



# AUSTRALIAN COUNCIL OF DEANS OF AGRICULTURE

Submission to Senate Enquiry

## **Higher education and skills training to support future demand in agriculture and agribusiness in Australia.**

### **Introduction**

The ACDA welcomes the Senate Enquiry. There can be no doubt that there is an alarming shortage of agricultural and agribusiness graduates to service the needs of the greater agricultural industries at a time when the needs of the industry are at an all time high. Research by the ACDA has shown that there has been a continual decline in graduate completions in university agriculture and related degrees for the last two decades (currently <300 in agriculture and <700 in agriculture and related courses) whereas the job market for graduates, as evidenced by job advertisements, indicates that there have been in excess of 4000 positions per year consistently over the past 4 years. These data are to the end of 2010 and are fully explained in **Attachment I**. The trend in graduate numbers has implications for the productivity of the industry, for access to quality tertiary agricultural education and for the sustainability of agricultural R&D. The ACDA addresses the criteria put forward in the Terms of Reference below.

- **the adequacy of funding and priority given by governments at the federal, state and territory level to agriculture and agribusiness higher education and vocational education and training;**

a. It is the view of ACDA that no particular priority has been accorded to agriculture/agribusiness and related education by governments over a long period of time. Currently there is discrimination against agricultural science in that mathematics and science are listed as 'National Priorities' for the purposes of HECS discount but agricultural science is excluded from 'science' in this definition.

b. The ACDA wishes to point out to the Senate Committee that agriculture is a very expensive area to teach. Its multi-disciplinary character requires a wide range of academic expertise for course delivery which is increasingly difficult to provide as student cohorts decline in size. Other disciplines in the university benefit by service teaching opportunities which are not available to agriculture staff. Agricultural courses are recipients of service teaching rather than deliverers of service teaching and so resources are always limiting for the employment of academic staff. As student cohorts become smaller the cost of utilising field facilities, laboratories, excursions and the like become prohibitive and so the quality of courses declines in order to meet limited budgets.

c. Academics are employed to undertake teaching and research. The contraction in the size of the remaining agricultural faculties/schools/departments in the university system has meant both a loss of expertise and an increase in the teaching loads of the residual staff. The resultant consumption of time has compromised the opportunity for staff to undertake research. It is important to note that universities contribute about 25% of the research effort in agriculture in Australia, as measured by grant funding and staff-years of effort. This proportion could increase if the state agencies continue to contract but it would require a

significant increase in student numbers, under current federal funding models, to sustain agriculture courses and their staff complements.

d. The ACDA points to 'extension' as a particular issue. Academics are commonly called on to do extension work and there is an expectation by research granting bodies and the industry itself that university staff will contribute to the extension effort. This is particularly so in regional institutions. Universities are only funded for teaching and research and so extension activities are performed *gratis* and additional to individual workloads without recompense. The ACDA considers that there is merit in reviewing the US Land Grant University System where the funding base specifically provides for extension activity within the university system. In other professions (eg, Medicine, Veterinary Science, Psychology, etc.) the university system provides a clinical loading for staff. The ACDA argue that food production is a critical aspect of Australia's economy and standard of living and so a financial arrangement to support extension activities is worthy of serious consideration.

- **the reasons and impacts of the decline in agricultural and related educational facilities;**

a. The ACDA advises the Senate Committee that the number of campuses in Australia providing agriculture/agricultural science degrees has declined from 23 in the 1980s to around 9 in 2011. The number of campuses in regional Australia has declined from 9 to 4 in the same time. Clearly this has impact on the availability of facilities and particularly on access to higher education in agriculture and related areas.

b. The decline in student numbers results in a reluctance by university decision-makers to invest in new facilities or to refurbishment of existing facilities. Whilst lecture theatres and laboratories shared with other disciplines are maintained, specialist facilities for agriculture, especially in the field, are not accorded the same attention. Potentially OH&S guidelines then come into play, particularly with animal handling facilities and machinery and specialised equipment, and so these aspects of the curriculum may then not be taught.

c. The ACDA welcomes the trend of collocation of state agency research facilities and staff on university campuses. This has the effect of consolidating, where appropriate, specialist facilities and creating a critical mass of staff. The collaborative arrangements between the agency and the university vary substantially and it is too early to judge which of those arrangements work best.

- **the impacts of any shortage on agricultural research;**

a. The ACDA wishes to point out to the Senate Committee that whilst there is the serious issue of student shortage, this accentuates the dearth of top students. The research effort relies on a pipeline of the 'best and the brightest' to deliver the outcomes on which the progress of the industry relies.

b. It is important to note that postgraduate scholars receive a stipend (\$22K) that is close to the poverty line for Australians. Such scholars receive no increments or superannuation whilst undertaking the higher degree and continue to accumulate interest on their HECS debt which is likely to be around \$30K on graduation. The stipends are tax-free but this status is of little to no advantage as tax scales have largely moved beyond such

stipends. The ACDA has previously argued that rather than the government doubling the number of APA scholarships, the industry would have been better off with fewer scholarships of much higher stipend value. Incentives, rather than disincentives, are needed to attract 'the best and brightest' into Agricultural Science.

c. The research workforce in agriculture has contracted in recent times and now does not provide the strong career paths as in the past. Doctoral graduates are forced into short-term (3-year) contracts on research projects as state agencies are no longer providing many places for researchers on a relatively secure basis. In such arrangements the researchers are, for example, unable to secure home loans. This insecurity is not being addressed by Rural R&D Corporations (the research funders) and there is much attrition out of the industry as a consequence.

d. The age structure of the agricultural research workforces is skewed towards the older end with an estimated 50% of researchers being above 50 years of age.

e. Whilst there is adequacy in numbers of new technology graduates such as molecular biology, the ACDA has concerns about the lack of pipeline for field research such as agronomy, entomology, plant pathology, plant breeding, soil science and the like.

- **the economic impacts of labour shortages on Australia's export oriented agricultural industries;**

a. R&D has served Australian agriculture well over the last 50 years with productivity gains being double the national average for an extended period. Those productivity gains in agriculture have slowed in recent times resulting from the decline in investment in production R&D (See ABARES Research Report 11.4, "A turning point in agricultural productivity: consideration of the causes")

b. Productivity slowdown is an international phenomenon as the developed world has reduced funding for agricultural R&D.

c. World food security is now a concern with estimates of a need to increase food production by over 70% for a population increase of 30% by 2050. Australia is well placed to contribute and at the same time create further export earnings.

d. Agriculture is a major earner of export income for the Australian economy and should be strengthened so that the nation can cope with a downturn in mining at some time in the future. Currently Australia exports about 2/3 of its agricultural production but this will decline as Australia's population increases unless there are strong productivity gains.

- **the incorporation of animal welfare principles in agriculture education;**

This criterion pre-supposes that universities do not incorporate such principles in their teaching. The ACDA advises that animal production is taught in the context of best practice and that necessarily includes animal welfare principles. The University of Melbourne is used to exemplify university approaches.

Subjects *Animal Welfare and Ethics* and *Animals in Society* are offered in the Bachelor of Science degree and as breadth subjects in other degree programs. *Animal Welfare and Ethics* develops knowledge and understanding of systems for regulating body function, and physiological and behavioural processes that are utilised by animals in response to environmental challenge. It allows students to evaluate and assess animal welfare and ethical issues that confront livestock production and amenity use of animals in society. *Animals in Society* encourages students to think about how and why animals are so integral to human society. Students investigate the human-animal relationships, where they originated, during domestication, and where they are now. They examine in detail some key relationships between humans and animals, including animals as pets, in agriculture, as research subjects, in educational roles and as pests. The subject discusses the changing attitudes of humans towards animals throughout time and talks about humankind's moral and ethical obligation to animal wellbeing.

At post-graduate level, *Advanced Animal Welfare* provides students with a comprehensive knowledge and understanding of the welfare of animals in captivity that can be effectively applied in animal research, management, care, production, inspection, assessment, and preparation and implementation of legislation.

Further information on this topic can be found at the AWSC website ([www.animalwelfare.net.au](http://www.animalwelfare.net.au)).

• **other related matters;**

a. It has been well canvassed that the image of agriculture is an impediment to young people taking up agriculture as a career. This is reinforced by a survey of University of Queensland students (see **Attachment II**) who call for better promotion of the industry and the ready availability of information regarding careers.

b. It is important to note that agriculture in the school system is in decline. This is increasingly so as the national curriculum takes shape. Despite the overtures of the ACDA, particularly to the Australian Curriculum, Assessment & Reporting Authority, little notice of the importance of agriculture is taken and it is likely that agriculture will disappear from many schools, even at the level of discussion in the curricula, much less as individual subjects. Associated with this is the low number nationally of HSC students taking mathematics and science and this has the effect of reducing the numbers taking those disciplines (including agriculture) at university.

c. The ACDA contend that professional education in agriculture has not been a priority for the industry over many decades. As a consequence the industry has fallen well behind the community at large, and international competitors, in levels of education (see **Attachment I**). However the complexity of modern day living, the high tech nature of modern agriculture, the high levels of compliance, the complexities of business and marketing of produce, high expectations on environmental management including new

demands on emissions and climate change make the case very much stronger for higher levels of education and training than has hitherto been necessary.

- **solutions to address the widening gap between skilled agricultural labour supply and demand**

The ACDA puts forward some suggestions for consideration. It contends that this industry is of immense importance to the national economy and the health and wellbeing of its people. To address the crisis there is a need for strong government action and a whole of industry promotion.

**i. Industry promotion**

*There needs to be a clear signal from government(s) that agriculture is an essential industry for the Australian economy and that it contributes significantly in the high standard of living of Australians and the associated high quality of food consumed by the nation. Thus agriculture should be highlighted as a **national priority** for education in the same way as mathematics and science are priorities and as nursing and education have been previously.*

*There needs to be a clear signal from the industry (production, service, supply, processing and tertiary sectors) **promoting a positive image** of the industry, highlighting the **excellent range of career opportunities** and their benefits. This will need the help of government to coordinate the effort. It is noted that the production sector has a peak body (NFF) and the tertiary sector has its peak body (ACDA) but the agribusiness sector is in need of a voice. The ACDA understands that there are moves to establish an **Agribusiness Council of Australia** and strongly supports the initiative. When formed, this would provide the opportunity for the peak bodies to form an alliance so that the industry can **speak with one voice** when the need arises. All parties should address the need for **clear career pathways** for prospective employees.*

*In the school system all curricula should, inter alia, **provide contexts and examples of agriculture and food production**. The ACDA acknowledges the work of the Primary Industries Education Foundation (PIEF) in developing suitable curriculum materials for this purpose and its efforts should have ongoing support.*

*There is a need to **promote science in secondary schools** more vigorously as this would provide a larger pool of students from which agricultural science could secure a larger cohort than at present. The ACDA acknowledges the efforts of the Primary Industry Centre for Science Education (PICSE) which undertakes the promotion of science careers in secondary schools and introduces agricultural examples in the classrooms. PICSE also needs ongoing support. There needs to be **better support and training for teachers** in respect of agriculture and food production.*

*It should be noted that the ACDA makes a clear distinction between 'agriculture' and 'agricultural science'. In the school system 'agriculture' is provided in some schools for students who have no intention of further education and is thus purely vocational in nature. The ACDA considers that there should be a **strong presence of science** including 'agricultural science' for those students we would wish to attract into the industry. In doing so there would be a greater chance of attracting 'the best and the brightest' into the industry through tertiary education.*

**ii. Student support**

*The ACDA has already identified the need for the government to make agriculture a national priority area and thus include the discipline in the **HECS discount** category along with other science.*

Other studies have identified that financial hardship is more common for rural students attending university. There are now fewer campuses providing agriculture and related studies particularly in rural areas and so access to the remaining courses is likely to require higher costs to the student. **Modifying or waiving the time for establishing independence** for student support could be an option for consideration. For prospective students who take the "gap" period in order to qualify, the attrition is high and is thus counterproductive in priority areas.

The ACDA has responded to the need to have comprehensive information on agricultural and related careers in one place. The ACDA recently launched a website "**Career Harvest**" ([www.csu.edu.au/special/acda/careers/](http://www.csu.edu.au/special/acda/careers/)) which provides prospective students with the information and institutions for study.

### **iii. Research and development**

In order to attract the 'best and brightest' into agriculture the ACDA is of the firm view that postgraduate stipends are not competitive. Currently they are on the poverty line for Australia and this is a disincentive. **Postgraduate scholarships therefore should be increased substantially** (eg 2x), with annual increments for satisfactory progress, and should qualify for superannuation.

Government should exert influence on Rural R&D Corporations to address the **unsatisfactory short term salary funding** for postdoctoral researchers. No corporations have provided a satisfactory solution to this problem and most have not even addressed same. Employment periods of 5-7 years would be more reasonable and there ought to be a scheme whereby tenure can be granted to those who have secured a second longer term employment grant at the same agency or institution.

It should be noted that in all the government and other schemes relating to research fellows (QEII Fellows, ARC Fellows, Federation Fellows and the like), agricultural appointments are rare despite agricultural science delivering 10-11% of the national research effort. Thus a separate **Scheme of Fellowships**, with accompanying research funds, should be instituted specifically for agricultural researchers. They should apply to young postdoctoral graduates and to longer term researchers and be awarded on merit. Institutions hosting such awardees should guarantee that there is no substitution of that position for another.

### **iv. University support**

The impact of low class sizes in agricultural science and related areas in Australian universities has made it extremely difficult for those university agricultural schools/departments to provide the range of expertise needed, to provide the field and practical experience desired or to contribute sufficiently to the extension needs of the industry. The lack of service teaching reduces the opportunity to offset some of the costs. This warrants special provisions for the funding base of these schools and departments and they could include:

- ensuring that a minimum of 40% of federal funds provided for agricultural education are allocated directly to the schools/departments for staffing to reduce the siphoning of funds to other university activities;

- ensuring that student:staff ratios do not exceed 15:1 for the applied subjects to ensure appropriate instruction and supervision by qualified staff;

- specific funding for extension activities allocated directly to the schools/departments concerned without discounting by the institution. This could be in the form of a salary loading or technical support and travel grant to specific staff members where there is such an extension expectation.

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## **ATTACHMENT I      PROFESSIONAL AGRICULTURE – A CASE OF SUPPLY AND DEMAND**

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### **ABSTRACT**

**The agricultural industry is at the crossroads in terms of workforce capacity. Evidence is presented that there is a sizeable job market in agriculture and more than 4000 jobs per year are consistently being advertised seeking agricultural professionals. Conversely the number of graduates being supplied by Australian universities continues to decline significantly and is less than 20% of the number needed to satisfy the job market. Capacity therefore looms as the most significant issue for the agricultural industry as it endeavours to take advantage of the opportunities created by food security. The challenge is to make prospective students aware that careers in agriculture are at least as interesting, rewarding and challenging as in most other industries.**

### **Introduction**

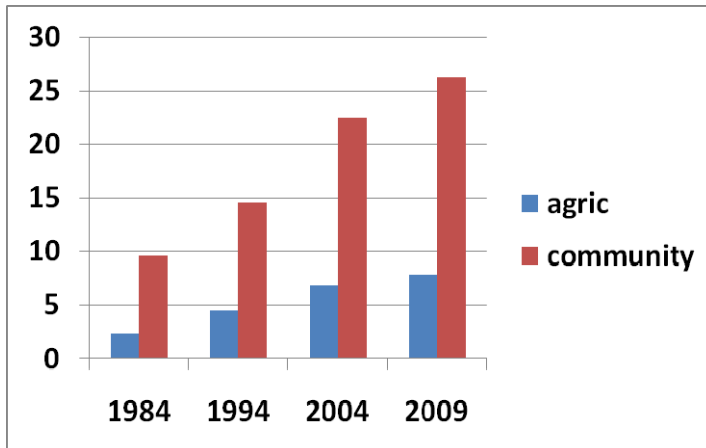
Agriculture has always been a complex business. In the 21<sup>st</sup> Century, however, the degree of complexity has intensified. Not only do farmers and their advisers need to contend with the usual production issues, they also need to be increasingly self-reliant in the marketing of their products, ensuring market quality and supply. There has always been a need to deal with climate variability but predictions indicate that this variability will increase and there is increased expectation for farmers to manage the risk of drought. The compliance aspects of the workplace continue to increase as occupational health and safety provisions apply together with, *inter alia*, pesticide management, flock care and stewardship of GM crops. At the same time agriculture manages over 60% of the Australian landscape and thus assumes the responsibility for native vegetation, landscape sustainability, biodiversity and the like. Technologies such as GPS, precision agriculture and remote sensing are now having impact and there is increasing expectation on agriculture to address carbon emissions and play its part in the carbon economy.

Farmers need increased personal capacity but thus will need greater reliance on expert advice from outside the farm. Research and development will continue to be needed to develop systems and technologies that allow productivity gains to maintain farm profitability and address the needs and opportunities in food security nationally and globally. The industry, from the farm, the service and post-farm gate sectors and in R&D, requires a workforce which is highly educated, highly skilled and with an image and reputation that is attractive to the best and brightest. As markets become more discriminatory in respect of quality and production practices, accreditation will become increasingly important and the industry will need to have robust mechanisms in place to assure those markets.

### **Benchmarking education in agriculture**

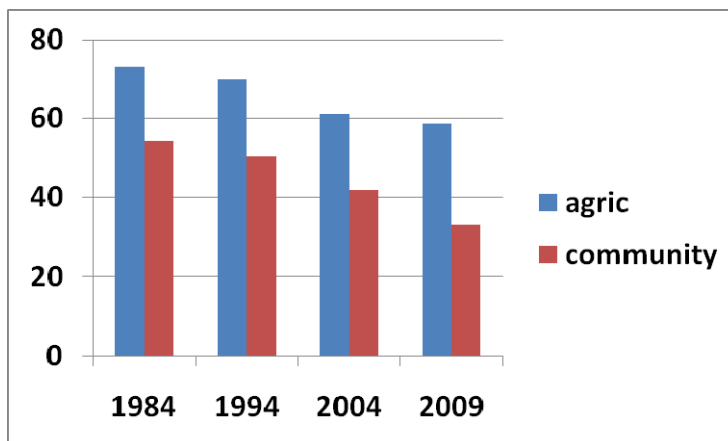


On any analysis, the educational standards of the agricultural industry do not stand up well to scrutiny (Figure 1). Over the past quarter of a century the proportion of the Australian community with tertiary qualifications has increased from just below 10% of the workforce to more than 25%. In contrast, in the agricultural sector, only 4% were degree holders in 1984 and in 2009 that proportion has risen to only around 7%. The gap is widening, yet food production would seem to be an essential service industry where standards should be unquestionably high.



**Figure 1 Relative proportions of the agricultural sector and the Australian community with tertiary qualifications, 1994-2009 (Source: Australian Bureau of Statistics)**

The comparisons are also stark if the relative proportions of the workforce without post-school qualifications are considered (Figure 2). Whereas the Australian community at large has reduced the proportion from 54% in 1984 to around 33% in 2009, the agricultural industry has achieved a reduction from 73% to only 58% in the same time – that gap also continues to widen.



**Figure 2 Relative proportions of the agricultural sector and the Australian community with no post-school qualifications, 1984-2009 (Source: Australian Bureau of Statistics)**

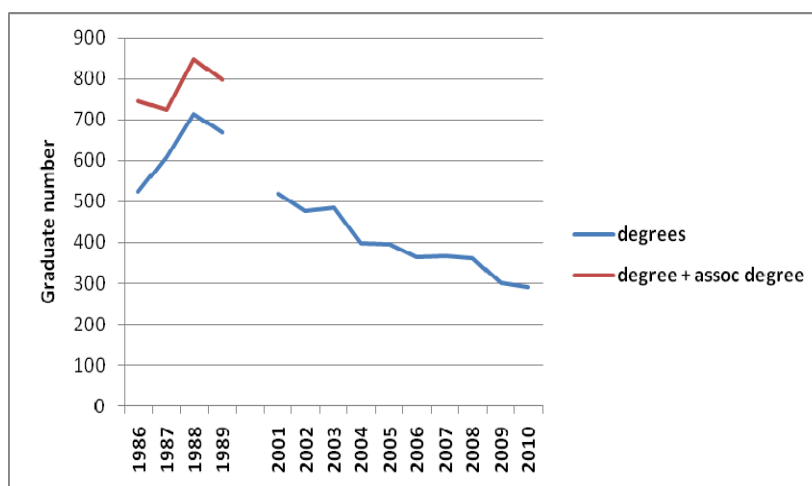
It is clear from these statistics that education of its workforce has not been a high priority for the agricultural industry. Yet this became a concern for the Heads of Agriculture schools within universities where declining enrolments were being experienced whilst at the same

time industry employers were complaining about the lack of graduates. In order to address this issue in particular, the Australian Council of Deans of Agriculture was formed in 2007. Further investigation by the ACDA revealed the government policy position at the time was that graduate supply was plentiful but that job prospects were poor. This conflicted with the experience of the ACDA members who embarked on a data gathering exercise to clarify the conflict. In this process it was discovered that graduate numbers used by government included all environmental science and management graduates and that the job market projections were based on advertisements placed only in selected metropolitan newspapers.

### Graduate supply in agriculture

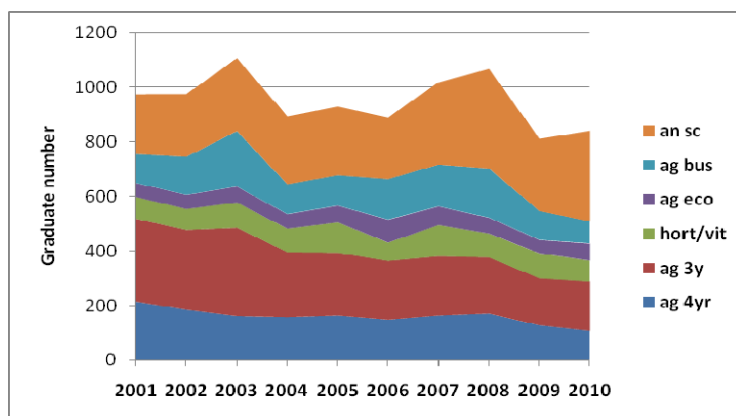
Data were collected from all universities with undergraduate courses in agriculture and in related areas. Such data were collected from 2001 until the present to establish trend lines. Figure 3 shows the graduate completions in agriculture courses over time and Figure 4 shows the data for agriculture and related courses for the same period. Where available, comparisons are made with the 1980s using data derived from the “McColl Report” (McColl *et al.*, 1991). Completions in the latter case were estimated in proportion to enrolments in the various levels of qualifications and so there are likely to be small errors in the absolute numbers used, although comparisons are not likely to be significantly compromised.

In the late 1980s there was a marked increase in the number of graduates with agriculture degrees, due largely to the conversion from diploma qualifications to degrees in the Colleges of Advanced Education (CAE) sector. Diploma qualifications have largely disappeared from tertiary education institutions since then. There was also a small component of 2-year associate degrees at that time and they have also become virtually extinct. Together degrees and associate degrees in agriculture delivered to industry around 800 graduates in the late 1980s. In the 21<sup>st</sup> Century, numbers had declined to around 500 in 2001 and that decline has continued such that only 300 degree graduates in agriculture entered the workforce at the end of 2010. There has been a 40% decline in last 10 years.



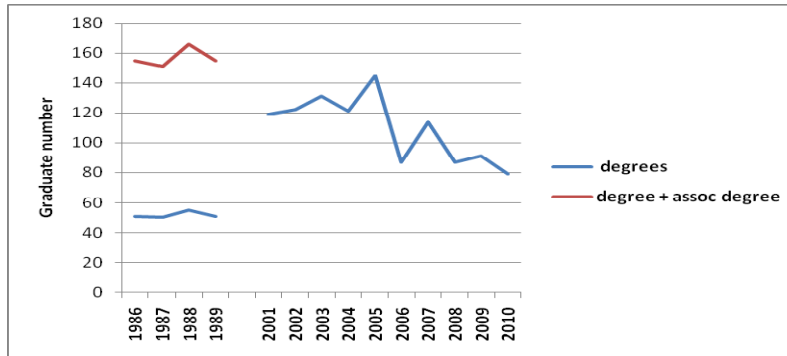
**Figure 3 Graduate completions in 3 and 4 year agriculture courses from Australian universities for the period 2001-2009 inclusive and estimated from McColl report for years 1986-1989 including 2 year associate degrees**

The agricultural industry, however, also receives value from graduates in related degrees such as horticulture, agribusiness, animal science and agricultural economics (Figure4). Whereas the total graduation cohort from agriculture and agricultural-related degrees was around 1000 per year in the early part of the recent decade, the number has declined to around 800 in 2010, ie a 20% decline. However it should be noted that a sizeable proportion of these are animal science graduates, only some of whom (probably fewer than half) are interested in livestock production with the remainder focused on wildlife and companion animals. The total available to the agricultural workforce then is closer to 700. Whereas animal science degrees were not available for the period studied in the McColl Report, there has been a proliferation of university courses in animal science in more recent times to capitalise on high student demand and, in many cases, to capitalise on the overflow of high quality students unsuccessful in their attempts to gain entry into Veterinary Science.



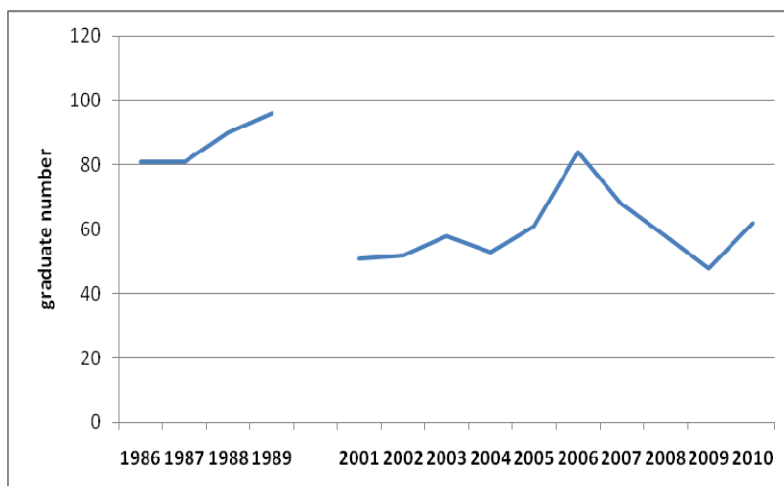
**Figure 4 Graduate completions in 3 and 4 year courses in agricultural and related areas from Australian universities for the period 2001-2009 inclusive.**

The data in horticulture reveal a substantial decline as well. This sector during the 1980s was characterised by a relatively small cohort of degree graduates and a high associate degree activity. These consolidated into degrees and at the turn of the century there were about 120 graduates per year. This reflected the buoyant position of viticulture at that time but there has been a decline in the number of providers related to the downturn in the grape industry. These numbers also include graduates in the amenity horticulture field as well as the very few in production horticulture. Thus the production horticulture industry will be dependant on agriculture graduates for its professional workforce, as before, and so will have to compete with the rest of the agricultural industry for employees. Several universities in recent times have deleted horticulture degrees from their profile.



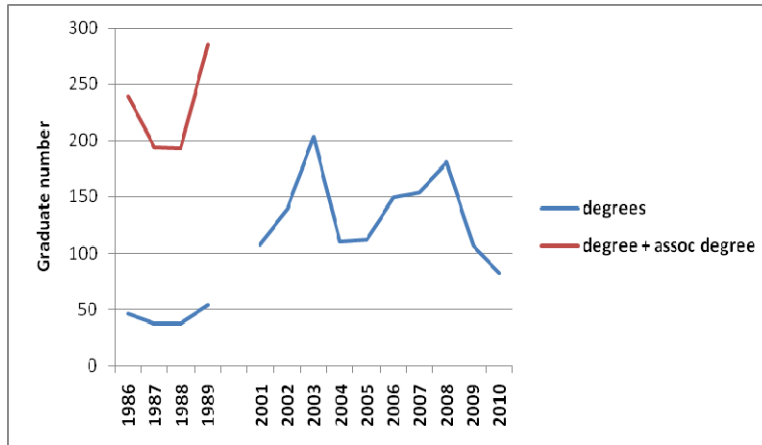
**Figure 5 Graduate completions in horticulture/viticulture from Australian universities for the period 2001-2009 and the degree completions estimated from the McColl report for the period 1986-1989 including 2 year associate degrees**

The discipline of agricultural economics did not have associate degrees in the 1980s and so comparisons are straight forward. Completions back then were around 80 to 90 per year but in the recent decade is now around 50 per year except for a peak in 2006. Only 3 universities provide graduates in this area with the University of Sydney providing the vast majority. Student demand suggests that there will be no new providers in the market any time soon.



**Figure 6 Graduate degree completions in agricultural economics for the period 2001-2009 inclusive together with estimates of degree completions from the McColl Report for 1986-1989**

In agribusiness/agicultural commerce, the main qualification in the 1980s was the associate degree being around 80% of the market. Together with degrees, these awards provided more than 200 graduates per year. In the evolution to degree-only awards in the last two decades there has been considerable fluctuation around 150 graduates per year declining to fewer than 100 in 2010.

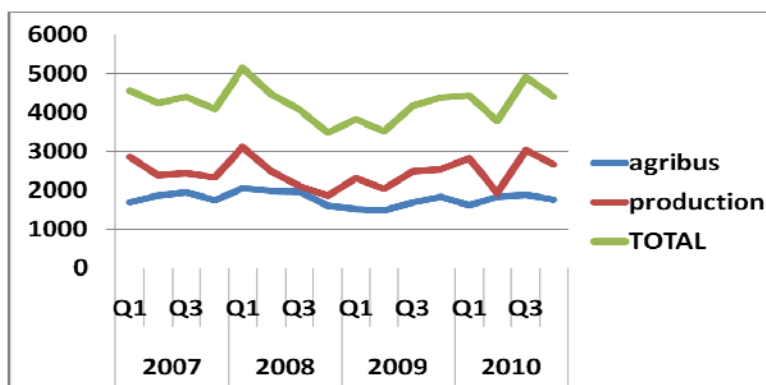


**Figure 7 Graduate degree completions in agribusiness for the period 2001-2009 inclusive together with estimates of degree completions from the McColl Report for 1986-1989 including 2 year associate degrees**

### Workforce demand

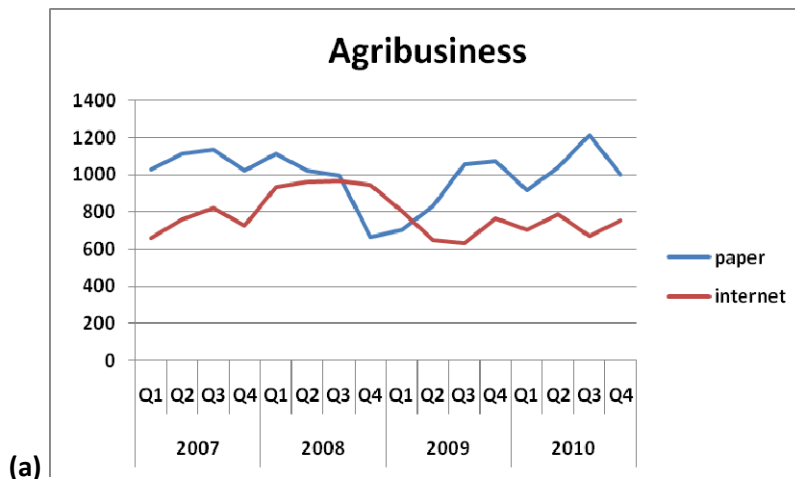
The job market in agriculture is based on the monitoring of job advertisements in state rural and metropolitan newspapers and on the internet over a four year period, 2007-2010, presented quarterly. The detailed methodology has been provided in an earlier paper on this topic (Pratley and Hay, 2010). It is recognised that there is the likelihood of an advertisement being placed both in print and on the web and subsampling suggests that this is of the order of 20% for agribusiness and conclusions have been adjusted accordingly. It is also recognised that there is the potential for “churn” where one advertisement is generated by the filling of another vacancy but this is balanced by jobs in local media, by word of mouth and direct targeting of employees, none of which is considered here. There is thus no adjustment for “churn”.

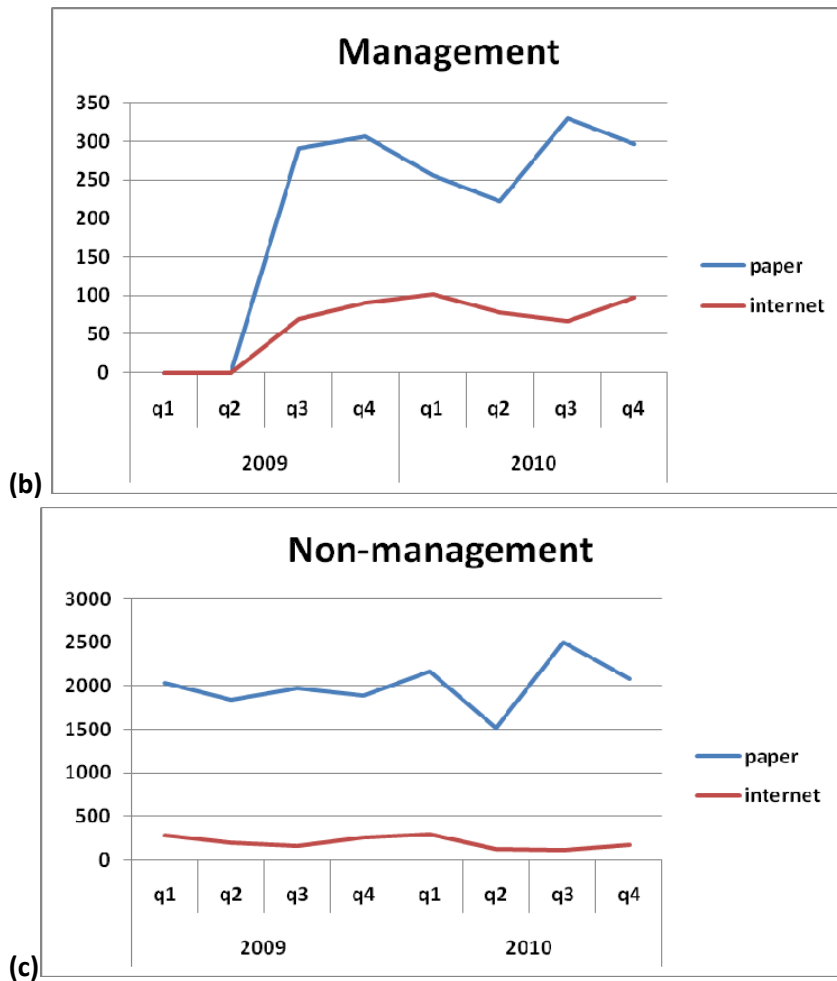
Data are provided for agribusiness and production for the four years of study (Figure 8). Total job numbers are consistently in aggregate around 4000, or 3600 per quarter after adjustment for advertising overlap in agribusiness. Despite the drought, which was very severe in 2008 and 2009, the number of jobs was not affected to a large extent although a rise is evident towards the end of 2010 as confidence returned with the breaking of the drought in eastern Australia.



**Figure 8 Number of job advertisements per quarter in agribusiness and in agricultural production for the period 2007-2010 inclusive.**

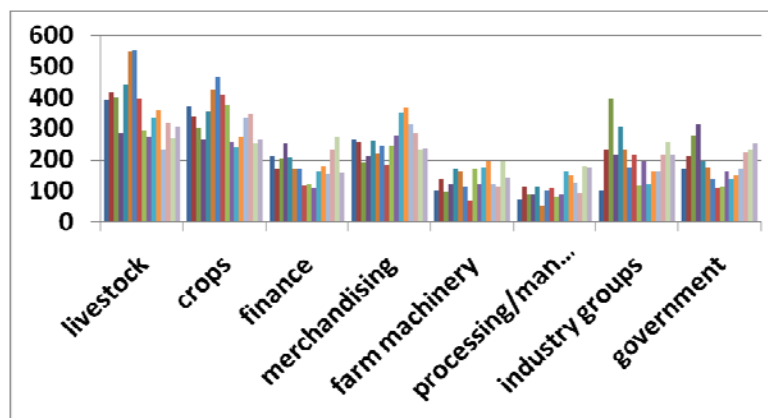
For 2009 and 2010, production advertisements have been categorised into management and non-management (Figure 9) to enable a better understanding of the required workforce. In the production sector, there was a consistent demand for some 2000 non-management employees per quarter and at least 300 managers per quarter. Also evident in the data is the differing role played by the internet in advertising jobs. In agribusiness the ratio of paper to internet advertising is around 5:4 whereas for on-farm management roles the ratio is 3:1 and for non-management jobs it is more than 10:1.





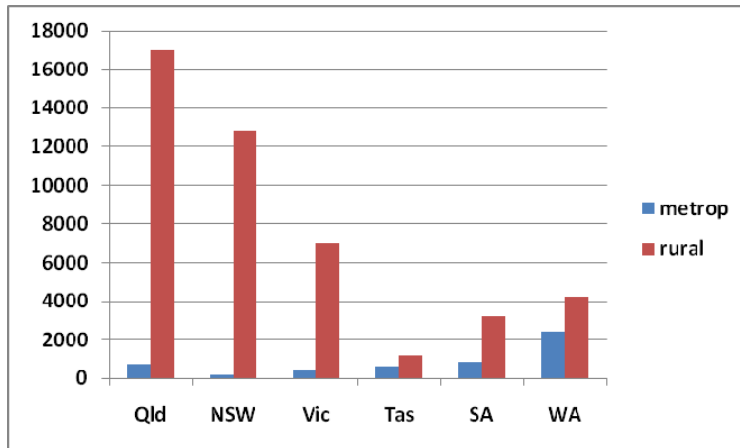
**Figure 9 Influence of the internet in job advertisements by quarter in (a) agribusiness in 2007-2010, (b) management in production in 2009-2010 and (c) production non-management in 2009-10**

Figure 10 shows the categories of jobs per quarter for the agribusiness sector. Particularly strong were the livestock and cropping categories but there were at least 100 advertisements per quarter for all categories.



**Figure 10 Number of job advertisements per quarter in various sectors of agribusiness for the period 2007-2010 inclusive**

The relative proportion of jobs advertised in the metropolitan press is particularly low when compared with those in rural papers. The exceptions are in Tasmania and Western Australia. In the states of NSW, Victoria and Queensland in particular, metropolitan newspapers have very little influence on the job market in agriculture.



**Figure 11 Relative number of job advertisements in metropolitan and rural newspapers in each state for the period 2007-2010 inclusive**

### Discussion

Regardless of the needs of the industry the level of educational attainment in the industry is unacceptable in a community which has education as a high priority. It is clear that there has been much complacency towards the improvement of skills and knowledge of its workforce at a time when the rest of the community has embraced the opportunities and moved well ahead. It is not surprising therefore that the image of the industry is not seen as progressive and the younger generations have not seen the opportunities for careers in agriculture that are seen in other industries. The reality however is that the greater expectations placed on producers and the associated services requires a highly educated and skilled workforce and there are opportunities for exciting and rewarding careers. The evidence is provided that the industry has a strong employment market.

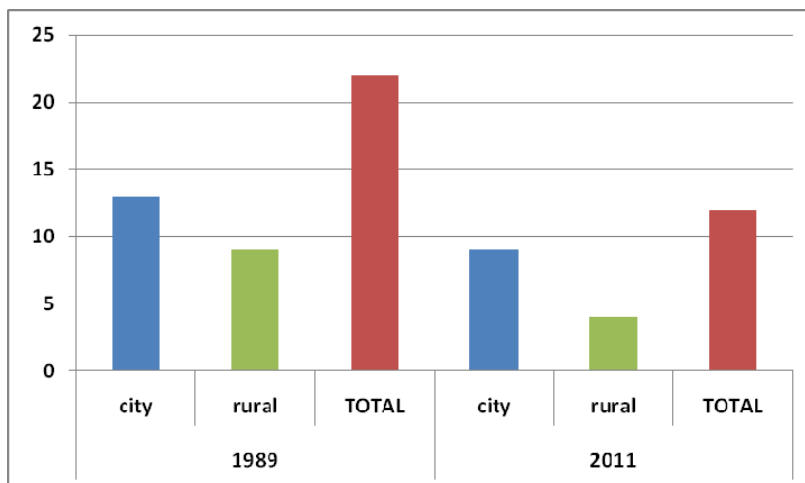
The data presented in this paper show that there is a job market of about 1600 per quarter in agribusiness. If it is assumed that 70% have a need or desire for graduates to fill those positions then there is a demand for around 4500 graduates per year. To this should be added the 1200 or so production management positions annually. Whilst the percentages used could be debated, what is clear is that the number is sizeable.

The universities are nowhere near satisfying the current market. The data show that only around 300 agricultural graduates per year are now produced. This number grows to over 700 per year when related courses are considered. These numbers assume that there is no leakage of these graduates out of agriculture – this leakage can be significant. At best therefore the universities are producing only 700 or so graduates for a job market of more than 4000. Further, the universities would need to produce about 2300 graduates just to maintain the current (7-8%) graduate level of education qualifications (Pratley and Copeland 2008) and that is nowhere near being achieved.



Industry responds to this dilemma in many ways – the workload builds on existing staff; staff are “stolen” from competitors but the expertise base is not increased; and less qualified people are employed thereby reducing the quality of service to clients and for the business. Anecdotal evidence from industry is that qualified people are leaving the industry due to the work demands being placed upon them, thereby exacerbating the problem.

A consequence of the decline in student numbers is the inevitable decline in the number of providers. The McColl Report in 1991 recommended that there be a consolidation of providers, on the pretext that the resultant providers would be more multidisciplinary and stronger than many of the earlier era. Whilst the rationalisation has occurred and almost all are part of multi-disciplinary organisations, the low student numbers have not provided the strength in many campuses that would have been expected. Thus providers of undergraduate agriculture courses have almost halved in number (Figure 12) fulfilling the recommendations of McColl and colleagues. Of greatest concern is the decline by about two thirds in country campuses offering agriculture. Thus access by rural students to agriculture has become highly limited yet it is rural-based graduate jobs which are the most difficult for employers to fill. Every state capital city except Brisbane currently retains at least one campus where undergraduate agriculture is offered.



**Figure 12 University campuses offering an undergraduate agriculture degree, 1989 and 2011**

By any measure, the agricultural industry faces immense challenges in capacity. Prospective students and their mentors do not see agriculture as a potential career path. Thus students are not entering relevant university courses in sufficient numbers even to maintain the current levels of workforce education. The issue is not that there are no exciting and rewarding careers in agriculture – it is that the emerging workforce generation does not perceive those opportunities in agriculture and is thus attracted to the more positive images portrayed in other employment settings.

If the trend in student enrolments continues we can expect to have further universities dispense with agriculture courses. It is unlikely, once relinquished, that any institution would

re-establish such a course. The industry as a whole seems reluctant to embrace education as an essential plank of its future sustainability and seems unwilling to work together to promote both a positive image for the industry and worthwhile careers for prospective participants. The industry as a whole seems to be reluctant to put pressure on the political system to lead the image repositioning and career promotion. There are now sufficient data available to have established that the capacity challenge is real. The challenge will intensify unless there is concerted effort for change.

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