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5 November 2011

Committee Secretary
Senate Education, Employment and Workplace Relations Committees
PO Box 6100
Parliament House
Canberra ACT 2600 Australia
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Dear Sirs,

Higher Education and Skills Training
to Support Future Demand in
Agriculture and Agribusiness in Australia.

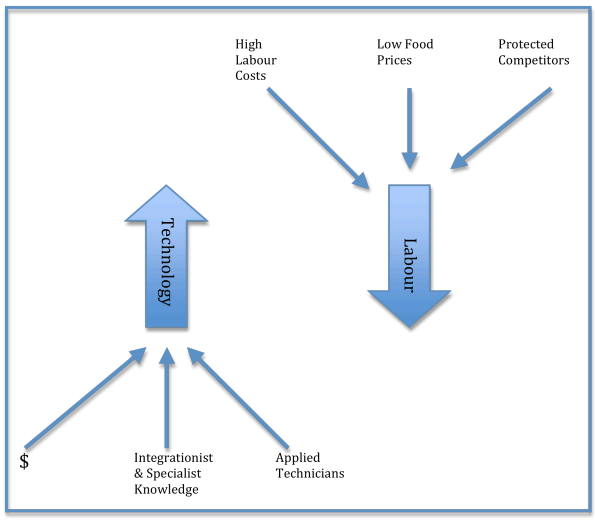
This is a personal submission based on experience that spans both tertiary educational sectors, international trends and norms in agricultural education, international agricultural research and development and large-scale investment in Australian agriculture. In order to have its summary commentary appropriately weighted, it is introduced with a presentation of relevant credentials and a realistic comment on the Enquiry before discussing individual Terms of Reference.

Many will claim the Enquiry is timely. If this statement is linked to a desire to return to a lost Eden of grand agricultural science faculties, the claim is empty – for that time has long passed. However, if it is linked to a clear understanding of current and future needs then the Enquiry may have the potential to cut through the self-limiting nostalgia that is both symptomatic of the problems of recent decades. Strong words perhaps, but as an agricultural scientist proud of what once was a great profession, I can see that the time for that mode of servicing such a critical sector as food production is now passed. On what basis do I make this assertion? No vested interest beyond objective concern for Australia and the field, and a unusually high level of experience across relevant educational, business and international sectors.

Personal Credibility:

- five agricultural qualifications, including three doctorates – PhD (Qld), D.Agr.Sc. (Melbourne) and D.Agr.Techn. (hon. causa – Thaksin, Thailand)
- Foundation Dean of Land and Food Resources at the University of Melbourne to merge the six colleges of the Victorian Colleges of Agriculture and Horticulture with the University's existing Faculty – when it was the largest provider of agricultural education in Australia offering degrees, diplomas and certificates from higher doctorates to TAFE competency certification
- CEO of MPW Australia and after merger of Coffey-MPW for international agricultural development across 60 countries – when Coffey-MPW was listed as Australia's largest exporter of professional services
- advisor to various international agencies and governments including World Bank, Asian Development Bank, UNDP, IFAD and aid agencies of Australia, Germany, and the Netherlands – across more than 20 countries
- Board Director of Hassad Australia, a new and very large (foreign) investor in Australian agriculture that expects to employ up to 100 agricultural practitioners by the end of 2013 to implement new technologies and higher standards of management than has been common in Australia

Context and Relevance of the Enquiry:



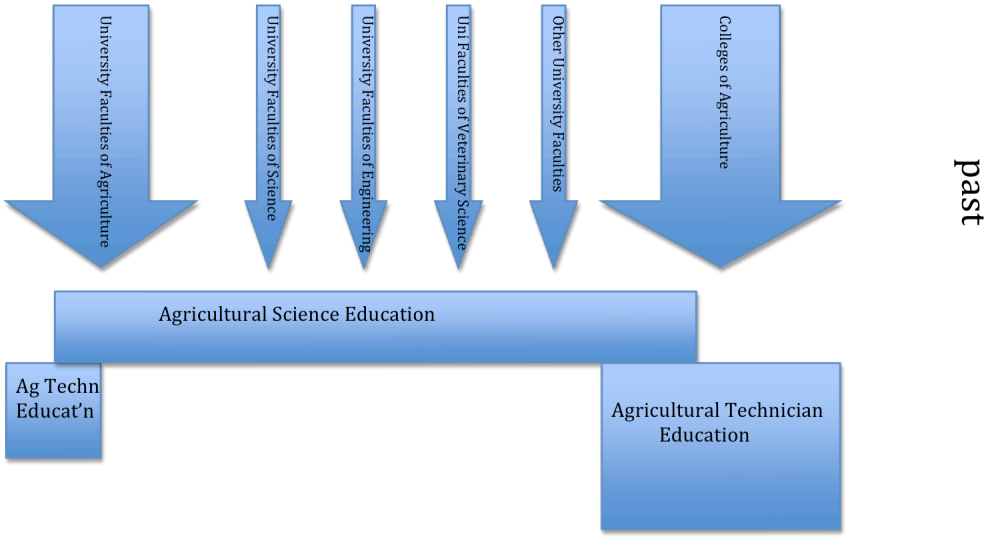
The Enquiry comes at a time when the transition affecting agricultural education has become clear. Rather than dwell on a past golden era of elite agricultural scientists – a valid description of some luminaries of agricultural science faculties – the Enquiry's relevance is dependent on recognition of the transition that has occurred and the direction in which it continues. This is summarized here in two diagrams, which illustrate that: first, the continuing trend to substitute technology for labour leads to increasing demands for business investment, specialist and

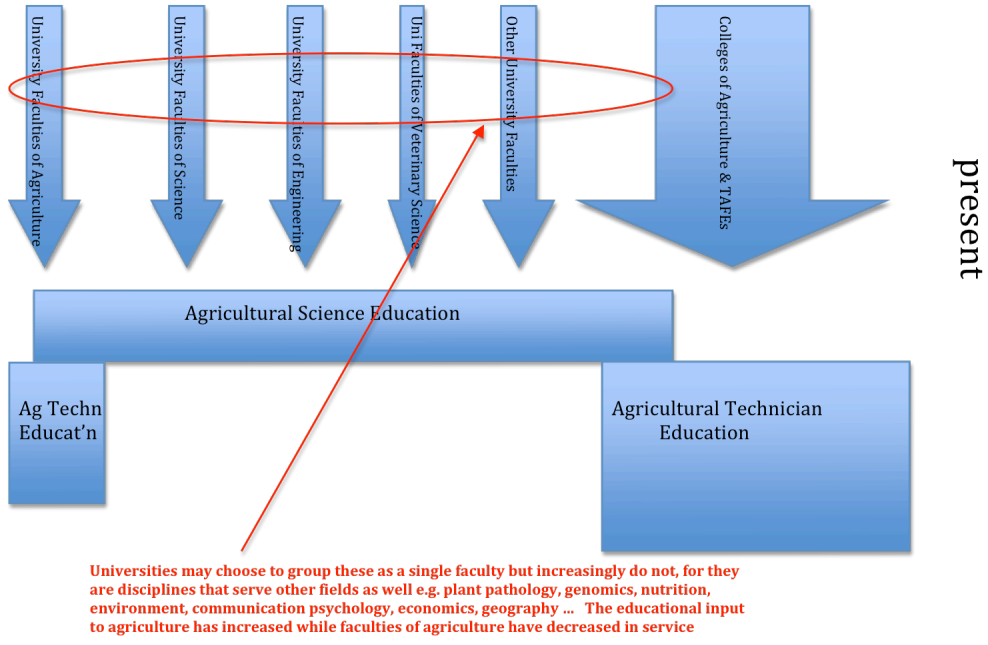
integrationist (elite) knowledge and technicians who can use new technologies. The second diagram compares the past sources of agricultural knowledge and the current situation and shows that while the discipline of agricultural science remains relevant, its function should already be oriented to supplying specialists in integrating disciplines while other university faculties increasingly service engineering and single discipline scientific requirements of industry for both research and education, and vocational colleges service the need for practical technicians who can apply new technologies.

The second diagram is contentious. Agricultural scientists commonly argue for a return to the model of their faculties providing all the integrated and specialist requirements for the industry and act as if the Rural Research Corporations are their private research bodies. I am an agricultural scientist but do not share these views. As the second diagram indicates, the industry needs all of these disciplines available to it, and the basis on which they are managed will be up to individual universities. This is the explanation of the reduction in the number of faculties of agriculture in recent decades – those institutions with a longer history and hence more conservative alumni are taking longer to change than the newer institutions. However, the reduction should not be seen as the same as the outcome recommended in the McColl Review, the most visionary of all of the reviews before or since. That review saw a logical reduction with an emphasis on rural providers supported by specific grants, as noted later in this submission.

In the second diagram, its should be noted that university Faculties of Agricultural Science have always included an element of technical education – often done less well than in the agricultural colleges. With the absorption of many agricultural colleges into universities with Dawkins' reforms, the science strength of university Faculties of Agricultural Science declined while the applied science outputs related to agriculture of Faculties of Science and others increased. Thus the remnant Faculties of Agricultural Science are not comparable to their predecessors – as their renaming in most university faculties indicates, e.g. Faculty of Food and Environment. Today pools of expertise related to agricultural science are to be found in State Agencies, CSIRO and diverse university faculties, which together represent the bulk of agricultural science education. Technical (vocational) agricultural education, on the other hand, is mostly to be found in TAFE-like colleges.

Hence is relevant for the Enquiry to recognize that a review of higher agricultural education should cover diverse faculties and agencies and not simply represent a consensus of the remnants of past Faculties of Agricultural Science.





This selective history omits much in its attempt to provide a context to this submission. For example, another aspect that could be elaborated from the basis of innovation in agricultural industries would indicate that most innovation arose from practitioners (farmers etc) rather than research for much of the 20th century, and that research from agricultural faculties assumed a major

contribution for a few decades only to fall with the rise of outputs from various other faculties. The reasons for this change within universities are twofold: (i) a decline in the image of agriculture in an increasingly urbanized student profile, and (ii) an increasingly complexity in agriculture itself.

Internationally the trend to service agricultural science from many faculties while retaining a small area of integrative agriculture studies is established. Australia will probably follow this trend for two reasons: (i) it has a small population base and cannot afford multiple well-equipped and subsidized faculties, and (ii) as a major agricultural exporter it has little pressure from its (predominantly urban) public for food supply. However, if it wishes to remain a major exporter, it would do well to study models in current successful countries, which are no longer in the West. Increasingly we look to China for the state-of-the-art in agricultural science.

Before commenting on the specific Terms of Reference, one more matter of relevance should be noted – at the risk of teaching grandmother to suck eggs. This concerns the confusion caused by a certain sleight of hand in arguments for increased funding of the organisational status quo, where agricultural education is swapped for agricultural science and vice versa according to the needs of the argument. Both are needed but they are different from each other. Agricultural science produces, among other things, research outcomes and future researchers (education) and is the minor output numerically compared to the outputs of wider agricultural education. Researchers and researcher training for agriculture is no longer a preserve of faculties of agriculture, and in other major agricultural countries is often shared with research bodies (elite learned academies) and government agencies, and partnerships with industry are supported very strategically by government subsidy. The trend is evident when one looks at the figures quoted in literature from agricultural faculties themselves, which indicate that their some 350-650 graduates form part of the demand for some 4,250 employment positions; graduates from science, engineering and other disciplines meet the balance with any long term vacancies being more related to an unwillingness to work in rural or remote areas – itself a problem exacerbated by the urban bias of many existing agricultural institutions.

Comments on Specific Terms of Reference

1. Funding and priority given by governments at federal, state and territory level to agriculture and agribusiness higher education and vocational education and training

Federal: Government has allocated priority de facto via rural research corporations for agricultural research training. However, this is inadequate in

terms of both quantum and mode. There is a need to encourage careers in research, which is not occurring at present with limited time contracts and shifting short-term objectives. To avoid past cosy career niches in which incumbents increasingly become recumbent, it is necessary to introduce some improved management evaluation approaches within funding bodies and universities.

HECS discounts for 'science' should include the science aspects of agricultural science, but this does not logically extend to the social science or 'appreciation' style subjects now populating some agricultural courses.

National interest within a planned food export plan should be conducted to inform costs for maintaining a cadre of competent and elite scientists and technicians in agriculture into the future. This may not necessarily follow the existing model of universities and colleges – it requires analysis. It is not a simple matter of smaller class sizes demanding higher per-student costs, because the student market in fact has failed in this respect. The long-term nature of both agriculture and education would not be left to market forces as universities do if national interest was a priority. This is clear in quotas for medicine, for example, which while commonly assumed to be in response to costly courses, is also based on meeting national needs. A professionally managed investigation into national needs is required before estimates of additional costs can be made; the team would need to be carefully selected to maintain objectivity and an international perspective.

CSIRO (and State Departments – see same paragraph in State section) conduct agricultural research and research training, in conjunction with universities. With the reduction in resources specialized agricultural faculties in universities, pools of expertise – created by universities in the past – are now in these other organisations where they are more practically engaged in applied agricultural science. Incentives to collaborate are ad hoc and primitive, and an enhanced means of stimulating joint projects is needed. Perhaps scholarships can be tied to joint research work with the research training including a career path with the agencies that will be the major employers of researchers into the future. This is as close as Australia may come to the romantic antipodean image of the US Land Grant System of integrated research, education and extension – a past success of the USA that is today difficult to find and impossible to reproduce.[1]

State: Technical aspects of agriculture are costly to run, and as these subjects are vocational in nature, funding for TAFE and similar colleges should attract specialized support for relevant facilities. This does not mean that farms need to be owned by colleges if access is possible by other means – either way there is an incremental cost.

[1] Lindsay Falvey (1996) Food Environment Education: Agricultural Education in Natural Resource Management, The Crawford Fund and the Institute for International Development, 280pp.

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2. Reasons and impacts of the decline in agricultural and related educational facilities

As the second diagram in the introduction indicates, there has not been a major decline in agricultural education in the sense implied by this term of reference. The decline has been in university Faculties and Departments of Agriculture. At the same time there has been a rise in the applied sciences and other units within universities providing high-level services to agriculture. The impact of that shift has been generally positive for the specialized scientific fields, but negative where universities have sacrificed integrative for specialist expertise in agricultural faculties. Such an outcome is common, as university prestige is often greater for the specialist than the integrationist; this represents a failure of both university management and funding allocations that seek to influence universities.

The decline in agricultural degree providers often omit degrees in agriculture offered by new and highly competent entrants such as the private Marcus Oldham College and Northern Metropolitan Institute of TAFE (Victorian examples only). More serious than the absolute numbers is the location of institutions. The revered McColl report noted the need for the reduction in the number of players that has occurred by natural attrition, and it also noted the need for rural providers to be given precedence. This has not occurred under the market model, which has favoured urban institutions that have in turn shown reduced commitment to the field. A national commitment to sound rurally-based agricultural education, with financial incentives, in such institutions as Muresk

[2] Egan, A. and Falvey, L. (1996) Land Grant College Models. Case Study 1 in Effective and Efficient Strategy to Support Industry Learning. Paper presented to the Conference of the Australian Society of Animal Production, July 1996, Brisbane.

(not Curtin central), Charles Sturt, UNE, Gatton (not UQ central) etc would address the serious impact described in the following paragraph..

The impact of large urban universities dominating agricultural science education has been two fold. First, a reduction in status arises from an urban student and staff profile that maintains an outdated ignorance of modern agriculture, and second urban institutions attract and favour urban students who, if they study agriculture, require more practical instruction due to deficiencies in their life experience. Rurally based facilities of high quality would overcome this peculiar constraint, if such facilities are well resourced and not undercut by urban universities.

3. Impacts of any shortage on agricultural research

Rates of technological improvement, such as grain yields,[3] indicate a general reduction in the quantum of research outputs. University faculties of agriculture sometimes relate this to poor graduate student quality, but this needs to be analyzed. In fact very high quality postgraduates are attracted, but they are often foreigners who seek to work with staff of repute. Australian candidates are, as in other faculties, of variable quality and motivation – this is a serious national cultural issue that should be considered separately. Part of the matter is miserly stipends compared to other countries, but more money is not the sole solution.

As researchers are coming from various faculties, agriculture should be advancing faster in the application of technology than it is. Again, a structural problem overshadows what those involved only in universities may see as the aging cohort of researchers (in agricultural faculties only), a dearth of talented Australian research degree candidates and declining investment in the old structures. The underlying structural issue is the malaise that affects developed economies with strong agricultural exports, which is the lack of incentive to apply existing technology since products are in surplus, and the extremely low relative price of agricultural goods in rich economies which makes exports seem less valuable than they can be. Education needs a global understanding to meet even Australia's needs; in addition, the past reputation of Australian agricultural scientists produced international professional incomes and global investment opportunities that are now less apparent with the reduction in Australia's reputation in the field.

[3] Another example is genetic improvement in sheep, where stagnation in Australian compared with continuous improvement in the case of France.

4. Economic impacts of labour shortages on Australia's export oriented agricultural industries

As the first figure in this submission indicates, technology continues to substitute for labour in Australian agriculture. Technology in turn relies on research skills and investment. Australian agriculture has long suffered from a shortage of investment capital to use its research output and other new technologies. The only long term solution has been corporate and foreign investment under Australia's tight legislation. As a Director of (the Qatar-owned Australian company) Hassad Australia, I have seen the benefits of bringing foreign capital and markets for food to the Australian production base in the form of applying technologies left on the shelf by conservative and operationally cash-poor Australian investors. The economic impact in this way is positive. In other cases, it is of course negative where research or labour skills are not available from colleges/TAFEs and universities.

Declining investment in agricultural research and education is a general Western phenomenon that exacerbates global threats of migration and conflict as population and variability of climates increase. The argument is well developed and some aspects of the concerning actions of international agencies in this respect form the basis of my recent book.[4] Another discussion of the subject from a wider perspective produces a similar conclusion.[5] Of interest is the growth in China's investment in the sector to exceed that of any Western nation.

The most obvious labour shortage is that of skilled technicians. The jackaroo system works well, but is increasingly dependent on foreign work-visa adventurers and unskilled Australians. Enhanced training of young workers for rural locations is necessary immediately.

5. Incorporation of animal welfare principles in agriculture education

As the foundation Chairman of the Board of the Centre of Animal Welfare at the University of Melbourne, incorporating Monash University and the Victorian State Department, I know that animal welfare is a major research topic in that location as well as in Queensland and elsewhere. The international medallist for the field is located at Melbourne. However, integration into education at university level is often through electives rather than compulsory courses and so may not be learned. This is a professional and social responsibility for graduates who will work with animals and should be mandatory.

[4] Lindsay Falvey (2010) Small Farmers Secure Food: Survival Food Security, the World's Kitchen and the Critical Role of Small Farmers. Pp 232. Thaksin University Press in association with the Institute for International Development.
[5] Julian Cribb (2010) The Coming Famine. University of California, Davis and CSIRO Publishing. Pp c.280.

Likewise, in college/TAFE courses, some animal welfare is taught, but mainly from the viewpoint of animal handling. There is a need for an ethical and societal responsibility orientation to these courses. The subject is poorly appreciated by practitioners.

6. Solutions to address the widening gap between skilled agricultural labour supply and demand

The old chestnuts posed as solution to this old question are promotion to industry, leadership and agricultural science as a school subject. These have value but have all been tried many times and not provided the expected response.[6] The reasons are known by those outside the cloister, and include: promotion to the informed industry is ipso facto unnecessary; leadership is earned not taught and existing agricultural bodies are occupied with lobby functions in a political environment that treats long-term needs in short-term agendas and assumes food can never be an issue (in Australia this is largely true except for food-induced migration and conflict elsewhere that will impinge on Australia), and past school subjects have attracted lower performing students who cannot handle the science required of some university courses. The solution includes these three mechanisms but in concert with investment in practical (TAFE/college) courses for average to high-average students in surplus numbers to afford a choice for employers.[7]

In the university sector, just as there are no specific Faculties of Mining Science, some question whether there is still a need for Faculties of Agricultural Science. Just as mining is critically important and requires world-leading researchers and education at both university and college levels, so does agriculture. The skill gap may be reduced by offering incentives through all contributors to agricultural education across all faculties.

The most efficient students for agriculture come from rural backgrounds. They have the practical experience as a context for their theoretical learning, are usually more mature in outlook and are more likely to be comfortable in a rural career. Specific incentives are required for such students and must be above those for urban students who have choices of living at home or with friends.

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[6] Falvey, L. and Matthews, B. (1999) Revitalising Agricultural Education. A Report for the Rural Industries Research and Development Corporation, Canberra. RIRDC Publication No: 99/172 RIRDC Project No. UM-27A. <http://www.rirdc.gov.au/reports/HCC/99_172.pdf>

[7] Falvey, L. and Matthews, B. (1999) Stakeholder Views on Agricultural Education in Australia. Journal of International Agricultural and Extension Education 6 (1): 23-35 Matthews, B. and Falvey, L. (1999) Year 10 Student Perceptions of Agricultural Careers: Victoria (Australia). . Journal of International Agricultural and Extension Education 6 (1): 55-67

The Academy of Technological Sciences and Engineering (ATSE) is the appropriate body for advice on the subject. The agricultural profession's institute has assumed a different function oriented to practical matters and may be of value for technician training advice. The ATSE has recently studied engineering education in detail and the model could serve agriculture well. One mechanism for research might be the allocation of elite prizes and funds through the ATSE for outstanding mid career persons who could be named as Elite Food Fellows, for example.

Conclusion:

The Enquiry may make a difference, but not a major change. The trends of changes have already made much of the usual wish-list untenable, and now there is a need to acknowledge the changes and reinforce those that best serve Australia. These include: increased skilled labour of higher quality from the vocational sector; enhanced researcher security and rewards across all relevant university faculties and commissioning of more detailed analysis of key areas highlighted in this submission. All require funding, but not at exceptional levels; < million not hundreds of millions at this stage.

I am available for further comment and as a witness subject to timing.

With thanks for this opportunity,