
# Hawkesbury-Nepean Natural Resource Management Region: Horticultural Sector

## Key Points

- The horticultural sector contributed 43% of the gross value of agricultural commodities in Hawkesbury-Nepean in 2010-11.
- The sector employed 0.5% of the labour force or 46.5% of the agricultural workforce.
- Characteristics of the sector that potentially **decrease** its vulnerability to the impacts of climate change include 1) its location in areas classified as 'major cities of Australia' where there is good access to services; 2) its occurrence within moderately diverse local economies with alternative employment opportunities; and 3) the young age profile of the Vegetable Growing and Nursery & Floriculture Production workforces, as well as the owner managers within these sub-sectors.
- Characteristics of the sector that potentially **increase** its vulnerability to the impacts of climate change include the clustering of the workforce around Richmond where there are higher levels of socio-economic disadvantage.

## Introduction

This brochure focuses upon the horticultural sector in Hawkesbury-Nepean Natural Resource Management Region (NRMR). It has been prepared as part of a top-down socio-economic vulnerability assessment to the impacts of climate change based upon freely available, national data sets from the Australian Bureau of Statistics (ABS). Sub-sector classifications (i.e., Nursery & Floriculture Production, Vegetable Growing, and Fruit & Tree Nut Growing) are derived from the ABS classifications used to report data from the 'Census of Population and Housing 2011' and the 'Agricultural Census 2010-11'. It is recommended that the brochure be read and interpreted in the context of more detailed knowledge of local circumstances.

### Brief Sector Profile

In 2011, the horticultural sector employed 2,391 persons, which represented 0.5% of the total Hawkesbury-Nepean labour force or 46.5% of the total agricultural workforce.

The sector comprised three sub-sectors:

- Nursery & Floriculture Production
- Vegetable Growing
- Fruit & Tree Nut Growing

More than half of those employed in horticulture worked in the Vegetable Growing sector (59%), 30% worked in the Nursery & Floriculture sector, and the remaining 11% worked in the Fruit & Tree Nut Growing sector (Figure 1). In the workforce, there were equal proportions of employees (45%) and owner managers of horticultural businesses (45%); 7% of the workforce were family members contributing to a business.

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Combined, these three sub-sectors contributed $340 million (43%) of the gross value of agricultural production in Hawkesbury-Nepean in 2010-11. The Vegetable Growing and Nursery & Floriculture Production sectors contributed almost all of the value of horticultural production (95%; $323 million), the Fruit & Tree Nut growing sector contributed $16 million (5%) (Figure 2).

The value of commodities produced in the Vegetable Growing sector was dominated by mushroom production (53%; $87 million). In the Nursery & Floriculture sector, almost half (48%; $76 million) of the value of commodities produced came from nurseries, a further 32% was contributed by cultivated turf ($51 million). The remaining 20% came from cut flower production ($32 million).


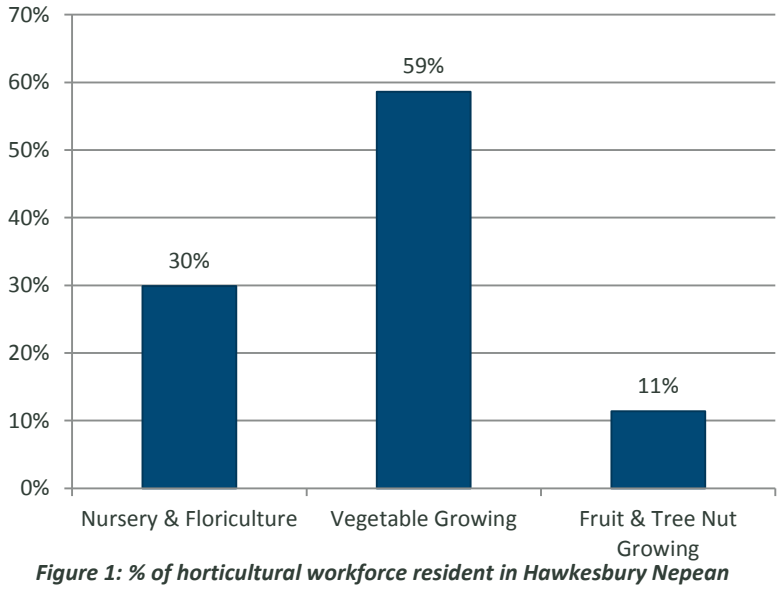


***Figure 1: % of horticultural workforce resident in Hawkesbury Nepean***

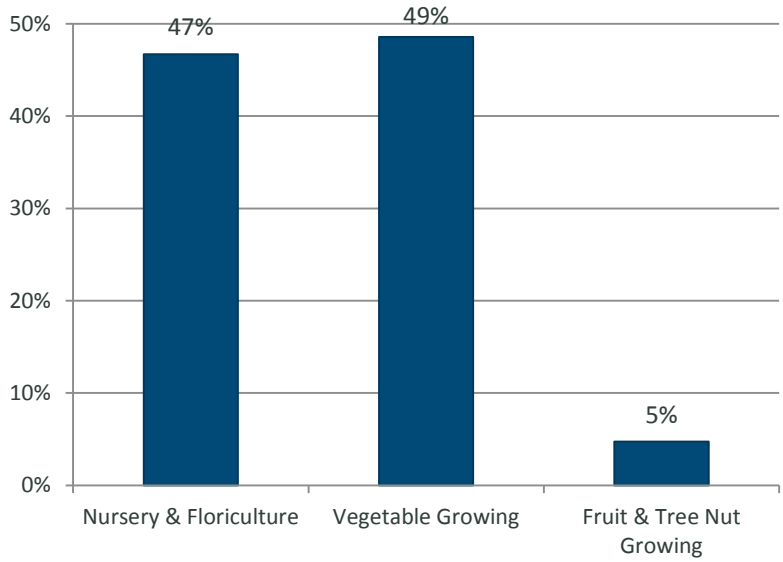


***Figure 2: % of gross value of horticultural commodities produced 2010-11***

## Geographic Remoteness

Rural and regional areas are often characterised by higher levels of disadvantage than urban areas because of the interaction between socio-economic characteristics of the population and the characteristics of particular places.[7] For example, following the natural disasters in Queensland in 2010-11, higher proportions of people living in rural and remote areas reported suffering adverse impacts when compared to people living in larger urban areas.[5] Similarly, more negative social impacts of drought were experienced in rural areas that had experienced a reduction in the level of services when compared to areas where service provision was more stable.[8]

The measure used here is the Australian Bureau of Statistics' 'Remoteness Structure' which divides Australia into five areas based upon relative access to services by measuring the physical road distance between populated localities and the nearest service centres. There are five categories: Major Cities of Australia, Inner Regional Australia, Outer Regional Australia, Remote Australia, and Very Remote Australia.[9]

In 2011, 67% of the horticultural workforce lived in areas classified as 'major cities'. The remaining 33% of the workforce resided in 'inner regional Australia'. The distribution of the workforce is comparable to the distribution of the wider Hawkesbury-Nepean population, although the wider population was more concentrated in 'major cities' (83%). The remaining 17% lived in 'inner regional Australia' (Figure 3).

## Significance of Agriculture

Sensitivity to the impacts of climate change has been associated with the degree to which a population is dependent upon natural resources.[1, 2] Populations dependent upon economic sectors that are characterised as being highly resource dependent may be highly sensitive to climatic variability. Agriculture, broadly defined, is highly dependent upon natural resources; thus, populations in which agriculture is socially and economically significant may be more vulnerable to downturns in one or more agricultural sectors. One way to assess the significance of agriculture to a given population is to consider the percentage of the labour force that is employed in the sector

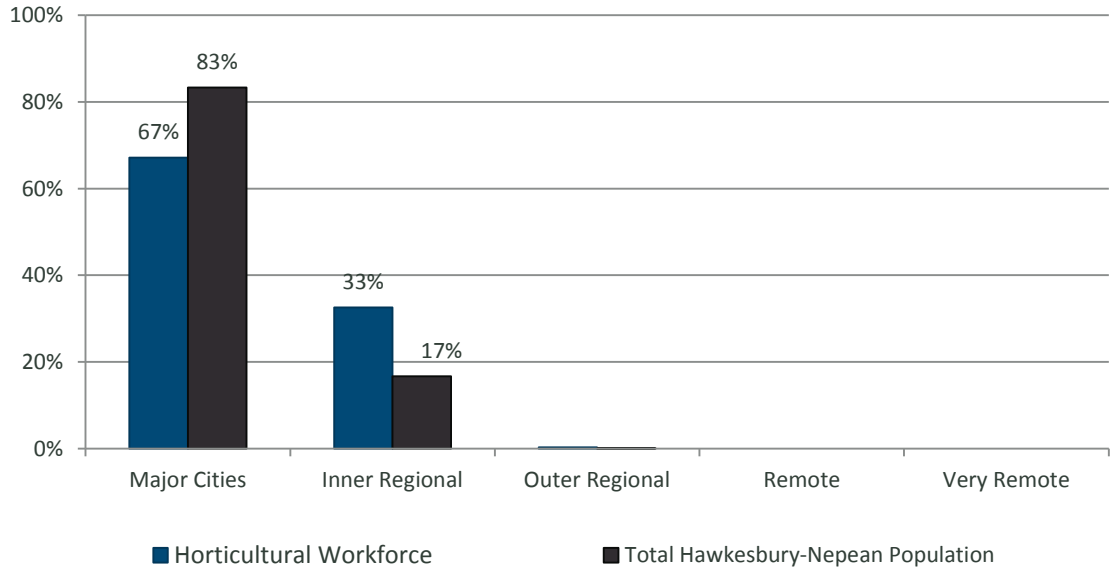


***Figure 3: Geographic remoteness***

In 2011, 1.0% of the Hawkesbury-Nepean labour force was employed in agriculture but this varied across the region. The percentage of the labour force was calculated for 88 statistical areas in which the labour force was greater than 100 persons. The percentage of the labour force employed in agriculture ranged from 0.0% to 17.9%. In 29 of these areas, more than 1.0% of the labour force was employed in agriculture; in 57 areas less than 1.0% of the labour force was employed in agriculture.

The percentage of the labour force employed in agriculture was highest in the far south of the region (in areas surrounding Goulburn up to 40% of the labour force were employed in agriculture), and to a lesser extent in the north-west, north and north-eastern areas. The percentage of the labour force employed in horticulture represents a more even pattern across the region, with few areas where horticultural employment is more than 10% of the labour force. In Sydney's urban fringe, the percentage of the labour force employed in horticulture tended to be the same as the percentage of the labour force employed in agriculture more generally, suggesting that the agricultural sector is highly specialised in these areas. In contrast, in the horticultural areas farthest from Sydney (Goulburn and Singleton Regions), the percentage of the labour force employed in horticulture tended to be less than the percentage of the labour force employed in all agricultural sectors, suggesting that the horticultural sector in these areas co-exists with other agricultural sectors.

## Socio-Economic Advantage & Disadvantage

As mentioned above, the role remoteness plays in socio-economic vulnerability to the impacts of climate change intersects with other socio-economic characteristics. In general, populations with higher levels of socio-economic disadvantage may have reduced capacity to respond to climatic and environmental changes.[5, 10]

The indicator used here is the Australian Bureau of Statistics' 'Index of Relative Socio-Economic Advantage & Disadvantage' (IRSAD) which is a measure of people's "access to material and social resources, and their ability to participate in society".[11] The index is derived from a range of data collected in the 'Census of Population and Housing'. Geographic areas are assigned a decile from 1-10. A low decile indicates a high proportion of relatively disadvantaged people in an area. A high decile indicates that an area has a relatively low incidence of disadvantage.

In Hawkesbury-Nepean, a higher percentage of statistical areas (32%) had very low levels of disadvantage (deciles 9-10) when compared to

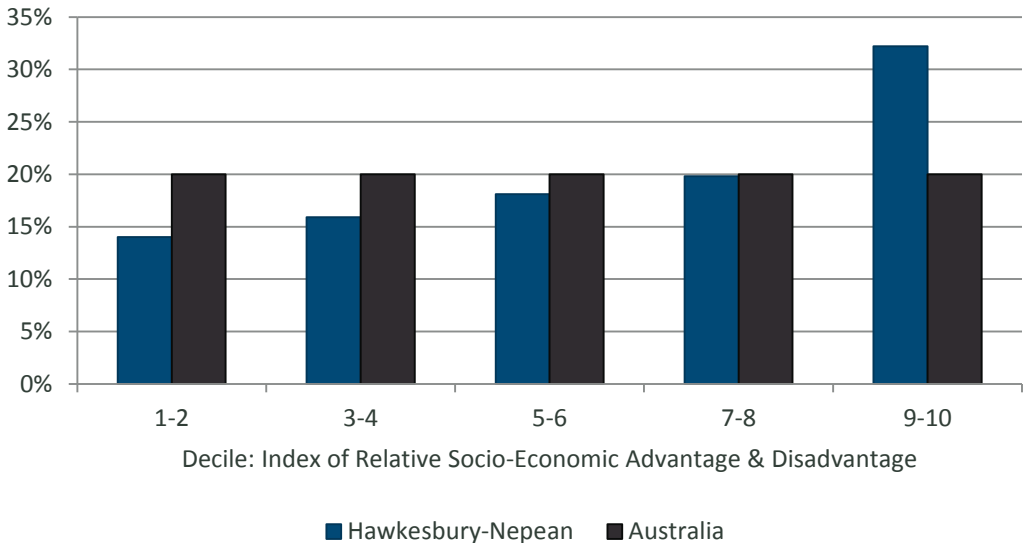


***Figure 4: Percentage of statistical areas (SA1) in Hawkesbury-Nepean by IRSAD decile***

Australia (Figure 4). Unsurprisingly, populations with high IRSAD deciles, indicating a low proportion of disadvantaged people (deciles 7-10), were clustered around Sydney's northern urban fringe, and in southern Hawkesbury-Nepean around Bowral and Goulburn.

The distribution of the horticultural workforce in Sydney's west spanned a range of IRSAD deciles. Horticultural areas in the north-east and far south of the region tended to be characterised by relatively low levels of disadvantage (deciles 5-8); while the horticultural workforce that lived in the far north of the region had higher levels of socio-economic disadvantage (deciles 3-4)Economic Diversity

## Economic Diversity

A diverse economy may contribute toward reduced socio-economic vulnerability because it provides a broader range of employment opportunities if individual sectors experience a downturn due to economic or environmental factors. For example, a study of farming and small communities in the Murray-Darling Basin revealed that widespread negative social impacts tended to be experienced more acutely in areas that were almost totally reliant on agricultural sectors, with almost no alternative avenues of employment.[8]

The indicator used here is the Hachman Index, a measure of how closely the employment distribution of Hawkesbury-Nepean resembles the employment distribution of the wider Australian economy. Scores range from 0.00-1.00, where the economic diversity of the Australian economy is considered to be equal to 1.00.

The Hachman Index for Hawkesbury-Nepean is 0.96 meaning that the diversity of the economy is comparable to the wider Australian economy. In 2011, all sectors of the economy were represented, but the top five sectors comprised more than half of the region's employment (54.0%). In 2011, the retail and health sectors contributed 25.8% of total employment (compared to 22.6% for the Australian economy). The agricultural sector was the fifteenth highest contributing sector (1.9% of employment compared to 2.5% for the Australian economy).

Within Hawkesbury-Nepean there was spatial differentiation. The Hachman Index was calculated for 93 statistical areas that intersect with the Hawkesbury-Nepean NRMR boundary. Using 0.90 as representative of a diversified economy,[12] none of the statistical areas were diversified. Twenty (22%) areas scored above 0.75, which represent the Sydney suburbs of Berowra and Dural, the urban centres of Blacktown, Windsor and Penrith to Lawson, as well as Camden, Bowral and Goulburn further south.

In 2010-11, the areas that contributed most to the gross value of horticultural production on Sydney's urban fringe had moderately diversified economies (scores between 0.60 and 0.80),

suggesting that there is a range of other employment opportunities. The exception was in the north of the region where the economies were more specialised (0.40 or less).

## Age

Age is one of the most common socio-economic variables to be associated with vulnerability to climate change impacts. In general, much of this research focuses upon the increased sensitivity of older populations to negative health impacts of changes to the climate[3] or their reduced capacity to respond to stressors.[4] However, the direction of the association between age and vulnerability to climate change is not straight-forward. For example, a survey of 6,104 Queensland residents after the flood and cyclone events of 2010-11, revealed that adults of working age were more likely to report exposure to property damage, reduced incomes, and adverse emotional impacts. The researchers of this study suggested that this is because people of working age have a greater likelihood of being employed, owning income producing property, and having dependent children.[5] Similarly, in an agricultural context, other researchers report that both older- and younger-aged cattle producers can demonstrate similarly low levels of vulnerability to climate change impacts because of other intervening factors (e.g., strength of industry networks and willingness to make changes).[6]

In the Hawkesbury-Nepean horticultural sector, 10% of the workforce was aged 65 years or older compared to 16% for the total agricultural sector. There were differences between the age profiles of each sub-sector. The Nursery & Floriculture workforce was slightly older than the Vegetable Growing workforce. In the Nursery & Floriculture workforce, 11% were 65 years or older, compared to 7% of the Vegetable Growing workforce. Almost one-third (30%) of the Fruit & Tree Nut Growing workforce was in the oldest age category. (Figure 5 shows the age distribution for the horticultural sector and each of the sub-sectors).

When considering horticultural workers who have decision-making responsibility, a slightly higher percentage of owner managers were aged 65 years or older (16%). In comparison, 21% of owner managers in the wider agricultural sector were 65 years or older. Owner managers in the Nursery & Floriculture sector (19% were 65 years or older) tended to be older than their counterparts in the Vegetable Growing sector (11% were 65 years or older). More than one-third (36%) of owner managers in the Fruit & Tree Nut Growing sector were aged 65 years or older.

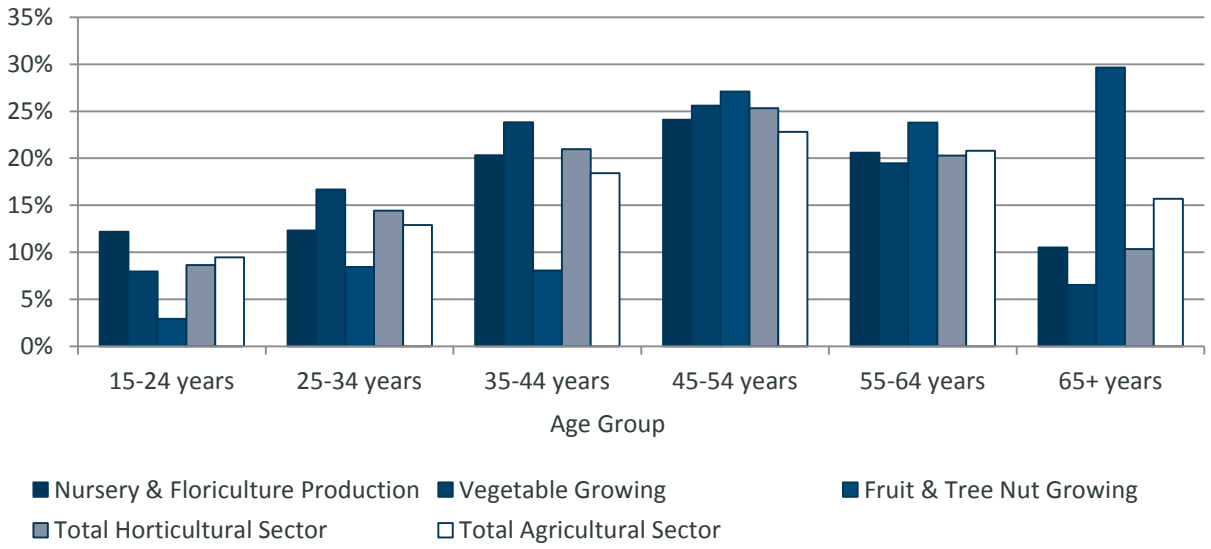


***Figure 5: Percentage of horticultural workforce by age***


## Summary

The following table summarises the indicators presented and the typical way in which they are interpreted concerning socio-economic vulnerability to the impacts of climate change.

***Table 1: Indicators for assessing potential socio-economic vulnerability***

| **Variable** | Categories or Scores | Interpretation |
|---|---|---|
| Significance of Agriculture | Percentage of labour force employed in agriculture | A higher percentage of the labour force employed in agriculture indicates a population/region in which agriculture is more significant than populations/regions in which a lower percentage of the labour force is employed in agriculture. Higher significance of agriculture suggests higher levels of resource dependency and, therefore, higher sensitivity to the impacts of climate change. |
| Age | 1. 15-24 years<br>2. 25-34 years<br>3. 35-44 years<br>4. 45-54 years<br>5. 55-64 years<br>6. 65 years or older | Older aged people are often more sensitive to climate change impacts (e.g., increases in temperature) and often have lower levels of adaptive capacity. This combination suggests potentially higher levels of vulnerability. |
| Geographic Remoteness | 1. Major Cities of Australia<br>2. Inner Regional Australia<br>3. Outer Regional Australia<br>4. Remote Australia<br>5. Very Remote Australia | Larger distances from service centres are suggestive of higher vulnerability. |
| Socio-Economic Advantage & Disadvantage | Deciles between 1 and 10 | Deciles closer to 10 indicate a lower proportion of disadvantaged people which is suggestive of higher levels of adaptive capacity, and therefore potentially lower levels of vulnerability. |
| Economic Diversity | Scores between 0 and 1 | Scores closer to 1 indicate a more diverse economy which is suggestive of lower levels of vulnerability. |


## Data Sources

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## Further Information

This Fact Sheet should be referenced as:

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This Fact Sheet forms part of the activities of the East Coast NRM Cluster. This project aims to foster and support an effective "community of practice" for climate adaptation within the East Coast Cluster regions that will increase the capacity for adaptation to climate and ocean change through enhancements in knowledge and skills and through the establishment of long term collaborations. The East Coast Cluster consists of the coastal Natural Resource Management (NRM) bodies in Queensland and New South Wales between Rockhampton and Sydney. The Research Consortium comprises: University of Queensland (Consortium leader); Griffith University; University of Sunshine Coast; CSIRO; University of Wollongong; New South Wales Office of Environment and Heritage; and Queensland Department of Science, IT, Innovation and the Arts (Queensland Herbarium). The views expressed herein are not necessarily the views of the consortium partners, and the consortium partners do not accept responsibility for any information or advice contained herein. The East Coast NRM Cluster received funding from the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education as part of the Natural Resource Management Climate Change Impacts and Adaptation Research Grants Program, under the Natural Resource Management Planning for Climate Change Fund - A Clean Energy Future Initiative. The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.

Contact information:

Professor Tim Smith
+61 (0) 7 5459 4891
tsmith5@usc.edu.au
www.usc.edu.au


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