

Costs of production  
for Australian  
vegetable growers

**AUSVEG**

**HAL**

Horticulture Australia



## Introduction

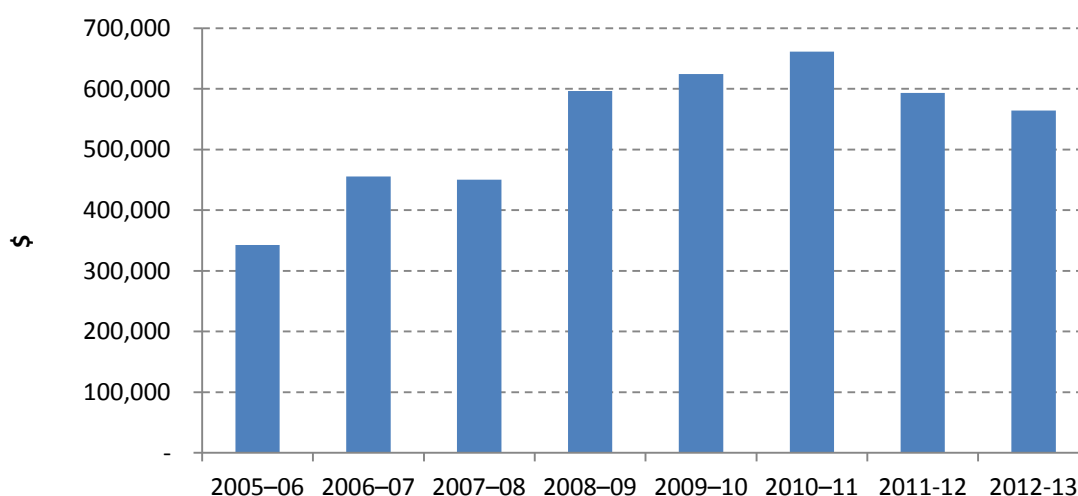
Australian vegetable growers operate in a highly competitive domestic and international market, which results in continuous pressure to reduce operating costs. Understanding the nature of vegetable production costs is important due to the impact these costs have on the profitability and sustainability of Australian vegetable growers.

The objective of this discussion paper is to highlight the Australian vegetable industry's costs of production. The paper will explore the trends in growers' costs of production at a national level, the drivers of these costs, and also highlight initiatives being implemented by growers to help alleviate these costs. This research builds on survey data produced by the Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES) who survey Australian vegetable growers on behalf of Horticulture Australia Limited (HAL). In addition, this paper draws upon many other Government and independent reports.

### Total Cash Costs\* (average per farm)

Reducing and managing total cash costs is essential to maximising the returns of Australian vegetable growers, who have had to contend with rising average total cash costs for much of the past eight years, particularly during 2005-06 to 2010-11.

**Figure 1:** Vegetable growing farms total cash costs in real terms (average per farm)



Source: ABARES *Australian vegetable growing farms: An economic survey, various years*

\*Total cash costs: Payments made by the farm business for materials and services and for permanent and casual hired labour (includes administration costs, seed, electricity, fertiliser etc).

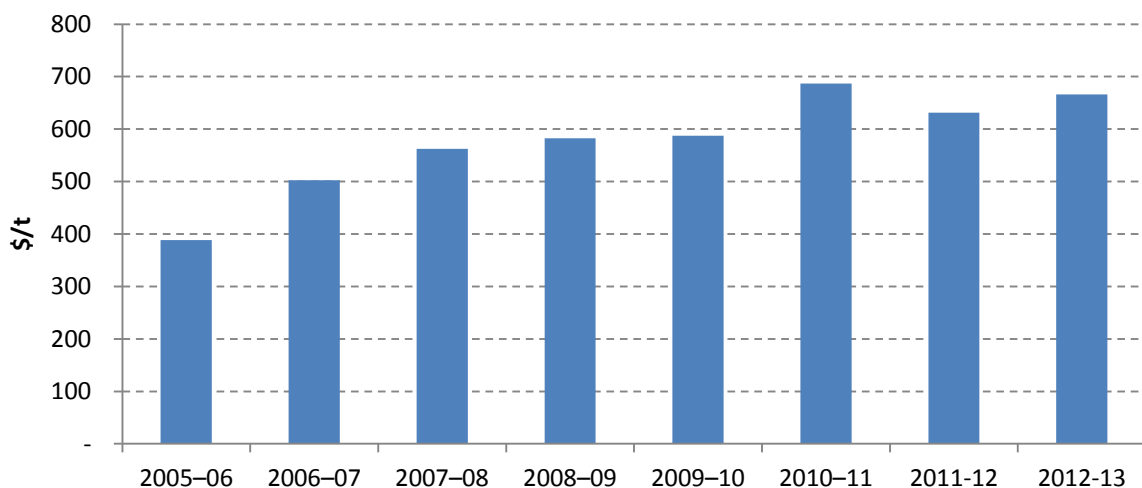
Despite lower average total cash costs in 2011-12 and 2012-13, growers' returns are estimated to have fallen due to decreased production<sup>1</sup>. There is a strong correlation between the average total cash costs for growers and the amount of vegetables produced. For example, if Australian vegetable growers produce less vegetables, fewer production inputs, such as labour and fuel, are required, costs generally fall accordingly overall.

<sup>1</sup> ABARES *Australian vegetable growing farms: An economic survey, 2011-12 and 2012-13, (2013-14)*.

The average vegetable production per farm experienced slow but steady growth from 2005-06 to 2010-11, however average production per farm has fallen in the past two years. In 2005-06, Australia's average total volume of vegetables produced per farm was 882 tonnes, but is estimated to have fallen to 847 tonnes in 2012-13<sup>2</sup>. Despite average vegetable production per farm decreasing by four per cent since 2005-06, average total cash costs have increased by approximately 65 per cent during the same period.

To understand the relationship between total cash costs and production in more depth, the costs have been analysed by tonne of production. As shown in Figure 2, average total cash costs per tonne of vegetables produced continues to increase over time and peaks in 2010-11 due to lower than average yields. These findings suggest that although production volumes undoubtedly affect growers' total cash costs, increases in production input prices are also having an impact on total cash costs.

**Figure 2:** Total cash costs per tonne produced in real terms (average per farm)

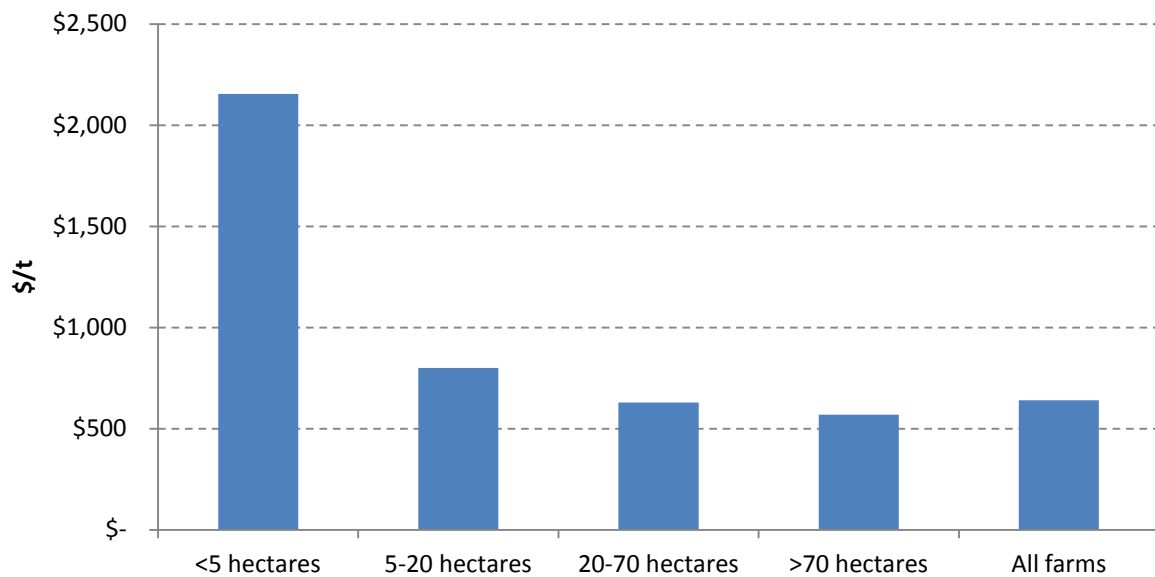


Source: ABARES *Australian vegetable growing farms: An economic survey, various years*

The data also suggests that the impact of cash costs on vegetable growers varies depending on the size and scale of the business in question. As shown in Figure 3, growers that produced vegetables on less than five hectares had significantly higher average cash costs than those that grew vegetables on five or more hectares, when measured by per tonne of vegetables produced in 2010-11. Moreover, average cash costs continue to decline as the size of area sown increases. This is largely due to the cost advantages that are achievable with increased vegetable production. For example, the cost to produce a vegetable unit tends to decrease as total vegetable production increases as the costs are shared over a larger sum of vegetables. Increased scale may also reduce costs per vegetable unit due to efficiency gains.

<sup>2</sup> ABARES *Australian vegetable growing farms: An economic survey, 2011-12 and 2012-13, (2013-14)*.

**Figure 3:** Total cash costs per tonne of production by area sown in 2010-11



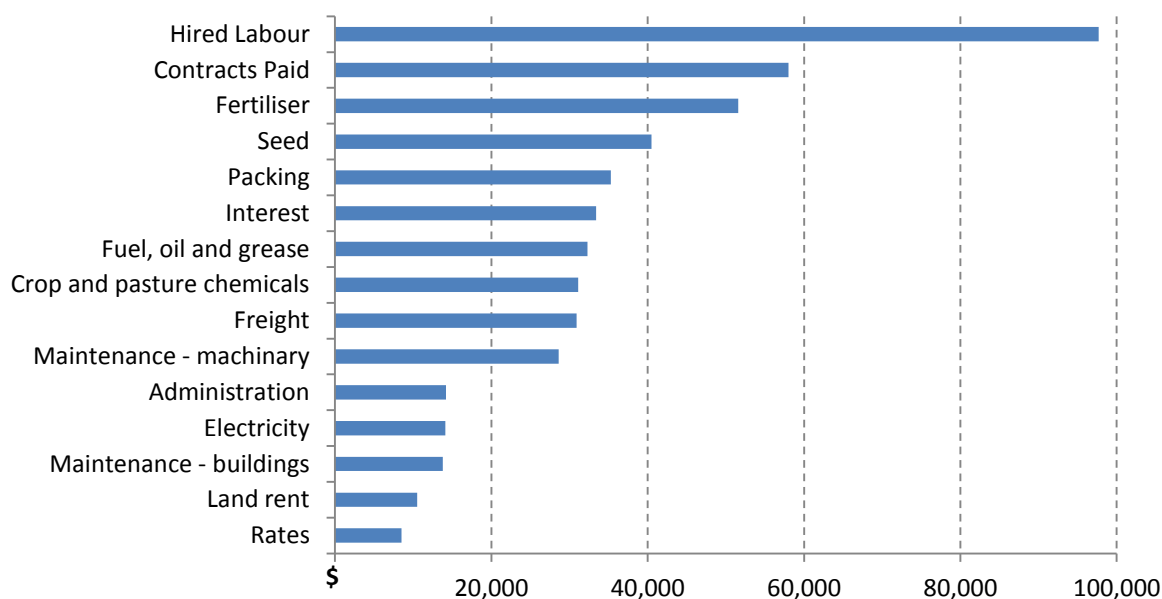
Source: ABARES *Australian vegetable growing farms: An economic survey, various years*

In summary, reducing production costs and improving productivity is critical to improving returns for Australian vegetable growers. Although increasing scale of production may help to alleviate production costs, this may not be an option for many vegetable growers. Therefore, it becomes increasingly important to understand the costs involved in vegetable production and what techniques are being implemented by growers to reduce these cost pressures.

## Vegetable Production Cash Costs

According to ABARES data, hired labour continued to be the highest cash cost for vegetable growing farms, accounting for approximately 17 per cent of total average cash costs in 2011-12. This was followed by contracts paid (10 per cent), fertiliser (9 per cent) and seed (7 per cent). Other cash costs used during the production of vegetables, such as fuel and electricity accounted for 6 per cent and 2 per cent respectively.

**Figure 4:** Composition of vegetable production cash costs, 2011-12 (average per farm)



Source: ABARES *Australian vegetable growing farms: An economic survey, 2011-12 and 2012-13*

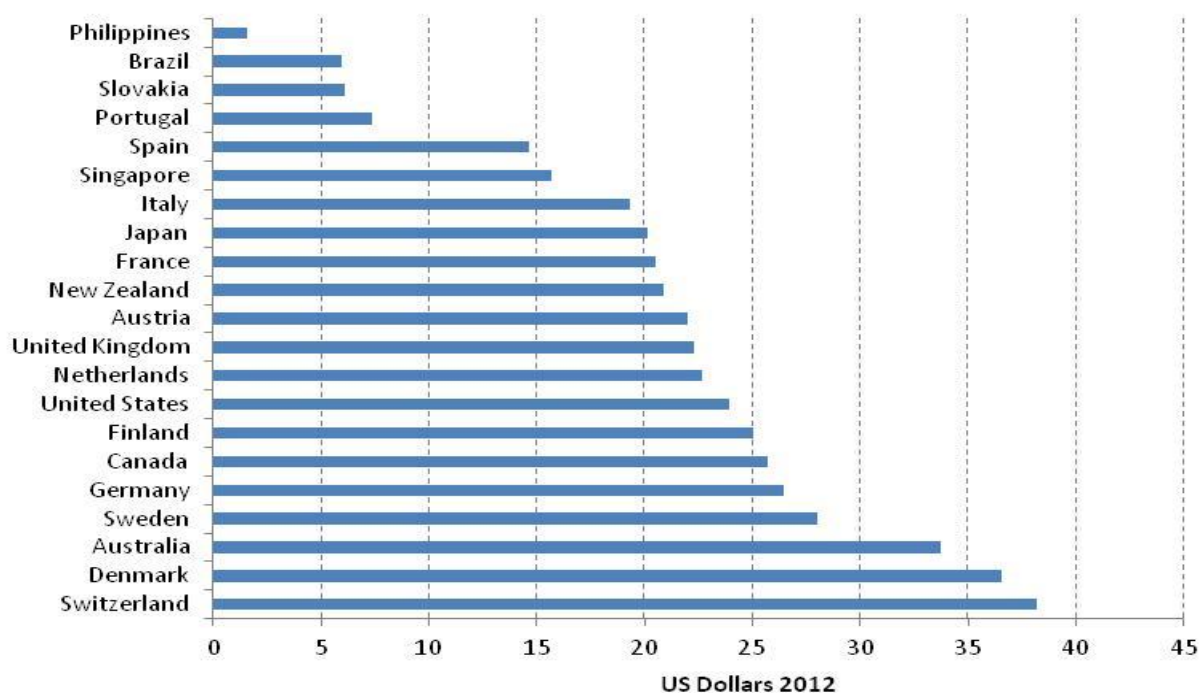
## Hired Labour Costs

Typically, vegetable growing in Australia is more labour-intensive than other agricultural industries. The delicate nature of the produce commonly requires the use of labour to hand pick the vegetables. This puts the vegetable industry at a disadvantage to other agricultural industries as it limits vegetable growers' ability to introduce mechanised technologies as a substitute for labour.

Growers dependency on labour to grow vegetables, coupled with Australia's high labour costs, reduces their capacity to minimise labour costs. Australia's labour costs are amongst the highest in the world<sup>3</sup>. As shown in Figure 5, Australia ranks third highest internationally for its hourly direct pay rate for time worked in manufacturing, being surpassed only by Switzerland and Denmark. Australia's hourly direct pay rate for time worked in manufacturing is approximately 60 per cent higher than New Zealand's.

<sup>3</sup> International Labour Organization, *Global Wage Report 2012/13, wages and equitable growth*, (2012-13).

**Figure 5:** Comparison of hourly direct pay\* for time worked in manufacturing, 2012 (US\$)



Source: United States Department of Labor, Bureau of Labor Statistics (BLS), 2012.

\*Hourly Direct Pay: Pay for time worked is primarily base wages and salaries, overtime pay, regular bonuses and premiums (paid each pay period), and cost of living adjustments.

Over the decade to 2011, Australian labour costs have grown rapidly, more than twice as quickly as a number of OECD countries, as shown in Figure 6. During this period, Australia’s average unit labour costs grew by 3.3 per cent a year, in contrast to 2.4 per cent in the United Kingdom, 1.8 per cent in the United States, 0.2 per cent in Germany, and the entire OECD averaged 1.3 per cent. As labour costs rise faster in Australia than most other OECD countries, this weakens Australia’s competitiveness, particularly for vegetable growers given the labour intensity involved in producing vegetables.

**Figure 6:** International Unit Labour Costs\*, 2001-2011

	Average, annual percentage change	Percentage change (2001-2011)
Australia	3.3%	36.3%
United Kingdom	2.4%	26.2%
Italy	2.4%	26.7%
France	1.9%	21.0%
United States	1.8%	19.9%
Korea	1.5%	16.0%
OECD average	1.3%	14.5%
Germany	0.2%	2.7%
Japan	-1.6%	-17.3%

Source: OECD Statistics, Unit Labour Costs – Annual Indicators

\*Unit labour costs: measure the average cost of labour per unit of output.

## Opportunities and Challenges

Australian vegetable producers directly employed around 15,000 people in August 2012<sup>4</sup>. However, labour shortages and the ability to retain workers has been an ongoing issue for the vegetable industry. The availability of human capital is of significant concern, as these shortages provide growers with limited opportunities to reduce their labour costs. Labour issues, primarily in rural and regional Australia, have occurred as a result of lower birth rates, an ageing demographic profile, increased personal wealth, provision of social welfare, sustained economic growth, and low unemployment<sup>5</sup>. These reasons have lessened the number of persons willing to work in the vegetable industry, coupled with competition and more generous rewards on offer from other industries, such as mining.

## Overseas Workers and Skilled Migration

Australian vegetable growers typically use local labour, although, during peak periods overseas workers and skilled migrants provide an adequate secondary labour source. The Temporary Work (Skilled) visa (subclass 457) allows skilled workers to come to Australia and work for an approved sponsored business for up to four years. In 2012-13, around 1,400 applications were granted throughout the Agriculture, Forestry and Fishing industry, representing approximately a 40 per cent increase from the previous year<sup>6</sup>. The Regional Skilled Migration Scheme is a similar type of program but provides a permanent residence visa for skilled workers who want to work in regional Australia. There are currently categorisation issues that may prevent some vegetable businesses from utilising these schemes to obtain skilled workers.

Vegetable growers' labour requirements vary throughout the year, given many vegetable products are seasonal in nature. While migration programs are undoubtedly beneficial for growers, they can also become problematic for both migrants and growers. Depending on the nature of the business, during quiet periods, some growers may not be able to afford to pay for migrants' wages, and there may be limited alternative job and training opportunities for migrants to pursue given the remoteness of many vegetable farms.

As such, many growers still depend on the thousands of backpackers looking for work, to fill unskilled labour shortages during peak periods. Initiatives that encourage backpackers to visit Australia and travel to vegetable growing areas are essential to minimising growers' labour costs and providing greater access and flexibility with regards to labour.

Growers also have the opportunity to provide incentives for backpackers to work on their farm by offering discounted or free rental accommodation, free dinners and other amenities. This strategy is likely to provide additional appeal and encourage backpackers to travel and work on vegetable farms.

---

<sup>4</sup> ABS, Labour Force, Australia, Detailed, Quarterly, cat.no. 6291.0.55.003 Australian Bureau of Statistics, Canberra.

<sup>5</sup> Maclellan, N. & Mares, P, *Labour mobility in the pacific: Creating seasonal work programs in Australia* (2005).

<sup>6</sup> Department of Immigration and Border Protection, *Subclass 457 State/Territory summary report 2012-13 to 30 June 2013, (2012-13)*.

## Skills Shortage

Over the past decade, vegetable growers have found it increasingly difficult to access both skilled and unskilled workers. Impediments to meeting the industry's skills shortage include low levels of industry participation in education and training, low numbers of under-graduates and graduates in tertiary agriculture courses, poor awareness of agricultural career pathways amongst students and the limited capacity of the current education and training system to deliver innovative training solutions<sup>7</sup>.

The vegetable industry's ability to attract young people to study and pursue a career in vegetable farming is critically important to the longevity of the industry. Without an injection of new and younger workers into the farming workforce, there will be an inevitable loss of productivity. The industry must realise that attracting new entrants and retaining quality staff is pivotal to future growth and productivity<sup>8</sup>.

One of the most significant impediments to attracting people to study and work in the agriculture industry is its poor image in the media and a reluctance to relocate to rural areas. The agriculture industry has low prestige due to the common belief that agricultural employment is necessarily manual labour with limited (if any) skill requirements, that may not provide secure ongoing work or opportunities to develop and advance careers. Agriculture is also not considered to have strong economic prospects or provide a stable income given its vulnerability to climatic events<sup>9</sup>.

Although enrolments in agricultural courses are no longer declining, there are currently no courses offered that exclusively focus on horticulture at any university, and many of the agricultural courses have a reduced or limited focus on horticulture. To assist in increasing the number of enrolments in agriculture and improve its image, the vegetable industry could increase its focus on high school students (particularly those nearing completion); provide students paid employment for work placements in conjunction with degrees; and target agriculture related scholarships to students nearing completion of their course<sup>10</sup>. Implementing these initial initiatives would be expected to provide tangible benefits for the vegetable industry and establish a strong foundation the industry could improve on.

## Labour Intensity

Whilst vegetable growers will always require sources of labour to produce vegetables, growers may have the ability to reduce their labour requirements by reviewing and identifying alternative methods in relation to their production processes. In theory, where inputs to production are flexible and interchangeable, the industry would move away from the relatively expensive labour into relatively cheaper capital<sup>11</sup>.

---

<sup>7</sup> DAFF Workforce, *training and skills issues in Agriculture 2009*, (2009).

<sup>8</sup> DAFF Workforce, *training and skills issues in Agriculture 2009*, (2009).

<sup>9</sup> DAFF Workforce, *training and skills issues in Agriculture 2009*, (2009).

<sup>10</sup> AUSVEG, *Investigating future training and education opportunities for both new and existing vegetable industry members*, project number: VG12077, (2013).

<sup>11</sup> Cuadrado, F. & Long, N, *Capital labour substitution, structural change, and growth*, (2013).



However, as mentioned earlier, growing vegetables generally requires labour to hand pick vegetables. Where feasible, growers should seek to substitute labour intensive processes with capital and mechanised improvements. Although this would require a financial outlay, in the long-term, this could improve growers' financial position. If the cost of purchasing capital equipment is too expensive, arrangements where growers could pool together funds and share the machinery, as required, could be pursued as an alternative.

## Energy Costs

Rising energy costs (electricity, fuel, oil and grease) place additional cost pressures on the vegetable growing industry, therefore reducing growers' returns. On average, energy costs accounted for approximately 8 per cent of total cash costs per farm in 2011-12<sup>12</sup>. While energy costs account for a moderate proportion of growers' overall costs, energy prices have increased significantly in recent years.

Agriculture accounts for nearly 4 per cent of industry energy usage in Australia, with energy being consumed in three major forms on most farms: general electricity (lighting, appliances); fuel (machinery, vehicles and freight costs); and heating/cooling and refrigeration<sup>13</sup>.

As with many other costs, vegetable growers have very limited ability to influence the price of energy (supply side), as these prices are influenced by other factors, including exchange rates, world market trends and consumer preferences.

## Electricity Costs

Over the past four years the cost of electricity for households has risen on average by around 59 per cent nationally<sup>14</sup>. Electricity prices vary considerably amongst states, due to different electricity generation methods (e.g. coal, solar, wind etc...) and grid investment strategies (transmission and distribution of electricity). Regardless, most Australian states' wholesale electricity prices have experienced significant price increases since 2011-12. In 2012-13, average wholesale electricity prices in South Australia, Queensland and Victoria more than doubled from the previous year. Electricity prices for New South Wales and Tasmania also increased by 86 per cent and 48 per cent respectively<sup>15</sup>.

The increase in electricity prices is largely being driven by improvements in Australia's infrastructure networks (power poles and wires) and transition to electricity generation from renewable energy sources, like solar or wind. The cost of these upgrades is then transferred to consumers, including growers, which pushes up electricity costs.

---

<sup>12</sup> ABARES *Australian vegetable growing farms: An economic survey, 2011-12 and 2012-13, (2013-14)*.

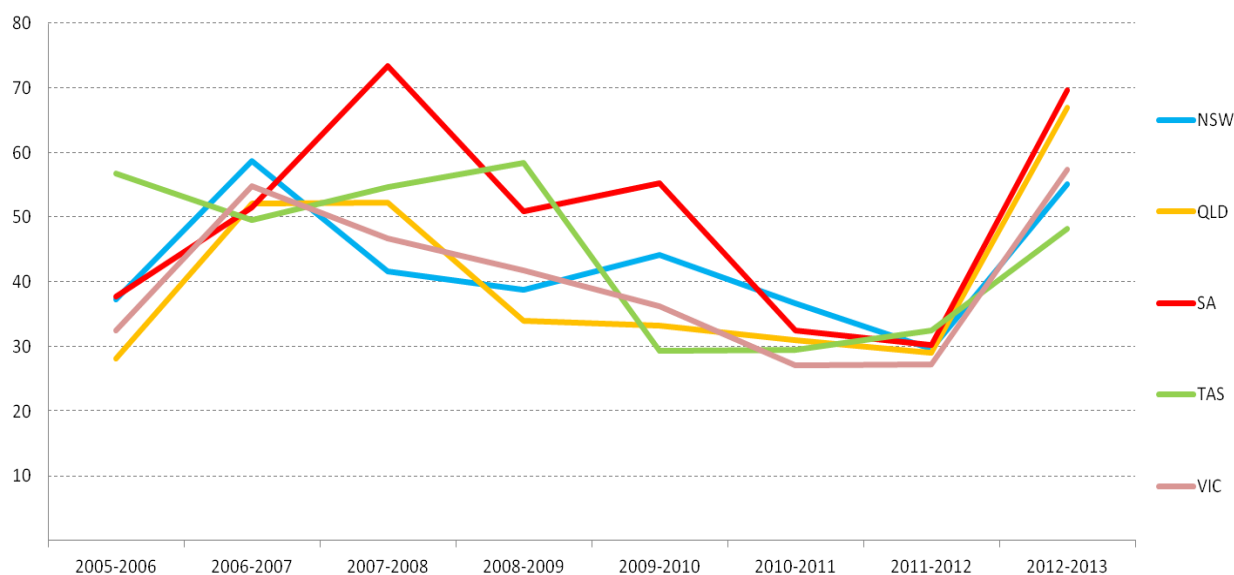
<sup>13</sup> Clean Energy Finance Corporation: *Energy Efficiency Agriculture*, date accessed:15/12/2013, <http://www.cleanenergyfinancecorp.com.au/energy-efficiency/agriculture.aspx>.

<sup>14</sup> ABS (Sept 09 – Sept 2013) *Consumer Price Index for electricity (cat. no. 6401.0)*

<sup>15</sup> Australian Energy Market Operator: *Electricity data average price tables*, date accessed 25/11/2013, <http://www.aemo.com.au/Electricity/Data/Price-and-Demand/Average-Price-Tables>.

The proposed removal of the carbon tax is expected to provide vegetable growers some much needed relief through lower electricity prices. It is estimated that the removal of the carbon tax will reduce the average household electricity bill by \$200 and gas bill by \$70 in 2014-15<sup>16</sup>.

**Figure 7: Average annual wholesale electricity prices, per \$/MWh**



Source: Australian Energy Market Operator: Electricity data average price tables

Despite vegetable growers' inability to influence electricity prices, the retail electricity market is competitive. Accordingly, growers are shopping around for an energy market contract that provides the most cost-effective prices, and terms and conditions most suitable to their needs. Vegetable growers can also achieve energy cost savings by minimising the level of energy required to operate their farm (demand side). There are various ways to save energy, from adjustments to maintenance procedures, process improvements and increasing plant and equipment efficiency. Various energy saving options deliver immediate benefits and savings, whilst others involve an upfront cost that can be recovered within months or years<sup>17</sup>.

## Fuel

Fuel is also an important production input for vegetable growers, as it enables growers to use machinery to more efficiently produce vegetables and can therefore improve productivity levels. To this end, increasing fuel prices adds a further cost pressure on growers.

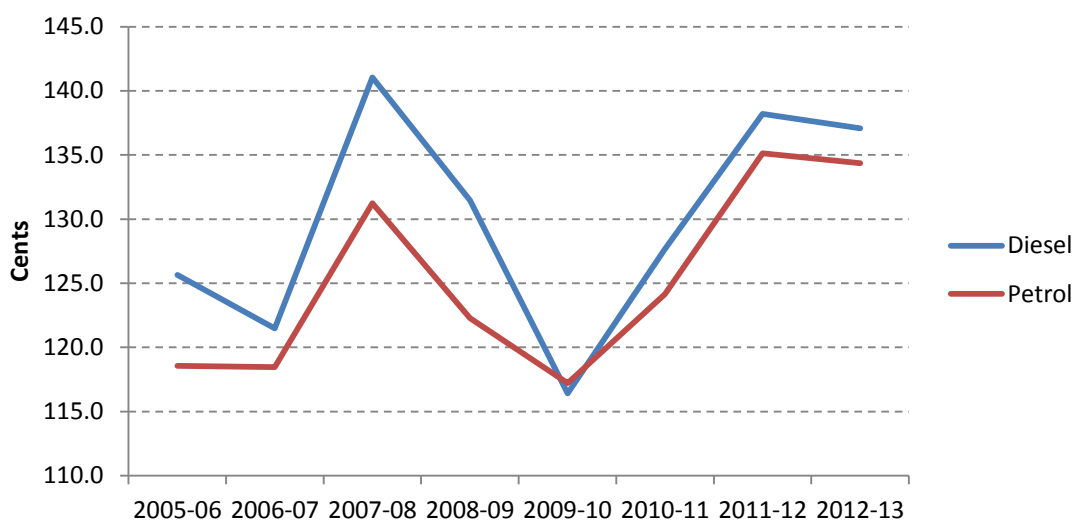
In the past eight years, vegetable growers have had to contend with volatile national fuel prices. Prices for both petrol and diesel tracked similarly, with diesel generally being more expensive. During 2009-10 to 2011-12, average wholesale fuel prices have increased by approximately \$0.20 cents, but have remained steady since. To meet Australia's fuel demand, around 15-20 per cent of

<sup>16</sup> The Commonwealth Treasury cited in the Department of Industry, *the facts on electricity prices*, page 2 (2013).

<sup>17</sup> Australian Industry Group, *Energy Saving Fact Sheet – Saving energy in the fruit and vegetable processing industry*, n.d.

petrol is imported (mainly from Singapore)<sup>18</sup>. A weakening Australian dollar is expected to push up fuel prices.

**Figure 8:** National average terminal gate fuel price (yearly)



Source: Australian Institute of Petroleum: Terminal Gate Prices (wholesale)

Many growers are beginning to realise the cost, efficiency and environmental benefits of improving their on-farm fuel efficiency. These benefits are being realised through various means, including replacing older equipment with more fuel efficient equipment and changing growing practices. According to research, the greatest gains in fuel efficiency can be achieved through changing farm practices. This consists of: ensuring the field is designed with as little shape, contours and obstacles which can cause increased manoeuvring or reduced yield via nutrient loss; using a predetermined optimum tractor course which could improve fuel efficiency by up to 20 per cent; using one set of permanent tracks for all the machinery operations on the field (controlled traffic farming); machine maintenance which can reduce fuel consumption by 5-15 per cent; and using machinery at their optimum travel speed, since speed has a large effect on fuel consumption<sup>19</sup>.

## Fertiliser Costs

Fertiliser is an essential production input that contributes to growers achieving the highest possible yield for their produce. Australia uses between five and six million tonnes of fertilisers each year, with half being manufactured in Australia but also consisting of imported minerals<sup>20</sup>. In 2011-12, fertilisers represented 10 per cent of total cash costs for farms, according to farm survey data collected by ABARES.

<sup>18</sup> Australian Institute of Petroleum – Facts About Petrol Prices and the Australian fuel market, date accessed 27/11/2013,

[http://www.aip.com.au/pricing/facts/Facts\\_about\\_Petrol\\_Prices\\_and\\_the\\_Australian\\_Fuel\\_Market.htm](http://www.aip.com.au/pricing/facts/Facts_about_Petrol_Prices_and_the_Australian_Fuel_Market.htm).

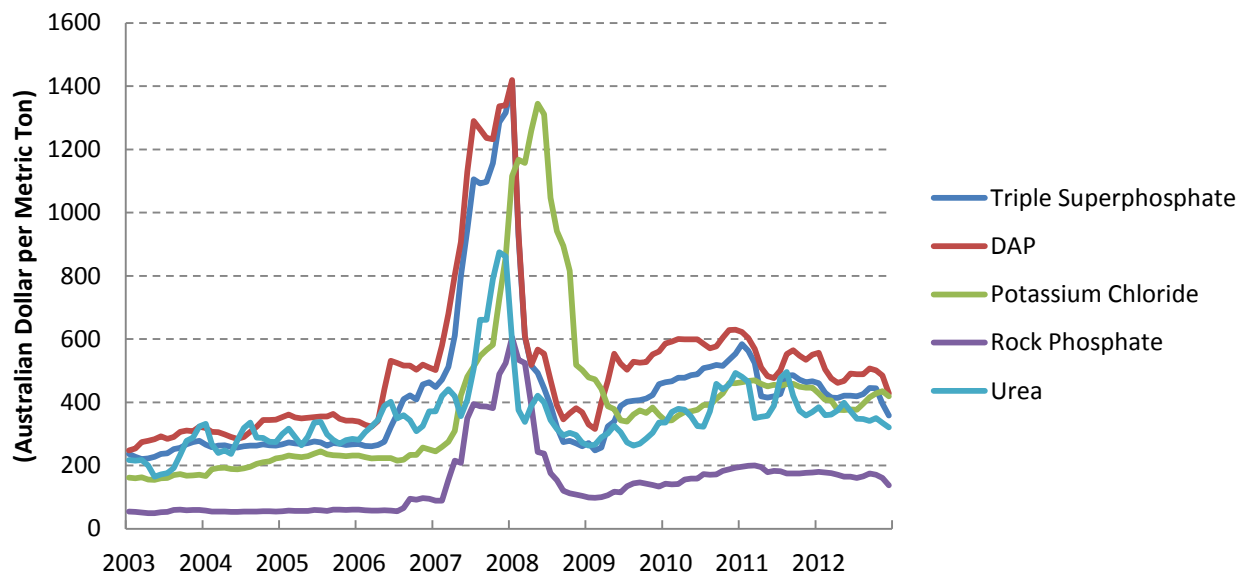
<sup>19</sup> Biggs, L & Giles, D, *Current and future agricultural practices and technologies which affect fuel efficiency*, Intelligent Energy, Europe, (c. 2012).

<sup>20</sup> Fertilizer Australia – *Domestic Fertiliser Market*, date accessed 28/11/2013, [http://www.fertiliser.org.au/default.asp?V\\_DOC\\_ID=1176](http://www.fertiliser.org.au/default.asp?V_DOC_ID=1176)

Compared to the global fertiliser market, Australia is a small player. The International Fertilizer Association estimates that on a total nutrient (NPK) basis, Australian fertiliser consumption is just over 1 per cent of global consumption. As such, this limits Australia’s ability to influence the global fertiliser price, resulting in Australian growers being vulnerable to global fertiliser price movements. Global fertiliser prices are highly dependent on prices for agricultural commodities. If prices for agricultural commodities increase, demand for fertiliser also rises as agricultural producers respond by increasing production<sup>21</sup>. The final price of fertiliser for Australian vegetable growers also depends on sea freight costs and exchange rate movements.

World fertiliser prices have been extremely volatile over the past decade, with fertiliser prices rising by over 750 per cent, in some instances. The most significant price increase occurred between 2007 and 2008 (world food price crisis), where the price of DAP, triple superphosphate, and potassium chloride reached above \$1,300 Australia dollars per metric tonne. This spike was spurred by the increase in global food prices which led to increased purchases of fertiliser as growers sought to capitalise on this opportunity. However, fertiliser prices also fell during the global financial crisis (GFC) as it had become too expensive for most growers to continue purchasing fertiliser at such a high cost. Fertiliser prices also tend to fluctuate based on key inputs such as natural gas, potash and crude oil.

**Figure 9: World Fertiliser Prices**



Source: Indexmundi

In the last two years, world fertiliser prices have been generally declining, providing Australian vegetable growers some much needed relief. Whilst world fertiliser prices have reduced, prices remain above the pre-GFC period.

Many growers understand that managing and improving soil health is a crucial element to the success of their business. Attempting to minimise or stop the use of fertiliser and soil amendment

<sup>21</sup> Fertilizer Australia – *Global Fertiliser Price*, date accessed 28/11/2013, [http://www.fertilizer.org.au/default.asp?V\\_DOC\\_ID=1173](http://www.fertilizer.org.au/default.asp?V_DOC_ID=1173)

for crop and pasture production can be counterproductive<sup>22</sup>. This could result in lower yields for growers and increased soil erosion, reducing returns for growers. Soil health is being improved through: tillage at minimum levels to reduce soil disturbance; growing green manures as cover crops; crop rotation; applying amendments from plant or animal origin, composts, crop residues that increase soil carbon and structure; manures; and minimising the movements of machinery and equipment across soil surfaces<sup>23</sup>.

## Conclusion

Australian vegetable growers have been incredibly resilient over time, continuing to produce high quality, safe and nutritious vegetables whilst experiencing increasing production costs. To assist growers, additional levels of support are needed to ensure costs of production are managed and controlled at more sustainable levels. This is essential for the industry given the majority of growers are price takers and cannot influence or control the prices of production inputs (i.e. fertiliser and fuel).

To help alleviate growers' rising labour costs the Australian vegetable industry needs: a flexible and adaptive workforce that meets growers needs; to target teenagers (at high school or university) to provide an injection of new and younger workers; to promote the industry as a highly-skilled viable and long-term career opportunity; and provide more flexible career development opportunities. For example, what other career opportunities could pursuing a career in the vegetable growing sector lead to; engaging in positive mainstream and targeted media to promote the success and employment opportunities that agriculture/horticulture can offer and dispel the notion that agriculture only involves manual labour, and lower salaries compared with other industries<sup>24</sup>.

Rising energy expenses, particularly electricity, have imposed additional costs on growers. Many growers have reduced their energy costs by implementing energy saving options, such as altering their production process and increasing their energy efficiency. In some cases, vegetable growers have exhausted most of these opportunities. While growers have a direct incentive to reduce their energy costs as it translates into higher returns (all else equal), the correct policy settings must encourage this transition. Generating renewable energy on farms, cogeneration plants and purchasing efficient and larger machinery generally require a significant capital outlay. Therefore, incentives to encourage the uptake of these type of investments, where cost-effective to do so, should be made more readily available. There is also a need for simplistic and streamlined arrangements, where multiple parties could pool funds together and purchase an energy efficient piece of machinery (i.e. cogeneration system). Such arrangements need to be explored further.

Fertiliser prices have fluctuated extensively over the past decade, partly due to the GFC and price movements in key production inputs such as natural gas and crude oil. Similar to many production

---

<sup>22</sup> New South Wales Department of Primary Industries, *AGFACTS: Managing soil amendments and fertilisers for a cleaner environment*, (2004).

<sup>23</sup> The Department of Environment and Resource Management and the Department of Employment, Economic Development and Innovation, *Soil health for vegetable production in Australia*, (2010).

<sup>24</sup> AUSVEG, *Investigating future training and education opportunities for both new and existing vegetable industry members*, project number: VG12077, (2013).

inputs for growers, fertiliser prices are influenced by external factors, including exchange rates, the availability and prices of potash, world market trends and consumer preferences. To somewhat mitigate the volatility in fertiliser prices, growers will need to continue to effectively improve soil health through implementing various techniques, such as crop rotation, using slow release fertilisers, composts and growing green manures as cover for crops.

Vegetable growers need to continue managing the level of inputs required to achieve an optimum yield, given they have limited ability to influence the price of inputs. However, the key to reducing growers' costs is to improve and accelerate productivity growth, which would also increase the vegetable industry's competitiveness. Moving forward, it would be valuable for the vegetable industry to identify how productivity growth, which is essential for the sustainability of the industry, can be increased and which new technologies offer the largest gains.