Inquiry into Agricultural Education and Training in Victoria

Specifically:
“How to improve public perceptions around pursuing a career in agriculture, and potentially increase the enrolment of young people in agricultural education and training courses”

A submission to the

Education and Training Committee
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East Melbourne
Victoria

by the

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Australia is a global leader in agricultural science, particularly in advanced dryland production systems and crop breeding technology, and its farmers are among the most efficient in the world.

The agriculture sector delivers a substantial contribution to the Australian economy and community. Primary industries produce 93 per cent of Australia’s fresh food supply and feed almost 40 million others, with export revenue exceeding $30 billion annually, while the overall agribusiness value chain represents a $120 billion-plus slice of the national economy.

The country’s 133,000 farms are the more visible manifestation of agribusiness in Australia; however the sector’s significant role and the sophisticated technological innovation underpinning it receive little external recognition.

This oversight is one of the key reasons that food and fibre production, our most essential industry, is failing to attract interest from future leaders.

The number of Australian students completing agricultural undergraduate degrees has declined over the past decade and postgraduate student numbers in agricultural and environmental sciences are also low.

This is a major concern given that Australia’s rural sector is on the edge of unprecedented change and its workforce is ageing. More than half of Australia’s active farmers are aged over 55 years and the scientific agricultural workforce is similarly ageing, with the lack of replacements creating a skills deficit that suggests demand for rural sector researchers could outstrip supply over the next 10 years.

The situation is complicated by obligations to meet climate adaptation, food security and trade commitments underlying a need to achieve higher productivity in the face of rapid global population growth and a shrinking natural resources base.

Alongside innovation to support more efficient and sustainable food, fibre and fuel production, the need to reinvigorate Australia’s rural sector and improve human capacity is critical to addressing these long-term challenges.

The challenges themselves present unprecedented opportunities to develop a career path addressing the most significant issues confronting humanity and to make a genuine contribution to the future. The pursuit of new ways to feed more people, both in Australia and globally, will generate valuable industry offshoots such as aquaculture, while increasing consumer demand for high quality, sustainably produced food will give rise to cross-sectoral research and development in areas ranging from environmental management and biosecurity to health and nutrition.

Highlighting new employment opportunities, showcasing developments in modern food and fibre production such as biotechnology advancements, and promoting agriculture as a business vocation are essential to encourage more young people to enter the industry.

In 1998 the School of Agricultural Science (UTAS) established the Primary Industry Centre for Science Education (PICSE) to develop and deliver strategies to encourage more young people to enter primary industry and associated research organisations.
An overview of a well regarded national agricultural education partnership

The PICSE Program

Starting from small beginnings in the NW of Tasmania, the School of Agricultural Science, through the Primary Industry Centre for Science Education (PICSE), has been addressing the issue of human capacity in the area of Food Security since 1998. Australia’s capacity to achieve future food security will be seriously compromised without a stream of young tertiary trained people dedicated to agricultural science, science, innovation and research.

PICSE’s goal is to foster and support young people’s interest in science, and their subsequent participation in tertiary study leading to research or careers relating to the Food Security sector. The Federal Government, national agribusinesses, research organisations and universities financially invest in PICSE because of its demonstrated ability to generate a positive and sustained attitudinal change in science students, leading them into careers in primary industries.

Across the Nation, PICSE Science Education Officers (all ex-science teachers) facilitate the building of professional relationships between teachers and students, with primary industries and research organisations through camps, Industry Placement Scholarships (IPS), Science Investigation Awards (SIAs), teaching resources and professional development courses for science teachers. The Science Education Officers (SEOs) operate out of, or are linked with, a local university and manage their PICSE Activity Centre. These Activity Centres are currently located at UTAS (Lead Institution), UWA, Curtin University, Flinders University, CSU, UNE, USQ, USC, Cotton CRC and the Riverland in SA. Plans are well advanced to bring JCU and University of Ballarat into the PICSE program.

Figure 1: Current PICSE Activity Centres. Victoria will be included in 2012
PICSE provides an established integrated program and strategy that includes science class activities, teacher professional developments, student camps, industry placements and ongoing teaching resources which are freely available on the PICSE website (www.picse.org). Collectively, these activities build strong and sustainable relationships with science practitioners, researchers, educators and students.

Figure 2: The PICSE Model of school, industry and research engagement

Unlike many existing awareness and promotional programs, PICSE Science Education Officers are offered class time by teachers to engage with high school science students. In the Middle School, the SEOs work with the students to plan their individual open ended PICSE Science Investigation Awards (SIAs), often relevant to local primary industries.

In the Senior School, the primary focus of the presentations by the SEOs is to provide current practical examples of today’s science applications and relevant careers in primary industries and research organisations. Following the presentation, students are invited to apply for the PICSE Industry Placement Scholarships (IPS), which consists of a Science/Industry Camp, an Industry Placement and a Reporting Back Session.

At the five day residential Science/Industry Camp, students are engaged in activities at the university and have the opportunity to interact with lecturers, undergraduates and postgraduate students. In addition, students visit research organisations, learn about current agricultural research, as well as touring primary industry facilities and research/demonstration farms. A travelling scholarship program exists that funds students to attend an IPS program away from their home State.

The Industry Placement occurs in January. For one week, students are embedded in a scientific research or extension team, experiencing working alongside a scientist or scientific professional, aiding in the current research work of their mentor scientist or industry professional. This is a great
opportunity for students to gain a deeper knowledge of what is involved in working in a field that takes their interest.

A Reporting Back Session is held after students have completed their Industry Placements. Students give a short presentation about their experiences, the highlights and how the program impacted on their study and career pathways. These presentations often reveal significant attitudinal shifts in thinking and new perceptions regarding potential career choices in primary industries.

As PICSE expanded from Tasmania to WA and then the other States, the outcomes of all aspects of the program have been independently measured, evaluated and reported on, both qualitatively and quantitatively by QualDATA. Each year these evaluation reports are used to determine the impact of the program against the goals, as well as to fine-tune the program at each Activity Centre. An important aspect is the tracking of the PICSE students from high school, through universities and into the workforce. PICSE engages “Ambassadors” who have had their aspirations and study directions changed by the program as high school students, who are graduates and now working in Primary Industry, to mentor current PICSE high school students.

In the Activity Centres that focus on agricultural science, depending upon the annual cohort of students, between 45% to 70% students reported a change in enrolment into agricultural science and a pathway leading to careers in primary industries. More generally in 2010, 84% of the participating IPS students positively changed their attitude towards careers in primary industries.

Between 1998 and 2010, the PICSE program has:
• presented to 44,540 students in 2,272 Year 11/12 science classes nationwide,
• selected 778 Year 11/12 students for science/industry camps and industry placements,
• conducted practical professional development programs to 850 secondary science teachers using select primary industries to demonstrate the science,
• supported 3,336 secondary school students in the participation of Science Investigation Awards (2009/2010),
• partnered with the Commonwealth Government, universities, RDCs, research organisations, state governments and industries to secure in excess of $12m (2000 - 2010) to grow the program from a single Activity Centre with one SEO to a National Program of nine Activity Centres with 26 staff.

The relationships built by the 12 PICSE Science Education Officers with their local primary industries and universities, are fundamental to the success and sustainability of the program to date. The outcomes of the PICSE program are further supported by research that indicates the significant value of building long term relationships to affect changing attitudes and perceptions amongst students, teachers, industry and the broader community.

The national funding of PICSE is an essential aspect of sustainability of the program. An important part of the business case was to garner financial support to match Federal Government funding, not just from partner universities, but national R&D Corporations (RDCs). During 2010, there has been a high level of activity by PICSE National to bring together this essential support. Currently, Memorandum of Understandings have been approved by nine non-university organisations for annual cash contributions of a total $475,000 in 2010. The university partners have contributed $558,000 cash during 2010, matching the DEEWR investment of $1,200,000 for 2010 (note: this does not include any “in-kind” contributions).

In 2011 PICSE continues to expand. With the recent establishment of a National Advisory Board chaired by Prof Alan Robson (UWA), PICSE will continue to develop and maintain a clear strategic direction for the future. In 2010, new partnerships were established with a large agribusiness and additional university. In 2011, discussions are well advanced with 2-3 new university partners with the outcomes being the establishment of new Activity Centres. The advice and guidance from the Board, and the formation of new relationships and partners are critical for the ongoing development and longer-term sustainability of PICSE.
“How to improve public perceptions around pursuing a career in agriculture, and potentially increase the enrolment of young people in agricultural education and training courses”

For at least the last four decades, the major strategies employed to improve public perceptions of agriculture and increasing the enrolment in agriculture courses has been to provide isolated media stories of agriculture, provide stand-alone teaching resources in agriculture and teach agriculture in some high schools. Given the current poor public perception of agriculture, the removal of agriculture from the school curriculum and the significant decline of students studying tertiary agriculture, these strategies in themselves, patently have not been effective. Unfortunately, the key players in these promotional activities have been content to fund these strategies for several reasons, including the fact that a glossy poster, a resource CD, media stories of school students raising animals, “Expos” for students and the like, can be held up as evidence of use for promotional funds. Traditionally, the missing factor in all of these activities has been the lack of any meaningful evaluation of predetermined short and long term impacts on public perception and student uptake of agricultural courses.

While the PICSE Program designs and delivers media stories and teaching resources, these are a small part of an integrated platform to raise awareness, interest and participation of the science that supports the primary industry sector. The structured and integrated series of PICSE activities consist of the sub programs:

- Science Class engagement
- Teachers Professional Development courses
- Industry Placement Scholarships and Camps,
- Teaching and Classroom Resources.

PICSE contracted QualDATA to develop a Measurement, Evaluation and Reporting process to provide both process and impact data. Every activity is evaluated by all participants. This data is analysed and reported on by QualDATA. These reports are used as a feedback mechanism for the ongoing improvement of all activities at every PICSE Activity Centre.

The critical factor in the PICSE Program is the employment of successful and enthusiastic science teachers as Science Education Officers (SEOs). These SEOs are embedded in the participating university from which they manage the local PICSE Program. The main task of the SEOs is to build sustainable relationships between the program, students, teachers, local primary industries, researchers and university staff. The annual PICSE “cycle” is described in Figure 2. The key drivers of the program are the building of relationships “face to face” and the promotion of the relevance of science to students. The National Office and Senior Management Team support and manage the SEOs and their local programs, and are responsible for the quality assurance.

The School of Agricultural Science, through the PICSE Program, designed specific strategies of engagement of key partners in primary, secondary and tertiary education, primary industry and research organisations. This was mapped out as a Capacity Building Supply Chain, starting from upper primary school students to postgraduates and employees in primary industries (see Figure 3). At the early stages of the supply chain, PICSE focuses on developing an increased awareness of the importance of science relating to primary industries. Many programs have a primary focus on raising awareness of agriculture, full stop. PICSE moves students and teachers to the next level, that of increasing an interest in the science underpinning food and fibre production and the associated study and career options.
Finally, PICSE develops an attitudinal change in students and teachers, leading to an ongoing participation in the scientific basis of food and water security for the future. Some of the outcomes of this participation phase are:

- SEO becoming a valued member of the community of PICSE partners,
- an increasing cohort of science teachers as PICSE ambassadors in schools,
- more students who change their study and career pathways towards primary industries,
- increased retention of urban and rural students into tertiary agricultural science courses and
- the return of students to their rural areas to be employed in local primary industries.

In attempt to improve public perception around pursuing a career in agriculture, when engaging with the media, PICSE focuses on the relevant strategies listed below:

- redefine agricultural science as a modern, sophisticated bio-science,
- strengthen awareness of the increasing overlap of the biological sciences covering both agriculture and the environment,
- raise community awareness of science and interest in food production and quality,
- proactively influence broader community understanding of Australia as a world leader in agricultural technology and innovation,
- highlight the essential contribution of Australian agriculture to national and global food security,
- highlight the major contribution of agriculture and agribusiness to the Australian economy,
- promote the role of farmers as environmental stewards who employ best practice management to deliver sustainability,
- promote the exciting career options available in agriculture and related areas.

The following is a list of the key drivers that PICSE uses to increase the enrolment of young people in agricultural education at university:

- provide exciting and relevant science activities (Science Investigation Awards)
- promote the relevant sciences that underpin food and water security,
- build relationships with science teachers (delivering resources and PDs),
- build relationships with students (in class, SIAs, camps, IPS),
- building relationships with local industries (Industry Placement Scholarship),
- relationships with school, university, RDCs and industry partners,
- provide an integrated package for schools, year in, year out,
- provide a passionate team of Science Education Officers as mentors,
- build a PICSE Alumnus as ambassadors in university and industry.

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