source: (ABS, 2012b, 2017c)

In 1993 Wollondilly Shire Council published its Agricultural Lands Study which also analysed these commodities and found a similar pattern of the dominance of the Sydney Region in the NSW production of perishable vegetables, poultry, and nurseries, flowers and turf for the 1990-91 year (Wollondilly Shire Council, 1993). In 2001, the Penrith Rural Lands Study reported a similar trend for the 1997 agricultural census (Edge Land Planning, 2001). So, it can be seen that the Sydney peri-urban area has been a significant contributor to the production of these key agricultural commodities over many decades

Another indicator of the significance of agriculture in Sydney compared to the rest of NSW is to look at the Farm Management and Demography data collected as part of the ABS Agriculture Census. This shows that the average age of the farm owner in the Penrith LGA is 54 years, compared to 55 for Sydney's peri-urban area, 57 for NSW and 56 for Australia (ABS, 2017a). The census data shows that in the Penrith LGA has 77.6% of the farm workers aged less than 55 years compared to Greater Sydney (including both urban and peri-urban areas) there were 70.9% of the farm workers less than 55, which is much more than regional NSW, NSW and Australia. The LGA has the largest proportion of farmers under 55 in Sydney – Central Coast has 67.4% and Wollondilly has 69.0% of farmers aged younger (ABS, 2017a). This can be seen from Figure 17. This was 69.7% for Sydney peri-urban in 2011 (ABS, 2012a). Therefore, the Penrith LGA and the Sydney Region has the youngest farmers in NSW and Australia.
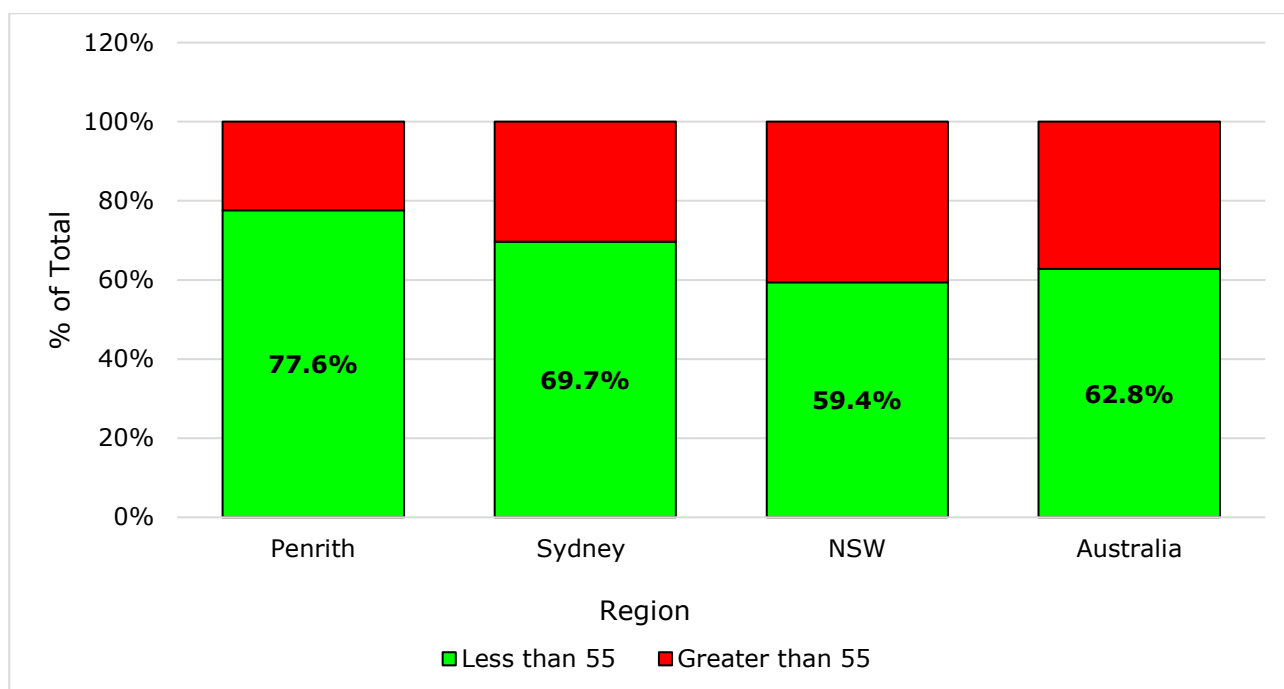
Figure 18: Proportion of Farm Workers aged less than 55 years
Source: (ABS, 2017a)

Another indicator is the percentage of income generated by agriculture on the farm and the percentage of off-farm income. Farm owners in the Penrith LGA generate 77.2% of their income from on-farm, which is less than the Sydney Region compared to 82.3% for NSW and 83.6% for Australia (ABS, 2017a). Penrith farm owners rely on off-farm income for 16.3%, compared 11.0% for Sydney, 13.1% for NSW, and 12.1% for Australia (ABS, 2017a). It should be noted that there are other sources of income from grants, Government transfers, relief funding and other funding sources that have not been included in these figures by the ABS, hence the reason the figures presented don't add up to 100%. This illustrates the strong productive capacity of agricultural businesses in the Penrith LGA and shows that farm owners on the Penrith LGA and the Sydney Peri-Urban area generate more of their income from farming than for other areas of NSW and Australia, and conversely rely less on off-farm income.

The Census of population and housing is also an indicator of the performance of agriculture in the Sydney peri-urban area. Data from recent censes shows that employment in agriculture has fluctuated since 1991, and in 2016 it was higher (9,919 people) than it was in 1991 (9,849 people). In between it increased to 11,151 in 2001 and then dropped to 7,796 in 2011. It is significant to note that employment in agriculture increased by 2,123 from 2011 to 2016. It is a similar pattern in Penrith LGA where it was 1,317 in 1996 then dropped in 2001 (1,174) and continued in 2006 (938) to reach a low in 2011 of 847 and has rebounded to 936 in 2016.

Chapter 3: Rural Demography

The 2016 Census of Population and Housing provides details of the population and housing characteristics.

Detailed analysis has included the Statistical Area 1 (SA1) level of data being aggregated to identify the demographic profile of the rural areas. SA1 is the smallest unit for data collection and processing at the 2016 Census and contain an average of 200 dwellings. At previous censes, the smallest area was called a Collector District. They have been changed and are now called SA1. This has been subtracted from the LGA total to gain a picture of the urban area. This has allowed for comparison between the rural and urban parts of the LGA. The SA1 the former Collector District boundaries and are not the same spatial area which means that direct correlation between the 2006, 2011 and 2016 areas is not possible, however, it is possible when the SA1s and CDs are aggregated to form a rural area dataset.

Analyses have been carried out of the 2001,2006, 2011 and 2016 census at the CD / SA1 level to allow for the demography of the rural lands to be examined.

The following points can be observed for the 2016 Census year:

- The urban – rural split is 92.4% urban and 7.6 % live in the rural land. This has changed from 87.5% and 12.5% respectively in 2001.
- The rural population has grown from 11,163 in 2001 to 15,245 in 2016.

3.1 Age profile

Population Pyramids have been produced and the differences can be seen between the rural lands and the LGA in Figure 19 and Figure 20. The pyramids show the differences between the rural area and the LGA particularly the larger proportion of the rural population in the 15-19 year and 45 to 49 years age groups. The rural pyramid resembles one that is more akin to the pyramids for Peri-Urban LGAs like Wollondilly and Wingecarribee that don't join the metropolitan area.
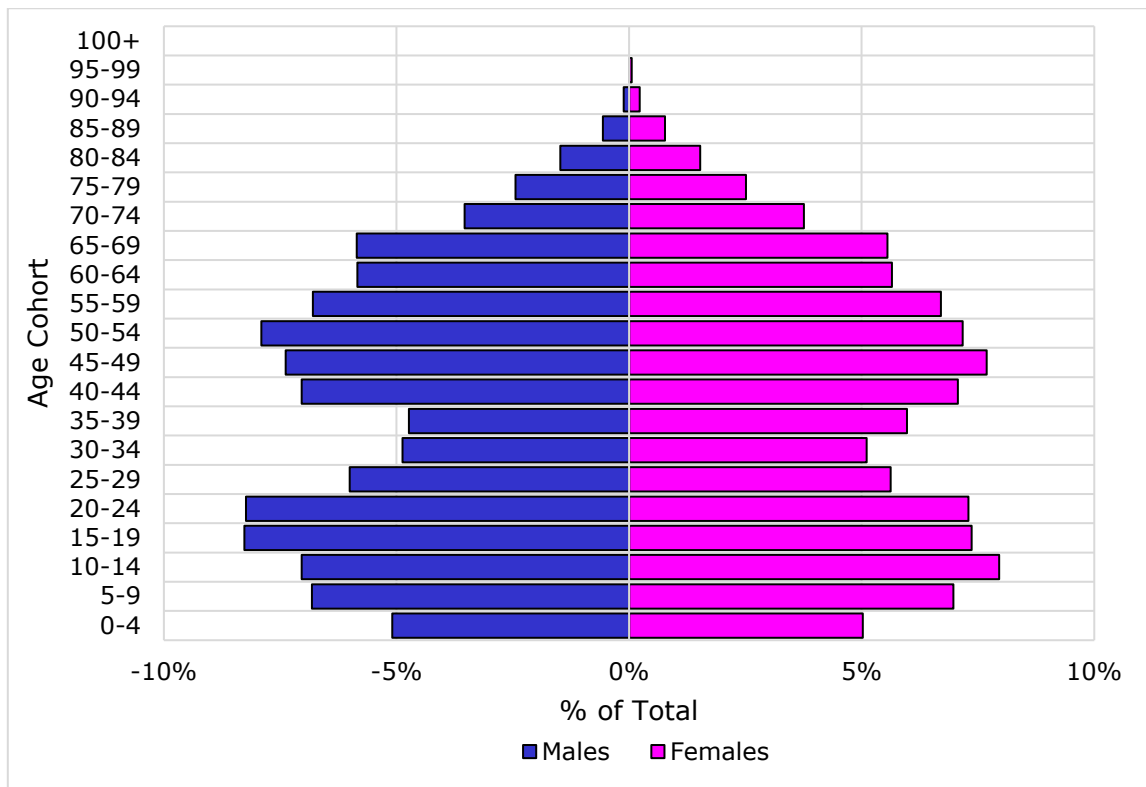
Figure 19: Rural Land Population Pyramid
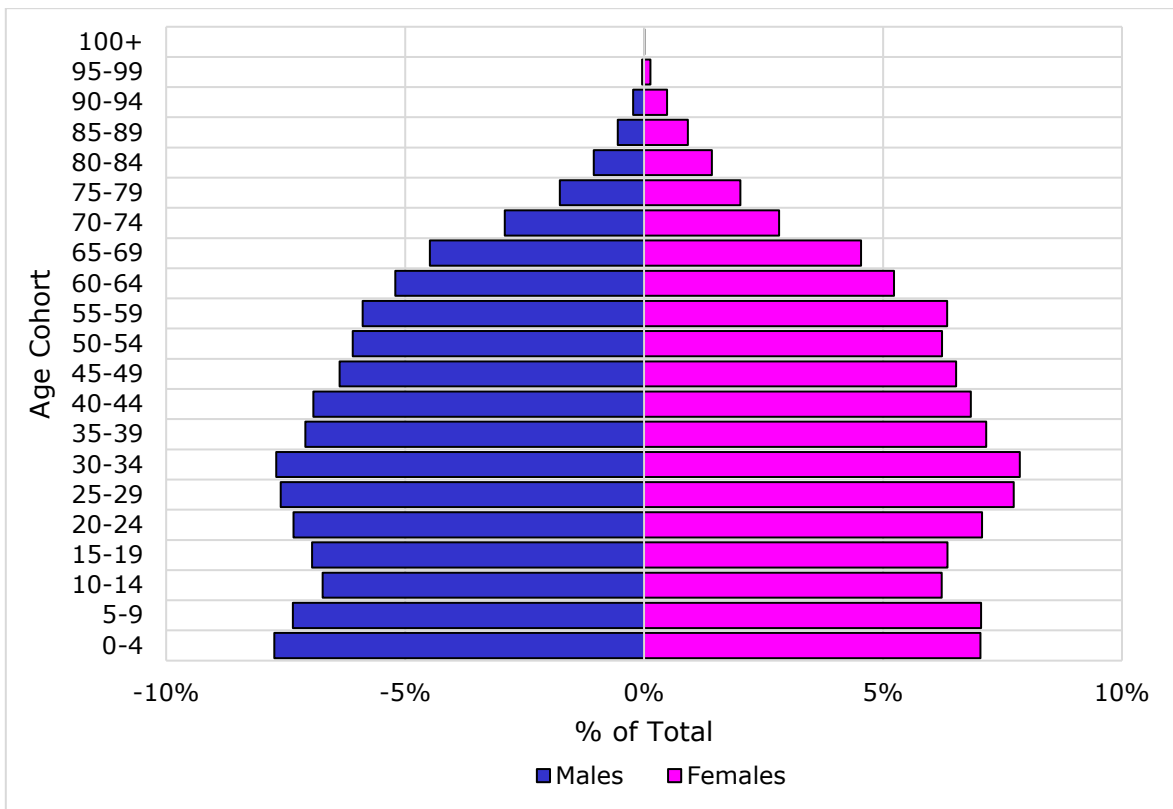Source: ABS Census of Population and Housing

Figure 20: Penrith LGA Population Pyramid
Source: (ABS, 2019b)

Figure 21 shows the age comparison between the rural, urban and LGA. It shows that the rural area has more people in all age groups from 5 to 19 and 40 to 74. This is reinforced in Figure 21 which shows that there are more secondary school students in the rural area than the urban area and LGA as well as there being the same parents and homebuilders, more older workers and pre-retirees, empty nesters and retirees as well as seniors but less elderly aged than the urban area and LGA.
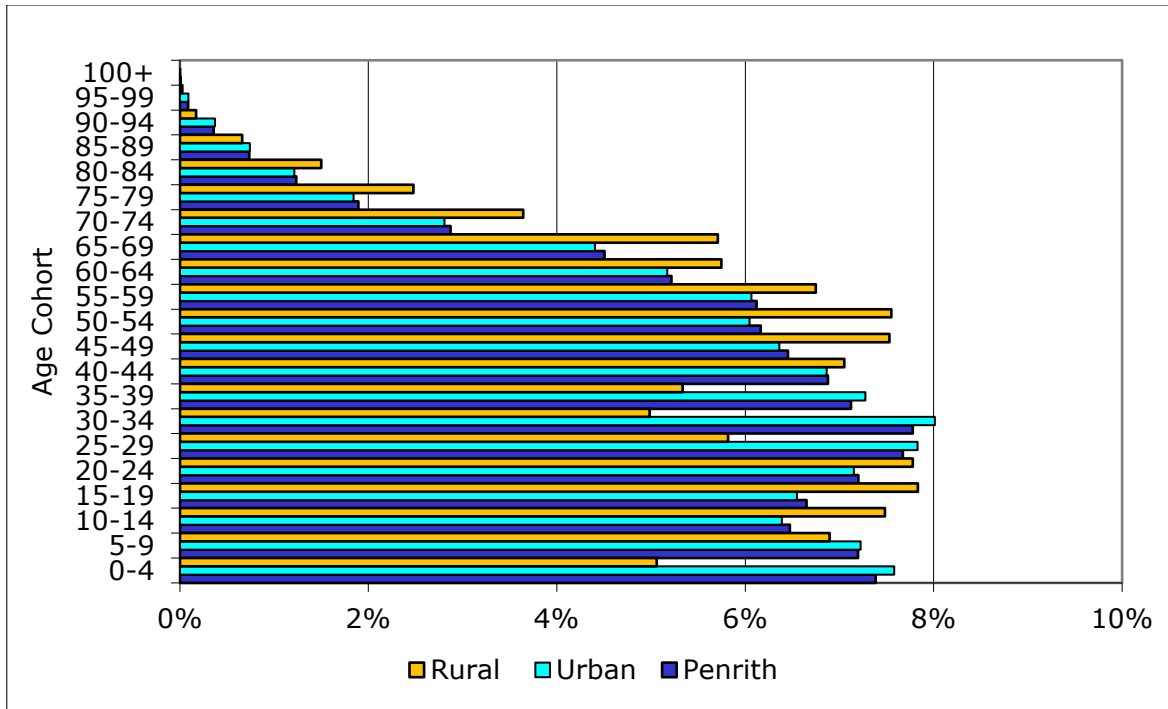
Figure 21: Age Cohort Comparison
Source: ABS Census of Population and Housing
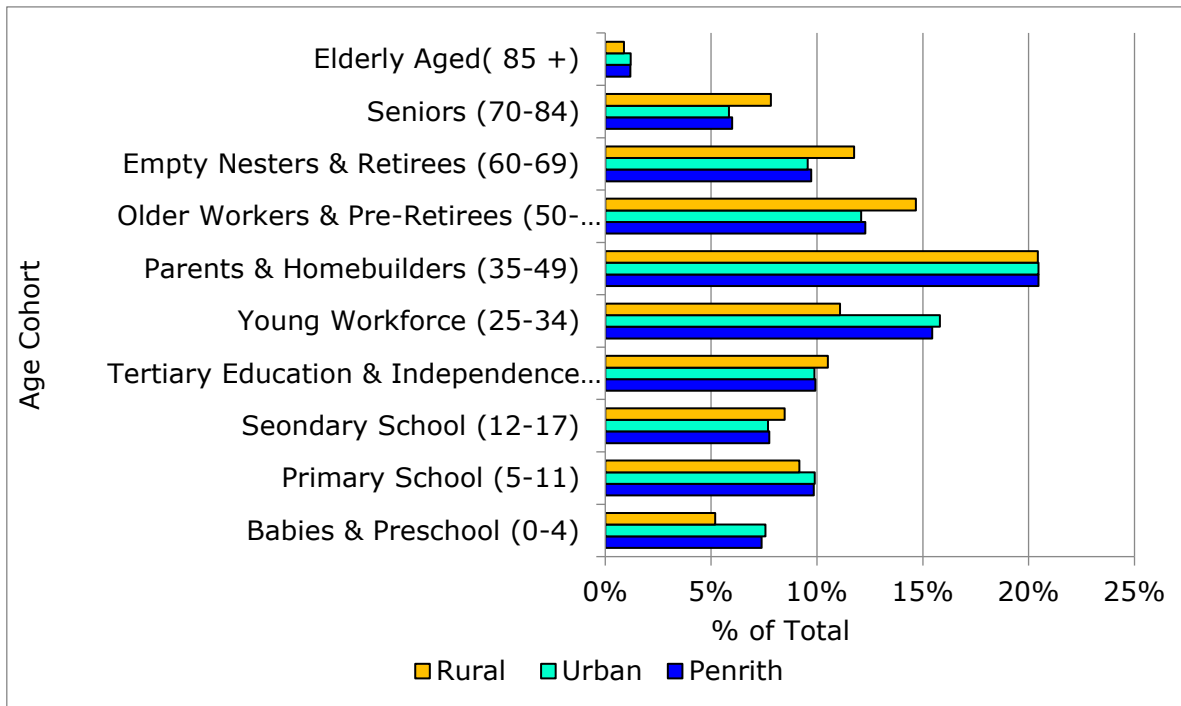
Figure 22: Specific Age Cohort Comparison
Source: ABS Census of Population and Housing

3.2 Households

More of the rural residents are married and less separated, divorced, widowed and never married as can be seen in Figure 22.
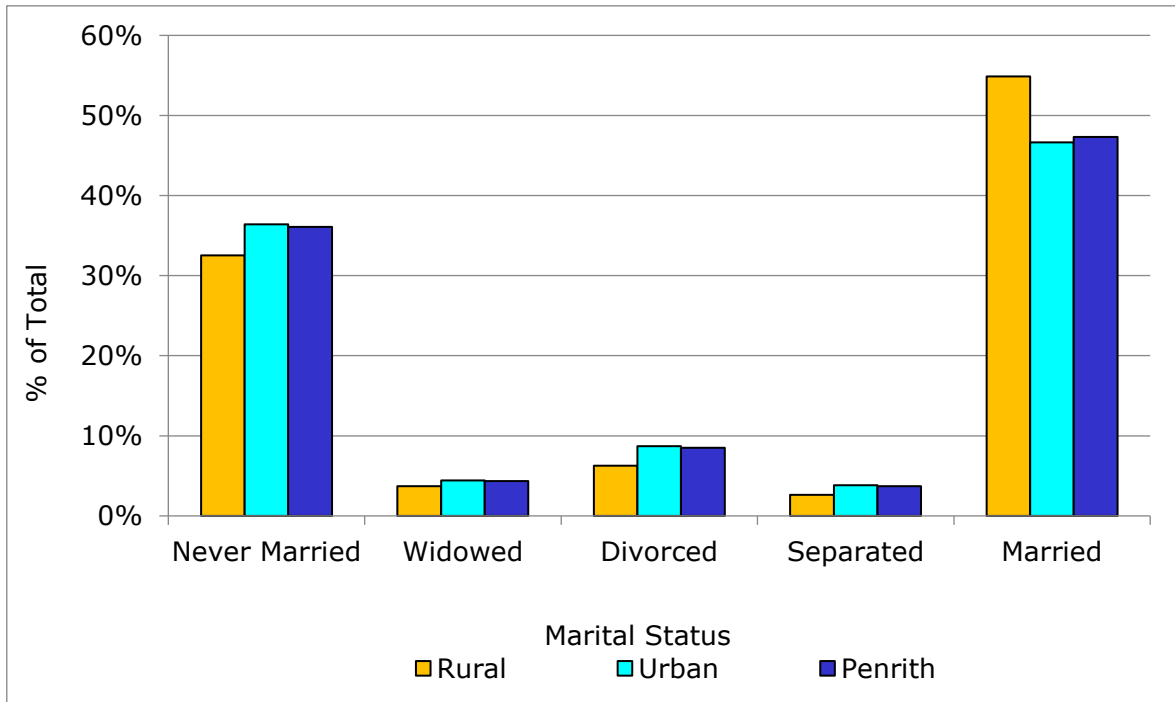
Figure 23: Registered Marital Status
Source: ABS Census of Population and Housing

There are less pre-schoolers and infants / primary and but more secondary school students in the rural, than the urban and LGA. There are also less TAFE and university students in the rural areas and LGA, as can be seen in figure 2.35.
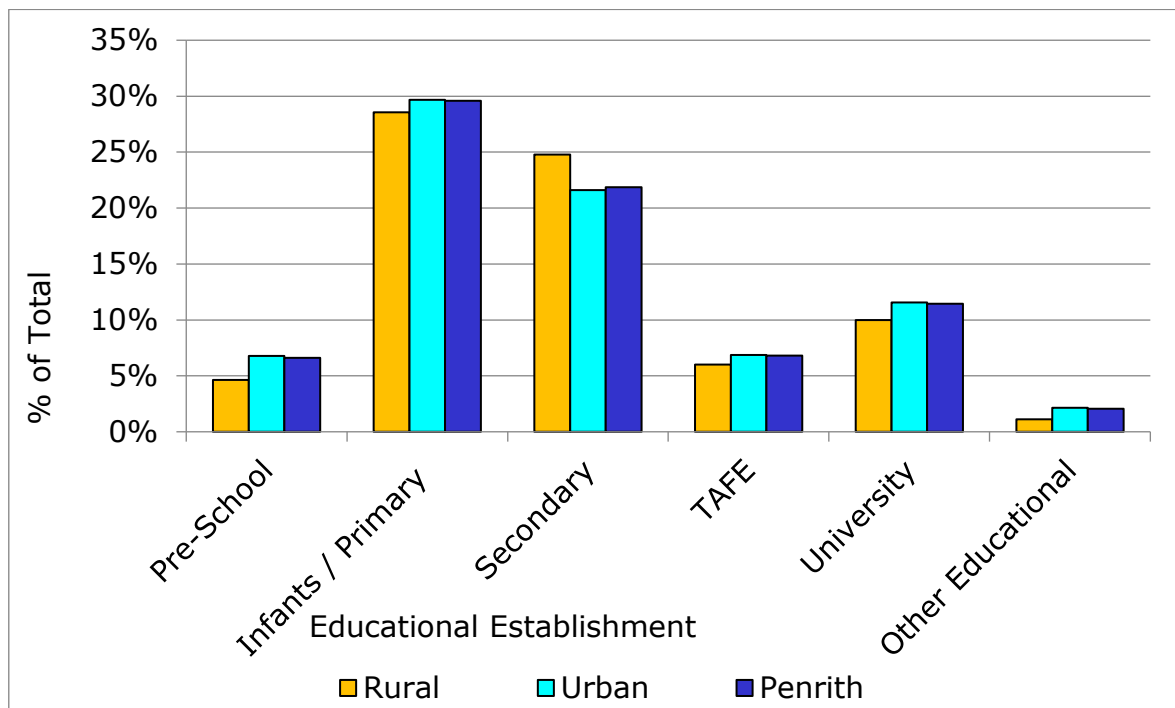
Figure 24: Educational Establishment Attending
Source: ABS Census of Population and Housing

There are less people in the rural area who completed school after year 12, but slightly more in year 11 and more in year 10 and years 9 and 8 than the urban area and LGA as can be seen in figure 2.36.
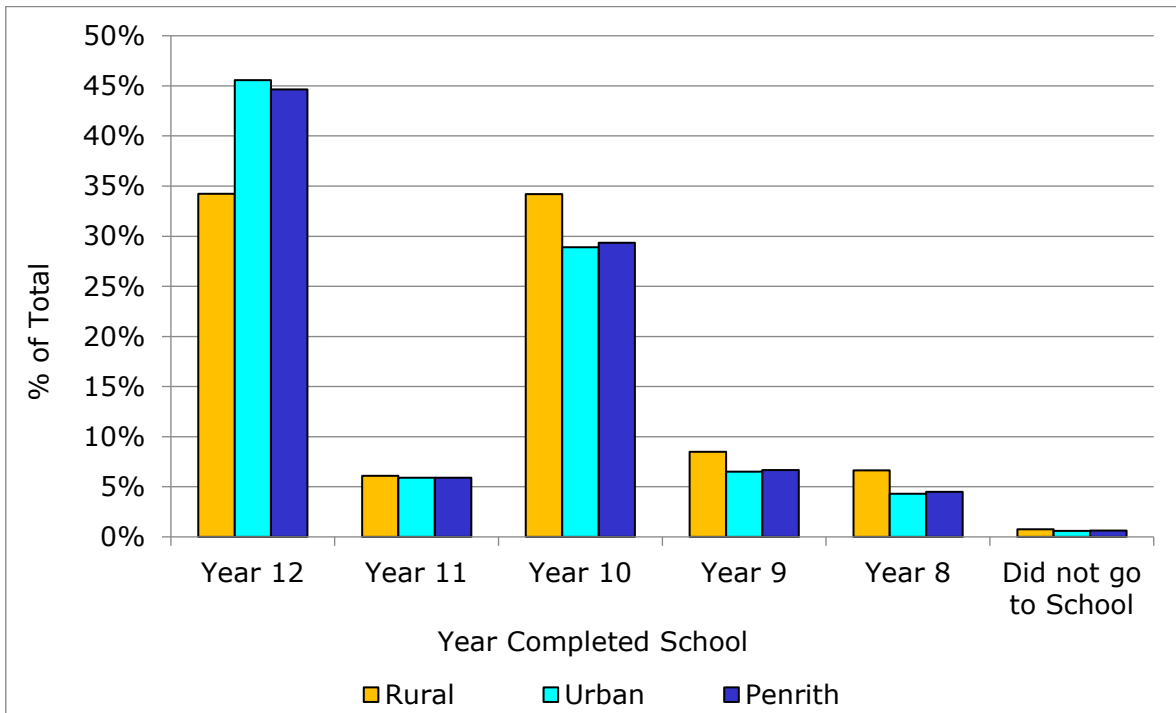
Figure 25: Year Completed School
Source: ABS Census of Population and Housing

Figure 26 shows that there slightly are more people who volunteer in the rural areas.
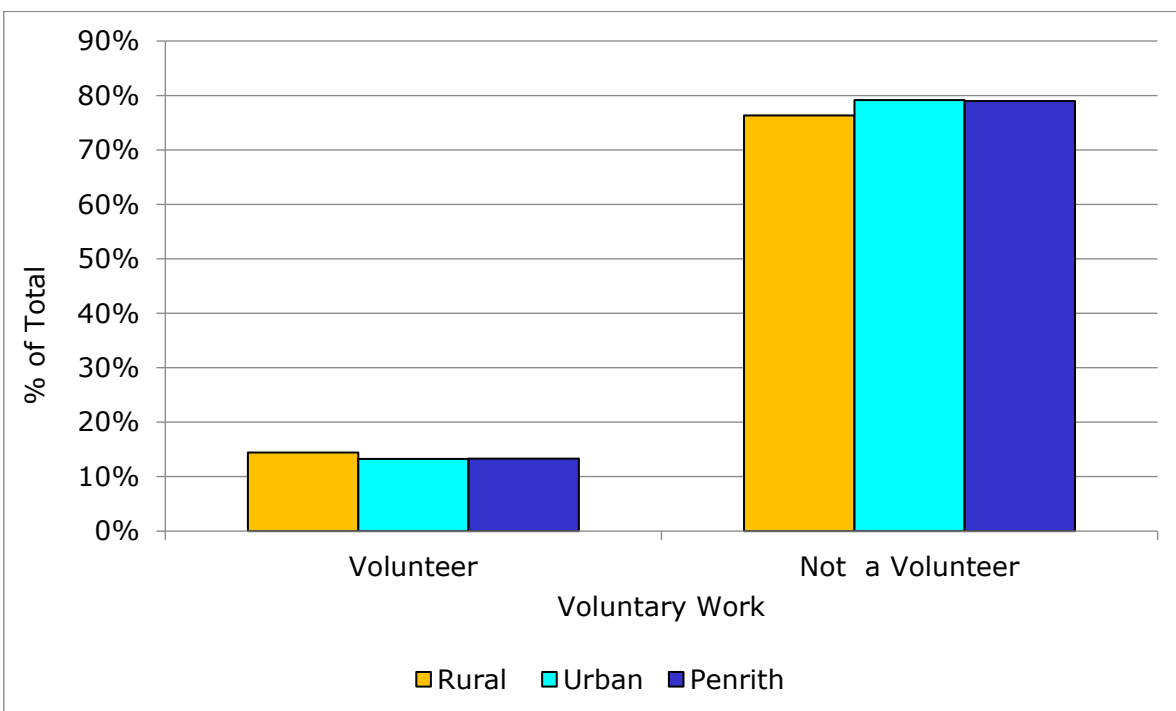
Figure 26: Voluntary Work
Source: ABS Census of Population and Housing

There are more two parent families with no children as well as no children under 15 (older children living at home) in the rural areas and the same for families with more with children under 15 and but much less single parent families in the rural areas than the urban and LGA as can be seen from Figure 27.
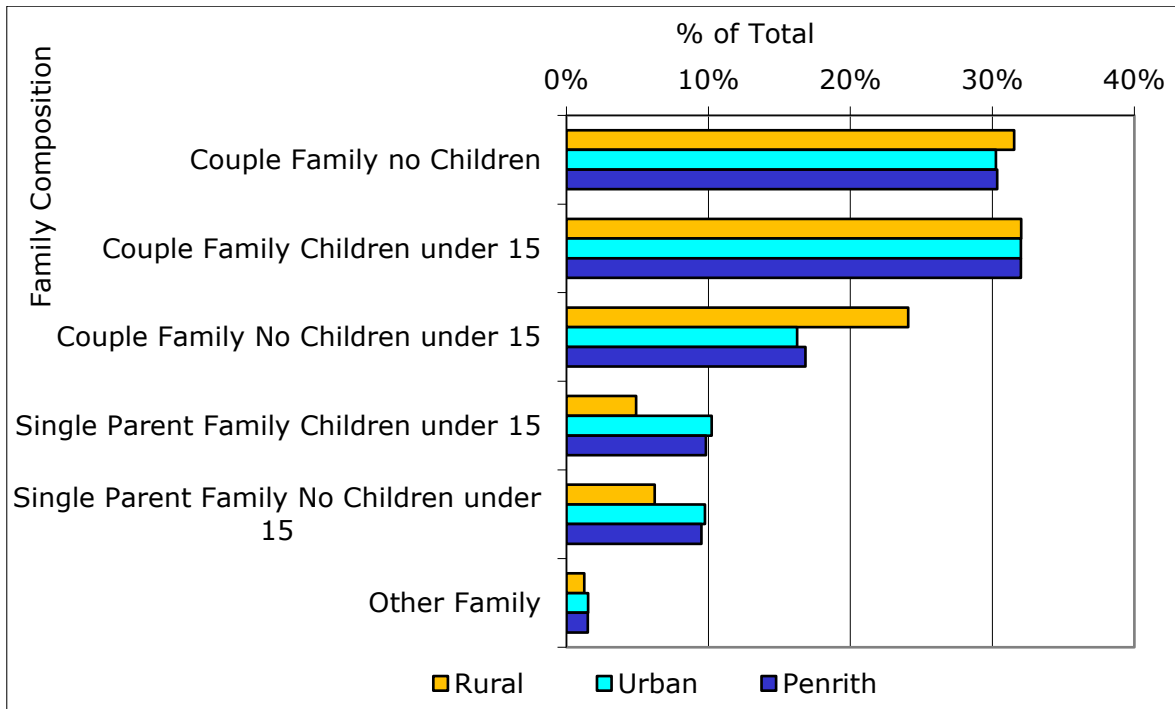
Figure 27: Family Composition
Source: ABS Census of Population and Housing

Figure 28 shows that there are more families earning less than $399 and more earning between $400 and $2,999 per week in the rural area and considerably more earning more than $3,000 per week than the urban areas and the LGA.
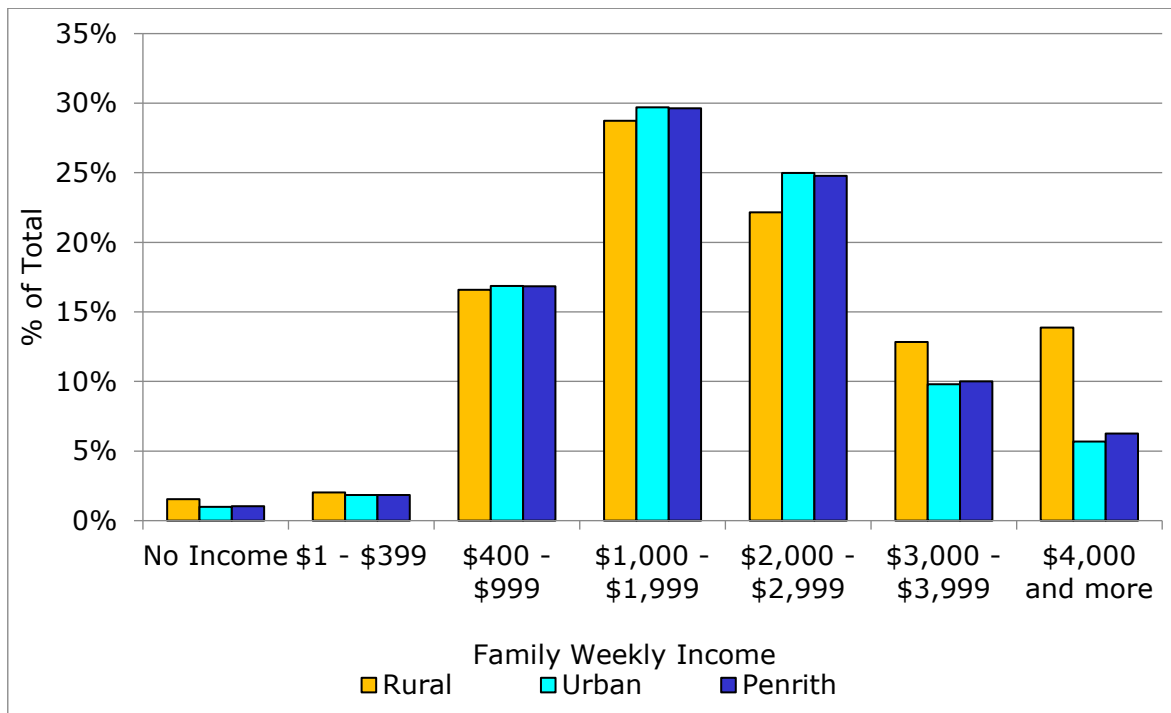
Figure 28: Family Income
Source: ABS Census of Population and Housing

Figure 31 shows that there are more separate houses in the rural area than the urban area as a proportion of the total dwellings.
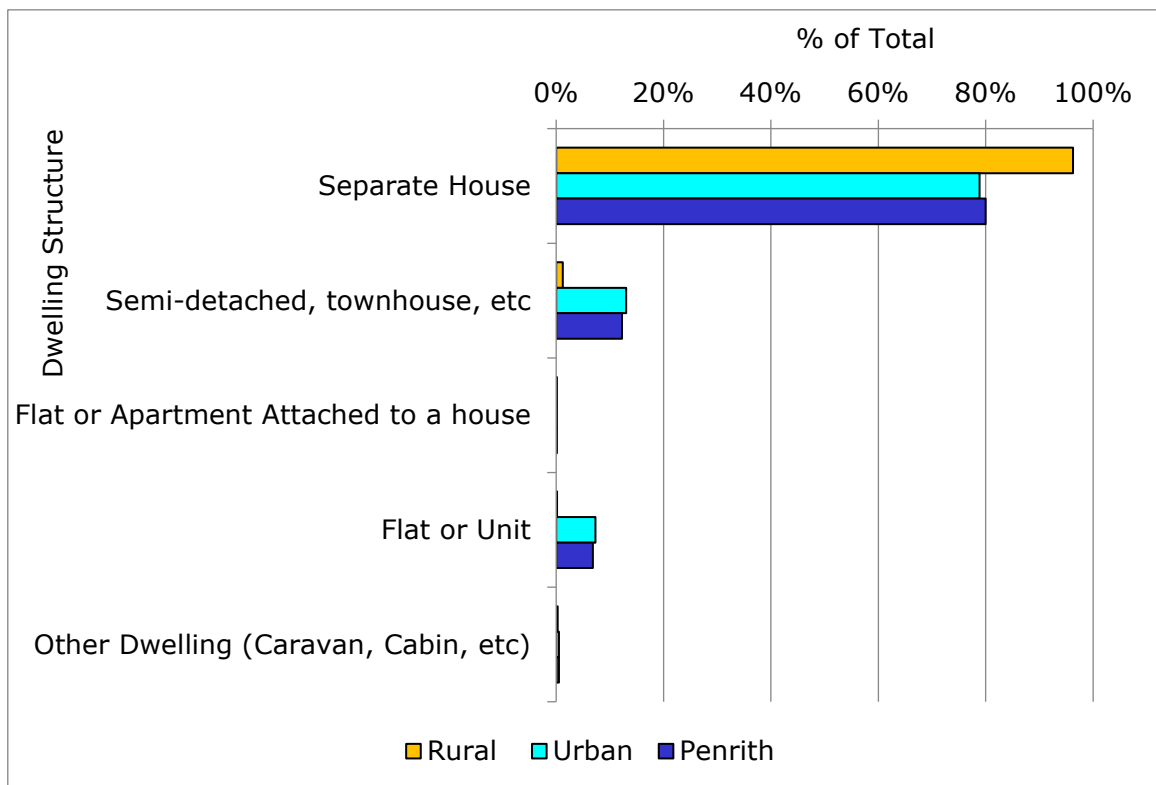
Figure 29: Dwelling Structure
Source: ABS Census of Population and Housing

There are more houses owned outright in the rural area than the urban area and LGA as can be seen in Figure 32. It also shows that there are more houses with a mortgage and rented houses in the urban area and LGA.
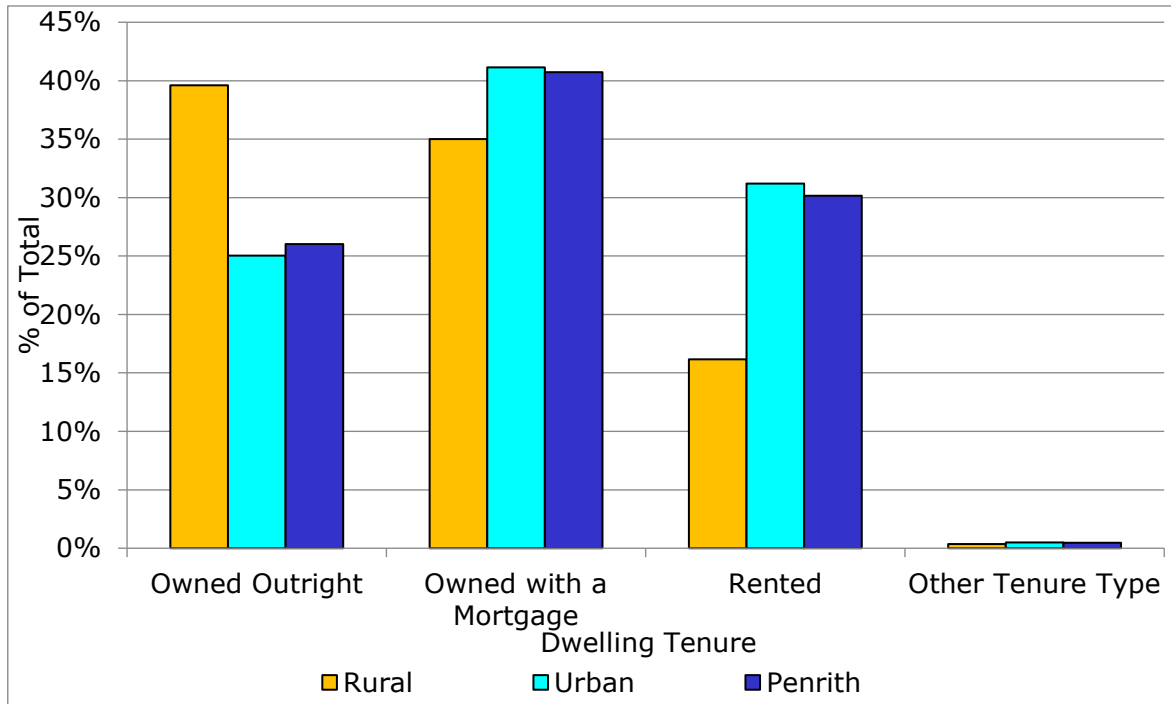
Figure 30: Dwelling Tenure
Source: ABS Census of Population and Housing

There are less dwellings with a mortgage repayment of less than $2999 per month in the rural area and more people with repayments of greater than $3,000 than the urban area and the LGA, as can be seen in Figure 33.
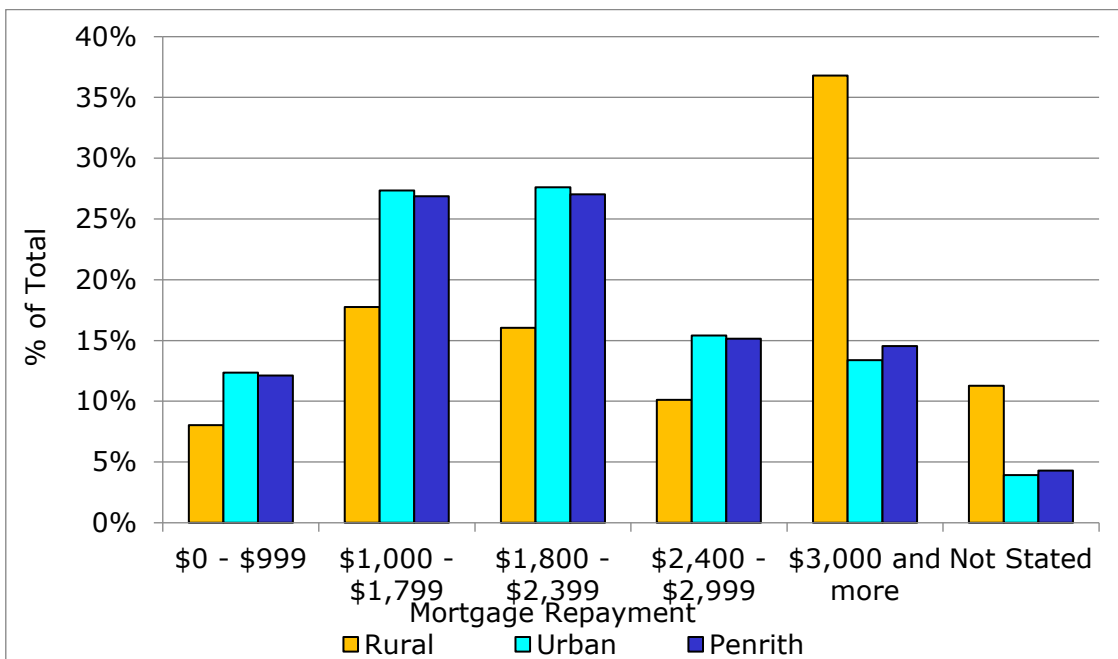
Figure 31: Mortgage Repayment
Source: ABS Census of Population and Housing

Figure 2.45 shows that there are more dwellings with a weekly rent in the rural areas of between $0 and $149 and slightly less with a rent of between $150 and $224 but more with a weekly rent of greater than $225 to $649 but less over $650 per week.
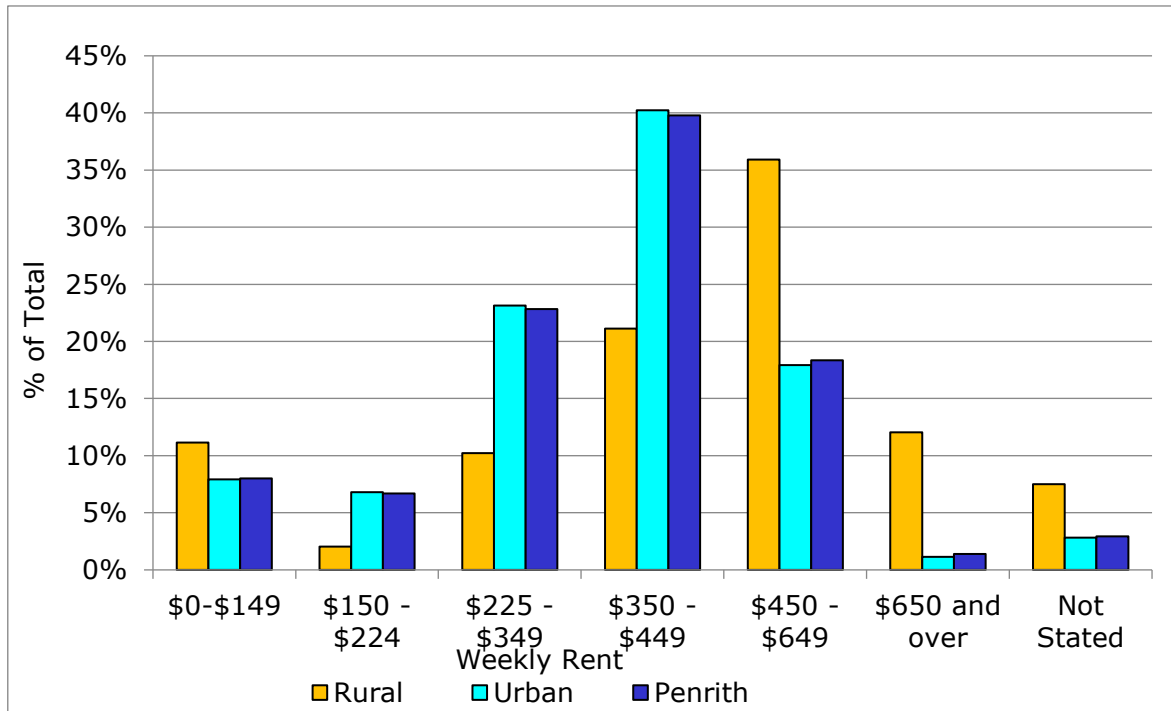
Figure 32: Weekly Rent
Source: ABS Census of Population and Housing

People in the rural area are less mobile than people in the urban area and the LGA. This can be seen from Figure 36 which shows that there are less people who lived at a different address 1 year ago than five years ago in the rural area than the urban area and LGA.
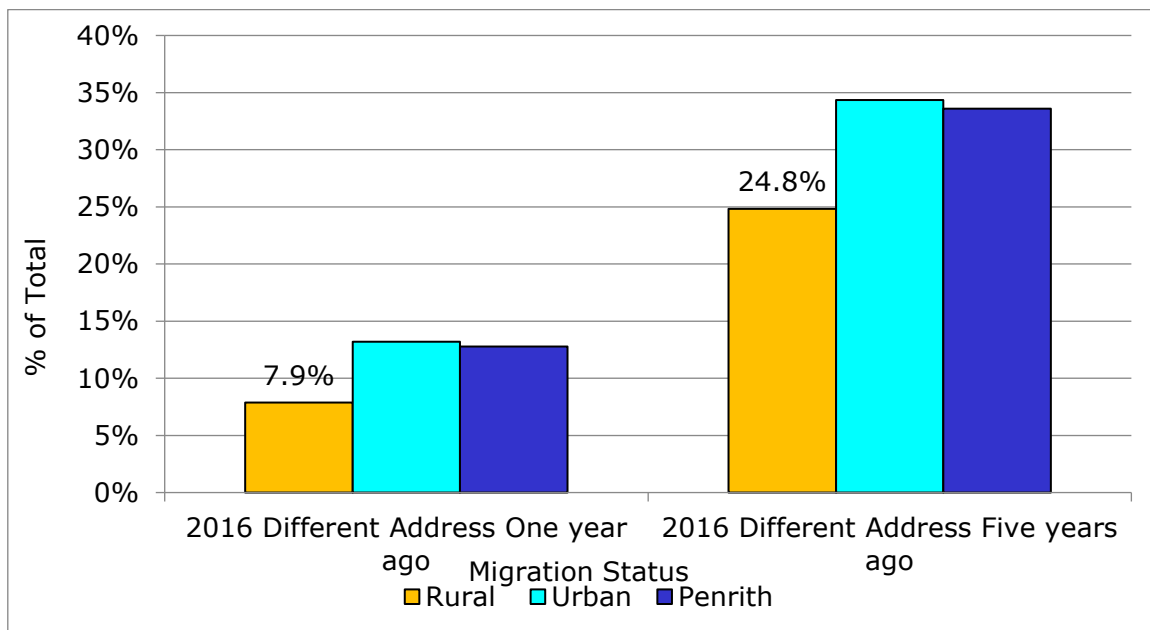
Figure 33: Migration Status
Source: ABS Census of Population and Housing

There are slightly more people with professional qualifications in the rural area than the urban area and LGA as can be seen from Figure 37. It also shows the comparison with Sydney, NSW and Australia which shows that there are more non-professional workers in the LGA.
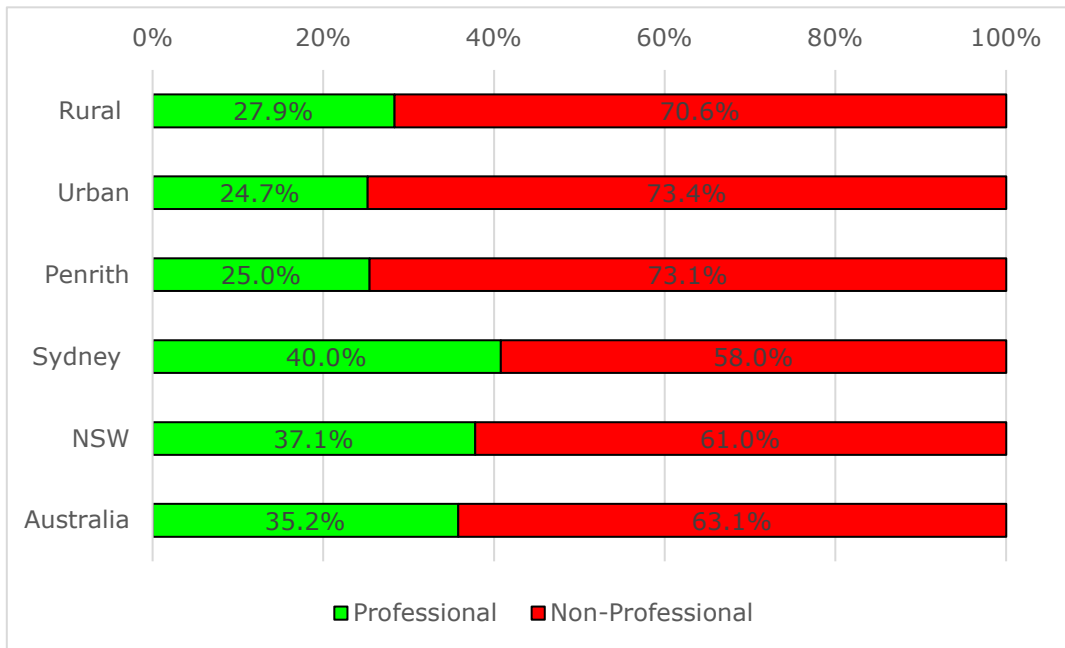
Figure 34: Professional and Non-Professional Occupation
Source: ABS Census of Population and Housing

The details of the tertiary qualifications of the workforce can be seen from Figure 38. There are less people with a Bachelor, Graduate Diploma / Graduate Certificate and Post Graduate degree. There are the same number of people with a certificate qualification.
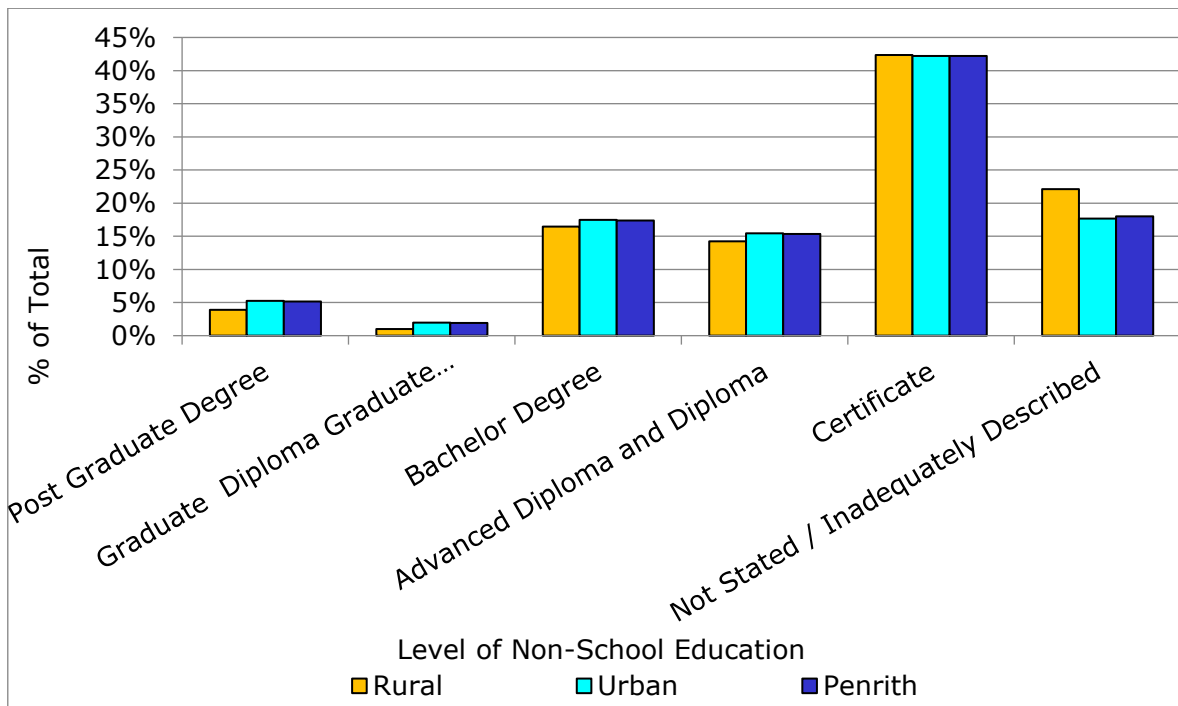
Figure 35: Level of Tertiary Education
Source: ABS Census of Population and Housing

3.3 Employment

There are slightly less people employed full time and slightly more part time workers and employed and away from work in the rural area than the urban area and LGA, as can be seen from Figure 39. It can also be seen that there are less people unemployed and looking for work.
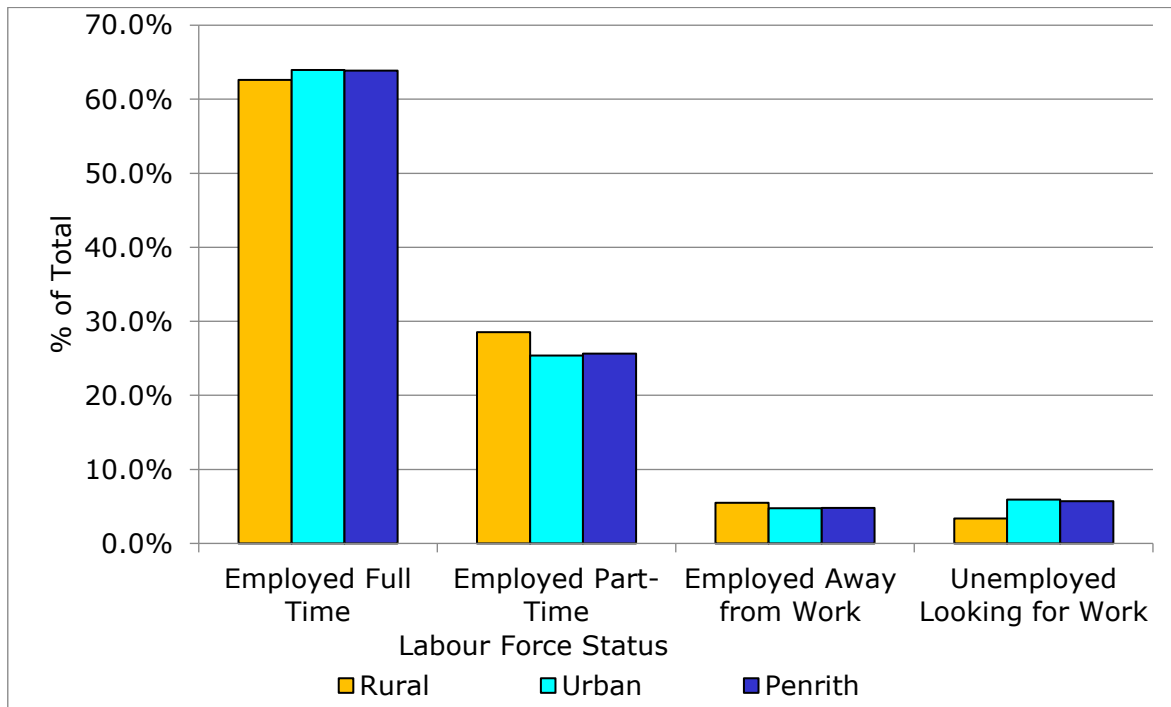
Figure 36: Labour Force Status
Source: ABS Census of Population and Housing

Figure 40 shows that the workforce participation rate is higher in the rural area than the urban area and LGA.
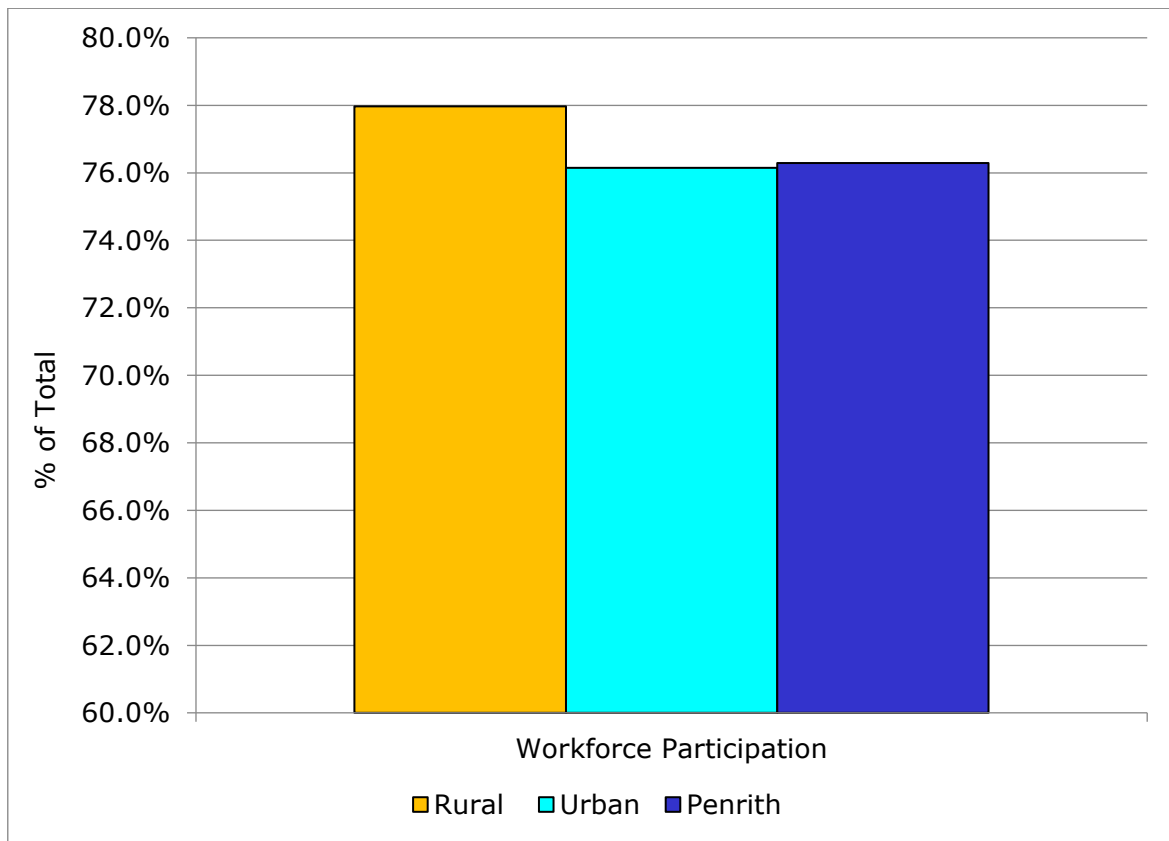
Figure 37: Workforce Participation
Source: ABS Census of Population and Housing

The industry sector of the rural workforce is shown in Figure 41. It is significant to note that the number one industry sector is construction followed by retail trade then health care and social assistance; manufacturing; transport, postal and warehousing; education and training; public administration and safety; professional, scientific and technical services; other services; accommodation and food services; agriculture, forestry and fishing;; wholesale trade; administrative and support services; financial and insurance services arts and recreation services; rental hiring and real estate services information , media and telecommunications; electricity, gas, water and waste services; and mining. It is significant to note that agriculture is number ten when it would be expected to be number one in a rural area and also that it is only 4.7% when it would be expected to be much higher.
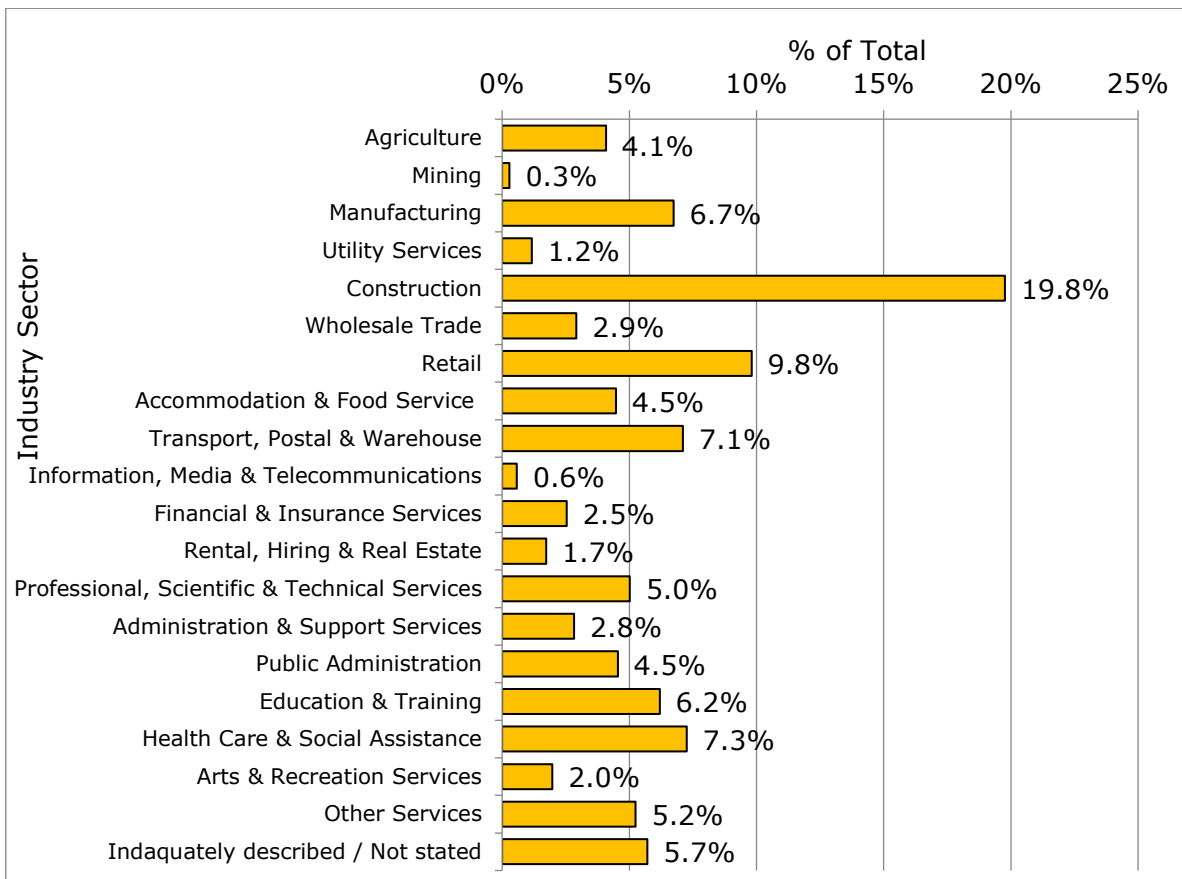
Figure 38: Industry Sector of Rural Workforce
Source: ABS Census of Population and Housing

The industry sector of the workforce for the rural, urban and LGA are shown in Figure 42. This shows that comparatively, the rural area has more people employed in agriculture (which would be expected) and also more in construction; professional, scientific and technical services; administrative and support services; education and training and other services.
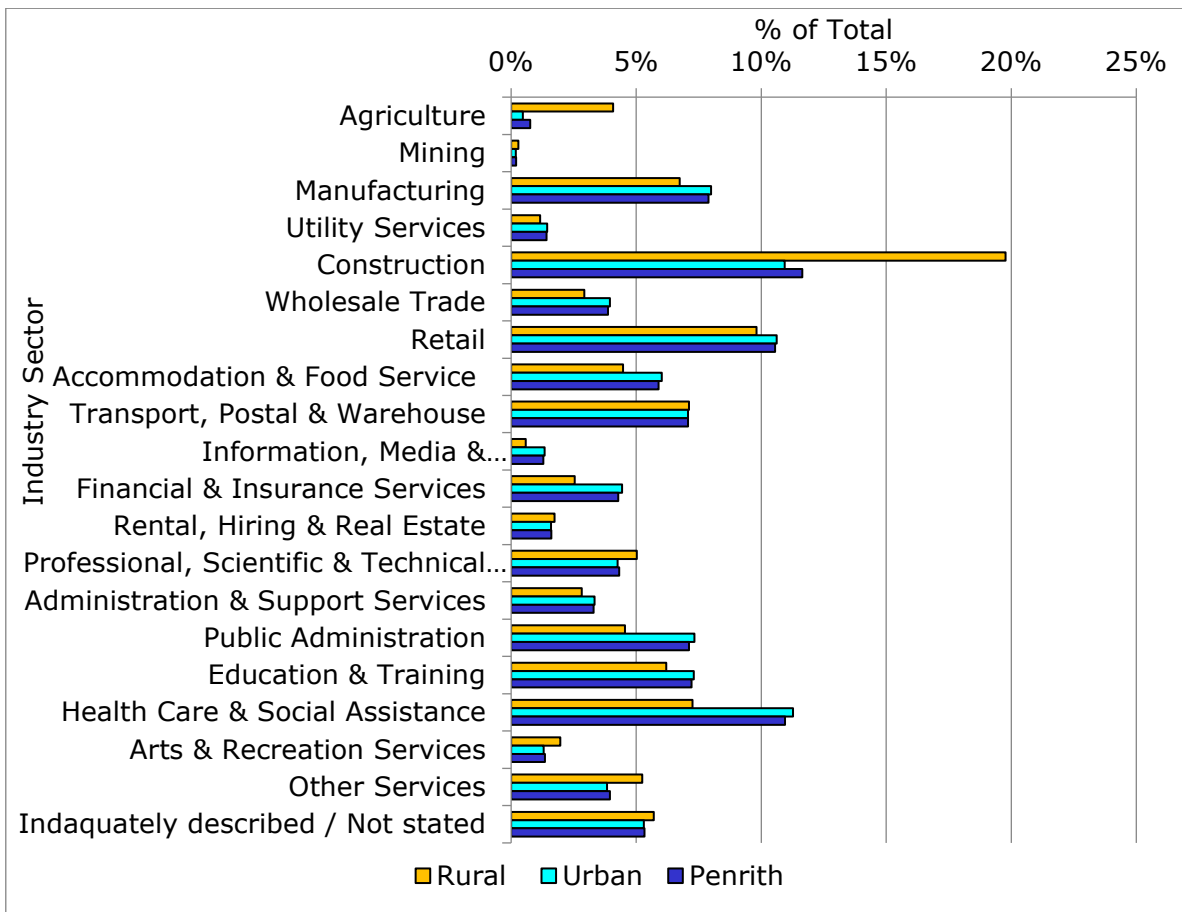
Figure 39: Industry Sector of Workforce
Source: ABS Census of Population and Housing

Map 4 shows the spatial distribution of the people employed in agriculture. The average of the rural land is 4.1% employed in agriculture. However, this data needs to be used with caution as it is possible that a number of people living in these areas of high agricultural employment are retired and operating the farm on a part-time basis. It is noted that the question asks what employment did was the person in on the week before of the Census night.

Legend
Employed in Agriculture (%)

🟥	20 to 26.9
🟧	10 to 20
🟨	4.1 to 10
🟩	2 to 4.1
🟦	0 to 2
🟦	Urban Areas
⬛	Major Roads

Rural Land Average Employed in Agriculture: 4.1%

0   5
Kilometres

Map Prepared by Edge Land Planning
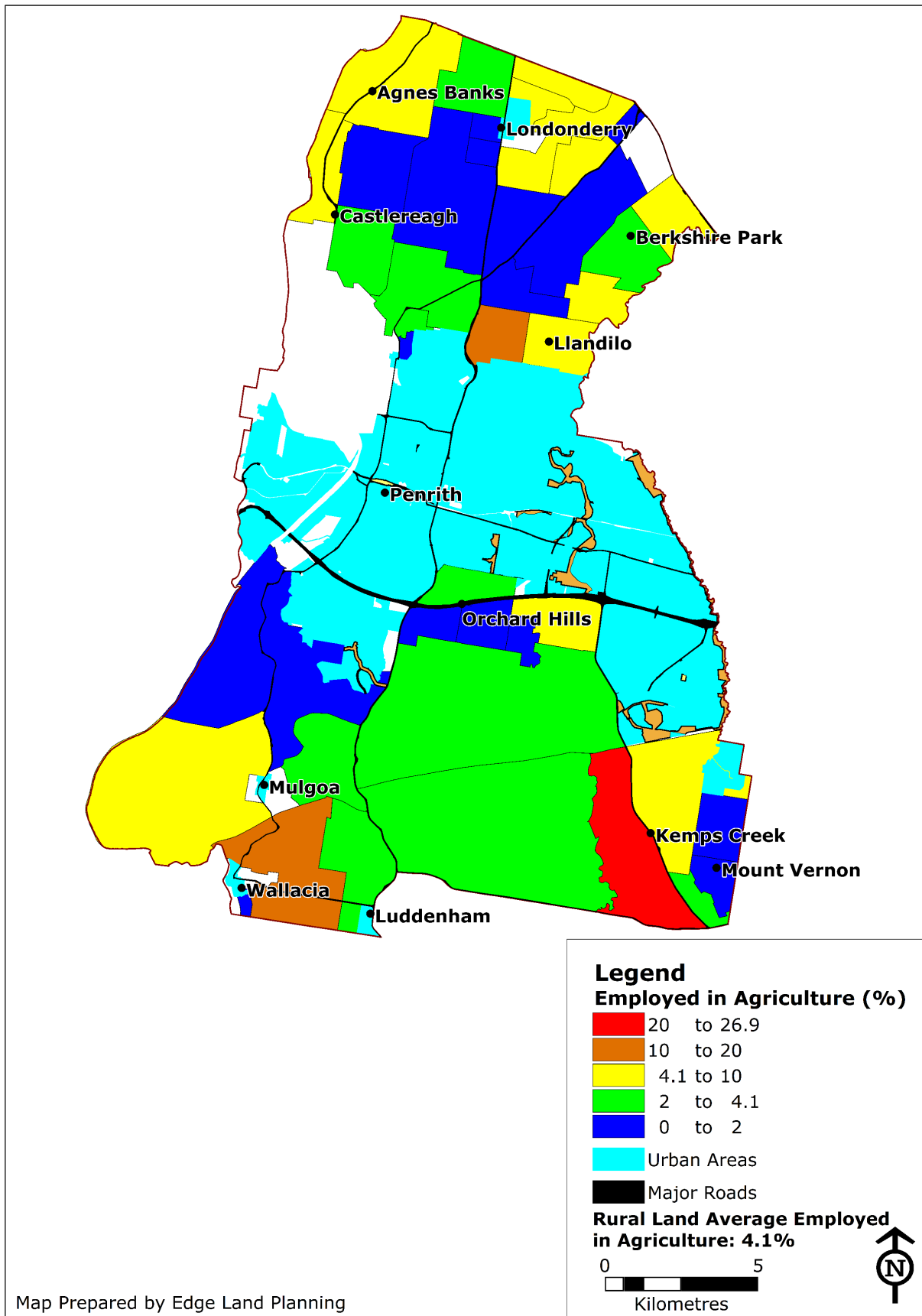
Map 4: Employed in Agriculture LGA

There are more managers and less professionals and more technicians and trades people in the rural areas and less community and personal services, clerical and administration, sales, machinery operators, and labourers' occupations in the urban areas as can be seen from Figure 43.
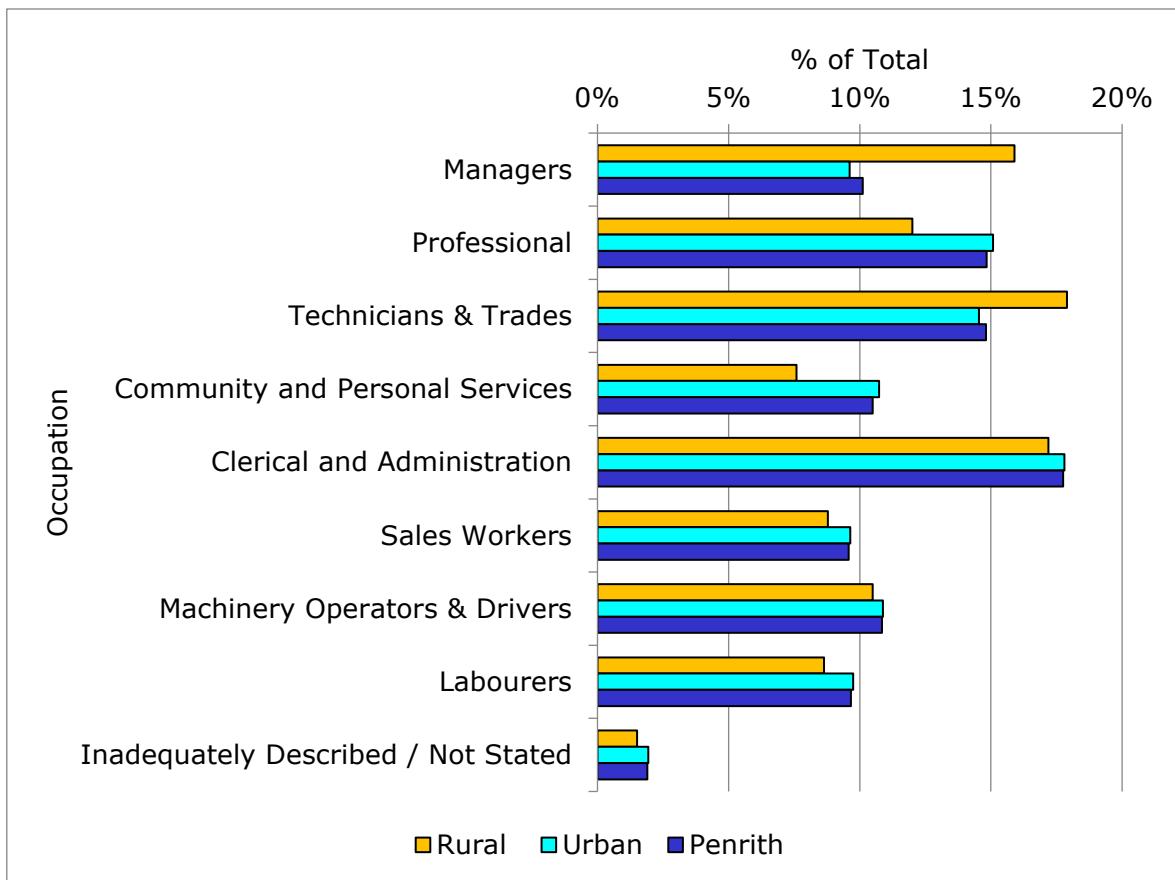
Figure 40: Occupation of Workforce
Source: ABS Census of Population and Housing

The majority of people drove to work as a driver in the rural and urban areas as can be seen from Figure 44, which shows that there are more people in the rural area than the urban and LGA.
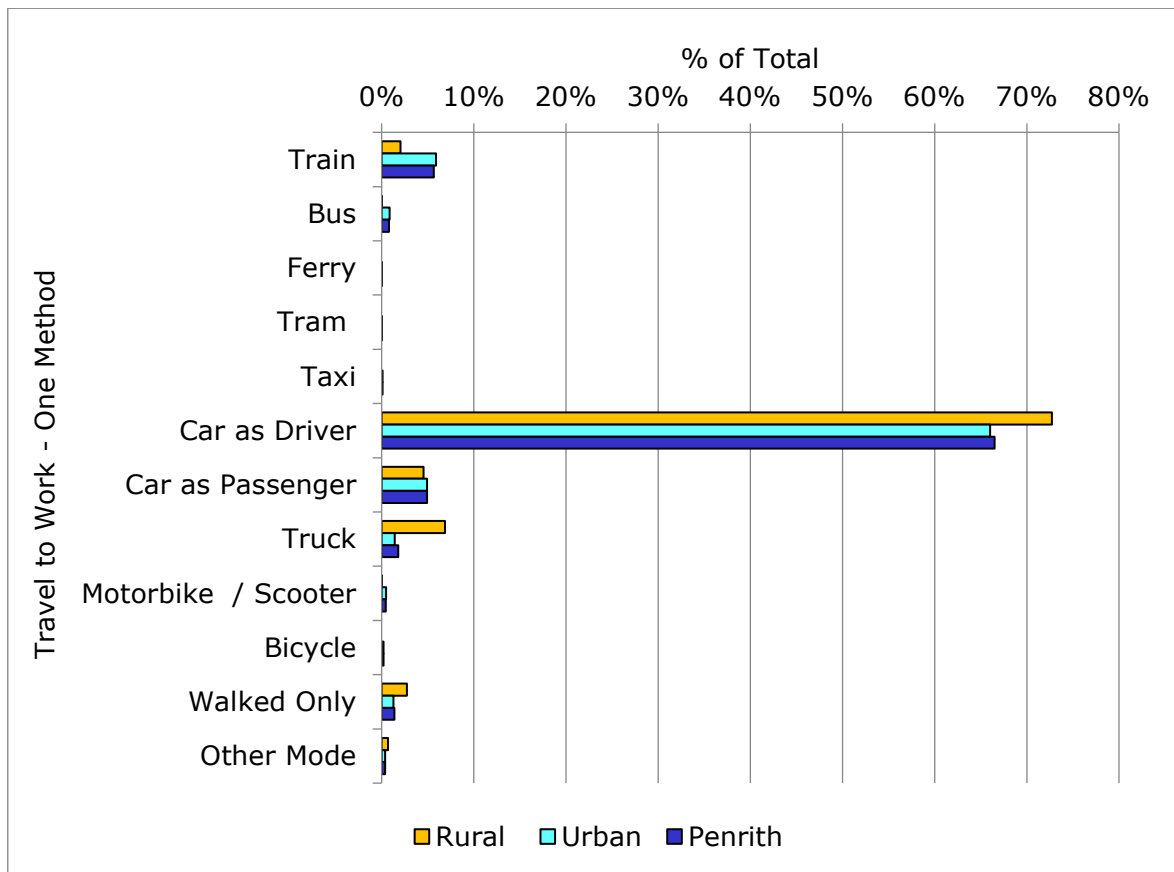
Figure 41: Method of traveling to work
Source: ABS Census of Population and Housing

Two- and one-half times more people in the rural areas worked at home than the urban areas and nearly twice as much as the LGA as can be seen from figure 2.57
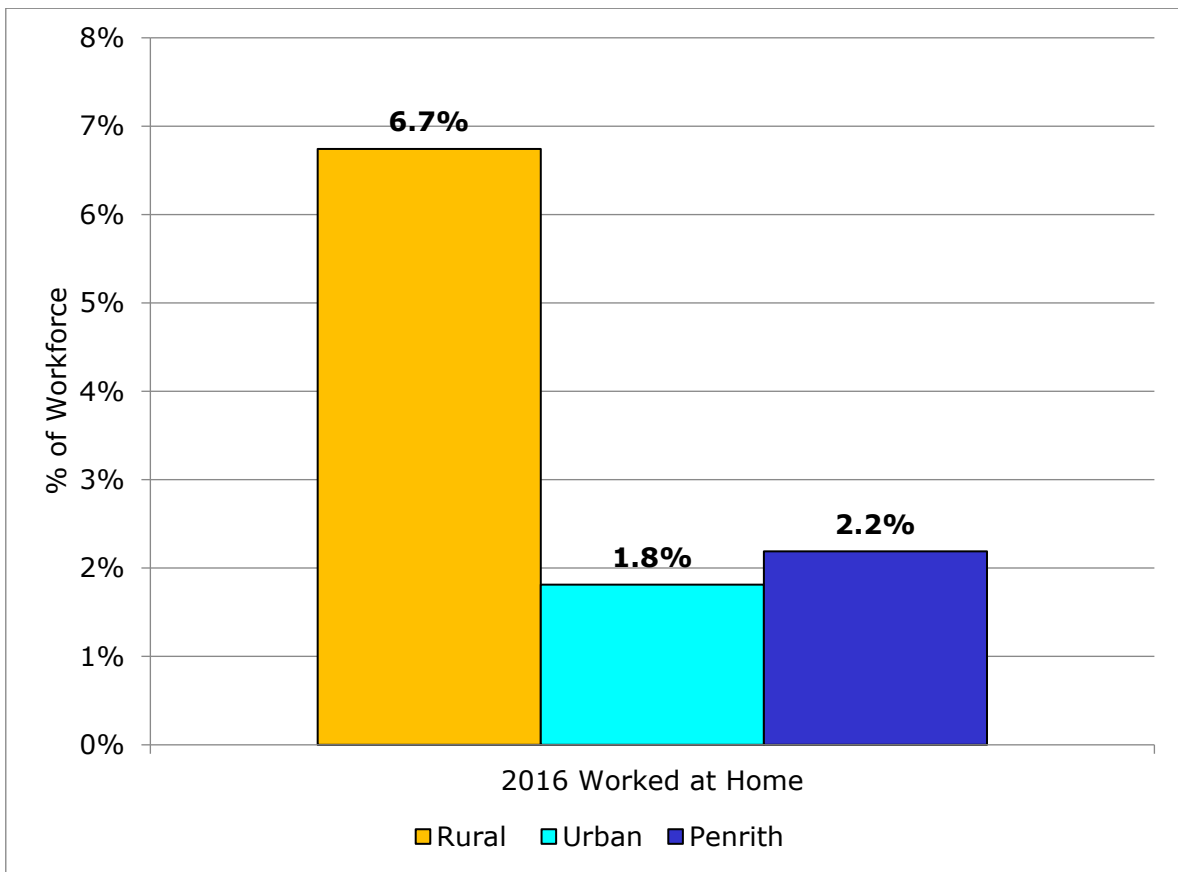
Figure 42: Worked at home

Source: ABS Census of Population and Housing

Chapter 4: Rural Land Use

The pattern of development in the rural area is dictated by the land use and the holding sizes as well as a range of environmental factors such as soil type, access to water and topography.

There are a variety of land uses within the rural parts of the LGA. They include intensive and extensive agriculture, native vegetation, rural residential, urban, extractive industries, commercial and light industrial uses. They all have an impact on each other as well as the environment. The two mainland uses which are of note are agriculture, and rural residential. The resultant rural land use conflict from the various uses is perhaps one of the most important issues to be addressed for the future of agricultural landscapes. Finding the balance between these often-competing desires for rural land is the key to planning for rural areas.

There are basically two forms of land use within the study area – ones based on agriculture and ones that do not have an agricultural base.

The uses based on agriculture include the following:
- Irrigated plants
  - Vegetables grown in market gardens and protected cropping structures,
  - Nurseries
  - Turf
- Intensive Animals
  - Poultry meat and egg production
- Grazing animals
  - Cattle,
  - Horse studs, agistment/boarding, and horses associated with rural residential use
- Rural Tourism uses
  - Farm gate sales,
  - Horse riding,
  - Farm Stay Accommodation.

There are also a number of uses that are not based on agriculture which include the following:
- Rural residential uses
  - Rural residential dwellings only,
  - Home businesses, home industries, tradesman or truck depots,
  - Horses (domestic / recreational)
- Commercial Uses
  - Petrol stations, rural industries, rural produce stores, shops, medical practitioners, mechanical repairs, clubs, cafes and restaurants
- Extractive industries
  - Quarries
- Public Uses
  - Cemeteries, halls, churches, pony clubs
- Rural Tourism uses
  - Caravan Parks, camping grounds
- Village development
  - Residential, commercial, industrial uses

4.1 Land Use Survey

A detailed land use survey has been carried out of the study area to investigate and document a baseline state of these existing land uses. Its purpose is to give an understanding of the land use pattern so that appropriate decisions can be made having regard to the mixture of land uses throughout the area as well as to identify those localities that have a predominance of a particular land use in terms of the number of uses. is

The land use survey was based on the socio-economic characteristics rather than the landform characteristics because its purpose is to identify agricultural land uses as well as non-agricultural ones like rural residential, commercial and others. It is based on the cadastral boundaries rather than topographic features. The survey counted the number of lots that were used, and these were amalgamated into holdings which have been counted to provide the details below. This survey was carried out in January 2022. The methodology and details of the land uses – both primary and secondary can be found at Appendix 1.

The land uses were categorised into the following land use types

- Commercial
- Extensive Agriculture
- Extractive Industries
- Intensive Animals
- Irrigated Plants

- Native Vegetation
- Public Uses
- Rural Residential
- Vacant

Within each of these categories there are a number of subcategories relating to the specific use of the land. It should be pointed out that the land use survey categorised the primary use of the property and where a property had a number of uses, the dominant use was chosen. The native vegetation land use has been mapped but has not been counted in the analysis because of the extent of it as well as the fact that it is not a socio-economic based land use and is not within the purpose of the survey. The environmental and economic value of the native vegetation in the rural lands should be subject to separate investigation.

There is a total of 4,580 uses that were counted in the land use survey. The overall land uses are shown in Table 6, which lists the total number of uses as well as the land areas occupied by those uses and analyses the relative percentages. The percentage of the total number of uses is shown graphically in Figure 18.

Map 5 shows the land use in broad terms for the entire LGA. The majority of land for extensive agriculture is located in the southeast of the LGA, which has been rezoned for

The survey found that rural residential is by far the dominant land use representing 87.1% of the total number of land uses. This is followed by irrigated plants with 3.8%, extensive agriculture (1.7%), commercial (1.5%), (1.8%), public uses and vacant (1.8%), then intensive animals (1.3%), and extractive industry with 0.05% of the number of uses.

Table 6 also shows the area of each land use. It can be seen that rural residential takes up 54.1% of the land area followed by public use, and extensive agriculture, intensive animals and irrigated plants. The reason for the high area of public use is because it includes the Penrith Lakes and the Orchard Hills Defence Establishment, which are both designated as public uses, despite allowing only limited public access.

Table 6: Number of Primary Land Uses

Uses	Total LGA			
	Count	% of Total	Area	% of Total
Commercial	76	1.6%	718	3.6%
Extensive Agriculture	55	1.1%	2,440	12.2%
Extractive Industry	6	0.1%	133	0.7%
Intensive Animals	56	1.2%	1,348	6.7%
Irrigated Plants	192	4.0%	1,220	6.1%
Public Uses	78	1.6%	3,175	15.9%
Rural Residential	4,298	88.6%	10,824	54.1%
Vacant	89	1.8%	159	0.8%
Total Uses	**4,850**	**100.0%**	**20,015.2**	**100.0%**

Source: Penrith Rural Land Use Survey January 2022
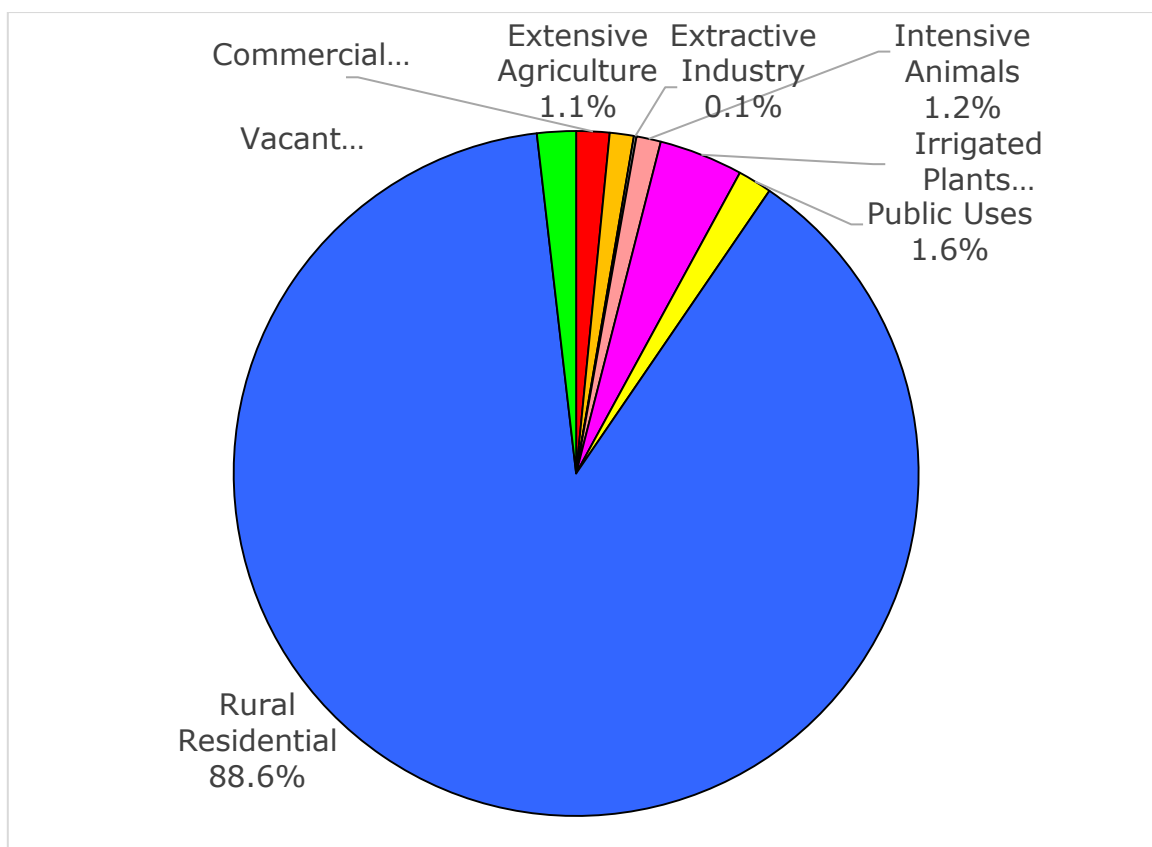
Figure 43: Number of Land Use activities by category in Penrith LGA
Source: Penrith Rural Land Use Survey February 2022
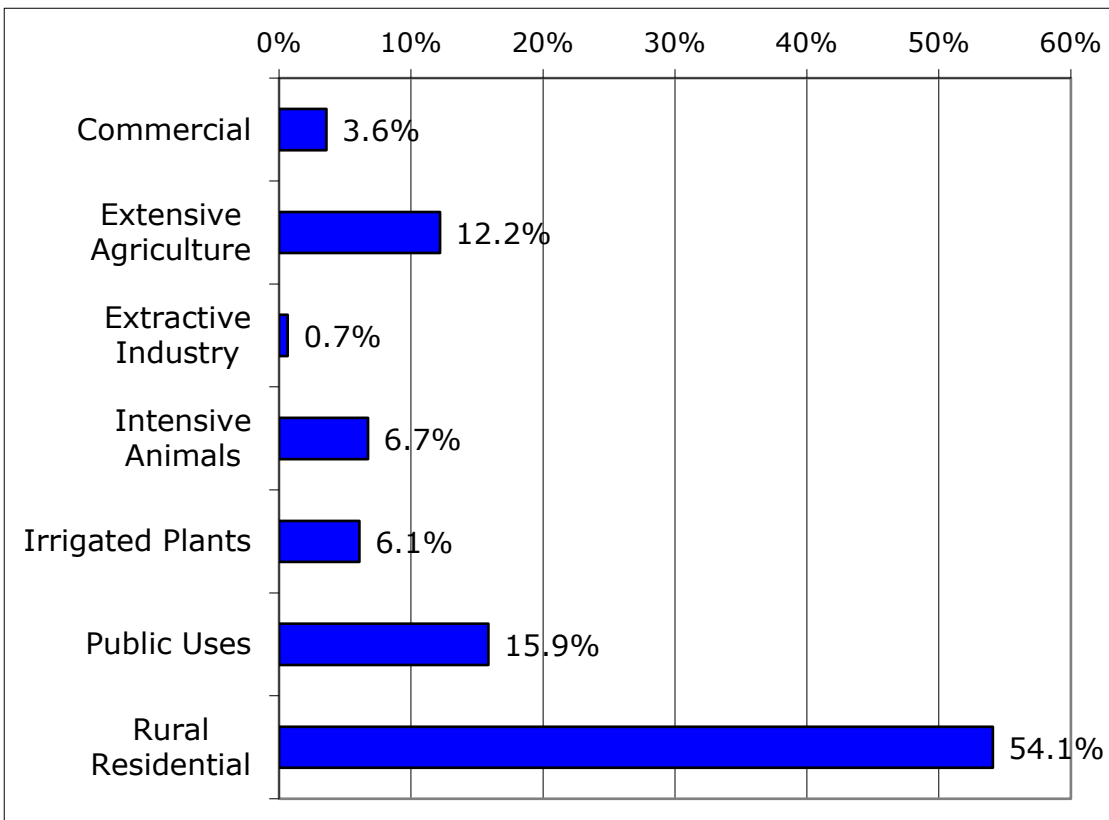
Figure 44: Area of Land Use by category in Penrith LGA
Source: Penrith Rural Land Use Survey February 2022

Legend
Prime Use
- Commercial
- Extensive Agriculture
- Exractive Industry
- Intensive Agriculture
- Irrigated Plants
- Native Vegetation
- Public Use
- Rural Residential
- Urban
- Vacant
- R5 Large Lot Residential & C4 Environmental Living Zones
- Major Roads

0 ───────── 5
Kilometres

N

Agnes Banks
Londonderry
Castlereagh
Berkshire Park
Llandilo
Penrith
Orchard Hills
Mulgoa
Kemps Creek
Wallacia
Luddenham
Mount Vernon

Map Prepared by Edge Land Planning

Map 5: Distribution of Land Use by primary use

4.1.1. Intensive agricultural uses

Among the intensive agricultural uses in the LGA the main activities include irrigated plants such as market gardens, nurseries, orchards, protected cropping and turf farming, as well as intensive animal uses including poultry and horse studs. Their spatial distribution of intensive agricultural uses is shown on Map 6.

There are nine categories of irrigated plants which were observed during the land use survey, and they are as follows:

- Hay
- Market Garden
- Market Garden plus Protected Cropping
- Protected Cropping
- Mushrooms
- Nursery
- Orchard
- Turf
- Vineyard

Figure 45 shows the proportion of these irrigated plant uses for the entire LGA. Market gardens make up the largest proportion of irrigated plant uses followed by greenhouses, nurseries and turf farming which make up nearly all of the land uses. There are some small areas of nurseries, mushrooms and hay. There are also some diversified farms, such as market gardens which also have protected cropping.
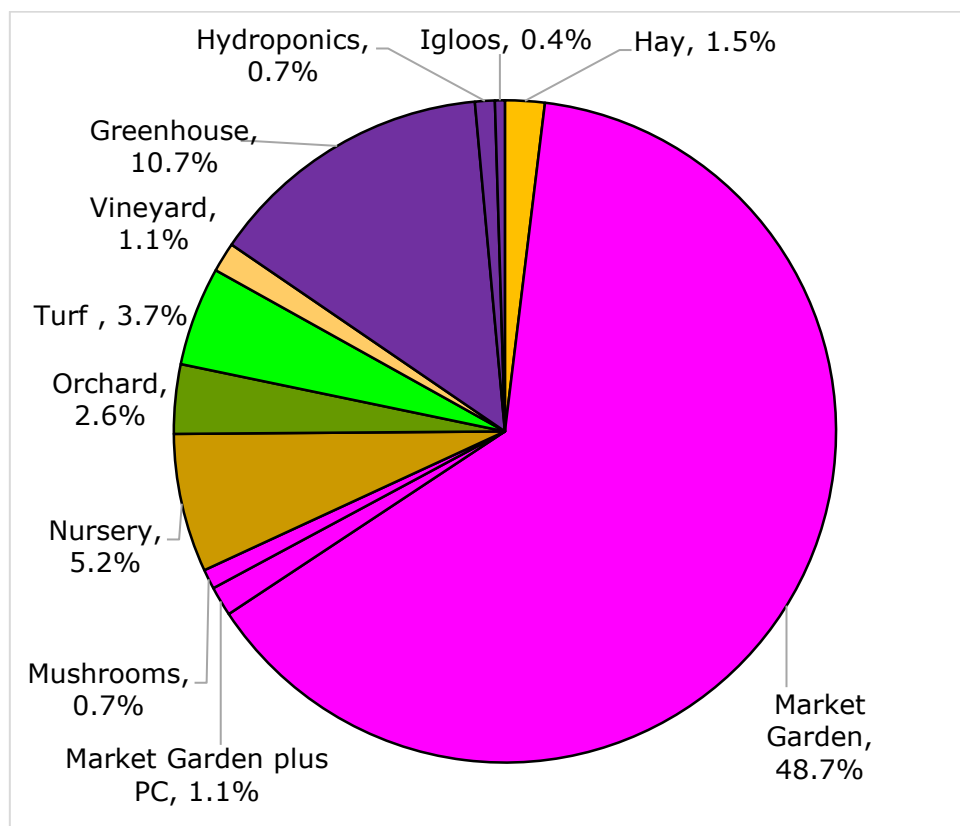
Figure 45: Irrigated Plant Land Use

Legend
Prime Use

■	Commercial
■	Extensive Agriculture
■	Exractive Industry
■	Native Vegetation
■	Public Use
■	Rural Residential
■	Urban
■	Vacant

Second Use

■	Horse Stud
■	Poultry
■	Market Garden
■	Mushroom
■	Protected Cropping
■	Hydroponics
■	Nursery
■	Orchard
■	Turf Farm
□	R5 Large Lot Residential & C4 Environmental Living Zones
■	Major Roads

0   5
Kilometres

N

Map Prepared by Edge Land Planning

Map 6: Rural Land Use Intensive Agriculture

The other significant agricultural land use in the LGA is intensive animals, which includes horse studs comprising 27.8% of intensive agricultural use for animals, and poultry farms growing eggs as well as chicken for meat. Figure 46 shows the distribution of the intensive animal uses.
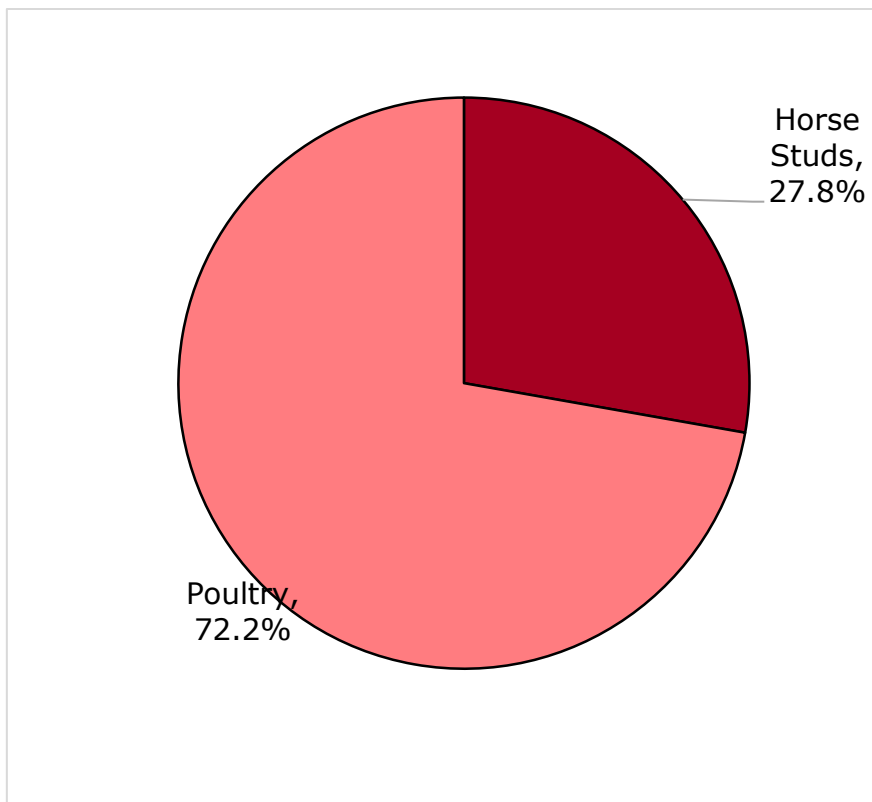
Figure 46: Intensive Animals

4.2 Holdings Analysis

This section details the holdings within the study area and it includes all of the rural land uses including agricultural,rural residential and public uses.

The rural land in the LGA is highly fragmented with the average size being 5.7 ha and a median of 2.0 ha. This can be seen from the holding analysis which is shown in Figure 46 and the spatial distribution can be seen from Map 7. It can be seen that the most holdings are in the 0.81 – 3.0 ha range and followed by less than 0.8 ha range and that there is not very many larger than 3ha. In fact, 88.4% of the holdings are less than 3 ha and 97.2% are less than 8 ha. In Western Sydney the number of holdings less than 3 ha was 76.6% so it can be seen that overall, rural land in Penrith is more fragmented than in the Western Sydney District.

There is also a difference between the north and south parts of the LGA. In the north there are 2,309 holdings less than 3 ha and in the south, there are 1,552. The distribution of the holdings for north and south can be seen from Figure 47: Holdings North and South
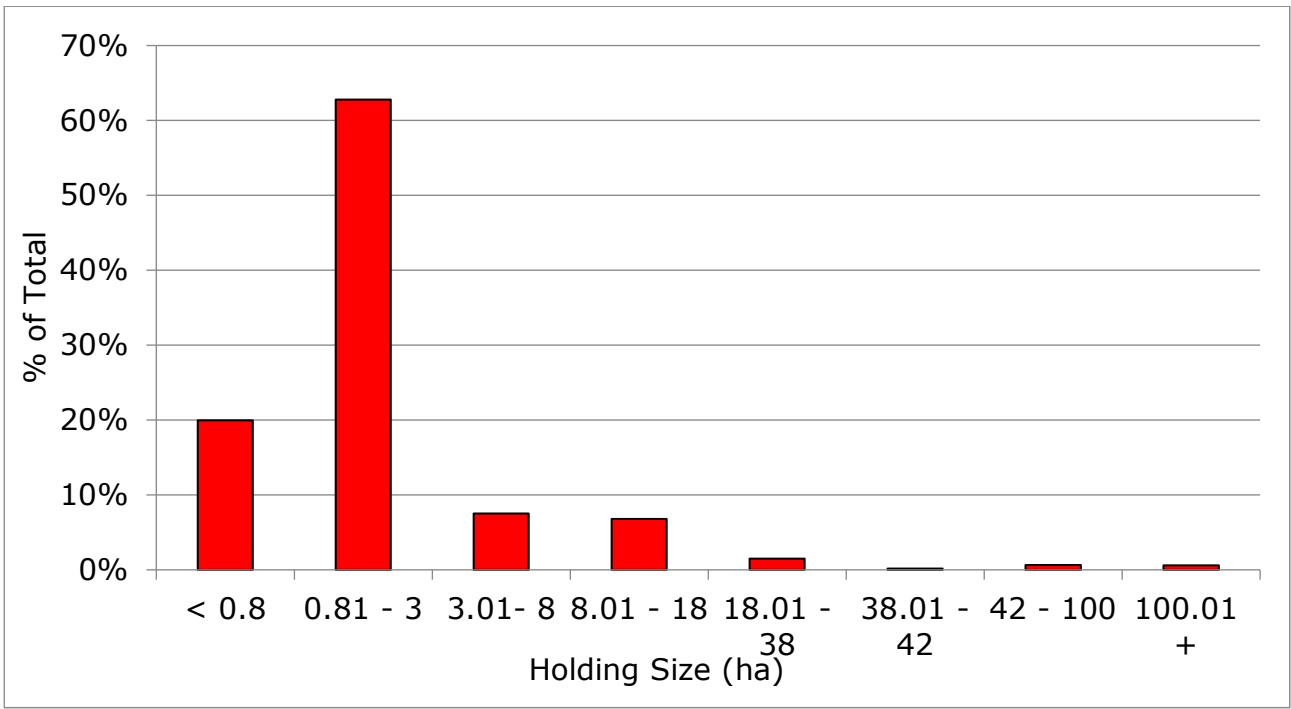
Figure 47: Rural land holdings
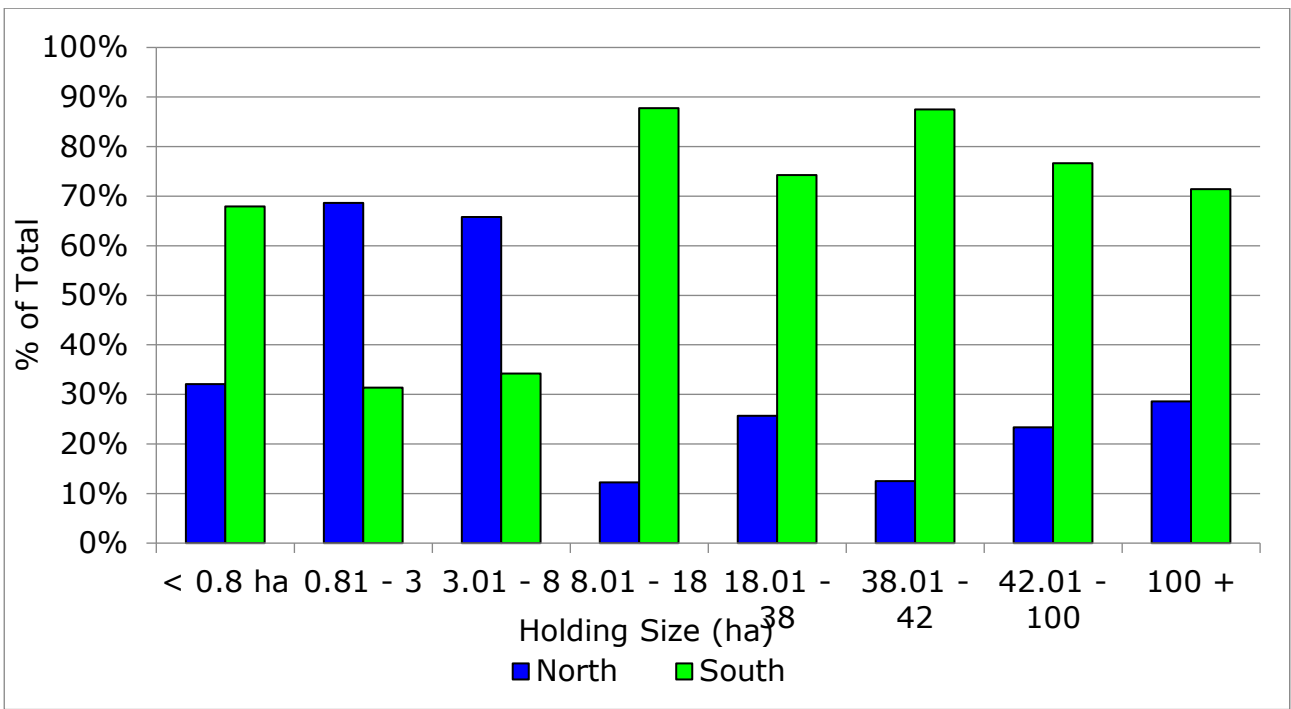
Figure 48: Rural land holdings North and South

Legend
Holding Range (ha)

- 500.01 to 1,690
- 100.01 to 500
- 42.01 to 100
- 38.01 to 42
- 18.01 to 38
- 8.01 to 18
- 3.01 to 8
- 0.81 to 3
- 0 to 0.8

Urban Areas

National Parks & Nature Reserves

Major Roads

0   5
Kilometres

N

Agnes Banks

Londonderry

Berkshire Park

Castlereagh

Llandilo

Penrith

Orchard Hills

Mulgoa

Kemps Creek

Wallacia

Mount Vernon

Luddenham

Map Prepared by Edge Land Planning
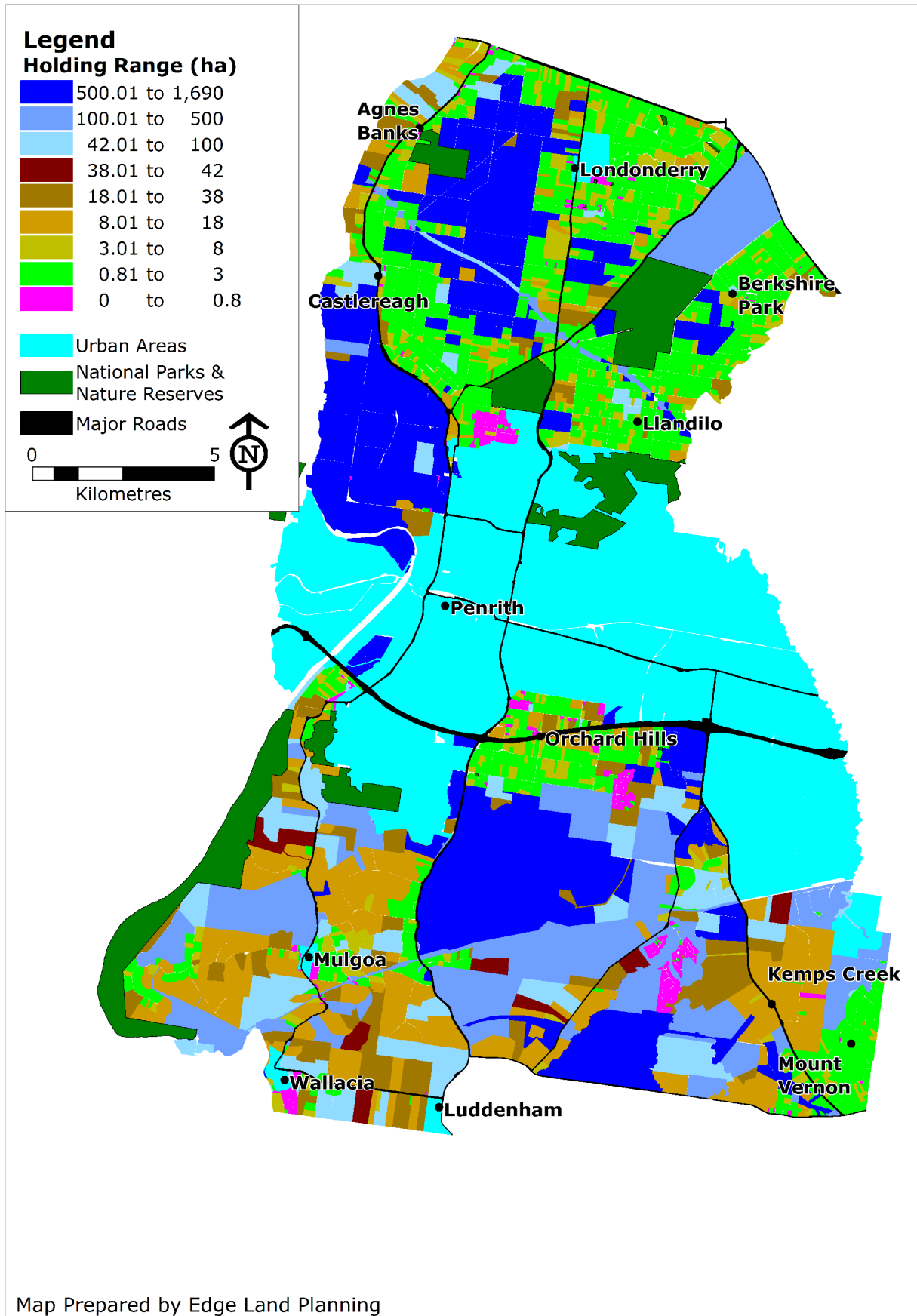
Map 7: Holdings Analysis

4.3 Rural Residential

The term "rural residential" has a number of different meanings. It generally refers to estate type of living on lots between 0.4 Ha and 2 Ha where services may or may not be provided. This type of land use is found in areas such Cranebrook and Luddenham. However, the term is also used to cover rural living on larger lots (generally greater than 2 ha), that are scattered throughout the rural lands, where farming is not practiced on a full-time basis, or as the major source of income. These are generally referred to as hobby farms or lifestyle lots, where the residents merely seek a rural lifestyle.

The following definition is useful:

"The residential use of rural land is called rural residential development; that is, people live on rural lots, but use the land primarily for residential rather than agricultural purposes. Although some engage in 'hobby farming', most derive the principal source of their income from pursuits not carried out on the land. The main distinction between urban housing and rural residential housing is bigger lot size and larger distances between dwellings. This creates a sense of openness and of living in the landscape rather than in an urban area. Rural residential dwellings are often large (up to 1000 to 2000 square metres in floor area). They can be found in clusters of new houses and are often mixed with intensive plant and animal uses, which invariably leads to rural land-use conflict (Sinclair, Docking, Jarecki, Parker, & Saville, 2004). They can have varying degrees of native vegetation cover, from totally covered to totally cleared. This has been termed 'rural sprawl' (Daniels, 2014) because of its pervasiveness over the rural landscape, particularly adjoining the metropolitan areas as well as large cities and towns.

Rural residential development can be divided into two main categories: rural fringe and rural living. Rural fringe development is characterised by single detached houses and dual occupancies on lot sizes of approximately 4000 square metres to two hectares laid out in an estate. This estate usually joins or is in close proximity to an urban area.

Rural living, on the other hand, features single detached houses and dual occupancies on lot sizes between one hectare and 40 to 100 hectares and can adjoin farmland or vegetated areas (it should be noted that there are sometimes lots of less than one hectare). People living on these lots use the land primarily for residential purposes, although they may graze some cattle or have horses. This requires lot sizes of more than two hectares of land degradation is to be avoided. The lots do not adjoin townships or villages and are scattered throughout the rural landscape." (Sinclair & Bunker, 2012).

The land use survey has found that both rural fringe and rural living types of rural residential development exist in the study area.

Rural residential development accounted for 4,278 holdings which accounted for 88.6% of the total LGA land use, Map 7 shows the spatial distribution of the rural residential development

Observations of the use of land within the Rural Residential category show that these areas are dominated by lots with dwellings only, followed by trucks, horses, accommodation, kennels and home businesses (Figure 46). This is considered to be a conservative count and there are probably more of these than are shown on the graph. There are more trucks in the north than the south being 28.4% of the total rural residential and 11.8% in the south.

Figure 49: Rural Residential Land Use

Legend

Prime Use

- Commercial
- Extensive Agriculture
- Exractive Industry
- Intensive Agriculture
- Irrigated Plants
- Native Vegetation
- Public Use
- Urban
- Vacant

Rural Residentail

- Accommodation
- Kennels
- Dwelling House
- Home Business
- Horse
- Truck
- R5 Large Lot Residential & C4 Environmental Living Zones
- Major Roads

0 ——— 5
Kilometres

N

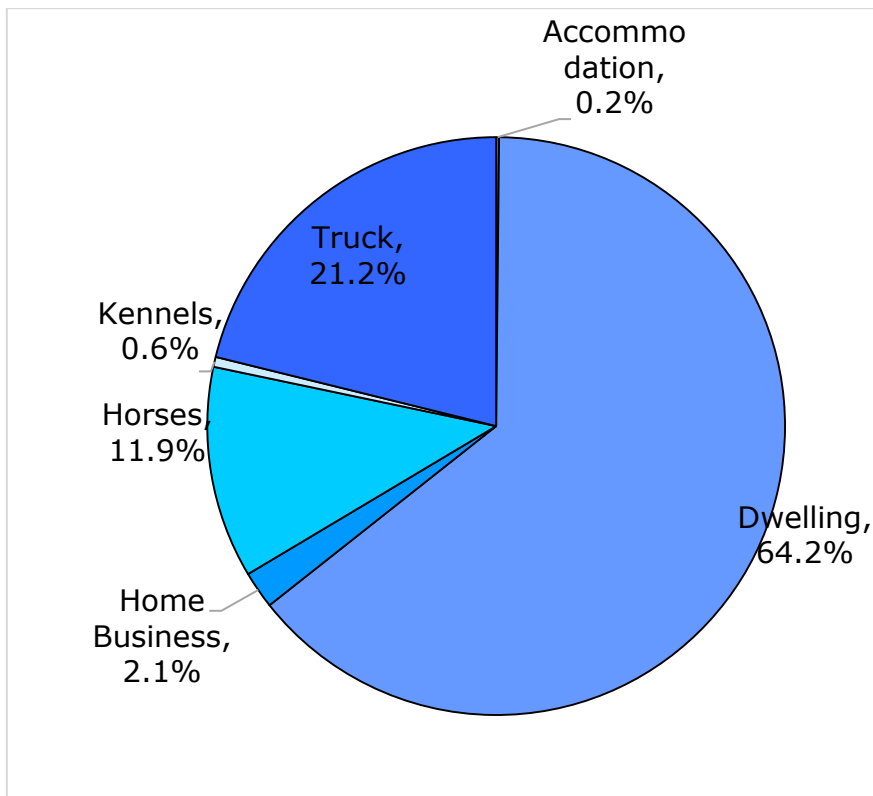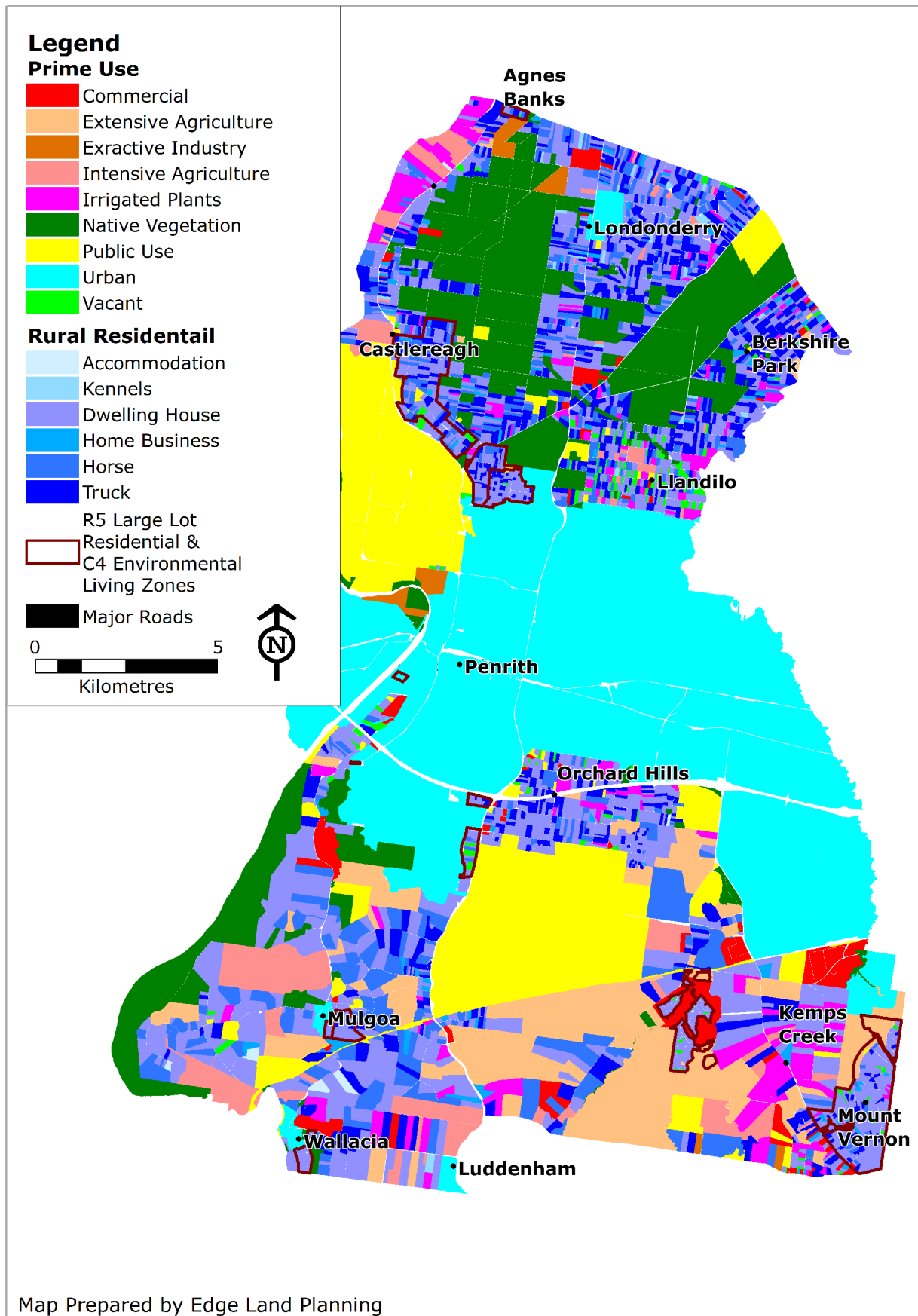Map Prepared by Edge Land Planning

Map 8: Rural Residential Land Use

One aspect of rural residential development is the size of the holdings and the distribution between north and south parts of the LGA. It can be seen that the north has most of the lots in the 0.8-3.0 ha range and this is where the trucks are parked.
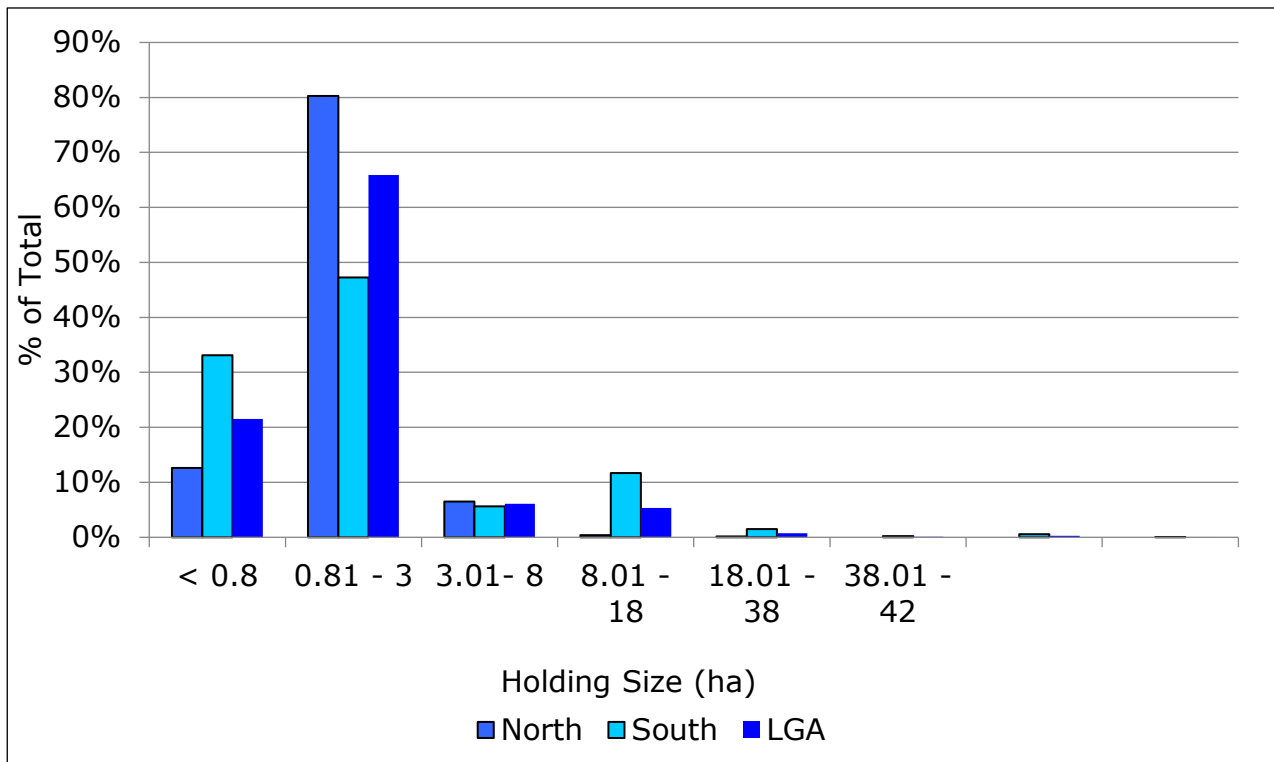

Figure 50: Rural Residential Holding Sizes North and South

Chapter 5: Conclusion

This study has shown that the Penrith LGA is the third most valuable LGA for agriculture in the Sydney Peri-Urban area behind Central Coast and Hawkesbury. This is mainly due to egg production, poultry meat and vegetables. The rural area is also a place for small businesses to operate and this is comprised of mostly construction and road transport operators.

There are a variety of land uses within the rural parts of the LGA. They include intensive and extensive agriculture, native vegetation, rural residential, urban, extractive industries, commercial and light industrial uses. They all have an impact on each other as well as the environment. The mainland uses which are of note are agriculture, and rural residential. The resultant rural land use conflict from the various uses is perhaps one of the most important issues to be addressed for the future of agricultural landscapes. Finding the balance between these often-competing desires for rural land is the key to planning for rural areas.

Rural residential land use is the most prevalent and this comprises accommodation, dwelling houses, home businesses, horses, kennels and trucks. The majority of truck uses are in the northern part of the LGA, and this is also where most of the construction and road freight uses are located.

It is significant to note that the most irrigated plants and also the largest holdings are in the southeast of the LGA and this land is to be rezoned as part of the Western Sydney Employment Area and Aerotropolis and so will be lost to agriculture. There is no land in the north of the LGA for it to move to that is not already being used for agriculture because of the small holdings in the north compared to the south. It could relocate to the Mulgoa Valley, but that land is very expensive land to purchase.

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Appendix 1: Land Use Methodology

The Land Use Survey:

A major component of this study has been a land use survey of all of the land within the study area. The purpose of the land use survey is to provide a baseline of information regarding the current use of rural and environmental lands.

The preparation of a land use survey is one of the most important components when zoning rural land. Each parcel of land has been inspected and given a land use description. This has been entered into Council's Property Information database and mapped using a GIS.

The first step is to identify the categorisation of the land uses to be surveyed. The land use has been categorised into primary and secondary land use categories. The primary land use categories are as follows:

- Commercial
- Extensive Agriculture
- Extractive industries
- Irrigated Plants
- Intensive Animals
- Native Vegetation
- Public Use
- Rural Fringe
- Rural Living
- Vacant

Definitions of each use which were used for the purpose of identifying the land uses are as follows:

- *Commercial* uses are uses that are used for a commercial or industrial type of use and which do not have any dwellings associated with them.
- *Extensive Agriculture* means the growing of plants using natural rainfall or the rearing of animals using grazing as a feeding method. It also includes the growing of fodder crops and irrigated pasture.
- *Extractive Industry* means a use that extracts material from the land and includes mining, sand and clay mining and quarrying of sandstone and other stones.
- *Irrigated plants* mean the growing of vegetables and ornamental plants for commercial gain using the application of irrigated water and includes market gardening, protected cropping structures, orchards, vineyards, and other similar uses.
- *Intensive Animals* means the rearing of animals using a feeding method other than natural grazing and includes poultry and piggeries mainly.
- *Native Vegetation* means a lot that has no dwellings or structures on it, and which has the majority of the land covered in native vegetation.
- *Public Uses* mean a use that is commonly used and or operated by a public authority or associated body. It includes community facilities, golf courses and Government owned uses of the land.

- *Rural Residential* means a house on a lot that is greater than 1 ha generally, and is in a rural environment where the main source of income is from other sources than agricultural use of the land. Rural-residential is further divided into three categories, being:
  - o *Rural Fringe* (generally up to 3.0 Ha).
  - o *Rural Living less than 3.0 Ha;* and
  - o *Rural Living* greater than 3.0 Ha
- *Vacant* land is land that is mostly cleared of native vegetation, and which does not have any dwellings or other structures on it.

The sub-categorisation of rural residential was done after the land use was coded. The rural fringe sub-category was determined by reference to the R5 Large Lot Residential zone. The rural living category is determined by subtracting the rural fringe category from the rural residential data and the further sub-categorisation was determined by reference to the holding size of each parcel and the ranges of less than 3 ha and greater than 3 ha.

The detailed categorisation is presented in the following table:

LAND USE SURVEY CODES

| PRIMARY | | SECONDARY | |
Description	Code	Description	Code
Commercial	CO	Abattoir	AB
		Accommodation	AC
		Child Care Centre	CC
		Cellar Door	CD
		Conference Centre	CF
		Campgrounds	CG
		Club	CL
		Caravan Park	CP
		Bus Depot	BD
		Education	ED
		Golf Course	GC
		Manufacturing	MF
		Mechanical Repairs	MR
		Paintball	PB
		Pool	PL
		Petrol Station	PS
		Rifle Range	RR
		Restaurant & Cafe	RS
		Shop	SH
		Sawmill	SM
		Sand and Soil Supplies	SS
		Springwater	SW
		Truck Depot	TD

PRIMARY		SECONDARY	
		Tourist	TO
		Veterinary Surgeon	VS
Extensive Agriculture	EA	Grazing	GR
Extractive Industry	EI	Sand Extraction	SA
		Sandstone Quarry	ST
Intensive Animals	IA	Dairy	DA
		Horse Stud	HS
		Pigs	PG
		Poultry	PO
Irrigated Plants	IP	Forestry	FO
		Lucerne	LU
		Market Garden	MG
		Market Garden Protected Cropping	MG PC
		Mushrooms	MU
		Nursery	NU
		Orchard	OR
		Protected Cropping	PC
		Protected Cropping Greenhouse	GH
		Protected Cropping Hydroponics	HY
		Protected Cropping Igloos	IG
		Turf Farm	TF
		Igloos	IG
Native Vegetation	NV	Native Vegetation	
Public Use	PU	Royal Australian Airforce	AF
		Bushfire Brigade	BF
		Cemetery	CE
		Community Facilities	CF
		Church	CH
		Crown Land	CR
		Electricity	EL
		Hall	HL
		Hospital	HO
		Open Space	OS
		Pony Club	PY
		Race Club	RC
		Showground	SG
		School	SL
		Telstra	TL
		University	UN
		Waste Disposal	WD
		Water & Sewer	WS
Rural Residential	RR	Bed & Breakfast	BB
		Dwelling	DW

PRIMARY		SECONDARY	
		Home Business	HB
		Horse	HO
		Truck	TR
Rural Fringe Vacant	VA	Cleared Land	CL

Methodology:

There are 3 components to the carrying out of the land use survey as follows:

- Preliminary identification of land use.
- Study area inspection.
- Data entry and mapping.

Preliminary identification of land use occurred in the office prior to the field inspection. Aerial photography was used to identify the land use. The major things to be picked out are extensive agriculture, intensive animals (horse studs and poultry), irrigated plants (particularly market gardens and turf farms), dwellings on small lots, vacant land, lots which are totally covered with native vegetation, and extractive industries. Only one major land use was identified for each site. An assumption was made that lots less than 40 ha which did not have an intensive agricultural, commercial, industry, public or government use and were in a separate ownership to the surrounding land, were rural residential. Where there is just a dwelling, it was coded in the second use as dwelling, if there was a horse, horse and if there was a truck use it was coded as a truck use. If the land is cleared and has a dwelling house located on it and is either greater than 40 ha or was owned in association with the surrounding land and was greater than 40 ha, it was coded as extensive agriculture.

This information was entered into the database using the coding that has been identified for the primary and secondary land uses.

The study area inspection was carried out by windscreen survey of all of the roads within the rural parts of the LGA. This was done to check the primary land use categories and also to enter secondary ones that could not be identified from the aerial photos. As each road is driven on the land use is clarified against the preliminary identification. Signage, which gives an indication that the property may be used for a secondary use such as a home business or a commercial use, was also noted. Many photos were taken of the land use and general landscape of the rural lands.