

**Submission to Inquiry into Agricultural Education and Training
For the Education and Training Committee (ETC)**

From Melbourne School of Land and Environment (MSLE), The University of Melbourne

Terms of reference for the ETC

- An evaluation of the current extent of agricultural-related courses in Victoria;
- An evaluation of the effectiveness of current agricultural programs;
- Whether the workforce training needs of agriculture are being met;
- An overview of well regarded agricultural education in other Australian States and Territories or other countries.

Specific points raised in the letter of invitation, indexed to page number:

1. Agricultural-based education and training courses offered by the University of Melbourne, and data on enrolment and completion rates (page 3);
2. Key benefits and issues surrounding agricultural education and training courses, including any gaps in existing educational opportunities: meeting the needs with Dookie 21 (page 10);
3. Availability and effectiveness of pathways that allow the transferability of skills acquired through informal industry training with competencies provided in formal education and training (page 11);
4. The role and effectiveness of the agricultural sector's current involvement and its future capacity in developing agricultural education and training (page 11);
5. The capacity of current and future on-the-job training and other alternative training programs to enhance the skill levels of new and existing workers in the agricultural sector (page 12);
6. The quality and availability of existing teaching staff in the Vocational Education and Training (VET) sector and higher education institutions and the potential impact of the ageing workforce in the agricultural sector on the availability of qualified trainers and teachers in the future (page 12);
7. Curriculum development to respond to the future needs of the agricultural sector (page 12);
8. How to increase the participation of existing agricultural sector workers in education and training courses (page 12); and
9. How to improve public perceptions around pursuing a career in agriculture, and potentially increase the enrolment of young people in agriculture education and training courses (page 13).

Introduction to the Melbourne School of Land and Environment and Overview

Before we address the specific issues above, it would be useful for context to give a brief overview of our faculty.

The Melbourne School of Land and Environment (MSLE) is a faculty of diverse disciplines that has emerged from a history of teaching and research across special purpose institutions. Through

its shared history, MSLE has robust connections to government decision makers, industry leaders, and urban, regional and rural communities across Victoria. Today our activities range across laboratory-based biological investigations, agricultural and forest ecosystem field-based research, and social science enquiry.

Our mission:

**Sustaining our community's land, natural resources and environment:
our challenge, our responsibility**

The fourth largest research faculty in the University, our research grants have increased from \$14.8m in 2006 to \$20.5m in 2009. Our researchers lead enquiry with colleagues across the university, Australia and the world and have strong collaborations with a number of Cooperative Research Centres (CRCs), government departments and research institutes.

As discussed further in our submission, many factors influence student demand for places, but two prime factors are the generally negative community attitudes towards agriculture and the failure of the agricultural and related sector to promote itself.

Sadly, these problems remain today, have continued to attract too little attention, and are largely out of the control of education providers. We have little influence over community attitudes compared to the media, and can only encourage the agricultural and related sector to promote itself.

Due to low and declining student demand and consequent loss of government income dating back to at least 2000, plus a clear preference among most students to experience a broad urban university experience, the Melbourne School of Land and Environment consolidated its agricultural teaching around its campuses at Parkville and Dookie with a strategic focus on higher education.

Because we have made significant sacrifices, including lower staff numbers and increased workloads, agricultural training at the University is no longer at immediate risk. However, a poor public perception of agriculture remains a key Victorian and national issue for the continued prosperity of agriculture and rural and regional life, and recruitment of students and future employees.

Against a background of these challenges, the Melbourne School of Land and Environment remains very optimistic about the future of agriculture. We have invested our own resources and have led two major proposals seeking university, industry and government investment around our Dookie campus, including Regional Partnerships Facilitation Fund application, and a much larger research, education and technology partnerships program called "Dookie 21", seeking total regional investments of more than \$40 million. These initiatives are described in part in this submission.

Specific Responses to the Letter of Invitation

1. Agricultural-based education and training courses offered by the University of Melbourne, and data on enrollment and completion rates

At an undergraduate level we offer a range of breadth subjects to New Generation Degree students across the University (e.g., Arts), such as the 3 year sequence “Food for A Healthy Planet”, which enrolls 300-400 students annually. We also offer majors in the Bachelor of Science (Agricultural Science, Animal Science and Management, and Food Science). In addition, we offer an Associate Degree in Environmental Horticulture and Bachelor of Agriculture.

Our graduate coursework addresses issues relating to Victorian agriculture and global food security (Agricultural Science, Animal Science, Agribusiness, Food Science and Wine Technology and Viticulture) and natural landscapes and ecosystems (Forest Ecosystem Science and Urban Horticulture). Our custom professional development programs include the Postgraduate Certificate in Climate Change for Primary Industries, Graduate Certificate in Garden Design and Discovering Horticulture.

Focusing in more detail first on undergraduate agricultural education, MSLE has a twin-pathway approach. Majors in Agricultural Science and Animal Science and Management are offered within the Bachelor of Science as part of the University’s New Generation Degrees. This program enables the School to capture the interest of those moving into the science curriculum uncertain of their specialist field of study.

Alongside this offering, MSLE also offers a stand-alone Bachelor of Agriculture (BAG) degree, which entails study at the Parkville Campus for Years 1 and 2, followed by a Dookie Campus-based program for the third year. The BAG affords MSLE the opportunity to promote a program with different entry requirements to a broader target group with a specific interest in agriculture and a broader based curriculum. Both the Bachelor of Science and the Bachelor of Agriculture have pathways onto honours or postgraduate coursework programs. This will be enhanced through a newly developed strategy to market the BAG as an alternate pathway to graduate study in Veterinary Science. Collaboration with the Faculty of Veterinary Science is in the early stages, and by 2013 will be re-structured to attract rural students and provide a grounding in agriculture/animal science that would lead to large animal vet science studies and a career path as a rural veterinarian. This will have the effect of increasing the uptake of agricultural studies, adding to the pipeline for Veterinary Science and increasing the University’s reach to rural students.

The Associate Degree in Environmental Horticulture is a niche course offered over two years at the Burnley campus with a set course structure that consistently performs well. The course is popular with industry and attracts a large number of mature age and career change students, assisting in the University to meet its Access targets. Importantly, the Associate Degree has a pathway into the Bachelor of Environments.

Post-graduate initiatives

MSLE runs a vibrant research training program through PhD and MPhil offerings across four campuses. In addition to Parkville, flagship Masters degrees are taught at each of the Burnley (Urban Horticulture), Dookie (Wine Technology & Viticulture) and Creswick (Forest Ecosystem Science) campuses, in addition to a uniquely diverse suite of graduate courses with strong industry links.

Our agriculturally related Masters offerings include:

- Master of Agribusiness (150 point Masters)
- Master of Agriculture
- Master of Animal Science
- Master of Food Science
- Master of Forest Ecosystem Science
- Master of Urban Horticulture
- Master of Wine Technology and Viticulture (150 point Masters)

MSLE's graduate coursework programs are unique in their diversity. Strong industry links make these courses appealing to career changers, mid-career professionals and those with some work experience.

Strong emphasis is given in these programs to more flexible delivery (intensives, online) with a view to encouraging uptake from a range of postgraduate student cohorts, particularly those working in industry full-time. MSLE has a track record of innovative delivery and has been running the Master of Agribusiness, in primarily online mode, since 1999. About 50 per cent of students doing this program live in regional Victoria and interstate.

MSLE is also the custodial Faculty for the Office for Environmental Programs (OEP), which administers the Master of Environment, for which we are also the largest teaching faculty. OEP fits well into our portfolio, both philosophically and in terms our shared range of disciplines.

Finally, MSLE offers a range of executive and industry-focused programs run through Melbourne Consulting and Custom Programs (MCCP) including customised industry-sponsored graduate certificates and courses tailored for government. MSLE ran four courses through Melbourne Consulting and Custom Programs (MCCP) in 2010 and 2011. Most of these were designed with strong industry or government input to meet specific client needs. One of these is "Postgraduate Certificate in Climate Change for Primary Industries", which was established with the Victorian Department of Primary Industries to meet specific training needs to address concerns in industry and the public.

In terms of Victorian higher education providers, La Trobe University, Marcus Oldham College and The University of Melbourne are the main providers of agriculturally aligned programs, as detailed further below.

Universities tend to treat data on **enrolment and completion rates** as commercial in confidence, given the competitive nature of Commonwealth educational funding. Thus, in a public document like this, the data are aggregated.

From 2007 through 2010, MSLE had an average of 180 bachelors graduates in agricultural degrees per year (with 183 in 2010), compared to a national total of about 700-800 per year. Included in this total were 25 graduates per year in the Dookie-based Bachelor of Agriculture. However, the intakes at Dookie were on the decline to as few as 15 in 2008 while the degree was still fully Dookie based, but have increased to near 40 with the shift of the first two years of the degree to Parkville. We had another 45 graduates per year in other degrees, such as Honours, Diploma and Associates.

Under the six new Melbourne 3 year undergraduate degrees, where most of our students are in the Science degree, it is difficult to define an intake, because we don't really know student numbers until the second or third year when they start to declare our majors. However, numbers seem reasonably steady.

Broader perspective on trends in agricultural-related programs

The last substantive review of Australian agricultural and related education was the McColl Report (Department of Employment, Education and Training and Department of Primary Industries and Energy 1991). After a period of high growth in students enrolled in agriculture throughout the 1980s, the McColl (1991) report foreshadowed a weakening demand for education places, and stated that greater student interest in agricultural and related courses needed to be engendered, highlighting that “[m]any factors influence student demand for places but two prime factors are the generally negative community attitudes towards agriculture and the failure of the agricultural and related sector to promote itself.” (p.51)

Sadly, these problems remain today, have continued to attract too little attention, and are largely out of the control of education providers. We have little influence over community attitudes compared to the media, and can only encourage the agricultural and related sectors to promote themselves.

More recently an assessment by Pratley (2008) was that Australian agricultural education and capacity building is at the crossroads. Pratley and Copeland (2008) in reporting graduate data gathered by the Australia's Council of Deans of Agriculture (ACDA) constituent Faculties, stated that the gap between industry demand and suitably trained graduates is widening with graduate completions amounting to about 800 per year compared with the estimated 2000 jobs per year required for new graduates. Their data recorded a decline in the numbers of graduated students for 2001 – 2006 particularly in traditional award areas of agricultural science (3 and 4 year) and horticulture / viticulture. While agriculture graduates, fell by 30 per cent from 519 to 365 graduates over this period, animal science and agricultural economics / business graduates were stable or showed moderate increases in graduated students. A subsequent analysis found that there are some 6000 advertised positions rather than just 2000 jobs per year.

Unfortunately, given the highly technological demands of modern agriculture, there is also low demand for post graduate course work and practice training in agriculture. A report commissioned by the University of Melbourne Provost's Office in 2008 identified total market size in Australia as 83 full time student equivalents (EFTSL) in Agriculture, 36 in Horticulture

and Viticulture, 21 in Forestry Studies and 44 in other Agriculture, Environmental and Related Studies.

McSweeney and Rayner (2011) also discussed some of the trends in higher education completions and student load noting that between 2004 and 2009, the total completions by Australian domestic students in higher education awards increased by 8.3 per cent, while award completions in the broad field of agriculture fell by 15 per cent from 3,493 to 2,968 students (Table 1). While there has been growth in postgraduate completions, undergraduate completions have fallen by 22.4 per cent. The view was that one structural change impacting sub-degree education was the drift of awards such as advanced diplomas and diplomas from the higher education to the VET sector.

Table 1. Domestic student completions (Australian higher education) by level of course and broad field of education – agriculture, environmental and related studies * (McSweeney and Rayner, 2011)

Course level – higher education	Agriculture, Environmental and Related Studies field			Total (all fields)		
	2004	2009		2004	2009	
	No of students		% change	No of students		% change
Doctorate by Research	183	201	9.8%	3,945	4,421	12.1%
Master's by Research	56	33	-41.1%	1,275	961	-24.6%
Master's by Coursework	331	374	13.0%	20,350	24,093	18.4%
Other Postgraduate	298	323	8.4%	25,072	30,249	20.6%
Sub-total Postgraduate	868	931	7.3%	50,642	59,724	17.9%
Bachelor's Pass	1843	1539	-16.5%	93,496	98,732	5.6%
Bachelor's Honours	419	332	-20.8%	9,300	8,967	-3.6%
Other undergrad award courses	363	166	-54.3%	8,224	7,647	-7.0%
Sub-total Undergraduate	2,625	2,037	-22.4%	111,020	115,346	3.9%
TOTAL	3,493	2,968	-15.0%	161,662	175,070	8.3%

* includes agriculture (agricultural science, wool science, animal husbandry, agriculture), horticulture and viticulture, forestry studies, fisheries studies (incl. aquaculture), environmental studies (including land, parks and wildlife management), other related studies.

(Data compiled from Australian Government Department of Education, Employment and Workplace Relations, Selected Higher Education Statistics

<http://www.deewr.gov.au/HigherEducation/Pages/default.aspx>)

Student enrolments (full time equivalent, or EFTSL) according to narrow discipline group provide another lens on student activity within the broad field. Of relevance to this Inquiry is the decline in undergraduate subject enrolments in agriculture (4 per cent) (Table 2). Although, there was strong growth in agricultural postgraduate load (24 per cent), it is likely that much of this growth may be attributed to overseas postgraduate activity. It should be noted that Australian higher education student load grew by about 23 per cent over this period.

Table 2. Equivalent full time student load (all students)(Australian higher education) in agriculture, environmental and related studies

Narrow field	2004	2009	% change
Agriculture Postgraduate	683	850	24%
Agriculture Undergraduate	2,192	2,099	-4%
Horticulture and Viticulture Postgraduate	197	88	-55%
Horticulture and Viticulture Undergraduate	344	251	-27%
Forestry Postgraduate	55	90	64%
Forestry Undergraduate	112	83	-26%
Fisheries Postgraduate	118	79	-33%
Fisheries Undergraduate	248	131	-47%
Environmental Studies Postgraduate	1,082	1,636	51%
Environmental Studies Undergraduate	3,021	3,668	21%
Other Postgraduate	190	138	-27%
Other Undergraduate	841	682	-19%

(Data compiled from Australian Government Department of Education, Employment and Workplace Relations, Selected Higher Education Statistics

<http://www.deewr.gov.au/HigherEducation/Pages/default.aspx>)

The profile of higher education providers has changed significantly within the last 20 or so years. McSweeney and Rayner (2011) make the point that during the 1990s, student load in the broad agriculture discipline area (then ‘agriculture and animal studies’) was concentrated within 13 of the 15 higher education providers operating in the area, with each of the 13 delivering over 300 EFTSL (Department of Employment, Education, Training and Youth Affairs 1997).

While provider numbers in the broad field have grown to 43, many of these work within the growth area of environmental studies. Table 3 (next page) ranks the Australian higher education providers within the broad field for years 2004 and 2009. **In terms of Victorian higher education providers, La Trobe University, Marcus Oldham College and the University of Melbourne are the main providers of agriculturally aligned programs.**

The **University of Melbourne’s campus at Dookie** is arguably the leading site in regional higher education in agriculture, both for agricultural majors, but also because we bring non-agricultural students for short-term intensive subjects with agricultural (and non-agricultural) themes, involving hundreds of students per year.

Table 3. Top ranked higher education providers in agriculture, environmental and related studies by equivalent full time student load (EFTSL)(McSweeney and Rayner 2011)

	2004	Rank 1	2009	Rank 2
	EFTSL		EFTSL	
The University of Queensland	1636	1	1278	1
The University of Melbourne	945	2	1067	2
Charles Sturt University	609	3	717	3
The University of Sydney	545	4	343	8
The University of Adelaide	483	5	454	5
Curtin University of Technology	405	6	247	12
University of Tasmania	403	7	484	4
The Australian National University	387	8	388	6
LaTrobe University	329	9	352	7
The University of New England	327	10	318	9
University of Western Sydney	295	11	222	13
Murdoch University	233	12	315	10
The University of Western Australia	185	13	308	11
% of total EFTSL	73%		65%	

(Data compiled from Australian Government Department of Education, Employment and Workplace Relations, Selected Higher Education Statistics
<http://www.deewr.gov.au/HigherEducation/Pages/default.aspx>)

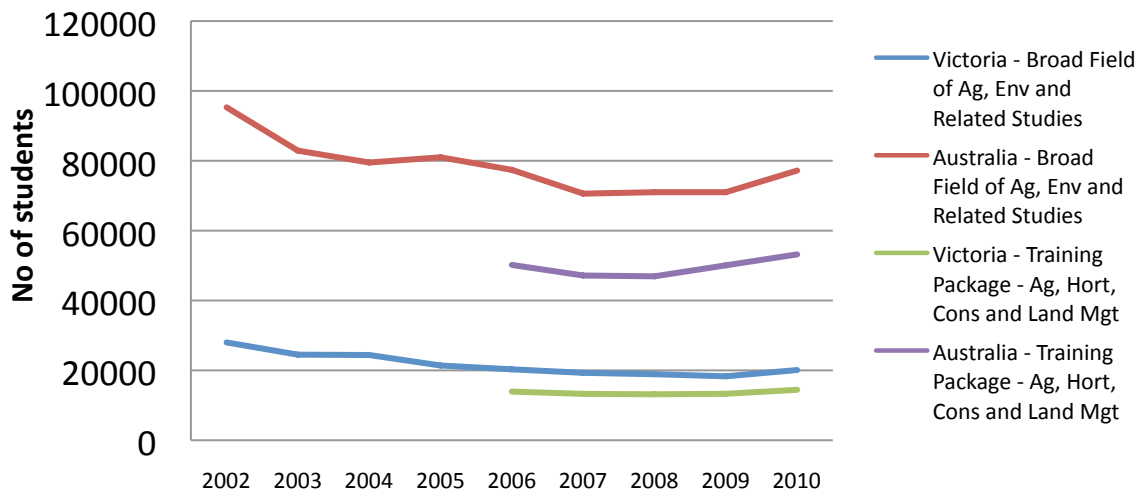
Table 4. Victorian higher education providers in agriculture, environmental and related studies by equivalent full time student load (EFTSL)

Provider	2003	2004	2005	2006	2007	2008	2009	2010
Deakin University	138	142	130	133	109	105	108	119
Holmesglen Institute of TAFE					4	3		
La Trobe University	290	329	326	331	301	308	352	410
Marcus Oldham College (1)	76		32	39	116	129	163	
Monash University	154	170	200	178	186	186	214	225
Northern Melbourne Institute of TAFE (1)				8	19	33	39	
RMIT University	245	209	222	222	264	296	281	302
The University of Melbourne	980	945	908	826	770	1027	1067	1176
University of Ballarat	48	55	53	49	51	49	33	np
Victoria University	34	30	30	24	13	13	15	np
Non-table A/B Providers								229
Total	1965	1880	1901	1810	1833	2150	2272	2512

(Data compiled from Australian Government Department of Education, Employment and Workplace Relations, Selected Higher Education Statistics
<http://www.deewr.gov.au/HigherEducation/Pages/default.aspx>)

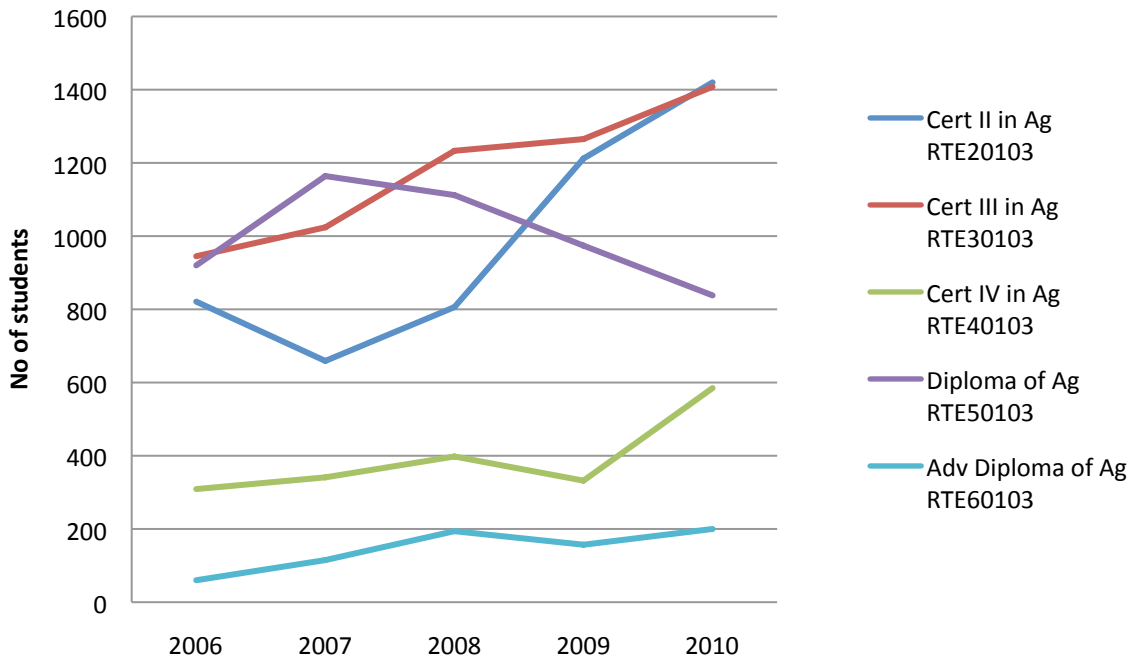
On movements within the vocational education and training (VET) sector, Figures 1 and 2 were tabled at the recent parliamentary Inquiry into Farm Sector Workforce Capacity. Enrolments in the broad field of study and relevant training packages (Victoria) have been relatively static at best (Figure 1). Growth in student enrolment activity seems to be at the lower training package levels as evidence by student numbers in Certificates II, III and IV in Agriculture (Figure 2). Enrolments are relatively low at the higher training package levels (Diploma, Advanced Diploma). It is likely that the activity in Certificates II and III is likely to be influenced by the popularity of VET in schools. Issues such as cost and the perceived value of the higher education may be seen as impacting movement into higher course levels within the VET sector.

Figure 1. Victoria students enrolled in Vocational Education and Training sector by broad field of education / relevant training package (Australian and Victoria)



Data Compiled from National Centre of Vocational Education and Training

Figure 2. Victorian students enrolled in Vocational Education and Training sector by selected courses



Data Compiled from National Centre of Vocational Education and Training

2. Key benefits and issues surrounding agricultural education and training courses, including any gaps in existing educational opportunities: meeting the needs with Dookie 21

Gaps in education and training provision are relative to the sector needs. Malcolm (2010) segmented the following categories of people entering agriculture:

- “New young(ish) recruits to work in farm businesses
- New young(ish) recruits to work in businesses providing services to farm businesses. These services range from farm contracting services to input suppliers such as the fertilizer, seed, chemicals and the finance sector, to output processors, transporters and traders.
- Students undertaking agricultural and agricultural-related fields of vocational training and undergraduate tertiary academic education in agricultural science and related fields.
- Students undertaking postgraduate training in agricultural science and related fields
- Young scientists to be recruited to work in agricultural RD & E.”

We think most of these areas are well covered yet we are cognisant of the need to establish broader pathways into higher education. Section 7/8 below responds to this need. At the University of Melbourne, we are working closely with the Melbourne School of Engineering to fill a key gap in what we see as modern agricultural engineering, which is tightly aligned with

internet technology, and building on our close relationships with companies such as Rubicon and IBM.

A key part of this reinvention is to redevelop the Dookie campus with modern infrastructure and equipment so that it can both inspire and train students and practitioners of all ages.

Dookie 21, as we call it, will be a world class interdisciplinary centre of excellence for research and development of systems and technologies towards efficient and climate resilient farming (livestock, horticulture, and broad acreage) in support of sustainable Australian and world food production.

Dookie 21 will unite researchers in the broad area of climate change resilient farming across the disciplines of engineering, agricultural and environmental sciences, and economics for the purpose of:

- applied research in the efficient use of natural resources (energy, water, fertiliser, land);
- education and training in new technologies and sciences underpinning efficient and climate resilient farming;
- demonstrating of the efficacy of such technologies and practices that can be deployed on a large scale using the Dookie campus;
- collaborating with national and international research institutes, local and federal government, non-government organisations, and farming communities alike.

The University of Melbourne has secured funding from the Regional Infrastructure Development Fund (RIDF), a Victorian Government initiative, to support the initial stages of this development at Dookie. Funding of \$2.5 million was approved by RIDF with a matching contribution of \$2.5 million from the University of Melbourne. Development of the Centre will contribute to the transformation of the Dookie campus into a living laboratory to educate, train and conduct research in sustainable agricultural practices particularly in the areas of irrigation efficiency, animal welfare and on-farm energy efficiency and self-sufficiency.

3. Availability and effectiveness of pathways that allow the transferability of skills acquired through informal industry training with competencies provided in formal education and training

Informal training with industry is widely available to our students now through supervised student projects and placements, especially students undertaking the Bachelor of Agriculture during their year at Dookie. We also find industry to be very willing, and we are building this into Dookie 21. Nonetheless, we have high and growing demand for industry internships / placements from both our undergraduate and postgraduate student groups. Our greatest weakness is that we lack the resources to appoint a staff member to manage these relationships and match students and industry more effectively.

4. The role and effectiveness of the agricultural sector's current involvement and its future capacity in developing agricultural education and training

The agricultural sector seems limited in this regard beyond the measures mentioned in question 3. Time pressures on their staff limit capacity to be involved in training beyond a relatively few but very inspirational guest lectures and the critical placements mentioned above.

5. The capacity of current and future on-the-job training and other alternative training programs to enhance the skill levels of new and existing workers in the agricultural sector

Please see question 3 above and 7/8 below.

6. The quality and availability of existing teaching staff in the VET sector and higher education institutions and the potential impact of the ageing workforce in the agricultural sector on the availability of qualified trainers and teachers in the future

In terms of higher education, we believe that the quality of the staff is very good. MSLE scores in teaching and course experience feedback, as benchmarked within the University community more broadly, are strong. Our teaching is well led by our active research at the cutting edge of key issues. The ageing workforce *per se* has not been an issue for us. We can recruit outstanding new staff members; the issue is that because student numbers are low, we have limited financial resources to make new appointments.

7. Curriculum development to respond to the future needs of the agricultural sector; and

8. How to increase the participation of existing agricultural sector workers in education and training courses

We have combined these two questions because we have a new initiative that closely links them. Beyond the Engineering and Dookie 21 initiatives mentioned above at question 2, we have developed a Regional Gateways proposal to the Regional Partnerships Facilitation Fund (RPF).

The University of Melbourne in partnership with Goulburn Ovens Institute of TAFE (GOTAFE) and Wodonga Institute of TAFE (the Consortium) have developed an expandable model for providing regional students with alternative pathways into higher education which will increase regional participation in higher education and in turn support regional employment and economic development in Victoria.

This proposal articulates the set up and pilot phase of the Regional Gateways framework (phase 1) in the Hume region which will provide the platform, infrastructure and methodology to extend its reach to students in other regions and across a wider range of programs.

During its first phase, the Regional Gateways framework will:

- Develop and deliver a Diploma in Integrated Studies (AQF level 5) that will be taught across the Consortium's six locations¹ in the Hume region. This course has been designed to provide students with new opportunities for further study in Science, Agriculture, Commerce, and Resource Management amongst other areas of specialisation sought by

¹ The six locations are Benalla, Dookie, Seymour, Shepparton, Wangaratta, and Wodonga.

local industry. It is primarily designed to enable school leavers to study locally part-time towards a higher education qualification whilst working 30 hours per week over at least 18 months to be eligible for Youth Allowance. The program will also be available to VET and mature age students, including those currently working in the agricultural industry, and will feature a highly flexible suite of delivery options.

- Put in place a mechanism for delivering a suite of year 12 extension subjects across the region, initially a limited offering in phase 1 to regional year 12 students of one or two extension subjects from the core Diploma curriculum. This is designed to expand the opportunity of access to an initial higher education experience to all year 12 students in the region and provide professional development opportunities for teachers in the region.
- Develop a framework for articulation between targeted VET qualifications (Cert IV and Diploma) and undergraduate higher education qualifications. This is designed to expose students (school leavers and mature age students with industry experience) in traditional VET programs to higher education subjects with an option to undertake and gain credit towards a higher education qualification *whilst primarily studying in the region*.
- Develop a framework for articulation between targeted VET qualifications (Advanced Diploma) and postgraduate higher education qualifications. This is designed to expose students (mature age students with prior industry experience and significant industry experience) in traditional VET programs to higher education subjects with an option to undertake and gain credit towards a higher education graduate qualification *whilst primarily studying in the region*.

Contingent upon the release of RPF funds, a pilot from the first cohort of students will enter the program in 2013.

9. How to improve public perceptions around pursuing a career in agriculture, and potentially increase the enrolment of young people in agriculture education and training courses.

A simple fact is that the news media prefer bad news stories, and these populate the public imagination of agriculture far more than a more balanced view of the successes of agriculture. Improving public perceptions of agriculture is therefore critical to encouraging more students to consider agricultural pathways.

And we have to do so for more than just rural and regional students. Some of these students will have other interests, and competition with other industries (such as mining) and demographic trends are against rural and regional students providing a sufficient workforce. Thus, we cannot ignore students from urban areas.

We agreed above with the perspective by McColl and colleagues' in 1991 that "the generally negative community attitudes towards agriculture and the failure of the agricultural and related sector to promote itself" still prevails today and are largely out of the control of education providers.

Another issue is that agriculture is probably not paying enough in salaries to attract the workforce needed. In unpublished analysis by the Australian Council of Deans of Agriculture (ACDA), it appears that entry salaries in agriculture are at least \$5000 pa lower than comparable positions in other industries that attract Science graduates. We also believe that graduates in other fields move onto higher salary levels earlier in their professional careers.

In terms of financial incentives toward study, in our response to the Victorian Parliamentary Inquiry into Farm Sector Workforce Capacity, we expanded on the rationale for financial incentives (e.g. cadetships, scholarships, other inducements) in encouraging uptake of undergraduate and professional / postgraduate level studies.

As noted by our colleague Bill Malcolm, “for agriculture to be able to attract young people into its work force, agriculture has to be able to pay wages that are competitive with alternative opportunities in the economy. For some businesses this will not be an option. However, for the best agricultural businesses, this will be an increased possibility if the productivity of the young labour is sufficiently high.”

The ACDA has been working for the last 4 years to improve the perceptions of agriculture as a career choice and stimulating interest in demand for related courses, all essential for maintaining the professional capacity and knowledge base of the industry.

Another issue that must be addressed is exposure to agriculture in primary and secondary schools. Victoria appears to lag behind at least NSW and South Australia in agricultural education. It’s not just that these states have specialist agricultural high schools, such as Urrbrae in Adelaide and Hurtlestone (and about 5 others) in NSW. There are 76 schools that teach agricultural subjects in South Australia alone, and very few in Victoria.

Unfortunately, Victoria may have had an adverse effect on agricultural education nationally. The Australian Curriculum, Assessment & Reporting Authority (ACARA) has been widely challenged for giving too little attention to agriculture (see attached letter to ACARA from the ACDA).

ACARA has not included agriculture in the science curriculum, and has relied on the Melbourne Declaration on Educational Goals for Young Australians for guidance on this area. It includes no mention of agriculture or food (see <http://www.acara.edu.au/curriculum/curriculum.htm>)

It’s not the lack of specialist schools or subjects that should alarm us, but the failure to integrate positive examples of agriculture into the broader curriculum of geography, history, math and science, such that all young citizens understand the roles of agriculture and at least some have their curiosity raised. This is an area on which government could have a significant impact with relatively little cost.

References, some which we include as emailed attachments

- Department of Education, Employment and Workplace Relations, (2010). Canberra: Australian Government.
<http://www.deewr.gov.au/HigherEducation/Pages/default.aspx>
- Department of Employment, Education, Training and Youth Affairs. (1997). Selected higher education student statistics. Canberra, November.
http://www.dest.gov.au/sectors/higher_education/publications_resources/profiles/students_1997_selected_higher_education_statistics.htm
- Department of Employment, Education and Training and Department of Primary Industries and Energy (McColl Report). (1991). Report of the review of Agricultural and Related Education. Volume 1, February. Canberra: Australian Government Publishing Service.
- Department of Employment, Education and Training. (1989). A fair go: the Federal Government's strategy for rural education and training. Canberra: Australian Government Publishing Service.
- Malcolm, B. (2010). Agriculture and agricultural science: where have all the young people gone? *Agricultural Science*. 22:3, November, 35-39.
- McSweeney, P. and Rayner, J. (2011). Developments in Australian agricultural and related education. *Journal of Higher Education Policy and Management*. 33:4, 415-425.
- National Centre for Vocational Education Research Ltd. (2010). Historical time series of vocational education and training in Australia 1981 – 2008. Canberra: Commonwealth of Australia.
- National Training Information Service. (2008).
<http://www.ntis.gov.au/Default.aspx>
- Pratley, J.E. (2008). Workforce planning in agriculture: Agricultural education and capacity building at the crossroads. *Farm Policy Journal*. 5(3): 27- 41.
- Pratley J.E., & Copeland L. (2008). Graduate completions in agriculture and related degrees from Australian universities, 2001 - 2006. *Farm Policy Journal*. 5(1): 1-11.
- Pratley, J. and M. Hay. (2010). The job market in Agriculture in Australia. Australian Farm Institute (2010). Occasional paper No. 10.01.