La Trobe University Submission to Senate Inquiry into Higher Education and Skills Training to Support Future Demand in Agriculture and Agribusiness in Australia

Executive Summary

- The workforce needs of Australian agriculture for graduates are not being met. Less than 300 graduates in agriculture are entering the national workforce annually, to meet the demand for more than 4000 positions.
- The number of students enrolling in agricultural-based courses at universities across Australia is declining. This is attributed to a negative image of agricultural careers. *Careers in agriculture urgently require promotion*.
- Declining student numbers creates financial pressure on university departments which offer such courses, as the Commonwealth funding for the institution is based on student numbers. This has led to staff cuts, increased staff workloads and, at some institutions, to course closures. The number of campuses providing agricultural-based courses in Australia has declined nationally from 23 to 12 between 2000 and 2010.
- La Trobe University is committed to the long-term provision of high quality agricultural-based undergraduate degrees and PhD programs. The university has made a substantial investment, with the Victorian Government, in the new $288 million AgriBio Centre at the Melbourne campus. AgriBio will be a leading national agricultural research facility.
- A concerted investment by Government and agricultural industries in undergraduate and graduate training, and career pathways, is recommended to drive increased student enrolments in agricultural education and to create clear and sustained career pathways for graduates.

Recommendations

1. That a *Marketing Taskforce* be established by Government and Private Stakeholders to undertake research and targeted promotion of agriculture careers for year 10-12 students and their parents, in both urban and regional areas. The objective is to increase awareness of the wide variety of rewarding careers and job opportunities that exist in the sector so that students, particularly urban students, can make informed career choices.
2. That Industry establish a national *Agriculture Tertiary Education Council* (ATEC) to foster the education of professionals for the sector. ATEC will support education and career initiatives in plant, animal and soil sciences; in agronomy; agricultural biotechnology; agribusiness; and for other related careers that employ graduates. Support will be provided to a network of University partners. Industry members fund ATEC through subscriptions or levies on production.
3. That the Government and ATEC collaborate to:

- stimulate career structures in the agricultural sector by offering scholarships, cadetships and HECS relief to undergraduates who complete degrees in the broad area of agriculture science and undertake positions in the sector;
- offer targeted PhD scholarships in the broad area of agricultural science to qualified students to enhance postgraduate training in the sector;
- create “Rising Star Future Fellowships” to attract postdoctoral fellows to pursue research and foster academic careers in the sector;
- fund academic Lectureships in the broad disciplines of agricultural science across the University sector to ensure a career progression for PhD graduates and Fellows.
- create annual awards to celebrate our “heroes” and raise the public profile of successes by students, scientists and industry members in the agriculture sector.

• 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;

- funding to Australian universities from the Federal Government has declined over the last two decades. This has meant that universities have had to make continual savings to meet increasing operating costs over time.
- for departments and schools involved in the provision of agriculture and agribusiness courses the general funding squeeze has been exacerbated by the decline in student numbers, as funding is provided on a per student basis.
- this has certainly been problematic at La Trobe University as the Department of Agricultural Sciences has to teach a range of subjects that make up the broad curriculum of the Agricultural Science degree
- many of our subjects are expensive agriculture subjects that require on-farm visits, district field trips, guest lectures by consultants or industry specialists, as well as a range of laboratory classes. Our small on-campus farm reserve has been particularly expensive to maintain.
- as outlined below (see *Solutions to address the widening gap between skilled agricultural labour supply and demand*), the Government should urgently consider ways to promote agricultural science as a career and attract undergraduates to study agricultural science.

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

- there has been a decline in the quality of the agricultural and related educational facilities at La Trobe University, which has been a function of declining student numbers.
- low enrolments have led to budget driven cost-cutting as described above, with staff retrenchments and a decrease in support for facilities.
- the likelihood that the small, on-campus farm reserve at La Trobe will need to be sold, to provide funding to refurbish teaching infrastructure, has been discussed.
- on the other hand, the university's investment into the $288 million AgriBio research centre, with the Victorian Government, provides considerable hope for the future. This will enable a large critical mass of agriculture-focussed scientists to be established in a new, state-of-the-art research facility.
- nevertheless, the problem of declining student numbers in agriculture courses still remains, and must be addressed.

We argue here that the decline relates to <u>both</u> educational facilities and, more importantly, the *failure to attract undergraduate students*. The two issues are linked.

Low demand for agriculture courses

- the fundamental problem faced by agricultural-based courses in higher education is their inability to attract students. We estimate that the five course offerings by La Trobe University have been attracting between 30-60 new students annually, and this has led to between 12 and 30 graduates entering the work force each year.
- the largest course, in terms of student numbers, is the Bachelor of Agricultural Science. This course has enrolled on average only 23 to 41 students annually over the last 6 years.
- the low demand inevitably leads to a lower ATAR rank score, compared to other courses.

- whilst the two double degrees – the Bachelor of Agricultural Science / Bachelor of Business and the Bachelor of Agricultural Science / Bachelor of International Development - attract students with higher ATAR rank scores (78 and 85, respectively), the number of enrolments attracted to each of these courses has been less than 11 students.

Reasons for the low demand for agricultural-based courses

(i) Crowded marketplace:

- the declining number of enrolments can be partly attributed to the series of reforms to the tertiary education sector in 1988 and the establishment of the 'Unified National System' for tertiary education where colleges of advanced education were transformed into universities, or merged with universities.
- this has created more options for students choosing to take a tertiary degree, suggesting we need to raise the profile of agriculture degrees in a crowded marketplace. The 2011 VTAC guide lists five bachelor degrees in Agriculture in Victoria. These are the Bachelor of Agriculture at Melbourne University (at Parkville/Dookie), the Bachelor of Agricultural Science and the two double-degrees at La Trobe, and the Bachelor of Agriculture at the Northern Melbourne Institute of TAFE.
- this small number contrasts with the total of 971 available courses in the guide.

(ii) Poor public perception of agriculture:

- the public perceives a poor image of agriculture and, by association, of agricultural careers. This is covered further below.
- it appears to stem from the media coverage of agricultural news which is more-often-than-not based on dramatic, negative happenings and general hardship conditions for farmers. This is conveyed by a response from a year 12 student, when considering the possibility of an agricultural-based course in the VTAC guide, who said "No, I don't want to work with struggling farmers".
- The extent to which such sentiment occurs in the minds of students needs to be determined by market research.

(iii) Failure to promote a positive image:

- the agricultural sector has failed to promote itself and convey the positive message of excellent job opportunities in the sector.
- either the message is not being conveyed effectively to year 10-12 students and their parents, or the message is not being positively received by the students and parents.
- a marketing campaign is suggested to address this key issue (see *Solutions to address the widening gap between skilled agricultural labour supply and demand* below).

(iv) Urban students do not identify with agriculture:

- the vast majority of our year 10-12 students live in cities and have very limited experience of rural life.
- this presents a major marketing challenge as the possibility of a career working outside the urban areas is not on the radar screen of most year 10-12 students or their parents.

Impacts of the low demand

(i) Low enrolments:

- the low student demand results in low enrolments of undergraduate students into agricultural-based courses. Given that Commonwealth funding is based on full-time student numbers, the income to the department offering the course will decline with the drop in enrolments which in turn will eventually lead to cuts in staff numbers.
- for example, the number of academic staff who teach into the Agricultural Science course at La Trobe University has declined from 25 in 1990 to 8 in 2011, while the number of support staff has fallen from 17 to 5 over the same period. This is reducing the critical mass of academic staff and their ability to cover the full range of subjects in the curriculum.
- the declining operating budget imposes financial constraints on the teaching and learning process, which is difficult to sustain for agricultural-based courses. Such courses are expensive to teach as they involve a wide range of subjects requiring specialized laboratory classes, facilities and field trips.
- at La Trobe University, we are fortunate to have a teaching farm reserve on the Melbourne (Bundoora) campus. Access to this facility is critical if we are to maintain a quality learning experience. However, financial pressures threaten its continuation.

(ii) Low ATAR scores:

- a second consequence that follows from the declining demand for places in agricultural-based courses is a low ATAR rank score for enrolling students. Whereas a high VCE-equivalent pass was required to enrol in Agricultural Science in the 1970s, this is not the case in 2011, as an ATAR rank score of <60 has enabled entry into the course.
- at La Trobe University the average ATAR rank score for the Agricultural Science degree between 2006 and 2011 has been 62. This is less than the score of 78 for the double degree of Agricultural Science and Business, and the score of 85 for the Agricultural Science / International Development double degree.
- the student with the lower ATAR rank score also tends to have studied fewer science subjects in VCE, and so they need to really apply themselves in their first year when they enrol in 1st year science subjects.
- an unfortunate consequence is that the attrition rates (the gap between enrolment and completion rates) are higher for Agricultural Science compared to those for the double degrees.

(iii) Course closures:

- a further serious consequence flowing from declining demand for agricultural-based courses in higher education is the threat of course closure. It is a negative feedback loop. If there are too few students then the institution cannot pay the costs of offering the course.
- this has occurred at all universities for different courses following marked declines in student numbers. For example, at La Trobe University, the Viticultural Science course is no longer offered because of the decline in student numbers.

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

There have been some unfortunate consequences from the declining student enrolments in Agricultural Science courses at La Trobe University:

Increased workloads and loss of quality research time:

- firstly, there were large staff cuts in 1997 which reduced the number of academic staff by more than 50 percent. This led to significant increases in teaching workloads for the remaining academic staff, as the same number of subjects still had to be taught.
- this resulted in less quality time being devoted to research activity by the staff and so research output has declined.

Loss of local students flowing into PhD programs:

- a second consequence flowing from low enrolments has been the low number of completions and the reduced supply of local agricultural science graduates each year. This has contributed to the shortage of graduates entering the marketplace, which in turn has led to increased job opportunities with industry. Agricultural Science graduates are not being attracted into PhD study because they are able to get good, well-paid jobs in industry.
- the low stipends offered to PhD students (about 80% of the minimum wage; Pratley 2008) are not attractive. We have not had one La Trobe agricultural science graduate enrol directly in PhD programs, following their graduation, in the last 5 years.
- we make the point that the proportion of local students undertaking PhDs at La Trobe has dropped from 74% to 56% since 2007 although the number of PhD students in agriculture in our department at La Trobe has increased from 19 to 27 due to the increased number of international students. However, this may not translate into increased PhD graduate capacity in Australia as many international students return home after completing their PhD.
- given that most of the research at universities is undertaken by PhD students, then the decline in local students taking up PhD training will negatively impact on agricultural research activity in departments across Australia: we should not rely on international applicants to sustain the research capacity in agriculture.

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

We contend that the diminishing supply of highly-capable, creative scientists with a thorough understanding of the science and economics that underpin the different production systems in Australian agriculture will restrict future productivity gains in Australia's export orientated agricultural industries. The supply of such scientists requires:

(i) that we attract bright young students with high ATAR rank scores to study agricultural-related undergraduate courses at Australian universities; and
(ii) that these graduates are inspired to choose research careers and undertake PhD degrees.

The point has been made that much of the productivity growth in Australian agriculture during the latter half of the 20th Century - productivity growth which has out-performed most other sectors in the Australian economy - can be attributed to research and development activity carried out in Australia (Pratley 2008). Moreover, a report by the Productivity Commission (2005) indicates that one of the key drivers for future productivity growth will be appropriate tertiary training. Clearly, the current trend towards the declining human capital of locally-trained graduates in agricultural research, development and extension will pose increasing problems for our rural industries.

- given the increasing need for innovation to increase productivity to maintain food security, and to maintain the competitiveness of our agricultural industries, then there is a most compelling

need for the nation to maintain its agricultural research capacity. If we cannot attract the best possible young people to agricultural-related university courses, then we will lose this capacity.

- Agricultural production systems are becoming more complex and require an increasing range of research specialists to address the problems that develop. There will be problems that relate to carbon sequestration and water use efficiency that arise with climate change, together with those pertaining to soil remediation, biosecurity defence, and the genetic improvement of crop and pasture species, all of which will require innovative solutions.
- sufficient numbers of research scientists will be required so that these problems can be addressed.
- apart from the need for adequate numbers of research scientists, there is also the need for adequate numbers of scientifically literate agricultural graduates to service the needs of industry.
- currently, there is a real problem for parts of the agricultural sector, due to the lack of trained graduates. A key area is the increasing shortage of trained crop agronomists for broad-acre cropping and for horticulture.

Evidence of graduate shortages in Victoria

Evidence for the shortage of graduates in 2011 comes from a recruiting specialist in NW Victoria who is seeking to locate agronomists for the smaller agribusiness companies in cropping and horticultural areas in regional Victoria. The results were quite alarming:

- there were over 30 vacancies for agronomists across the north-west region, and there were no applicants.
- this was occurring despite rising salaries and employment conditions for such appointments

• the incorporation of animal welfare principles in agriculture education;

We can just speak for La Trobe University and outline how we teach animal welfare principles in our courses:

- we offer a series of lectures and tutorial exercises for our 1st year students which address the need to consider animal welfare as a key management issue for our animal productions systems.
- in our 4th year case study subjects, students integrate understanding gained form earlier single-discipline subjects and learn how animal welfare issues are emerging and must be considered as part of the overall management picture.

Example:

In the dairy industry case study, the issues of male bobby calves, calving induction, tail docking and dehorning are closely examined, together with future scenarios that might develop if the issues are not addressed by dairy farmers. The students go on to devise ways that the problems might be cost-effectively managed.

• other related matters;

Commitment to Agricultural Science teaching at La Trobe University; the new $288M AgriBio

- La Trobe University remains committed to continue to offer its agricultural-based undergraduate courses. The University's confidence in, and commitment to, agriculture can be

judged by its large joint investment with the Victorian Government in the new $288M AgriBio Centre on the Melbourne Campus in Bundoora. This research facility will allow an additional 300 scientists from the Department of Primary Industries to co-locate with La Trobe staff to undertake research that will support Australian agriculture.

- The teaching programs in Agricultural Science continue to evolve in an attempt to give our students more options. Changes to the courses will occur in 2012, where the 4-year Agricultural Science degree will change to a 3-year + Honours year. Thus, students can choose to finish their studies with a 3-year Agricultural Science degree, or with a 4-year Agricultural Science/Business or Agricultural Science/International Development double degree. Alternatively, they can elect to undertake intensive research training for a further year to obtain an Honours degree in the discipline, and experience the exciting research environment in the new, state-of-the-art AgriBio Centre. We anticipate these new choices will be attractive to both undergraduates and those stimulated to undertake graduate degrees.

- Another initiative has been to assist rural students from north-east Victoria to enrol in the Agricultural Science degree by undertaking full-time first year studies in Agricultural Science at La Trobe University's Albury-Wodonga campus, before transferring to the Melbourne campus in Bundoora to complete the course. This helps students by reducing the costs incurred in the relocation to Melbourne for one year. The regional campus also provides a very supportive environment in which regional students can make the critical transition to university studies.

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

Here we discuss some key issues confronting our sector and offer some potential solutions for consideration.

Encouraging students to undertake undergraduate and graduate degrees in agricultural science and providing funding to foster career paths and build workforce capacity.

- the current involvement of the agricultural sector in developing agricultural education is fragmented and inconsistent.
- we see limited examples of how individual Research & Development Corporations for each industry sector actively assist particular university partners by partly or completely funding academic staff positions.
- examples include teaching/research staff at the University of Western Australia being supported by the Grains Research and Development Corporation. However, there is no long-term action plan for these organisations to assist universities with agriculture-based education in Australia.
- we suggest that this is one area that urgently needs to be addressed as Industry assistance would have significant impact on longer-term career decisions by students and graduates.

The Minerals Tertiary Education Council- a model for action!

An excellent model for dramatically improving this situation is the Minerals Tertiary Education Council (MTEC, http://www.minerals.org.au/focus/mtec), which was set up in October 1999 by the Minerals Council of Australia (MCA) to build the tertiary education of professionals for the Australian minerals industry.

Member companies of the Minerals Council of Australia fund MTEC through financial subscriptions each year.

Since 1999, over $20M of industry funds have been allocated to the development and delivery of undergraduate and post graduate programs in earth sciences, mining engineering and metallurgy across a network of selected university partners (eg http://www.adelaide.edu.au/mtec/).

MTEC provides financial support to its partner universities through the employment of academic staff, as well as travel bursaries so that students can attend courses at other universities.

Recommendation: create an Agriculture Tertiary Education Council to foster agriculture career paths

We suggest that Industry establish an *Agriculture Tertiary Education Council* (ATEC) to foster education of professionals for the sector.

ATEC will support education and career initiatives in the plant, animal and soil sciences; in agronomy; agricultural biotechnology; agribusiness; and in other careers that employ graduates, across a network of University partners.

Industry members could fund ATEC through subscriptions or levies on production. Such an approach would have significant impact in both attracting students into degrees in agriculture, and thus the sector, and will provide a transparent and sustainable career structure for graduates.

ATEC could be fostered by the proposed *Agribusiness Council of Australia* and support several initiatives in collaboration with Government to:

- stimulate entrance into careers in the agricultural sector by offering scholarships and/or cadetships to undergraduates who complete degrees in agriculture science
- offer targeted PhD scholarships in the broad range of agricultural sciences to qualified students to attract the best into PhD training in the sector
- create “Rising Star Future Fellowships” to attract postdoctoral fellows to pursue research and establish their fledgling academic careers in the sector
- support joint funding of academic lectureships in the broad area of agricultural sciences across the University sector to ensure a career progression for PhD graduates and Fellows

Financial inducements to attract students to agricultural-based courses

In the past, attempts have been made to provide scholarships and/or cadetships to financially assist undergraduate students and attract them to agricultural education. However, these have been limited in number and have only offered financial rewards to a small number of students. They have not resulted in a widespread increase in interest in agricultural education. As recommended above, we contend that such awards would be more effective if they were part of a larger package of actions to promote agricultural education to students and parents.

Financial innovation is required: offer HECS relief to graduates on employment

One innovative approach would be for an organization, which seeks to attract the best and most appropriate graduate for their business, to provide partial or full HECS relief over time as part of the employment package, at the time of employing the graduate.

This would mean that the organization would only make a monetary investment in the new graduate at the point of employment, and so avoid the risk of supporting the undergraduate student for a number of years without the certainty that such a student develops into the graduate that they seek to employ.

***Key Issue**: Improving public perceptions of careers in agriculture: increasing the enrolment of young people in agriculture education and training courses.*

We see this issue as one of the major issues that Government and Industry can help us to address.

The failure of the agriculture industry to attract young people into agricultural careers is the most pressing need facing agricultural education today. The problem has been steadily getting worse and there has been no concerted action to address it. In 1991, the McColl Report spoke of the decline in student enrolments in higher education agriculture-related courses. It indicated that this decline was due to:

- the poor perception of agricultural careers by the general public; and
- the failure of the agricultural sector to promote the courses.

Twenty years have passed and the agricultural sector continues to fail to effectively promote the courses and careers in agriculture. Here, we outline our thoughts on how these issues should be urgently addressed.

Past attempts by La Trobe University to promote Agricultural Science

Since the 1990s, a number of attempts have been made by La Trobe University to promote the Agricultural Science degree.

- the first attempt occurred in 1996 when the Department of Agricultural Sciences mobilized staff, past and current undergraduates and postgraduates to visit over 330 high schools across Victoria. The strategy was to talk about the strong and exciting job prospects and careers that can flow from Agricultural Science.
- the result was a small rise in enrolments in the following year. Unfortunately a continuing decline in enrolments followed in subsequent years.
- despite this promotion effort, major staff cuts were announced in early 1997 in the Department of Agricultural Sciences due to low student enrolments. No further promotion campaigns were then possible due to staff shortages and increased teaching workloads.
- in 2007, La Trobe University decided to remove the HECS fees for Agricultural Science students and undertook a wide publicity campaign to this effect to encourage enrolments.

- the result was a spike in enrolments in the following year; large attrition in numbers followed in that year as students transferred out of Agricultural Science to other courses, having enjoyed one year of HECS-free enrolment.

Ways to promote careers in Agriculture and student enrolments in Agricultural courses

- the following proposal describes one strategy to address the agriculture sector's failure to attract young people to its ranks.
- it requires a major time and dollar commitment from all affected private and public sector stakeholders.
- it is based around a committed and dedicated *Marketing Taskforce* that should be formed to promote agricultural careers and promote student enrolments in agricultural courses.
- it requires a significant budget and this would be possible if all stakeholders contribute to an operating fund.

The approach would be to undertake market research to determine:

- the features of agricultural careers that appeal to year 10-12 students and their parents
- how best to portray these features
- how best to reach this student cohort and parents to increase awareness.

A recent survey of 1st year students at La Trobe University indicates that the VTAC Guide, followed by the parents and friends, and then the internet, were key sources of information that influenced students to enrol in agricultural courses at the university. Notably, the career teacher was not a major influence. This sort of information needs to be taken on board by the Taskforce.

The second phase would be to carry out a targeted and ongoing promotion campaign, initially on a pilot basis, using advertising strategies and media which are informed by market research. Continued refinement of the marketing approach should occur to sustain the impact of the campaign.

Addressing the negative perceptions around careers in Agriculture

It is likely that the negative images portrayed in the public media create the negative perceptions of Agriculture to students and their parents (Pratley 2008). The images involve hardship on farms, the declining terms of trade for primary producers, climatic extremes impacting on farmers' livelihoods, outbreaks of animal and plant diseases, market collapses for key commodities, bank foreclosures on farming businesses, with considerable personal stress. All of these convey the picture of a struggling and unattractive sector in the minds of year 10-12 students and their parents.

These images need to be counter-balanced by the positive images of rewarding job opportunities for graduates who will act as professional agricultural scientists or agribusiness specialists. The positive images that occur with careers in Agriculture include:

- opportunities with investment banks and superannuation funds that are investing in agricultural businesses,
- exciting high-tech developments in precision agriculture and systems management to 'produce two blades of grass where only one grew previously',
- the challenges to deliver sustainable gains in such productivity with minimal environmental damage,

- the opportunity to make a real difference in confronting the challenges of local and global food security that will impacted by climate change,
- many opportunities for overseas work in international development (UN, FAO, NGOs),
- the opportunity to have a career that will leave a lasting legacy.

If such efforts are not made, and more students do not become aware of the exciting prospects for graduates from agricultural-based courses, then the negative perceptions will remain and further dampen entrance into the sector. Agricultural education needs to be raised in the consciousness of families, by a concerted smart and effective promotional campaign, as an entry into an immensely important "sunrise" industry, rather than an old and fading "sunset" industry.

Recommendation: create a Marketing Taskforce to promote careers in the agriculture sector

We suggest that a *Marketing Taskforce* be established by Government and Industry stakeholders to undertake research and targeted promotion of agriculture careers for year 10-12 students and their parents, in both urban and regional areas.

The objective is to increase awareness of the exciting features of the wide variety of careers in the sector and the excellent job opportunities that now exist so that students can make informed career decisions.

The sector needs to be promoted as an immensely important "sunrise" industry, rather than an old and fading "sunset" industry.

We need to attract the large urban population into careers in the sector.

To enhance the public perception of agriculture we suggest that Government create a series of prestigious national awards to promote the "heroes" in the agricultural sector who are "making a difference".

Recommendation: create annual awards to publicly promote the heroes in the sector

The agricultural education Taskforce and ATEC, discussed above, should consider creating a significant number of annual awards to raise the public profile of achievements by our heroes-students, scientists and industry members - in the agriculture sector. This would have tremendous impact on the perception of the wider public for the high potential of careers in the sector.

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