

Growing Food in a Residential Landscape

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Abstract

Food has always been grown on the peri-urban areas of large cities around the world. However as urbanisation has occurred, the former food growing land has been paved over forcing the food growers to relocate to the new peri-urban area which is now further away from the city centre. This is the way that the growth of Australian metropolitan areas has occurred, yet the peri-urban land is still a significant producer of food. The ABS Agriculture census has shown that the peri-urban areas grow 47.2% of Australia's perishable vegetables. Using the Sydney peri-urban area as a case study, it will be shown that this food is grown in a landscape that is mostly rural residential in use. The juxtaposition of rural residential land use to food production creates land use conflict. Land use conflict arises when people don't have any connection with the agriculture and merely seek a rural lifestyle. Using the ABS Census of Population and Housing, it will be shown that the people living in the peri-urban area have demographic make-up more akin to an urban area than a rural one. This 'urbanisation' of the food growing areas is a phenomenon that is increasing and the evidence provided by this paper will show that the production of food is a necessary land use for the peri-urban area. We cannot just push it over the range into the inland areas because the climate and soils there are not conducive to growing these perishable vegetables. Add to this the growing popularity of the local food movement as well as the transport costs and long supply chains and there is more reason to keep growing food in the peri-urban area. The production of food therefore is an industry that needs to be taken into account by the State Government when considering the strategic planning for the growth of Sydney as well as the other metropolitan areas around Australia.

Introduction

Food has always been grown in the peri-urban parts of the large metropolitan areas around the world (Adelaja, Sullivan, & Hailu, 2011; Condon, Mullinix, Fallick, & Harcourt, 2010; Dubbeling, Zeeuw, & Veenhuizen 2010; Mason & Knowd, 2010; Merson, Attwater, Ampt, Wildman, & Chapple, 2010; Morgan, 2014; Steel, 2006). This has been food that needs to be close to the market because of its perishability and it is characterised by perishable vegetables and some intensive animal production namely poultry as well as niche horticulture and animals.(ABS, 2012a)

The urbanisation of rural land has been a facet of the history of development of Australian cities. (Bunker & Houston, 2003; Buxton & Carey, 2014; Fisher, 2003; Freestone, 2010; Hamnett & Freestone, 2000; Mason & Knowd, 2010; Morison, 2000; Paul & McKenzie, 2011). This rural land at the edge has been called peri-urban.(Simon, McGregor, & Thompson, 2006) Peri-urban land is land on the fringe and has a mixture of land uses. "A peri-urban area can be defined simply as land adjacent to the edge of an urban area, that area of land extending from the built up edge of the city to the truly rural hinterland." (Buxton et al., 2006) p1. The peri-urban landscape is made up of a mixture of productive agricultural land, bushland as well as living areas which are urban and rural residential. (Edge Land Planning, 2003; Sinclair, Docking, Jarecki, Parker, & Saville, 2004) The peri-urban area has been the subject of increasing population growth since the 'turnaround' in population patterns of the 1970s when the population growth of the capital cities began to decline and rural areas began to increase in population. This is particularly so in the case of Sydney which has seen an increasing number of people choosing to live in the peri-urban areas.(Burnley, 1988, 1996; Burnley & Murphy, 1995a, 1995b; Hugo & Smailes, 1985; McKenzie, 1996).

The peri-urban areas are a land of transition because the land use is in a constant state of flux and is more desired for its use as future urban and rural residential than for its potential as a place of growing food. (Adelaja et al., 2011; Kerselaers, Rogge, Dessein, Lauwers, & Van Huylenbroeck, 2011; A. M. Lerner & Eakin, 2011; Morgan, 2014; Sinclair & Bunker, 2012; Steel, 2006; Zasada, Fertner, Piorr, & Nielsen, 2011), This has been described as an impermanence syndrome (Adelaja et al., 2011), yet as will be shown in this paper, it is still a significant producer of food.

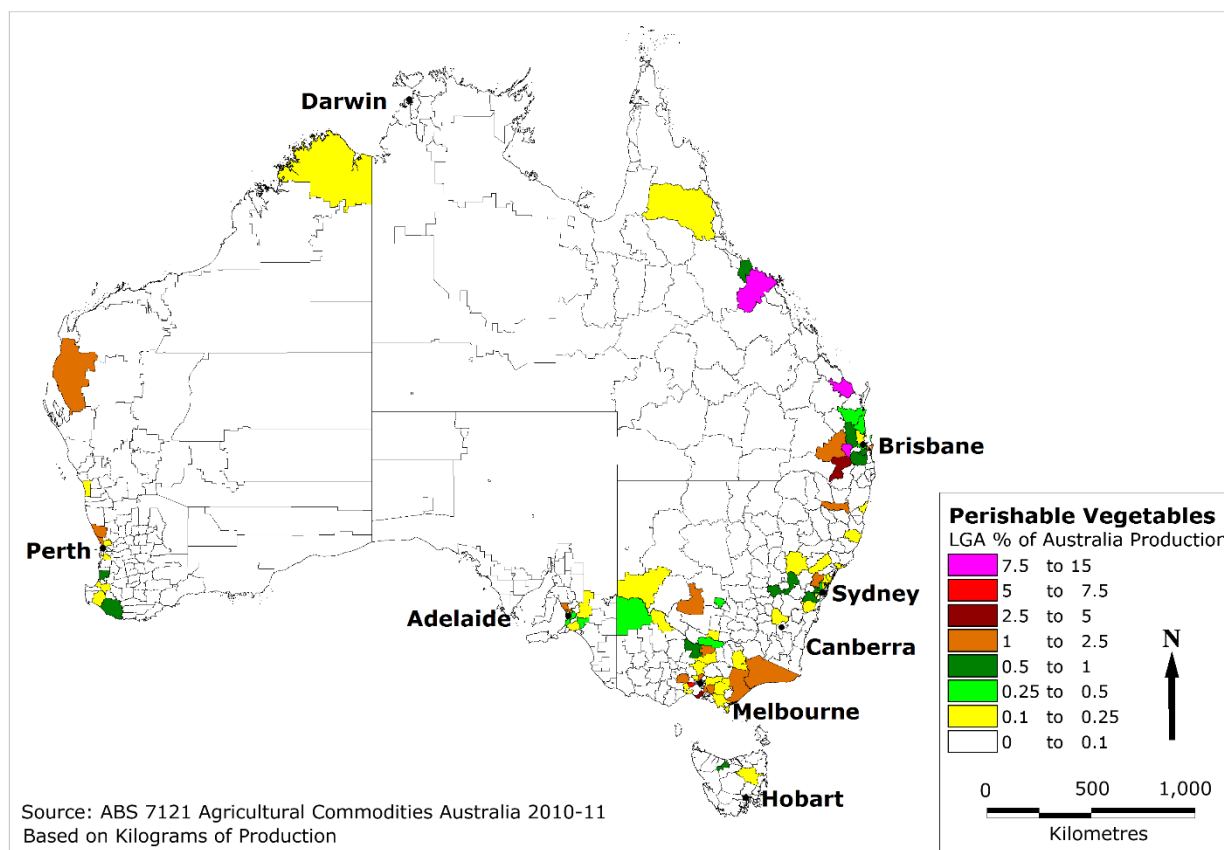
The purpose of this paper is to show that the peri-urban area is not only a significant food producer, but that this food production occurs in a contested landscape. It does this in three parts. Firstly it highlights the peri-urban area as a continuing food bowl for the production of perishable vegetables around Australia. Secondly, it uses the Sydney region to show that the food is grown in a mostly rural residential landscape which creates rural land use conflict with the surrounding agriculture. Thirdly, it will use ABS Census of Population and Housing data to show that these people have an urban demographic rather than a rural one. It concludes by commenting on the need to keep food production in the peri-urban area and the reasons for this.

Food on the Fringe

Around the world, food is grown on the peri-urban fringe of cities and towns where there are good soils as well as significant existing food production which provides good access to markets (Buxton et al., 2006; Dubbeling et al., 2010; A. Lerner, Sweeney, & Eakin, 2014; A. M. Lerner & Eakin, 2011). However, these cities and towns are expanding into this land to cope with the ever increasing urbanisation of the world's population. (Dubbeling & de Zeeuw, 2011; FAO, 2011; Millar, 2011; Millar & Roots, 2012). This is of concern when Australia's arable land is 6.0% (FAO, 2015) and which is focused on the coastal fringe of the continent where 86 % of the population lives and where the growth rate is above average (ABS, 2015). In addition, it should be noted that 74.6% of Australia's population lives in the capital cities (ABS, 2015).

Australia's food supply comes from both imported and domestically grown and produced foodstuffs. (Millar & Roots, 2012) Mason and Knowd (2010) Merson et al (2010) as well as Harman & Low Choy (2011) have all pointed to the issue of urbanisation of the peri-urban fringe and its impact on agriculture and food supply, which comprises perishable vegetables, some fruit, poultry as well as nurseries, flowers and turf. (ABS, 2012a) The focus of this paper is perishable vegetables – those commodities with a short shelf life and that need to be in the market soon after harvest (Malcolm & Fahd, 2009)

The peri-urban areas of Australia produced 47.2% % of the perishable vegetables grown in Australia in 2010-11. (ABS, 2012a). The commodities analysed are broccoli, capsicum, cauliflower, coriander, herbs, lettuce, mushrooms and fresh tomatoes. It should be noted that in 2011 the number of vegetables counted was reduced by the ABS to 17 from 40 in 2006 and previous censuses. Map 1 shows the spatial distribution of the perishable vegetable production at the LGA level, and it can be seen that they are concentrated on the peri-urban fringe of the capital cities as well as the coastal areas of Queensland (these coastal areas contribute an additional 27.6% of Australia's perishable vegetable production). The metropolitan fringe LGAs are also experiencing population growth. Between 2004 and 2014 the Sydney peri-urban areas achieved a population growth of 1.2% per annum which is less than the Australian growth rate of 1.6% and slightly less than the Sydney urban area (1.4%) (ABS, 2015). The capital cities also housed 74.6% of the total Australian population in 2014 (ABS, 2015). It can be seen therefore that the areas where the majority of the perishable vegetables are grown are also the areas experiencing high population growth (which is a mixture of urban and rural residential). This creates a contested landscape in which growing food is competing against the desire to grow houses.



Map 1: Australian Perishable Vegetable Geography by LGA

Source: (ABS, 2012a)

Four out of the top five perishable vegetable producing LGAs in Australia are in Queensland with Bundaberg being number one with 13.5% of Australia’s perishable vegetable production (ABS, 2012a) and number two is Whitsunday with 12.9%. Number three is Lockyer Valley (9.4%) which is in Brisbane’s peri-urban area and number four is Wyndham which is in Melbourne’s peri-urban area and number five is the Southern Downs (4.0%) which is also in Queensland. In the Sydney region, Hawkesbury LGA (which is in the peri-urban area) produces 2.2% of Australia’s perishable vegetable production which is number eight in the nation. The combined Sydney LGAs produce 5.2% of Australia’s perishable vegetables – all from the peri-urban area.

Winston (1957) provides some insights into the food production in Sydney and its importance in the 1950s with the following quote:

“The County is a small area and not particularly rich from the growing point of view, yet in 1947 it produced three-quarters of the State’s lettuces, half the spinach, a third of the cabbages and a quarter of the beans; 70 percent of the State’s poultry farms were in the County and more than 18 percent of Sydney’s milk came from the County; the preservation of the farms and market gardens is therefore of considerable importance for the well-being of Sydney as well as for the economy of the State. Rural production in the county has always played an important part in supplying food for Sydney, the advantages of proximity to the largest market in Australia more than compensating for the somewhat poor soil conditions.” p 49 (Winston, 1957)

It is interesting to note that the same sentiments are being reflected by this paper some fifty-eight years later. The only change is that the food is being produced some 40 to 50 km further out and the food growing lands of the 1950s are now middle ring suburbs of Sydney. Sydney’s population growth is reaching the geographic limits as the urban and rural residential ‘sprawl’ butts against the Blue Mountains, paving over once productive food growing land.

Peri-Urban Land Use

The Sydney peri-urban area has had an evolving landscape from a largely farming one before the 1950s (Winston, 1957) to now being a mostly rural residential one with some farming pockets. (Edge Land Planning, 2003; Kelleher, 2001; Malcolm & Fahd, 2009; Mason & Knowd, 2010; McFarland, 2014; Merson et al., 2010; Sinclair & Bunker, 2012; Sinclair et al., 2004). The change in land use has occurred as a result of the population 'turnaround' which occurred in the 1970s and which saw the slowing of population growth of metropolitan areas and the subsequent increase in population of rural and regional areas. (Burnley & Murphy, 1995a; Hugo & Smailes, 1985). Burnley and Murphy (1995a) note that rural residential development began to become popular from the 1970s and this popularity has continued to the present day.

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 main source of their income from pursuits not carried out on the land. (Sinclair & Bunker, 2012) 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 1,000 to 2,000 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 (Caldwell, Collett, Ludlow, Sinclair, & Whithead, 2011; Learmonth, Whitehead, Boyd, & Fletcher, 2007; Sinclair & Bunker, 2012; Sinclair et al., 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. Sinclair and Bunker (2012) have drawn the distinction between these as being a spatial one. Rural fringe is located in an estate style on lots of 4,000 square metres to 2 hectares and usually on the edge of or nearby to an urban area. Rural living, on the other hand is not spatially distinctive and is scattered throughout the food growing landscape on lot sizes ranging from 4,000 square metres to 40 hectares and more (Sinclair & Bunker, 2012).

In the Sydney peri-urban area the rural residential land use comprises 78.3% of the total land use (Edge Land Planning, 2003). This varies amongst the individual LGAs that make up Western Sydney and land use surveys carried out of the following Western Sydney LGAs illustrates this figure: Blue Mountains (78.0% rural residential) Camden (78.8%), Hawkesbury (83.1%), Liverpool (73.3%), Penrith (73.2%) The Hills (84.5%) (Edge Land Planning, 2003). Kiama (62.3%) (Edge Land Planning, 2006), Wollondilly (60%) (Wollondilly Shire Council, 1993), Wingecarribee (66.2%) (Edge Land Planning, 2007) are not part of the Western Sydney area but do form part of Sydney's Peri-Urban area. Agriculture only makes up 10.5 of these land uses and intensive plants growing (vegetables) comprises 6.8% of the total land use. So it can be seen that the food is grown in a landscape dominated by rural residential development.

Land Use Conflict

Rural land use conflict is one of the most significant issues facing food production. It has been defined by Learmonth et al as follows:

"Land use conflict occurs when there is a disagreement or dispute as to the use of land and / or a feeling that a person's rights or well-being or the rights of the environment are being threatened by an action or undertaking of another or the inaction of another." (Learmonth et al., 2007)

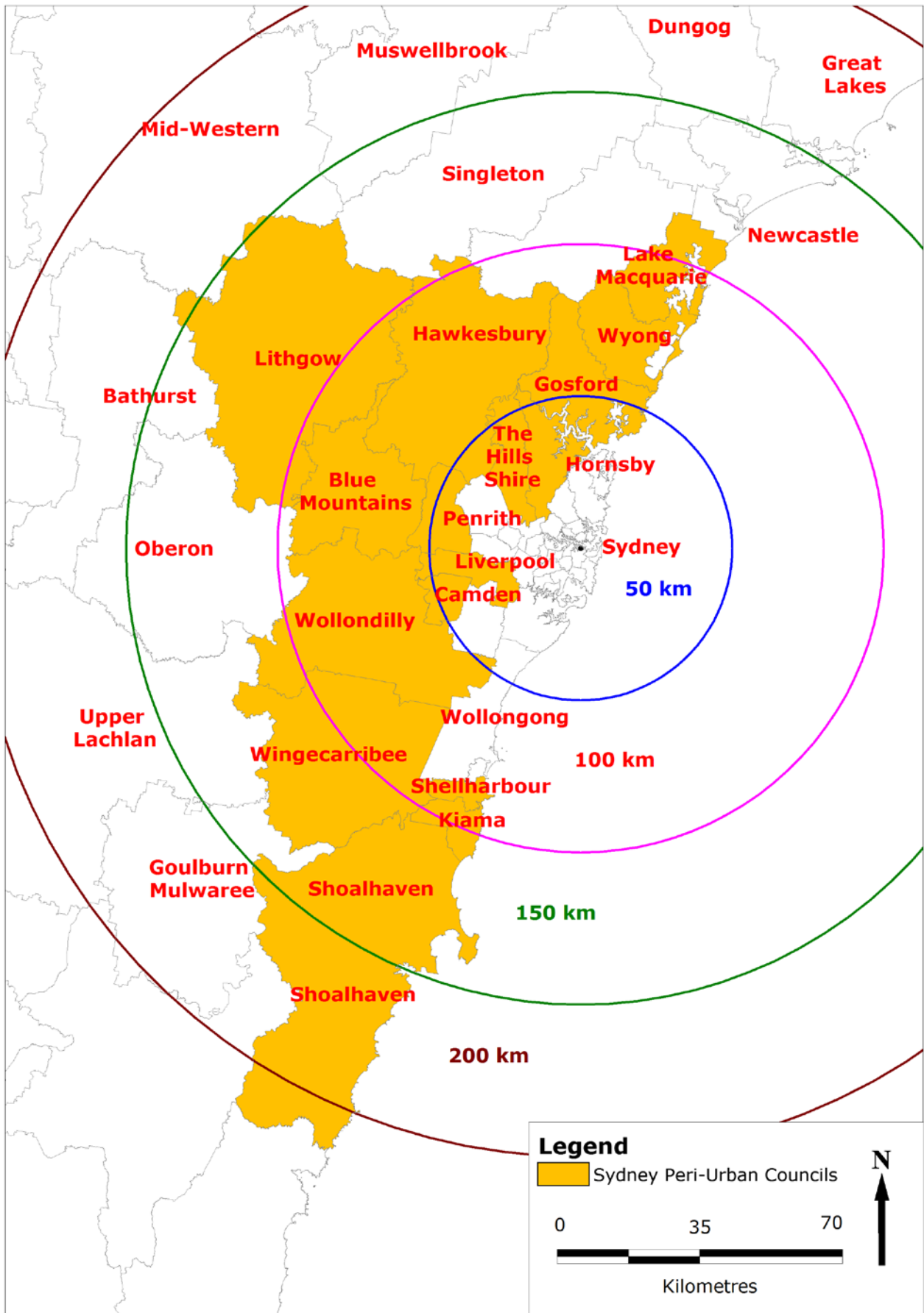
The environmental legislation governing pollution is based on an urban situation and one that assumes that all pollution can be contained within the boundaries of the land. If the neighbour complains, the local Council can require the farmer to reduce the pollution. This can often force farming operations to be restricted to certain hours, thus reducing the intensity and duration of the nuisance. But such restrictions can in turn force farmers either to move to another location (usually to the edge of the peri-urban area) or to cease farming, which accelerates the conversion of land to rural residential purposes. It could be said that the legislation benefits the complainant and not the producer because its target levels have been set for an urban situation, not a rural one. (Sinclair & Bunker, 2012)

Land use conflict in the peri-urban area occurs mostly between rural residential dwellers and farmers because people don't have an affinity with the productive capacity of the land. They are mostly escapees from the urban area seeking a new rural lifestyle and are largely unaware of the significance of the agriculture. (Burnley & Murphy, 1995a, 1995b; Burnley, Murphy, & Jenner, 1997; Buxton et al., 2006; Murphy & Burnley, 1993; Sinclair & Bunker, 2012)

Demography of the Fringe

The peri-urban area of Sydney will be used as a case study to show that the demography is more akin to an urban setting rather than a rural one. The Sydney peri-urban area is a large area that extends from Lake Macquarie in the north to Lithgow in the west, Wingecarribee in the southwest and Shoalhaven in the south and is shown on map 2. It encompasses the following LGAs: Lake Macquarie, Wyong, Gosford, Hornsby, The Hills, Hawkesbury, Blue Mountains, Penrith, Camden, Wollondilly, Wingecarribee, Shellharbour, Kiama and Shoalhaven. The common themes that combine to define these Council areas as peri-urban are the presence of agricultural production, biodiversity areas, settlements and areas of rural residential land use, as well as communities of interest and similar issues. The agriculture can be high value intensive plants and animals like vegetables, nurseries and poultry or extensive such as grazing of animals. The biodiversity in the peri-urban area is significant, and comprises some significant vegetation communities as well as a number of threatened species and endangered ecological communities

In an attempt to provide some context as well as some data on the Sydney peri-urban area, a broad analysis was carried using the ABS 2011 Census of Population and Housing to provide some information on the demographic composition of the peri-urban area. The analysis has provided data on the people who live in the rural parts as well as those who live in the urban parts of selected LGAs. This was done to allow for comparative analysis and to show how similar they are. The Basic Community Profile was used as the database to be analysed. LGA wide Community Profiles were gathered for all of the LGAs. Two data collection techniques have been used for this analysis. The first identified the Statistical Area level 1 (SA1) Basic Community Profile data for the rural lands of Gosford and Wyong and combined these to provide a total of the rural lands and then this was subtracted from the LGA total to arrive at the urban population data. The other technique used the Urban Centre / Locality level of data and these were totalled to provide a picture of the urban lands and this was subtracted from the LGA total to provide data on the rural lands. The LGAs which had parts of the Sydney metropolitan area urban centre within them were not able to be used to provide data on the rural areas because the data is not disaggregated to LGA level. These included Blue Mountains, Camden, Hornsby, Lake Macquarie (which is part of Newcastle metropolitan area), Liverpool, Shellharbour and the Hills. The rest of the Councils (Gosford, Hawkesbury, Kiama, Lithgow, Shoalhaven, Wingecarribee, Wollondilly and Wyong) were used to provide analysis of the rural and urban areas and these LGAs showed a good spatial spread of the peri-urban area. All of the LGAs can be seen from map 2.



Map 2: Sydney Peri-Urban Area

The data has been selectively presented from the Basic Community Profiles to show the similarities to the urban area which is aimed at confirming the urban demographic nature of the peri-urban area rather than a rural one, which is what can be assumed as people drive through it. Data will be presented showing industry of employment, occupation, qualification, working from home, age of the population, education establishment being attended and family composition. Comparisons will be drawn between the rural and urban areas for each of these. These are considered to be key indicators of demography.

The growth of the peri-urban area over the period from 2004 to 2014 was 195,153 people which represents 31.7 % of the total metropolitan growth (ABS, 2015). By comparison in the period 1981 to 1991 this the growth was 80% of Sydney's growth (Murphy & Burnley, 1993). The growth between 1981 and 1991 was mainly in the outer edge of the peri-urban area and the dramatic change is a factor of government policy to have more infill development over the past 20 years. Although the proportion of the growth has changed, it is still growing at a rate of 1.2% per annum which is slightly less than the Sydney region (1.4%).

Data on employment, occupation and qualification can be used to show the urban nature of the people living in the rural parts of the peri-urban area. It has been noted above that the dominant land use is rural residential. This dominance of rural residential land use can be validated by looking at the data on employment, occupation and qualification.

The employment data shows that there are only 6.2% (ABS, 2012c) of the rural workforce employed in agriculture, and this is the sixth highest employment sector (the top five are shown in table 1 which is discussed below). To provide some context to this, in the Moree Plains rural areas (the number one agricultural LGA in Australia) the figure is 65.4% (ABS, 2012c). However it is interesting to note that the agricultural value of production in Moree Plains is estimated to be \$918.3m compared to Sydney with \$749.2m (ABS, 2012b). It is significant to note that Moree Plains Shire has a total of 1,512 (ABS, 2012a) people employed in agriculture whereas the Sydney peri-urban area has 6,823 (ABS, 2012a) people employed in agriculture – more than four times the number, signifying that agriculture in Sydney is more labour intensive. In 1981 agriculture comprised 20.8% of the workforce and in 1991 it was 23.6% (Burnley & Murphy, 1995a) which shows a significant decline, however, it is still producing a substantial amount of food. It should be pointed out that the study area for this analysis is larger than Burnley and Murphy's but they covered a similar spatial area.

The five highest employment sectors in the rural area are the same in the urban areas as well as the peri-urban area in total and the wider Sydney region (although the ranking changes). It should be noted that the Professional, scientific and technical services category is number seven in the rural and number eight in the urban area. They can be seen from table 1. This points to the rural lands as having an urban based workforce. This has implications for not only the demographic make-up but also the number of cars on the roads because the people living in the rural lands travel to work each day, which generates the same traffic movements as the urban area (6 to 10 per day) but on roads that are not always designed for such levels of traffic.

There are more managers who live in the rural lands (17.6%) compared to 10.5% of the urban dwellers. (ABS, 2012c) The numbers of professionals is the same (17.5% rural and 17.4% urban) and there are similar proportions of people who work in technical and trades in the rural areas (16.8%) and the urban areas which has 16.5%. There are significantly less community and personal service workers who live in rural lands (8.3%) than urban (11.8%) and clerical and administrative are similar (14.2% rural and 14.1% urban). More people working in sales live in the urban areas (10.8%) than rural (7.9%). There are slightly more machinery operators living in the rural lands (7.2%) than the urban (6.8%) but more labourers in the urban areas (10.3%) compared to the rural lands with 8.8%. This points to the urban demographic make-up of the rural dwellers.

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The data on the qualifications shows similar proportions of people with post graduate degrees (3.7% rural and 3.2% urban), graduate diplomas and certificates (2.2% rural and 2.0% urban), bachelor degrees (15.5% rural and 15.3% urban), advanced diploma and diploma (14.3% rural and 14.2% urban) and certificate qualification (42.9% rural and 43.7% urban). (ABS, 2012c) So it can be seen that the qualifications of the people who work in the rural areas are the same as the urban areas.

Table 1: Top five Employment Sectors

Rural	Urban	Peri-Urban Area	Sydney Region
Construction 12.0%	Health care & social assistance 13.5%	Health Care and Social Assistance 12.9%	Health Care and Social Assistance 10.9%
Health Care and Social Assistance 9.6%	Retail trade 12.3%	Retail Trade 11.8%	Retail Trade 9.8%
Manufacturing 9.3%	Construction 9.5%	Construction 9.9%	Professional, scientific and technical services 9.6%
Retail Trade 9.3%	Manufacturing 9.2%	Manufacturing 9.2%	Manufacturing 8.5%
Education and Training 8.6%	Education & training 7.7%	Education and Training 7.8%	Education and Training 7.6%

Source: (ABS, 2012c)

The number of people who do work from home is 9.6% of the workforce for those who live in the rural parts compared to 3.9% in the urban parts. This is an indicator of lifestyle choice and when this is read in conjunction with the employment sector and occupation it shows that there are not many farmers (as they also work from home) but it points to the dominance of rural residential land use. Using the occupation and employment data in conjunction with the working from home, it can be inferred that these people would be a mixture of tradespeople as well as professionals.

The population pyramid for the peri-urban area has a distinctive hour glass shape to it, which represents a high proportion of children in the 0-15 year olds and a high proportion of adults in the 35-54 year old cohort, who would be the parents of the children.(ABS, 2012c) This can be seen from figure 1 and it is the opposite of the Sydney region which is shown as figure 2. There are differences between the age cohorts of the rural and urban an areas. Figure 3 shows that the rural lands have more 5-19 year olds and 45-69 year olds. The urban area has more has more 0-4 and 25-34 year olds and more 75 year olds and over. This is consistent with the retirement age as people will move to urban areas for retirement living options.

The median age is also similar being 42 for the urban dwellers and 41 for the rural dwellers. (ABS, 2012c)

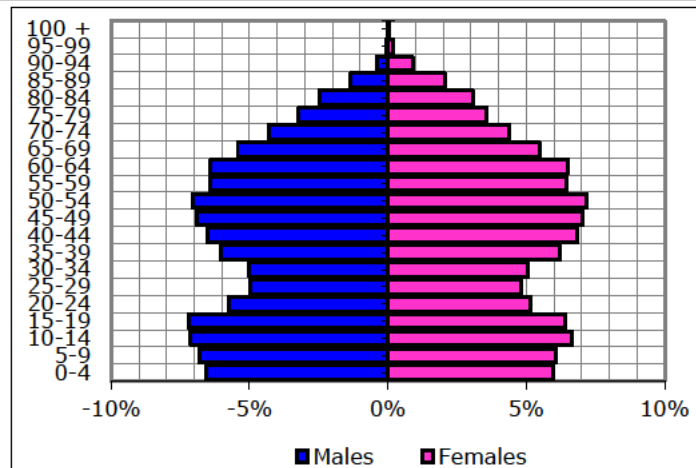


Figure 1 Population Pyramid Peri-Urban Area

Source: (ABS, 2012c)

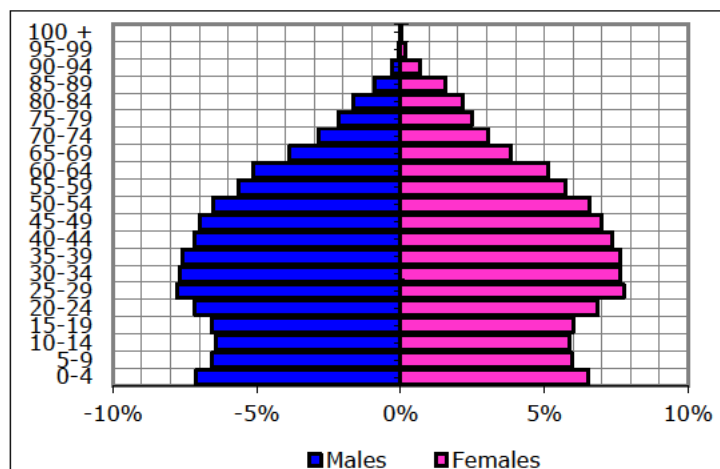


Figure 2: Population Pyramid Sydney Region

Source: (ABS, 2012c)

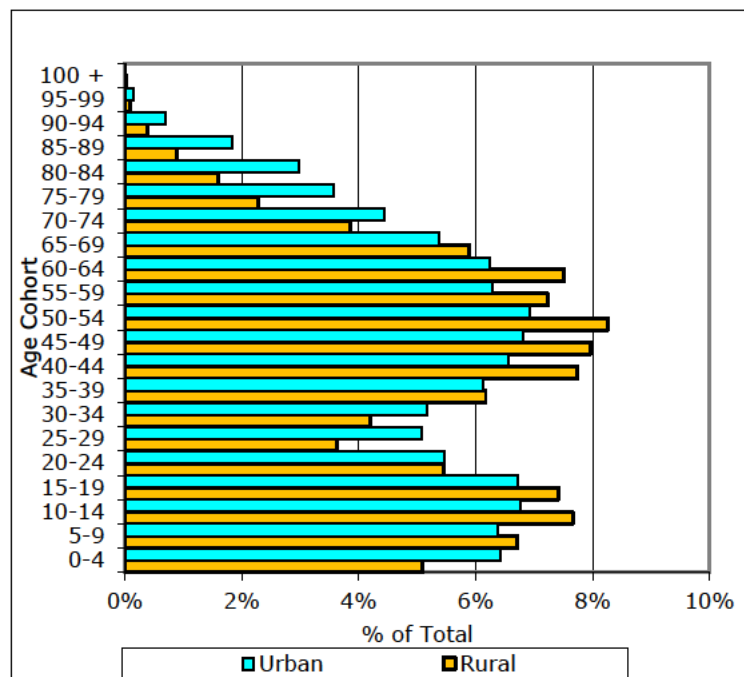


Figure 3: Age Differences Rural and Urban

Source: (ABS, 2012c)

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Family composition is shown in figure 4. This shows that there are slightly more people living in the rural area who are a couple with no children and also a couple with children 15 and under. However, there are more single family households in the urban areas. This data is corroborated by the data shown in figure 3, where the people in the 35 – 64 age cohort are the parents of the children in the 5 – 19 cohort. (ABS, 2012c)

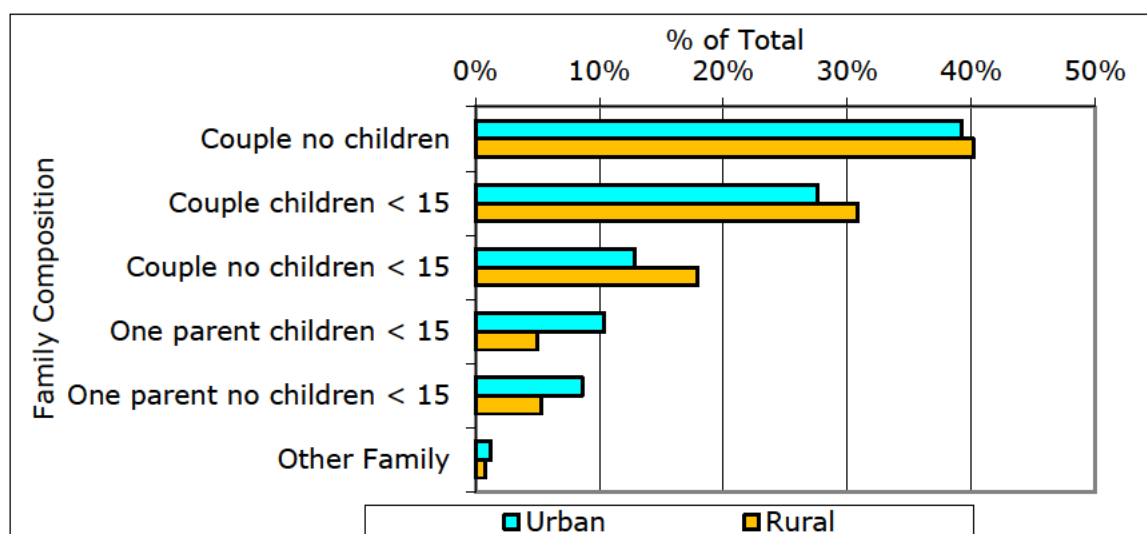


Figure 4: Family Composition

Source: (ABS, 2012c)

The number of students in pre-school, infants / primary and secondary schools are similar for the urban and rural areas as are the numbers attending TAFE as well as university. This is consistent with the family composition data, particularly where the couples with no children under 15 are concerned. It can be assumed that the university and TAFE students are living at home. (ABS, 2012c)

The median household weekly income is \$1,206 for the rural area and \$1,116 for the urban area and there are more people with incomes greater than this in the rural area than the urban area. (ABS, 2012c)

So it can be seen that the rural areas of peri-urban Sydney have a urban demographic make-up.

Conclusion

The peri-urban areas are significant food sources as well as being places where the land use is dominated not by food growing but by rural residential development. This land use mix leads to rural land use conflict which can lead to the need for the food production to relocate because of the pollution laws which have an urban focus and not a rural one. The people who live in the rural areas of the peri-urban fringe are not farmers but work in a variety of employment sectors that mirror the nearby urban areas (including the metropolitan area). This is a dilemma for the future provision of fresh food for our ever growing cities.

This paper has provided data on the continuing importance of food production in the peri-urban areas and has shown how this is under threat from rural residential land use. In Australian cities the planning of the metropolitan areas has, in some cases, recognised the value of food production on the fringe and has totally ignored it in others. This is a disappointing state of affairs because the food production cannot just be moved 'over the range' to the inland parts of the country because of the problems with climate – the predictions are that it will get hotter and drier which is not conducive for growing perishable vegetables (Hughes, Steffen, Rice, & Pearce, 2015). We also cannot just 'get it

from Queensland' as has been the call of many people in the community. The two key areas for growing perishable vegetables are Bundaberg and Whitsunday LGAs (number one and two in Australia respectively) (ABS, 2012a) and in these areas, the land use mix and growth pressures are the same as for the peri-urban areas, that is rural residential as the dominant land use (Sinclair & Bunker, 2012). Add to this the distances that the food travels which has been termed 'food miles' as well as the central buying policies of the supermarkets which leads to long supply chains which have been broken by floods and cyclones in the past five years. This all points to the need to keep food production in the peri-urban areas.

Olivier de Schutter, the United Nations Special Rapporteur on the Right to Food sums the issue up well in his report titled "The transformative potential of the right to food" when he says:

"As the competition increases between putting land to urban or to industrial use in the urban and peri-urban perimeter, and as increased food supplies create unprecedented logistical challenges for food distribution and transport systems, it is vital that cities assess their food dependencies, identify weaknesses and potential pressure points and, where possible, develop a variety of channels through which they can procure their food. Urban and peri-urban agriculture, as well as the development of short food chains connecting cities to their local foodshed, will therefore play an increasingly important role"(Special Rapporteur on the Right to Food, 2014)

It can be seen therefore that there is a place for food production on the peri-urban fringe and it needs to be taken seriously by Governments around Australia when planning for the future of the metropolitan areas. It needs an integrated policy approach so that we can grow food and grow houses in a sustainable manner

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