



# THE WORKFORCE CHALLENGE IN HORTICULTURE

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He is a former President of the Australian Society of Agronomy and former Vice President of the International Allelopathy Society. He has served on the Boards of the Cooperative Research Centres of Viticulture, Sustainable Rice Production, Weed Management Systems and Plant Based Management of Dryland Salinity. He is a member of the Research Advisory Committee of the Australian Farm Institute, the NSW Primary Industries Minister's Science Council and the Federal Minister for Agriculture's Rural Research and Development Council.

## ABSTRACT

**The future for Australian horticulture is buoyant but taking advantage of the opportunities is likely to be compromised by the shortage of professionals in the sector. The levels of education are low relative to the rest of the community and the offerings of horticultural education at universities are disappearing through lack of students. There appears to be no strategy in place to address this challenge.**

## INTRODUCTION

Horticulture is the third largest sector in agriculture behind meat and grains. Its gross value of production in 2008-2009 was \$8.39 billion and the sector employs around 200,000 people. A document "Future Focus" (HAL 2008) produced for Horticulture Australia Limited in recent times showed that by 2020, the current growth rate would deliver an extra \$0.9 billion in profit. **However there was potential for a further \$2.45 billion in profit if the sector was prepared to keep up with and improve on the performance of its competitors.** That same document commented that the sector had an inability to attract and retain human capability and skilled staff and strategies needed to be developed to increase productivity, attract skilled labour at all levels and develop/adopt labour saving devices. It further recorded that the sector needed to be attractive for young people to enter at all stages of the supply chain as providers of innovation services. The document was silent on how these outcomes might be achieved. Workforce is thus a critical issue for the horticultural sector and an analysis of the current workforce would provide a benchmark for future action.

## THE HORTICULTURE WORKFORCE IN AUSTRALIA

For purpose of analysis the horticulture sector is classified into two subsectors, amenity and production, with production further divided into fruit/nuts and vegetables. Figure 1 provides gross numbers for the components. Amenity horticulture employs more than 80% of the horticulture workforce (ie around 160,000) whereas the production sector provides the rest.

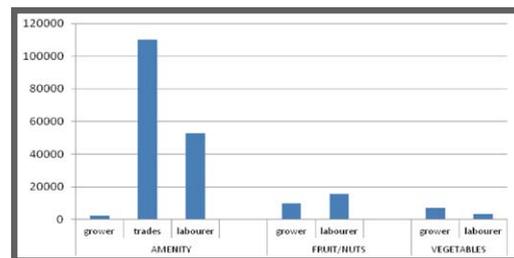


Fig. 1. Numbers of people employed in the horticulture workforce in Australia by sub-sector (2006 census)

There are some gender inequities (Figure 2) with the proportion of females being at best 30% overall and significantly lower in trades and labourer categories in the amenity subsector.

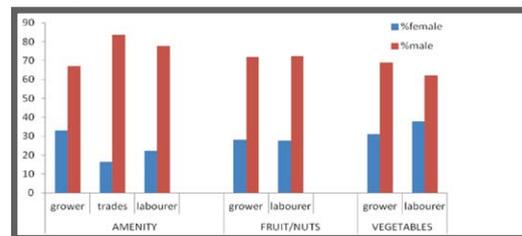


Fig. 2. Proportion of genders in the components of the horticulture workforce in Australia (2006 Census)

Previous studies have considered education for the horticulture sector in Australia. These include, inter alia, McEvilly and Aldous (2010), Guisard and Kent (2009), Rayner et al. (2009). This study builds on those papers. For the industry to move forward it is reasonable to expect that education and training would play a significant role. However on closer inspection the data suggest that horticulture in Australia is not well placed. Figure 3 shows the very low level of tertiary qualifications in the sector with only flower growers above 10% and most categories below 5%. There is a stronger performance in respect of vocational qualifications with amenity horticulture being significantly more qualified (45% having VET qualifications) than other categories.

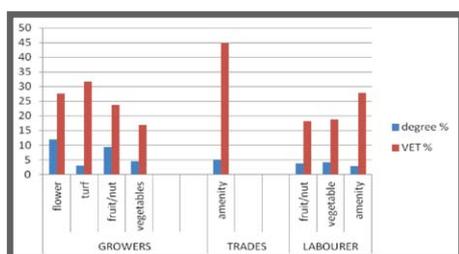


Fig. 3. Level of qualifications of the horticultural workforce in Australia (2006 Census)

The question arises as to how these levels of education relate more widely. The Australian community has about 26% of its constituency with a university degree whereas the agricultural sector has around 7.8% and horticulture 4.6% (Figure 4).

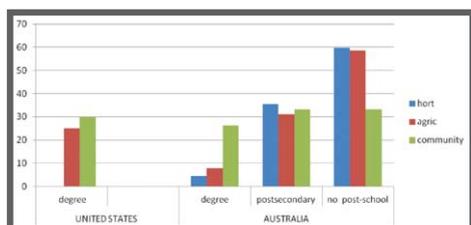


Fig. 4. Qualification levels for the community, agriculture and horticulture in Australia and for agriculture and the community in the US.

In the US around 30% of the community has a degree whilst 25% of its agricultural sector also has degree level qualifications. **These data suggest that the horticulture sector in Australia operates at an educational level below what might be considered adequate in modern Australia and well below at least one of its international competitors.** That said, it is also clear that vocational education is valued and that the levels in the horticulture sector overall are comparable with levels in the community generally. However the numbers are distorted with higher levels in the amenity subsector and significantly lower levels in the production subsector where the prospects for increased productivity and markets are purported to be high.

#### AN EDUCATED AND TRAINED WORKFORCE FOR HORTICULTURE

In order to address the perceived shortage of university trained people, it is important to understand the current graduate completion numbers and associated trends. Whilst it can be argued that the degree does not need to be in horticulture, there ought to be an expectation that the industry would want a large proportion of such graduates to have the relevant expertise. A perspective is provided by considering the trends over the last two decades or so. In the 1980s the agricultural college network provided horticulture qualifications at degree and associate degree levels. Data (Figure 5) show that at that time there were in excess of 150 graduates annually.

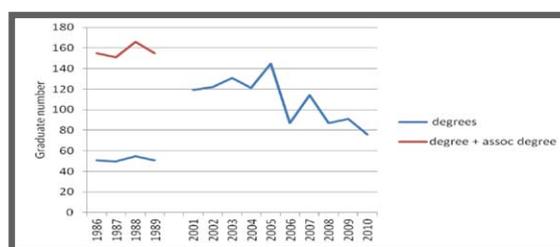


Fig. 5. Graduate completions in horticulture, 1986 to 2010, from higher education institutions in Australia.

With the Dawkins reforms in higher education in 1989 the colleges were gradually absorbed into the revamped university sector and programs were rationalised. Courses disappeared where market forces did not support retention. Completions steadied to around 120 for the period up to 2005 but have been in steady decline since then. In 2010 there were fewer than 80 graduates in horticulture from Australian universities. It needs to be recognised that the vast majority of these graduates are amenity horticulturists and very few represent the production horticulture subsector and of those, mainly in viticulture.

As student intakes decline, universities respond by contraction since funding follows student load. Horticulture courses are no different and there has been significant loss of offerings across Australasia. In relatively recent times up to ten or so institutions offered a degree in horticulture in Australia and New Zealand. A survey in 2011 showed that only Charles Sturt University still offered a horticulture degree and the University of Melbourne offered an associate degree. The University of Queensland, The University of Sydney and Massey University now offer a strand in another degree whilst The University of Western Sydney, the University of Adelaide, the University of Tasmania and Lincoln University offer one or more units of study. Ballarat University has a degree on its books but it is not offered.

**It is clear that access to tertiary horticultural education has been severely eroded as a result of lack of demand for such courses and there is no indication that the decline has stopped.** Specialist viticulture programs continue at Charles Sturt University, the University of Adelaide, Curtin University and Lincoln University but in most cases now as joint degrees with oenology. Offerings at La Trobe and the University of Western Australia have ceased. Viticulture is a component of the Wine Technology course at the University of Southern Queensland.

At the vocational level the number of completions were consistent for the period 2004-2007 being around 4500 per year nationally. Certificate 2 and Certificate 3 programs were the most popular with low numbers at the higher level programs (Figure 6).



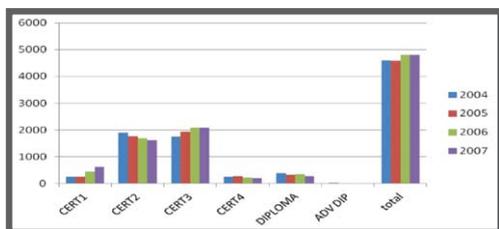


Fig. 6. Completions in vocational horticulture courses in Australia 2004-2007.

All states and territories provided courses with the majority in NSW followed by Queensland and Victoria (Figure 7).

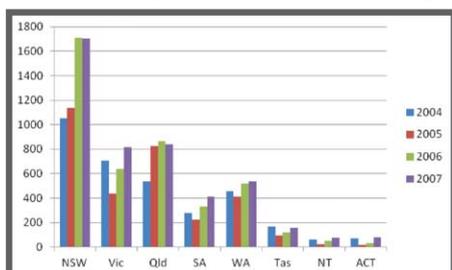


Fig. 7. Completions of vocational awards by state and territory in horticulture 2004-2007.

#### MATHEMATICAL CONUNDRUM

In order to maintain the education levels in the industry some benchmark calculations are warranted. Table 1 shows the numbers of graduates required annually to maintain levels at current benchmarks. In the calculations it is estimated that the average career in horticulture is around 20 years.

**Table 1.** Numbers of annual completions required to maintain the proportion of university graduates in the horticulture industry in Australia at the current horticulture levels, at levels in the agriculture sector and at general community levels. Calculations are based on an average career span of 20 years.

Horticulture workforce	200,000 people
Tertiary graduates (4.6%)	9,200 people
Graduates required for maintenance (4.6%)	460 graduates annually
Graduates required for agriculture levels (7.8%)	780 graduates annually
Graduates required for community levels (26.2%)	2,620 graduates annually

The numbers generated will increase with a shorter career span and decrease with a longer career span. In order to maintain the current level of 4.6% university graduates in a workforce of 200,000 some 460 graduates per year are needed. If the horticulture industry had aspirations to match

the levels in the agriculture sector or the general community then an annual supply of graduates needed would be 780 and 2,620 respectively without allowing for the graduate injection needed in the first place to be at the benchmark level. Figure 5 shows that the annual supply is under 80 university graduates in horticulture and declining. This is under one fifth of that required to meet the current low levels of education. Clearly, if the industry is to maintain its levels of university trained workforce, then graduates will have to come from other disciplines.

At the vocational (VET) level the situation is more positive. The horticultural industry has around 35% of its workforce (ie about 70,000) with vocational qualifications. Assuming the 20 year career average, then a steady state operation would require annual additions of VET qualified people of around 3,500. That number equates to current rates of completions and is above the levels in the agricultural industry and in the community generally (Figure 4). It needs to be recognised that there is a significant proportion of VET training undertaken 'on the job' and so the calculations used simplify the situation somewhat but nevertheless provide a 'ballpark' estimate.

These calculations suggest that the horticultural industry faces a challenge at the management level whereas training of the labour force seems well founded relative to other sectors of the economy.

#### THE NEED FOR GRADUATES

It is a reasonable question to ask why the industry needs more graduates. Doubters can point to the last century where the industry performed well and developed to current production levels. This was achieved without the emphasis on university qualifications but with reasonable labour force vocational training. Whilst that has been the case, its continuation unchanged ignores the realities of the new century. There will continue to be the need for strong vocational training but there is an ever increasing need for high level management and technical skills that ought not be ignored.

Modern horticultural operations have levels of complexity that did not exist even 20 years ago. The modern manager is faced with major compliance responsibilities such as occupational health and safety, pesticide management and environmental sustainability. Biosecurity is increasingly important. Business principles receive greater scrutiny with regular business activity statements. **Marketing is increasingly the responsibility of the business, quality assurance is expected and accreditation will become more common.** Climate change has to be managed and carbon emissions need to be minimised. The industry is becoming more 'high tech' with precision agriculture and computer technology applications increasingly available. If the industry is to move forward, compete with international colleagues and capitalise on opportunities then it will need to attract the best educated people available. Further, there will need to be a continued pipeline of 'experts' to supply inputs,



including specialist advice, and manage supply chains to ensure the industry can deliver in the new paradigm.

Soderlund (2004) provided advice that the industry had to shift from “a market garden mentality and small business approach to a focus on supply chain management, technology (precision farming) and export competitiveness”. He further advised that a significant limitation was accessing *suitably qualified professionals* in those disciplines. It appears that there has been little movement in these directions in the intervening years. Continuing to ignore the realities will not serve the sector well.

#### CONSIDERING THE OPTIONS

The most obvious option for remediation of professional horticulture is to increase the number of students studying horticulture at university. In reality this is problematical because unless there is an immediate and substantial increase in student numbers, horticulture as an option is likely to disappear from university offerings. **The impact of this outcome is that the applied expertise will disappear as well as reduce R&D capability and postgraduate research training in applied areas.**

The fallback position is to attract agricultural graduates to the horticulture sector. Such graduates have made strong contributions in the past. However the decline in availability of graduates in agriculture is similarly dramatic (Figure 8), falling from around 800 in the 1980s to under 300 in 2010. If graduates in agricultural economics, agribusiness, horticulture/viticulture and animal science are added then that graduate number increases to around 700. Data show that the job market for graduates has been consistently in excess of 4000 per year for the recent past (Pratley and Hay, 2010) and so there is an acute shortage of graduates across the industry.

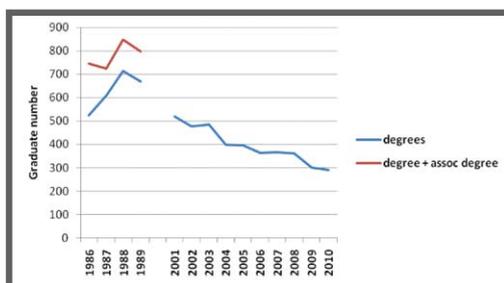


Fig. 8. Graduate completions in agriculture/agricultural science in Australian universities from 1986 to 2010.

The consequences are stark: there are now fewer campuses that offer agricultural or horticultural education. This is particularly so in regional Australia where the number has halved in the last 20 years. Student access is thus becoming more restricted and there is a reluctance to travel to distant and metropolitan campuses because of the cost and dislocation from community. **The shortage of graduates causes a reduction in the availability of informed advice**

**to producers and there has been a significant increase in the number of ‘snake oil salesmen’ and associated unproven products, highlighting the importance of an industry-wide accreditation scheme.** There is likely to be less capacity for R&D especially in applied science.

#### CONCLUSIONS

The strong prospects for the horticulture sector are compromised by the lack of professional expertise and in the ability of the student pipeline through universities to supply it. The horticultural offerings in the university system are difficult to sustain and the industry will depend on agricultural graduates which are in very high demand due to exceptional shortfalls in supply. The horticulture sector has been aware of this issue for some time but there has been no discernible action to address this. Ignoring the issue will hurt the sector: it needs to embark on a campaign to promote careers in the industry, to ensure there are clear career paths for prospective workforce, adequate remuneration to attract the ‘best and brightest’ and greater career support for its R&D workforce. The sector also needs to embrace and value education and support the institutions that can continue to provide it. Doing nothing is not an option.

#### ACKNOWLEDGEMENTS

Data for this paper are based on the 2006 Australian Census and ABS statistics. Graduate completions data have been provided from individual universities by members of the Australian Council of Deans of Agriculture.

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