Agricultural Education 'rebooted' in Australia

James E. Pratley

Corresponding author: James E. Pratley (jpratley@csu.edu.au)
School of Agricultural and Wine Sciences, Charles Sturt University, Wagga Wagga NSW 2678, Australia

Keywords: agricultural education, agricultural workforce, education history

Abstract

Agricultural education in Australia was in the doldrums for several decades in the latter part of the 20th Century and more recently. Some of this can be attributed to poor industry leadership, particularly in relation to recognition of the value of education and training in the sector. Consequently, agriculture lost community respect and was not seen by the emerging generation as the industry sector of choice for careers. For most of this Century there has been a concerted effort to change the public perception of the sector and the causal dynamics involved and it is pleasing to report that agriculture has been 'rebooted' to a positive paradigm with an encouraging outlook. The circumstances for the fall and rise of agriculture comprise the basis for this paper.

Introduction

Agricultural education in Australia had been in the doldrums from the 1990s to around 2012. In general since then, there has been a resurgence within the school systems and the universities. However, the vocational colleges around Australia, with the notable exception of the successful Tocal College in the Hunter Valley of NSW and the revitalised Longeronong College near Horsham in Victoria, have been extinguished, largely by political decisions. Reflection on the history of agricultural education in Australia is informative and has been addressed by Pratley and Archer (2017a, 2017b) in some detail. Some aspects pertinent to this paper are noted in the search for understanding of what caused the demise and the rebounding.

The deficiencies in agricultural education came to a head in 2007 when, at a conference in Adelaide, universities were berated by industry for not producing a sufficient number of graduates to meet industry demand. The university agriculture departments were themselves in a parlous state as they struggled to keep the doors open in a climate of poor interest from prospective students.

This paper considers some of the historical context in the evolving dilemma and the steps taken to rebuild and sustain the provision of agricultural education in Australia. What emerge from this consideration are the contradictions that beset the process over time.

The evolution of agricultural education

Public education, at the primary level, became a focus in Australia in the mid-1800s. There was resistance from specialist disciplines such as blacksmithing and farming, as the prevailing view was that such occupations handed down the appropriate knowledge; that experience was the best teacher. Towards the end of the 1800s secondary public schools were established, although these were seen largely as a pathway to university. The Universities of Sydney and Melbourne had been established in the 1850s, the University of Adelaide in the 1870s and the

University of Tasmania in the 1890s with others to follow in the 1900s. In 1910, as only about 5% of students continued past primary school level, the numbers going onto university study were very low. Agricultural studies were not offered in universities until the 1900s.

Despite opposition to education generally, and agricultural education in particular, governments established specialist agricultural colleges (Table 1), beginning in the 1880s. Over time, these colleges established themselves as an important part of agricultural history. They evolved through 'academic creep' to 'colleges of advanced education (CAEs)' from the 1970s, eventually being absorbed into the university sector in the process of rationalisation of higher education in 1989. Through their education provision, they were pivotal in producing extension officers for state Departments of Agriculture, although that function was largely lost in the amalgamation of the colleges with the universities. The state agencies gradually withdrew from the extension activity and have been replaced largely by private consultants, many of whom have been products of that new single higher education tier of university agriculture. The one exception at this level has been Marcus Oldham College at Geelong in Victoria, which has successfully maintained its private operation since its establishment in 1962.

Table 1. Specialist colleges in agriculture established in the 19th Century in Australia

Agricultural College	Year established
Roseworthy (now University of Adelaide)	1883
Dookie (now University of Melbourne)	1886
Longerenong (now vocational college)	1889
Burnley Horticultural College (now University of Melbourne)	1891
Hawkesbury (now Western Sydney University)	1891
Wagga (now Charles Sturt University)	1896
Queensland (now University of Queensland)	1897

At secondary school level, specialist agricultural high schools came into being from early in the 20th Century. In New South Wales, Hurlstone (1907), Yanco (1922), Farrer (1939) and James Ruse (1959) Agricultural High Schools were established. It was quite clear that such schools were particularly for students of 'high IQ'. In South Australia, Urrbrae High School had an agricultural specialty from 1932. Western Australian governments progressively (from 1942 through the 1950s) created what is now the Western Australian College of Agriculture comprising senior secondary schools such as Cunderdin, Harvey, Morawa and Denmark. Victoria established a network of agricultural high schools in 1907 but abandoned the idea a decade later as there was no public or agricultural support for the concept (Martin, 1977).

In the 1960s, politicians also responded to criticism that the well-established agricultural colleges were seen to be too academic to train 'farm boys' at the level needed by farmers and so new vocational colleges of agriculture were set up in New South Wales (principally Tocal College and Murrumbidgee, formerly Yanco, Agricultural College) and Queensland (principally Emerald and Longreach). In 2005, Longeronong College near Horsham separated from the University of Melbourne to become a successful vocational agriculture college. From 2020, only Tocal and Longeronong remain active, as Murrumbidgee met its demise in 2003 and the Queensland Government determined that the Queensland colleges would close at the end of 2019.

Thus, by the 1960s, agriculture was well served by the availability of specialist education at all levels. It was the only industry sector with specialist high schools and vocational colleges and there were provisions in all states at university level. Two aspects stand out: firstly, that the specialist provision was for males only; and secondly, there was a strong standard imposed (*e.g*. DH Drummond, NSW Department of Education Ministerial memo, 11 January 1939, provided in Pratley & Archer, 2017) for the specialist schools. In contrast however, there were low expectations for agriculture studies in the other schools for most of the 20th Century and early 21st Century. Yet there was little support from the sector itself for education due to the belief that farming skills were best learnt by experience on farm. Educated men were 'treated with scepticism' by farmers (Western Mail, Perth, 18 December 1941; Martin, 1977), a view that significantly persisted through the 1900s and early 2000s.

Agriculture in the Menzies era

Agriculture's role in the Australian economy for the first half of the 20th Century was major, accounting for approximately one quarter of economic output and over 70% of Australia's exports (Productivity Commission, 2005). During the post-World War II period, agriculture experienced boom times ('Australia rides on the sheep's back', as described in Cashin & McDermott, 2002). However, since that time its relative importance has declined, as other sectors of the economy, particularly services, have dominated. Menzies presided over much of the post-War period until the early 1960s, but in the latter half had to contend with John 'Black Jack' McEwen as leader of the Country Party and Deputy Prime Minister. Due to electorates being based on geography rather than demography, the Country Party held a large proportion of Government seats, and thus much political power. McEwan was well known for his protectionism of agriculture. At that time the Intermediate Certificate (the equivalent of the School Certificate) was, at best, the education level on farm, together with 'experience being the best teacher'. This tended to encourage a leadership style in the agricultural sector that was complacent about the future. It was thus ill-prepared for the challenges that would emerge in coming decades.

The Whitlam revolution

The election of the Australian Labor Party, led by Gough Whitlam, changed the political and education landscapes. The electoral system was changed to a 'one vote, one value' basis, resulting in the Country Party losing its privileged position of political power. Tertiary education suddenly was free to all, resulting in a large take-up by people who previously were unable to afford it. Women in particular, took advantage of this new opportunity. Interestingly, institutions from the 1970s had commenced admitting females into the agricultural high schools and colleges, due to anti-discrimination legislation enacted in the 1960s.

Over time there were many economic changes for agriculture: the superphosphate bounty and most tariff protections were gone. The dollar was floated, tree clearing was regulated, and free extension services were largely phased out in succeeding decades. At the same time the environmental movement was building: The Australian Conservation Foundation was formed in 1966 and the Greens in 1972. At that stage soil erosion was rife in Australian landscapes and this provided a 'free kick' to these movements, enabling them to establish their credentials and to use agriculture as a scapegoat, albeit justifiably. The proof of the erosion extent was provided in a governmental report on soil conservation policy (Department of Environment, Housing and Community Development, 1978). Agriculture lost its ability to create its own image and its leadership was unprepared to meet this challenge.

The agricultural workforce

The Productivity Commission (2005) describes the agricultural workforce through these political times in the following terms: a high proportion of self-employed, family and casuals; long job tenure; a relatively old workforce; a low incidence of post-school qualifications; and low employee wages, the lowest on average in the economy. The attitude over a long period was that qualifications were not regarded well because of their impact in increased wages. Nor were apprenticeships encouraged due to the commitments in pay and tenure. Little had been done to encourage entry of young people towards careers in the sector; no attention had been paid to the need to create career paths and pay competitive wages in order to encourage new entrants. It ought not to have been a surprise then that labour was to become a major constraint, particularly important as agriculture was to have a significant change in work as a result of technological advances that required new skills: sophisticated farm machinery; chemical inputs; genetic modification (GM); and digital technologies.

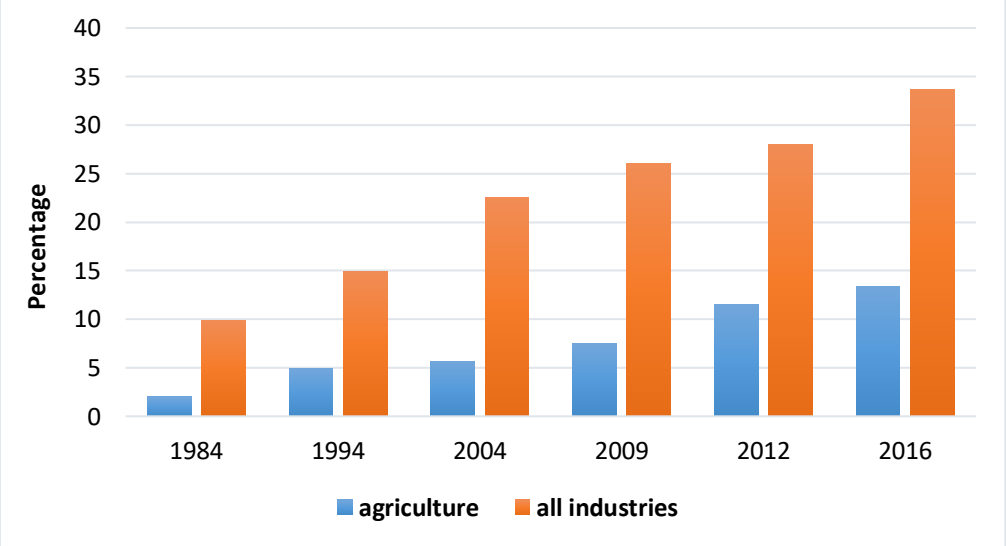

Figure 1. The attainment of university qualifications by the farm workforce and the Australian community from 1984 to 2016 (updated from Pratley, 2012)

Consideration of the qualifications of farmers shows that the education levels in the sector lag substantially behind those of the rest of Australian society (Figure 1) despite increases over time. In contrast, for contemporary pre-farm and post-farm gate employment, a degree is the main qualification sought by employers.

By 2007, it became apparent that the supply of graduates in agriculture was grossly inadequate to meet the demand of industry. University student intakes in agricultural courses were very low and several universities were contemplating termination of agricultural degrees. This was despite the Federal Government having the view that there were plenty of graduates and no jobs. This scenario resulted in the formation of the Australian Council of Deans of Agriculture (ACDA) which proceeded to collect and analyse the available data. Graduate numbers from Australian institutions in agriculture indicated that universities were graduating around 800 agricultural professionals in 1990, but that was down to 300 per year by 2009, a decline of over 60% (Figure 2).

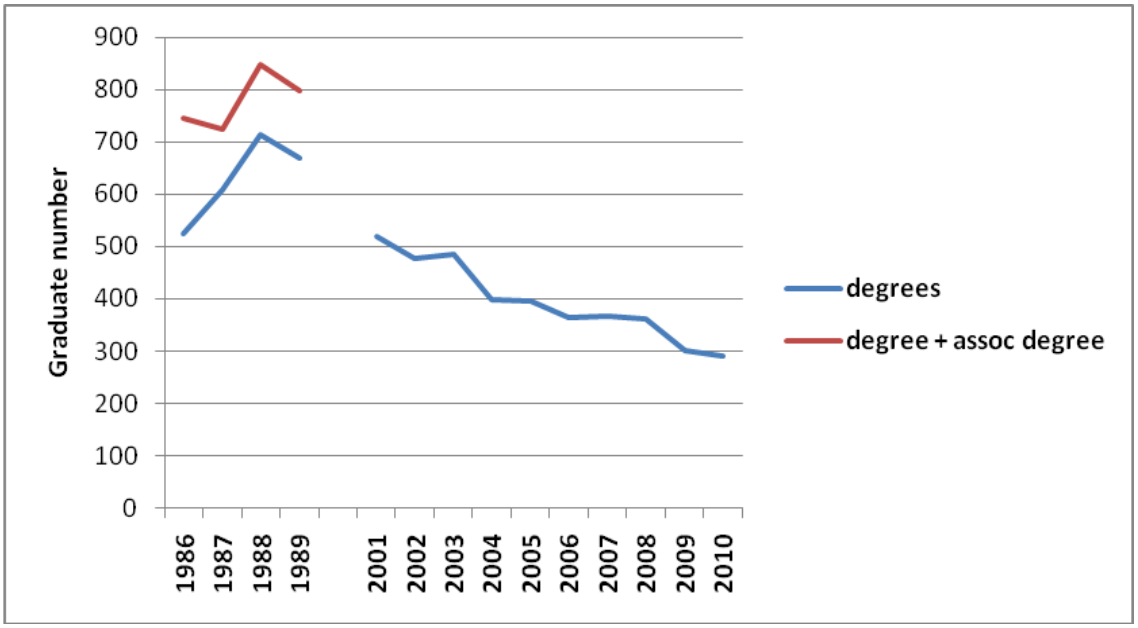

Figure 2. The supply of graduates in agriculture from Australian universities from 1986 to 2009 (Pratley, 2012)

This outcome was picked up by the media and promulgated widely, particularly to politicians. It raised the question however, whether there were jobs for these graduates. The ACDA joined forces with graduate employment company, Rimfire Resources, to evaluate the job market through monitoring paper and internet job advertisements. These data were able to demonstrate that there were well in excess of 4000 jobs per year and that for almost every category of job there were at least 100 jobs every quarter of every year (Figure 3), not including farmhand jobs for which a degree was not a requirement.

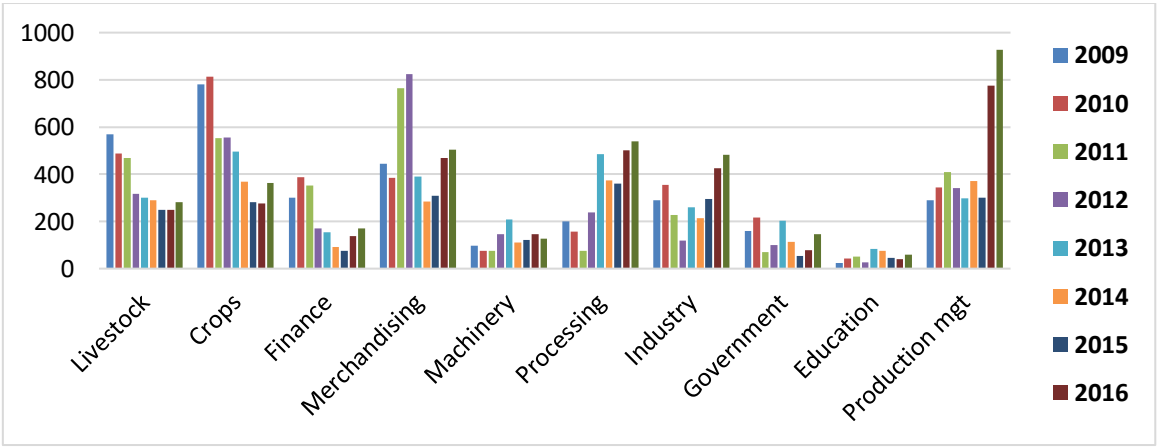

Figure 3. The number of job advertisements per quarter for different categories of employment over the period 2009 to 2017 (updated from Pratley, 2016)

If the range of agriculture and related courses were added together, there were more than five jobs for each graduate over the period of this study. This finding received strong attention from the media, as well as from various agricultural industries. There was clearly a decline in professional and technical capacity for the agricultural sector at a time when improved skills

in new technologies were in demand. It also provided an opportunity for 'snake oil salesmen' to prey in areas such as farming systems, soil carbon, soil biology and crop nutrition. Positively though, it did encourage various industry organisations to include Leadership and Capacity Building in their Strategic Plans for the first time and there was a noticeable increase in salaries being offered to new graduates as evidenced by feedback from former students, various annual reports of Graduate Careers Australia and advice from employment service companies (reported in Pratley, 2015b).

School education in the recent decade

At around this time, the results of a report on the knowledge of school children of their sources of food and fibre was published (Hillman & Buckley, 2011). Students from 150 Primary and 150 Secondary Schools were chosen with a focus on Year 6 and Year 10 students. Two outcomes in particular caught the public attention through the media – about one quarter of Year 6 students and 13% of Year 10 students thought yoghurt was a plant product; and about three quarters of Year 6 and over 40% of Year 10 students thought cotton socks were derived from animals.

The publicity on farmer education, the buoyant job market, the inability of universities to supply enough graduates and the realisation that school students did not understand their food supply, prompted political and industry responses. Several parliamentary reviews and enquiries followed, including a Western Australian post-secondary review (2010), an Australian Senate Enquiry (2012), a Victorian Parliamentary Enquiry (2012) and a New South Wales Ministerial Review (2013).

The New South Wales Review (Pratley, 2013) identified some issues around the attitudes towards agriculture in the school system and the need for the image of agriculture to be made positive. Careers advice had steered students away from agriculture – advice based on misinformation provided to Career Advisors due to poor analysis and interpretation of data from the then Graduate Careers Australia (GCA). In the GCA annual survey, agriculture data were combined with environmental data thereby disguising the employment opportunities in agriculture. The combined data, labelled agriculture, showed 30% unemployment in the combined data due to a 35% unemployment rate in environmental graduates. This discrepancy is explained more fully in Pratley (2015a, 2015b). A major recommendation in the Pratley 2013 Review, was that all secondary students in Years 7/8 should undertake a mandatory unit in Agriculture and Food in order to address public misperceptions of agriculture and to provide students with understanding regarding the source of their food.

Around 2008, the Primary Industries Education Foundation of Australia (PIEFA), a not-for profit entity, was formed. Its role has been to generate teaching material for the education system, a role which it has performed admirably, concurrently with the roll out of the national school curricula. It has been influential in transforming the image of agriculture in schools nationally and has established a very large network of those schools. Concurrently the Australian Council of Deans of Agriculture, formed in 2007, generated a website 'Career Harvest' for describing the professional careers in agriculture. That website is now under the management of PIEFA.

Other key facilitations to change perceptions include: Art4Agriculture and its 'Archibull' competition and 'Young Farming Champions', mainly in NSW but with some participation from Queensland schools (http://www.art4agriculture.com.au/); AgVision, a major careers

event in New South Wales involving the regional Junee High School and regional industry alternating in Sydney with the Royal Agricultural Society (RAS) and industry professionals; and more generally the education program of the RAS in NSW in the production of educational resources, farm day excursions and teacher professional development (https://www.rasnsw.com.au/education/). While most action is in NSW, other States do have careers events and universities provide incursions for special academic sessions.

The 'Report Card'

There is a new professionalism in the agricultural industries now, as dependence on the Internet of Things and digital technology become mainstream. The demand for university graduates has remained high. There is a greater awareness and realisation among the community that food and fibre production is an essential industry. The increased incidences of drought, the 2019/20 bush fires and then the 2020 COVID-19 virus, have demonstrated that food supply can be compromised and affect every household. Emphasis by various agricultural industries on their social licence obligations has helped repair attitudes that had been negative towards the sector. In 2019 in NSW, it became mandatory for secondary schools to provide a unit in Agriculture and Food for years7/8. This outcome was five years in the making as curriculum needed to be developed; over 800 teachers were provided with professional development. While there has been interest from other states, mainly from parents, there is yet to be much departmental or political action elsewhere. From a low point around 2010 of 1300 students sitting for the agriculture paper at the NSW Higher School Certificate, there has also been a recovery to 1623 students in 2019 (S. Graham, 2019, pers. comm.). The introduction of the Vocational offering of Primary Industries in schools in 2001 has also resulted in a further 1000 students by 2019 having HSC involvement in agricultural studies.

In Vocational Education and Training (VET) there has been a strong increase nationally in participation and completion across the range of qualifications, suggesting that there has been a significant change in the attitudes of employers to qualifications for employees.

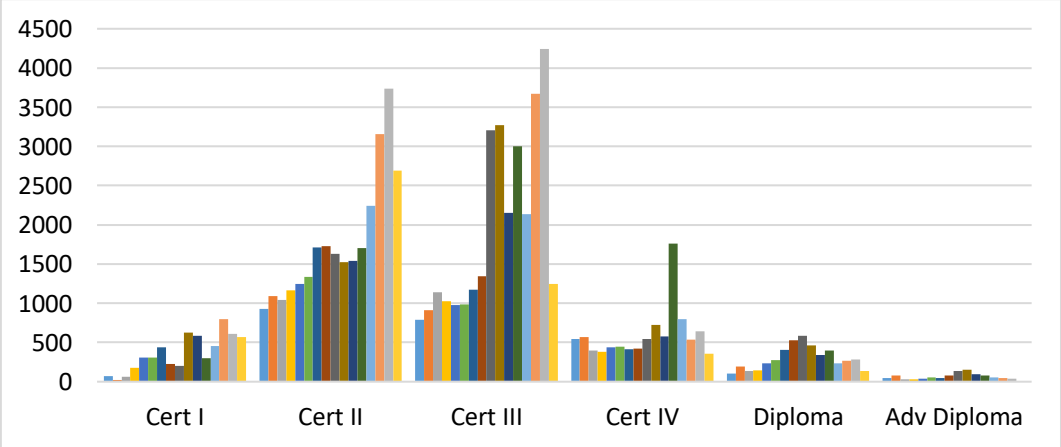

Figure 4. Completions in Australia of VET qualifications in agriculture from 2007-2018 (Source: National Centre for Vocational Education Research, 2019)

In the university system, agriculture student intakes reached a low point in 2012. Since that time there has been a recovery of 25% or more, although drought, fire and flood have impacted significantly on those numbers in the most recent years (Figure 5).

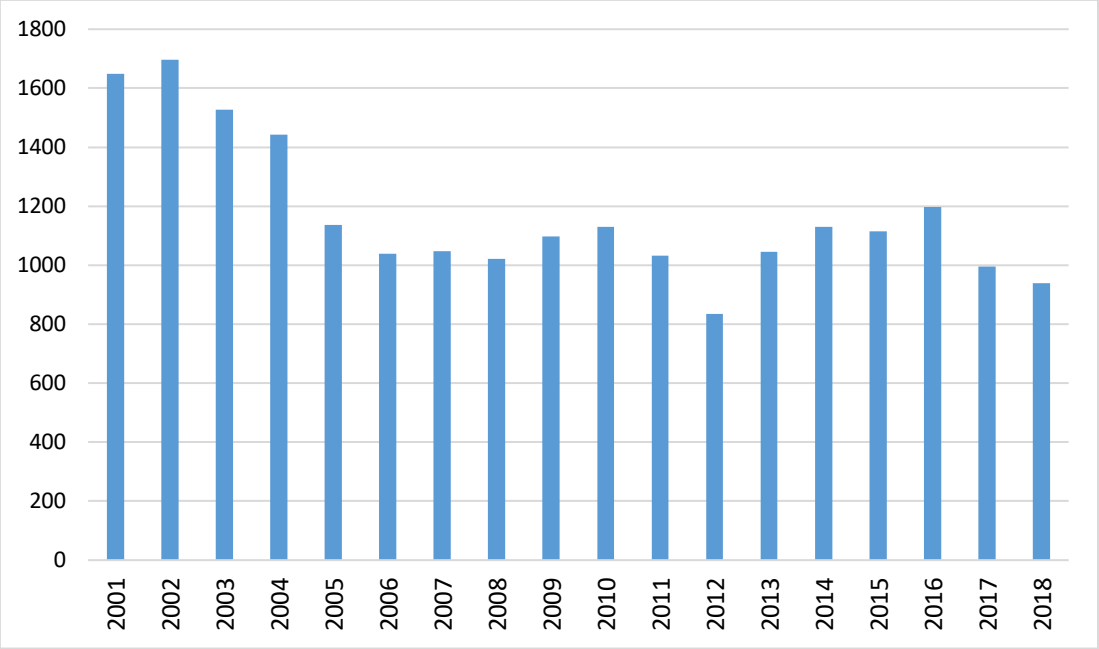

Figure 5. Number of students undertaking agriculture at Australian universities 2001-2018 (Source: University Statistics, 2019)

One particular statistic that provides a positive note is the gender balance in the university student population. Once a male-only domain as indicated earlier, the data show that women first out-numbered men in university agriculture in 2003 (Pratley, 2017) and that position has more or less been maintained. Agriculture proportions (53:47) are similar to, but slightly below, those of the university student population at large (58:42) and well in front of Engineering and Information Technology.

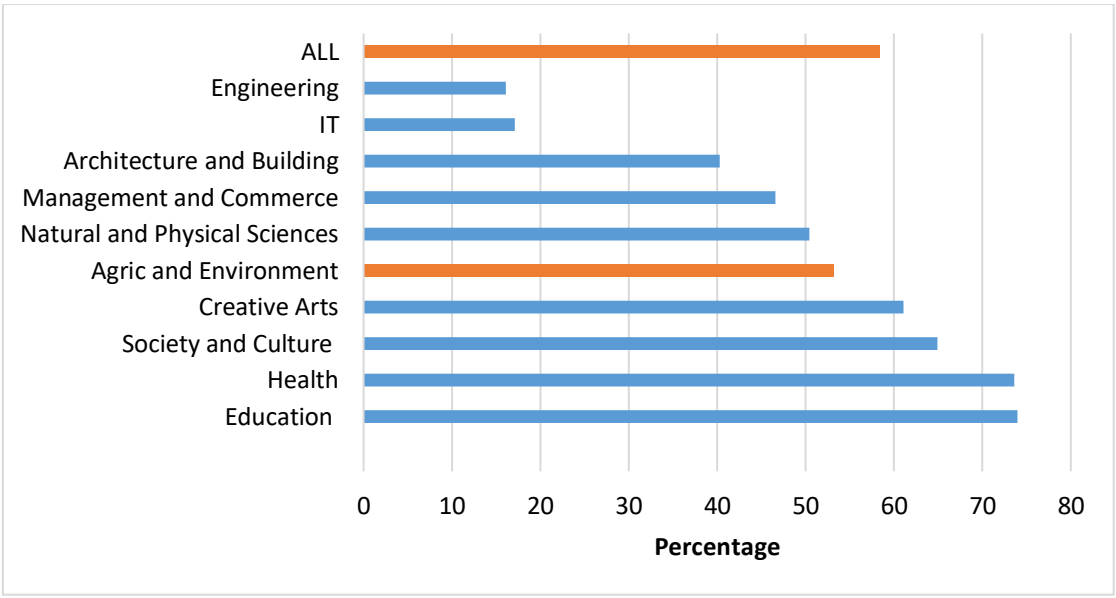

Figure 6. The percentage of females in various fields of studies at Australian universities with emphasis on agriculture relative to the overall ratio (Workplace Gender Equality Agency, 2019)

While much of this agenda commenced because there was an inadequate supply of agricultural graduates from universities to meet the employment needs of industry, it is clear that graduate supply remains inadequate to satisfy the market. Salary levels for new graduates continue to rise and are now competitive with most other high salary professions.

Finally, on closer inspection, university qualifications on-farm are higher than provided by first impressions (Figure 1). Because agriculture has a population skewed towards the older demographic, the analysis hides the higher proportion of 25-39 years age group in terms of higher education qualifications on farm. Figure 7 shows this demographic having 20% of the workforce with degrees, higher than across all age groups. This still is only half the level of the population at large in that age grouping. However, it might be expected that with time, retirements and new entrants may result in this proportion growing significantly in the near future.

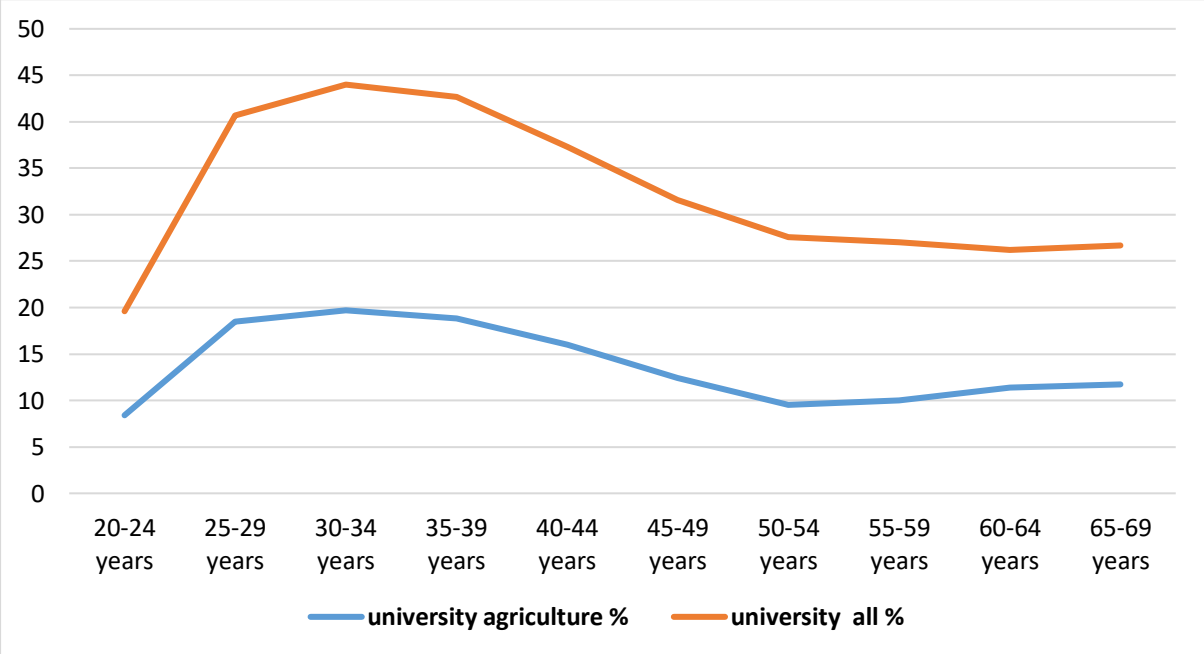

Figure 7. Percentage of the farm population and of the general community with university qualifications, as affected by age categories (created from Australian Census, 2016)

Conclusions

The agricultural sector has been through rough times over the past 40 years. This had led to a decreased interest in the sector for a career. Consequently, the acute need for graduates was unable to be matched by the University sector and that remains largely the case. The good news is that agriculture continues to address its image and its employment strategy and is now much more attractive in terms of career and in remuneration. The role of agricultural education has been determined, at least in New South Wales. Much has been achieved in 'rebooting' the need for understanding and connection with the community as well as the need for education qualifications in industries to take advantage of a very high tech, sophisticated sector.

From the beginning and into the not too distant past, the provision of agricultural education was contradictory to the sector's view on education. Its male focus restricted contributions and alternate views from its female counterparts. The outcome was a sector losing its place and respect in society. Attitudes in the sector have changed over time and education is seen as critical to the future. Women now make up the majority of the university agricultural student population. Together there is a paradigm shift from regressive to progressive. It only took 130 years.

Acknowledgement

Support under the auspices of the Australian Council of Deans of Agriculture is appreciated.

References

Cashin, P. & McDermott, J. (2002). 'Riding on the sheep's back': Examining Australia's dependence on wool exports. *The Economic Record*, 78, 249-263.

Department of Environment, Housing and Community Development (1978). *A basis for a Soil Conservation Policy in Australia: Commonwealth and State Government Collaborative Soil Conservation Study 1975–77 – Report 1*. AGPS, Canberra, ACT.

Hillman, K. & Buckley, S. (2011). *Food, fibre and the future: Report on surveys of students' and teachers' knowledge and understanding of primary industries.* Primary Industries Education Foundation. https://www.piefa.edu.au/uploads/9/8/9/8/98986708/food_fibre_and_future_pief_report.pdf

Lloyd, C.J. (2000). McEwen, Sir John (1900–1980). In *Australian Dictionary of Biography*, National Centre of Biography. http://adb.anu.edu.au/biography/mcewen-sir-john-10948

Martin, R.A. (1977). The Victorian agricultural high schools: origins, development and failure: with special reference to Ballarat, Sale, Shepparton and Wangaratta agricultural high schools. [Unpublished Master's thesis]. The University of Melbourne.

Pratley, J.E. (2013). *Review into Agricultural Education and Training in New South Wales*. NSW Government.

Pratley, J.E. (2015a). Agricultural education and damn statistics I: graduate completions. *Agricultural Science*, 27, 44-50.

Pratley, J.E. (2015b). Agricultural education and damn statistics II: graduate employment and salaries. *Agricultural Science*, 27, 51-55

Pratley, J.E. (2016). Graduate supply for agriculture – a glimmer of hope. *Farm Institute Insights*, 13, 1-5.

Pratley, J.E. (2017). Agriculture – from macho to gender balance. *Proceedings of 18th Australian Agronomy Conference*, Ballarat, Australia. http://www.agronomyaustraliaproceedings.org/

Pratley, J. & Archer, C. (2017). Education and agriculture in Australia–a journey of contradiction. In *Boundless plains to share: Australia's agribusiness partnership with Asia-century 21* (pp. 82-89). One Mandate Group.

Pratley J. & Archer, C. (2017). Evolution of agricultural education in Australia. *Agricultural Science*, 29, 13-27

Productivity Commission. (2005). Trends in Australian Agriculture, Research Paper, Canberra. https://www.pc.gov.au/research/completed/agriculture/agriculture.pdf

Workplace Gender Equality Agency (2019). Higher education enrolments and graduate labour market statistics https://www.wgea.gov.au/sites/default/files/documents/august_2019_grad_factsheet_0.pdf