



Response to
Agricultural Competitive Issues Paper



April 2014

Front Cover:

TOP: CSU Rhyzolysineter Laboratory, Wagga Wagga; CSU Biomedical Science Building, Orange
BOTTOM: CSU Vineyard, Orange; CSU National Life Sciences Glass Houses, Wagga Wagga

About Charles Sturt University

Charles Sturt University (CSU) is Australia's largest regional university, with more than 35,000 students and approximately 850 staff. Established in 1989 the University traces its roots back to the formation of the Bathurst Experimental Farm and Wagga Wagga Experimental Farm in the 1890s. In one form or another, agricultural education and research has been integral to the University's character and mission for more than a century.

CSU is a multi-campus institution with Australian campuses at Albury-Wodonga, Bathurst, Canberra, Dubbo, Goulburn, Orange, Port Macquarie and Wagga Wagga, and a Regional Study Centre in Wangaratta. The University's commitment to the development and sustainability of rural and regional Australia is informed by the partnerships it has formed with each of its campus town communities, and with the broader rural and regional communities it serves.

CSU offers a broad suite of agriculture specific and agriculture related courses, including courses in agricultural science, agricultural business management, horticulture, water management, sustainability, environmental science, wine science, viticulture, food and nutrition, animal science and veterinary science. This diversity of programs has arisen from continual reflection and review in order to respond to the changing needs of industry and community, and the strength of the industry links CSU has developed and maintained are in part reflected by the consistently high graduate employment rates CSU agriculture and veterinary students enjoy.

CSU has established successful partnerships with other providers in order to create pathways for students into University level agriculture education, and to offer agriculture courses in areas of industry need. For example, the University offers a pathway program through Goulburn-Ovens TAFE Wangaratta campus into the Bachelor of Agricultural Business Management and the Bachelor of Agriculture. This year, CSU has also been able to offer the Bachelor of Agricultural Business Management from the Muresk Institute campus in Western Australia, through a partnership with the CY O'Connor Institute.

CSU's agriculture related research centres help drive improvements and innovation in the sector, and leverage industry partnerships for the benefits of the University's students and communities. These centres include:

Graham Centre for Agricultural Innovation – an alliance between CSU and the NSW Department of Primary Industry. The Centre aims to address the challenges facing the agriculture industry in Australia, such as declining rural profits and changing demography, climate variability, soil health and erosion, water quality and globalisation.

Institute for Land, Water and Society (ILWS) – established in 2005 with the aim of undertaking internationally recognised research in sustainability to enhance the livelihoods and lifestyles of people in rural and regional Australia.

National Wine and Grape Industry Centre (NWGIC) – integrates the viticulture and wine science expertise of staff from CSU and the NSW DPI, with funding from the University, the Department and the NSW Wine Industry Association. A commercial winery,

supported by a high quality vineyard in Orange, support the University's programs in wine science and viticulture.

'Functional Grains' ARC Industry Transformation Training Centre – a research training hub linking industry, students and researchers from CSU, NSW DPI and CSIRO focussing on rice, pulses and canola. Partners include GrainGrowers, MSM Milling, Flavour Makers, Teys Australia, Woods Grains, Grains and Legumes Nutrition Council, Grains Research and Development Corporation and Rural Industry Research and Development Corporation.

Food Soil Research Centre – a partnership with Port Macquarie Hastings Council focussing on sustainable agriculture, food quality, food security and environmental science.

CSU is also a participant in a number of relevant agricultural cooperative research centres including:

Collaborative Research Centre for Cotton Catchment Communities – undertakes research, education and commercialisation activities to benefit the Australian cotton industry and rural communities.

Collaborative Research Centre for High Integrity Australian Pork – identifies ways of improving the efficiency of conversion of feed into live weight in growing pigs. This includes improvements in the quality of feeds and the reproductive efficiency of the national herd.

Collaborative Research Centre for Future Farm Industries – developing new and adaptable farming systems for Australia by creating new land-use systems which will make agriculture more productive adaptable to climate variability, sustainable and diverse.

CSU is also rapidly developing strong international RD&E and training links in SE Asia, China and India with funding from the Australian Centre for International Agricultural Research (ACIAR).

CSU's location in the heart of the most productive agricultural districts in the Murray Darling Basin, and across rural and regional NSW and Victoria, allows it to work alongside producers, processors and agribusinesses to identify challenges and opportunities, and deliver practical solutions in collaboration with industry.

Our students are predominantly drawn from agricultural communities, and return to those communities to address workforce need and shortages in key agricultural sectors.

Today, CSU is one of the largest tertiary agricultural educators in Australia, and has extensive engagement with industries located in close proximity to our rural and regional campuses, continuing a 100 year tradition of engagement and leadership in agricultural education and research.

Introduction

Charles Sturt University (CSU) welcomes and applauds the *Issues Paper on Agricultural Competitiveness* (hereafter the *Issues Paper*) which addresses a matter of critical importance to the Australian economy and environment, and the future health and resilience of Australian regional and rural communities.

The importance of agriculture to national GDP through pre- and post-farm gate earnings is well articulated in the *Issues Paper*. This is mirrored at State level: the rural and regional populations that are CSU's catchment comprise greater than 30% of the NSW population. Agriculture clearly makes a proportionally greater contribution to wealth generation and sustainability within these communities than within the metropolitan centres, and to the sustainable management of NSW's rural and regional environments.

As is noted in the *Issues Paper* and other recent organizational and government policy statements, there are many opportunities to further increase the economic returns from the food and fibre industries through focusing on meeting the demands of the rapidly increasing middle-class in Asia and the anticipated requirement for world food production to increase by 60-70% or more by 2050^{1,2,3}.

NSW already contributes significantly to Australia's exports of major agricultural products including beef, wool, grains, and wine. The draft *NSW Agricultural Industry Action Plan*⁴, the ATSE report³ and the Chief Scientists' statement of *Strategic Research Priorities*⁵ clearly recognize and support that rural research, development and extension (RD&E) is vital to the assuring growth in the productivity and competitiveness of NSW's and Australia's rural economies and hence the health and resilience of Australia's rural and regional communities.

It has been signalled in these and other⁶ documents – and CSU strongly supports – that whilst we must continue to seek profits through input efficiencies, we must also act to drive smarter production and supply chain systems focusing on enhancing product quality and value, and better meeting market needs. This is the primary goal of the 'Functional Grains' ARC Industry Transformation Training Hub recently awarded to CSU. These foci requires a greater understanding not only of the scientific and management principles governing farming systems but also of the processing, logistical, and marketing systems through which Australia's products will reach profitable markets. This reinforces that Australia will require a more highly-skilled professional workforce across all production and farm-dependent sectors to ensure that it remains competitive in export markets and maximizes profitability throughout the value chain, ultimately achieving enhanced returns at the farm gate.

Australia is well positioned to respond to the opportunities and challenges of increasing food demand, although even with forecast increases in food exports Australia will still not be a major contributor to overall global food security in absolute terms¹⁻³. ABARES modelling suggests the real net value of Australia's food exports may be 140% higher in 2050 than 2007 (in \$US), whilst overall growth in food demand is estimated to increase by 77%. This relative advantage is attributed to forecasted substantial increases in the real value of Australian exports of beef, wheat, dairy products, sheep meat and sugar^{1,3}. Additionally, Australia can be a valuable contributor of knowledge to support food production capacity in the developing world and elsewhere as global food demand rises². This is an area where Australian universities and agribusiness companies, working in

partnership through national and regional centres of excellence, can leverage current and future intellectual property and investment in RD&E across different geographical and production sectors. Realizing this opportunity will be dependent on building the highly-educated workforce necessary to provide such services across all relevant fields of agricultural production, research, and extension.

Increasing the numbers of people entering agricultural careers, assuring the quality of education and training provision, and improving the efficiency and effectiveness of RD&E will therefore be vital to growing the future agricultural economy of Australia and farm profitability.

CSU's responses to the Issues posed by the consultation questions in the review:

For convenience our responses mirror the structure adopted within the *Issues Paper*, as follows:

Issue 1: Ensuring food security in Australia and globally

(i) What opportunities exist to expand agricultural production in Australia and how can we take advantage of them?

In its simplest expression, expansion of agricultural production can occur through achieving greater productivity from existing land, bringing new land into production, or a combination of the two. Opportunities only exist in Northern Australia for a significant increase in land under cultivation, but exploiting this opportunity remains expensive and unproven, and the ultimate increase in capacity may still be limited³. In contrast, it is undisputed that productivity can be increased in existing productive areas and this should be a key target for Government in the short to medium term. The distribution of farm productivity values, and the potential gains through raising the productivity of farms in the lower quartiles of this distribution, has been well publicised⁶, including in the *Issues Paper*. Risk factors mitigated by a greater focus on currently productive areas in preference to the North include that current commercial farming regions: have existing infrastructure, albeit that this may need substantial investment to maximise its efficiency and cost-effectiveness; have the communities and industries to provide labour and other services and inputs to agriculture, and are in turn supported by the agricultural economy; and have within them a greater generational reservoir of knowledge about the local environment and those strategies likely to be successful in promoting resilience to climatic extremes, which will become more important in coming decades.

Australia can expand its agricultural production and its food security is assured; its contribution to global food security will be important, but small. Considering the key goal of the White Paper the question must be therefore asked if sector-wide and farm gate profitability is driven solely by production. An alternative - and our preferred - approach is to aim to increase the value of production, independent of the volume of production, i.e. to achieve a significantly greater return per hectare, not just bring more hectares into production. Moving products up the value chain to extract greater profit, including through more extensive or smarter processing of products in Australia, are strategies that should underpin future Government and private investment in the sector. These will complement the ongoing RD&E needed to reduce inputs and increase yields and productivity on-farm.

(ii) How can farm businesses, food manufacturers and the retail sector be more responsive to domestic and global food demand and better integrate into domestic and global supply chains?

Driving scale, and market penetration and awareness through vertical integration or strategic alliances, or targeting niche market opportunities, are all viable strategies to enhance market responsiveness and profitability in the food and fibre sectors. Establishing enduring relationships with key customers is critical: Australian farmers and processors must produce what their customers want to buy.

Whilst there is a need to retain competition for export driven growth, Government can assist industry to foster a 'Brand Australia' ethos and identity to combat this type of positioning by competitors such as New Zealand.

(iii) Do farmers have access to timely, relevant and accurate information to fully inform production decisions to meet domestic and global food demands?

Whilst farmers would undoubtedly appreciate more information, the more important issue appears to be the speed and reliability of access to that information which is available through the better provision of a reliable, fit-for-purpose communications infrastructure. The NBN must deliver against this need.

(iv) What opportunities exist for exporting Australian agricultural technology, marketing skills and expertise to improve global food security outcomes?

CSU sees a valuable opportunity in this context to provide a mix of shorter industry-focussed or research management training courses together with degree-level programmes and is already working with local agencies such as ACIAR, AusAid and the Crawford Fund, or international partners, to expand the scope and range of these offerings.

Issue 2: Farmer decisions for improving farm gate returns

(i) What are the drivers and constraints to farmers adopting alternative business structures, innovations or practices that will assist them in improving farm-gate returns?

Adopting innovative practices or alternative business models requires farmers and their funders to be confident about the reliability and sustainability of the proposed innovation and its capacity to deliver the expected gains in yield, productivity, product quality and/or input savings. Such decision-making is fostered by each farmers' ability to access and evaluate fundamental and applied scientific and business research data, and sound unbiased advice from extension specialists. The outcomes of field trials under relevant environmental conditions, and bioeconomic modelling addressing financial and sustainability objectives under different risk scenarios, are all essential requirements to the adoption of new practises and technology. Both these sources of information ultimately arise from Government and private investment in transformational and applied research through universities, departments of agriculture, grower groups and other providers.

Adoption timescales have traditionally been long and must be reduced in future to maximise the opportunities for Australian agribusiness to extract the greatest competitive advantage from local and international R&D.

Both the generation of the necessary scientific and business data and its transfer to farmers are therefore key drivers to improving farm gate returns, but also require that farmers have appropriate education and experience to make the best decisions for their situation. Thus CSU advocates increased Government and private investment in RD&E and assuring the quality of education and training provision, as well as Government support and interventions to attract the 'brightest and best' into agricultural careers.

CSU sees a key opportunity for Government to support a new model for R&D and particularly extension noting the withdrawal of state governments from some traditional services in this space. .

The principles of the US Land Grant model, which harnesses the resources and expertise of universities, could be adopted, ideally in partnership with private providers, to assure both the training of the next generation of extensions specialists and the provision of extension services to the sector. CSU, through the Graham Centre, would welcome the opportunity to pilot such an approach. Universities offer unique combination of facilities, equipment, knowledge and experience that is difficult to replicated and the Land Grant and related models show that these can be leveraged to achieve significant benefits to agricultural productivity, profitability and sustainability.

(ii) What tools, skills and advice do farmers need to effectively adapt and respond to the risks they face?

This question has been addressed in our answer to (i) above.

(iii) What alternative actions or measures by governments, farmers or others would result in improved financial performance at the farm gate?

This question has been addressed in our answer to (i) above.

(iv) What approaches could be used to encourage improved drought preparedness?

No comment.

(v) During drought, what measures are most effective in supporting long term resilience?

No comment.

(vi) How can new farmers be attracted to agriculture and how can they succeed?

Jobs in the agricultural sector cover a wide range of roles both pre- and post the farm gate; indeed, jobs outside the farm gate outnumber those within by some margin. The Australian Council of Deans of Agriculture (ACDA) has clearly demonstrated that the numbers of job vacancies greatly exceeds the current number of graduates⁷⁻⁹, hence there is a pressing need to attract both new farmers and new graduates to all roles relevant to maximising the productivity and profitability of the farming and farming-dependent sectors.

Farming is an increasingly complex business and farmers must now make far-reaching decisions impacting not just on farm production and sustainability, but also finance and marketing¹⁰. Therefore increasing the education levels of farmers and their ability to access information is critical to assisting them to succeed. To achieve these goals we need to harness and support both metropolitan and regional universities, and other VET sector institutions. In respect of on- and close to farm roles, the capacity to understand the pressures faced by producers, to relate to their business structure, and to provide professional advice is best achieved through immersion in a rural environment. Thus in NSW, the two regional universities (CSU and UNE) train the majority of Agricultural Scientists and Agricultural Business Managers; the University of Sydney makes a strong contribution in Agricultural Economics and a smaller contribution in Agricultural Science.

This is significant as we know that rural students are more likely to remain in rural areas to work: CSU's Regional Development Report shows 91.7% of its agricultural, veterinary and environmental science graduates go on to work in rural areas after graduation. CSU has similarly demonstrated that training Health graduates in regional areas increases the retention of these graduates in rural regions.

To achieve these outcomes, regional universities like CSU maintain extensive field facilities to provide excellent opportunities for relevant field-based practical education and exposure to growers and other stakeholders, but it must be recognised that this also increases the costs of course delivery over those courses with solely lab-based or less intensive practical components.

Additionally, students studying at regional universities often face greater costs than city students in attending university (a point also highlighted within the Victorian Inquiry¹¹). Despite this, HECS Help benefits through the ATO are not available to graduates of Agricultural degrees, although they are to BSc graduates (who studied courses within the ASCED code '01') employed in many core agricultural careers with known shortages, notably agronomists. We recommend this policy is reviewed and HECS Help extended to degrees in the ASCED '05' category.

The universities contributing to the agricultural workforce in NSW also do not attract similar cohorts of students; these differences are likely to be reflected in other states. Students applying for entry at the University of Sydney have a significantly higher median entry score than students selecting the regional universities. This may reflect other aspects of educational or economic disadvantage suffered by regional students (especially those from smaller and more remote centres) and has a significant impact on the cost of educating students in regional areas. These students often require a greater range and level of support interventions in order to complete their education at the highest standards (which must be maintained to ensure the rigour of the future workforce and its ability to contribute to the challenges ahead). Similar comments were made by La Trobe University in their submission to the Parliament of Victoria Inquiry into Agricultural Education¹¹.

Given the shortage of tertiary qualified agricultural graduates, CSU contends that better information must be obtained on the overall skills mix needed to address agricultural workforce requirements (through regional labour market reporting) and where those skills are needed (by region) to ensure effective targeting. We recommend a proactive approach by Government and industry to student recruitment but such approaches need to be relevant. There is a risk that increasing enrolments in metropolitan centres may

increase supply but not address demand in the right locations, given metropolitan students are unlikely to go into regionally-based work.

Our recent experience of an extended practicum within the fourth year of our Bachelor of Agricultural Science also confirms the value of such industry placements to producing employment-ready graduates with a greater awareness of the needs of industry. Employers have responded very positively to this development but the cost of the extra year of study can be a deterrent to greater uptake of the fourth year by students. CSU believes there is a valuable role for Government to play in working with Industry to develop support mechanisms that enhance the number of students electing to undertake such industry placements.

Attracting new entrants to on-farm roles also requires that younger farmers can access the capital necessary to achieve this without incurring a debt burden so great they that cannot confidently progress however attractive lifestyle factors may be. There is a role that Government could play in facilitating more favourable access to start up finance when this is supported by clear evidence of prospective farmers' abilities to effectively and profitably manage the enterprise.

Issue 3: Enhancing access to finance

(i) How do we better attract private capital into farm investment?

Private capital will flow into farm investment providing the benefits of that investment are predictable within the norms for the sector and the risks can be appropriately managed through the combination of: sound on-farm and supply chain decision-making by a highly educated workforce; an agile and aggressive innovation system underpinned by long-term Government investment in transformational RD&E; well-maintained and efficient infrastructure; competitive access to markets; and a lean well-integrated regulatory framework. There appears to be a need for a greater share of Australian capital funds to be invested in Australian agriculture with no apparent shortage of overseas investment funds. The Government should play a role in promoting greater local investment; the mechanisms for achieving this should include clear policies for and investment in the RD&E and education systems to underpin productivity growth and resilience to climate variability, and greater surety in the provision and quality of resources (notably water) and infrastructure.

(ii) What examples are there of innovative financing models that could be used across the industry?

No comment.

(iii) What would encourage uptake of new financing models?

No comment.

(iv) What alternative business structures could be developed for farming that also retain ownership with farm families?

A diverse range of farm business structures are already employed and there appears to be no 'magic bullet' to assure farm profitability and productivity, nor retention of family ownership. However family corporate, share farming, collaborative farming and other models all have successful case studies to offer and evidence was presented at the

recent ABARES (2014) conference that generational farms often outperform others. An important factor in the success or failure of any farming enterprise was shown to be the ability and willingness of farmers as managers to access education through diverse routes.

(v) How can foreign investment best contribute to the financing and productivity growth of Australian agriculture?

No comment.

Issue 4: Increasing the competitiveness of the agricultural sector and its value chains

(i) How might existing laws and regulations be changed to address any market power imbalances in the agricultural supply chain, without limiting prospects for global-scale firms developing in Australia?

No comment.

(ii) How can the agriculture sector improve its competitiveness relative to other sectors in the economy?

Increased competitiveness will in part require a multifaceted integrated approach in which a key role for Government is to promote better alignment and integration of RD&E and training (RDE&T). As noted above, there is an opportunity to develop a linked RDE&T system drawing on the success of the US Land Grant model to enhance the success and rate of adoption of new innovations and practices. Harnessing the collective resources of Australian universities in transformational research will be vital to achieving this goal.

Investments by Governments (state and federal) should focus on fundamental, long-term research with appropriate funding models and incentives to support greater industry and private investment in near-market applied R&D. In the production sector, grower groups have a key role to play and we believe the greatest benefits will accrue when these can be linked into the RD&E model proposed above. This approach is increasingly being deployed across the Graham Centre's project portfolio but there is much that still needs to be done to increase the value and sophistication of such collaborations with Government support.

Post-graduate training in agriculture also requires attention, particularly in relation to meeting the needs of the future RD&E and academic workforce sectors and for Australian agricultural consultants and specialists to capture the expected opportunities for RD&E services to address international challenges in respect of food security and adaptation to climate change. Again, CSU advocates the building of strong, productive and sustainable relationships to further agricultural education. For example, the Graham Centre for Agricultural Innovation is a research alliance between Charles Sturt University and the NSW Department of Primary Industries and this successful partnership has delivered effective joint supervision of PhD students and postdoctoral fellows supported by funding from the Rural Research Development Corporations, such as the Grains

Research and Development Corporation and Meat and Livestock Australia, and from the private sector.

Governments can foster these relationships by working with industry to fund Regional Centres of Research Excellence and Postgraduate Training Hubs, supporting career pathways for progression of PhD students through Postdoctoral Scientist posts into research or academic careers, and promoting working arrangements that facilitate flexible interchange of staff between the partner organisations. Investment in the regions will provide the specific expertise and technologies to drive improved farming and supply chain systems that will deliver gains in productivity and profitability across the Agricultural value chain.

(iii) Which examples of overseas approaches to improving agricultural competitiveness have relevance for Australia?

Two models that may provide useful insights are the US Land Grant University system (<http://www.aplu.org/>) for extension and the establishment of food industry clusters, as e.g. evidenced by the Wageningen food valley (<http://www.foodvalley.nl/>).

Issue 5: Enhancing agriculture's contribution to regional communities

(i) What impact does the growth of populations in regional centres and the decline in more rural or remote townships have on farming businesses and the agriculture sector?

There has been a trend of migration of people from smaller rural and remote communities to larger regional centres over many years. It is important that government creates an environment in which smaller rural and remote communities remain viable places to live and work. This will ensure that older Australians can maintain connection with their home and community as they age, as well as providing the distributed labour force needed to support dispersed agricultural industries.

Charles Sturt University is of the view that Regional Development Australia Committees (or their successors) should be asked to develop a Small Rural and Remote Community Linkages Plan for their region, in collaboration with regional service providers and local government, to identify the types of frequency of services required by these communities to be sustainable, and how these can be maintained and adapted as the needs of the community changes over time.

(ii) How can the agriculture sector best contribute to growth in jobs and boost investment in regional communities, including indigenous communities?

Simply, by being profitable, sustainable and resilient, and by increasing the opportunities for Indigenous Australian communities to foster their economic self-determination through access to and investment in agricultural enterprises. The keys to profitability and sustainability have been noted in various entries above.

(iii) What community and policy responses are needed in rural and regional communities to adapt and change to new pressures and opportunities in the agriculture sector?

Agriculture is an important component of the social and economic activity of many rural and regional communities. However, the future of rural and regional communities will depend on diversification of their economic base beyond agriculture. This will require more consistent coordination of planning at a regional level, with strong support from Federal, State and Local governments to an integrated planning approach.

(iv) How do we attract the next generation of farmers?

This has been addressed in part in our response to Issue 2, question (vi) above. CSU actively seeks to increase the number of students entering Agricultural careers by:

- (a) Appropriate targeting of student recruitment initiatives;
- (b) Increasing students' interest in and aspiration towards Agriculture and related degree programs;
- (c) Providing accessible pathways for students to progress to tertiary study; and
- (d) Better supporting teachers in the delivery of agricultural-related curricula.

Strategies and recommendations in respect of these points are elaborated below:

(a) Appropriate targeting of student recruitment initiatives

Most students choosing an agricultural course do not necessarily chose Agriculture as one of their core HSC subjects or Primary Industries. It follows that agriculture will gain much greater exposure amongst High School students by embedding appropriate applied case studies across the curriculum in all of Biology, English, Mathematics and Chemistry. CSU therefore recommends that relevant state and Federal Government agencies actively promote the adoption of positive Agricultural examples in these HSC subjects.

The success of such an approach will require appropriate resources and training to be provided to teachers. There is anecdotal evidence that when Agriculture (and more specifically, farming) is discussed in schools outside of Agricultural subjects, it may often be cast in a negative light. In particular, there appears to be a risk that outdated or unbalanced views regarding the environmental impacts of farming may be promulgated, when there is ample evidence through such sources such as the *Soils for Life* Project (<http://www.soilsforlife.org.au/>) or the recent ABARES report¹² on natural vegetation management that provide a very different perspective and one that should challenge and inspire students.

(b) Better supporting teachers in the delivery of agricultural-related curricula

There is no doubt that to better inspire and facilitate student progression into Agricultural careers, teachers must be supported by training and provision of quality resources – in Agriculture and Science in particular, but also more broadly to achieve the cross-curriculum exposure noted above.

In this regard we believe there is a key role for the Agricultural Industry to lead this through a model similar to that of the Minerals Council, with Government support and facilitation. For example, some regional universities have linked up with the Mineral Council who provide problem-based-learning (PBL) cases to High School Teachers and organise “live in” residential schools of up to 1 week (e.g. at CQU).

CSU has experience in innovative teaching and learning platforms to support study of applied science subjects with staff recognised for this expertise through Carrick and OLT citations. CSU and its staff would enthusiastically participate and be prepared to lead pilot programmes developed through such a model as proposed above to extend these high quality tools and resources to HS teachers and students.

(c) The provision of accessible pathways for students to progress to tertiary study

Increasing the opportunity for engagement in tertiary education programmes remains problematic, especially for many regional, remote, low socioeconomic and Indigenous communities. We believe there are three particular initiatives that can assist in addressing this challenge:

- (i) High School pathways;
- (ii) Provision of Distance Education; and
- (iii) Strong TAFE to University pathways.

Specific comments on each of these follows:

(i) Provision of High School pathways

To better support high school students CSU believes the provision of a transition course that provides credit on entry could be a successful means to both alert and attract students to the opportunities offered by Agriculture. CSU has successfully trialed this approach and the possibility of delivery in supported distance mode to more remote students is also under active consideration as there is a clear demand from remote schools for such a course.

(ii) Provision of Distance Education

CSU provides distance education (DE) programmes, allowing students the opportunity to study near their families or support networks, and near their place of employment. Over 50 students per year enrol in our Agricultural courses and a similar number across our programmes in horticulture, wine science and ecological agriculture. To further support this pathway, CSU has introduced a mobile student support unit to provide assistance to students studying by DE in regional and remote areas of NSW.

Delivery of distance courses is increasingly dependent on sophisticated on-line technologies and Government support to facilitate the rapid roll-out of the National Broadband Network is vital to ensuring students can appropriately access and use these learning platforms. The provision of access to appropriate computer facilities for students at any level by educational providers operating within the proposed Regional Collaborative Agricultural Networks could also provide another means of widening educational opportunities.

DE may also be the best vector for experienced professionals to gain the necessary skills to export their knowledge overseas, in line with ABARES predictions². Initiatives to develop this capability could be supported financially by the respective governments, as this will contribute positively to economic growth.

(iii) Strong TAFE to University pathways

TAFE-based (or equivalent RTO) programmes have the advantage that many such institutes have campuses or centres in regional areas. Based on their extensive interaction with the industry and long history of agricultural training, several VET institutes produce high quality Certificate III, Certificate IV, Diploma and/or Advanced Diploma agriculture graduates.

The long-standing and extremely successful relationship between CSU and TAFE has facilitated the development of successful alternative pathways to tertiary study at the local level. For example, CSU is working with RITAFE and an RTO in Dubbo to expand its existing articulation pathways, and has a major SAF-supported alliance with Goulburn Ovens TAFE (GOTAFE) to develop pathways that will see local students able to progress from Cert III through to Degrees in Agricultural Business Management and Agriculture in a supported local environment in the Hume region.

Key challenges to further developing such pathways are the contrasting learning and assessment styles commonly employed within the two sectors and that many university Agricultural courses require greater depth in basic science subjects (especially chemical and mathematical sciences) than is usually the case for VET programmes. Frequently this limits the amount of subject credits that can be given for vocational programmes and consequently this extends the required duration of what is frequently part-time study for these students. CSU recommends the Government investigate and support both: (a) the development of appropriate bridging subjects to address these major barriers to successful transition; and (b) the funding models to support students through these bridging programmes. The justification for this is that national data suggests that once TAFE students have overcome the hurdle of their first year of university study, they commonly outperform other cohorts.

Issue 6: Improving the competitiveness of inputs to the supply chain

- (i) How can land, water and other farm inputs be more effectively deployed to better drive agriculture sector productivity, while maintaining or enhancing the natural resource base?**

There is a clear consensus that not only must we significantly increase agricultural output and productivity to assure world food security, we must do so using significantly less water and other inputs than currently (colloquially, we need to “double the production using half the water”). To achieve such input efficiencies we must better understand the science underpinning the impacts of farming practices on water use and water quality, nutrient availability and distribution, soil health, ecosystem biodiversity, etc. This is a key goal of the Graham Centre and ILWS through research into improved mixed farming systems and riverine environments and water quality, respectively, and of Cooperative CRC's such as the Future Farm Industries CRC. The success of research platforms such as EverGraze™ and EverCrop™ developed through FFICRC in enhancing farm

profitability and resilience is testament to the value and need for continuing investment in both transformational and applied research.

Labour is another key input to farm production and the quality of decision-making supported by the education and extension services available and taken up by farmers is another critical component to achieving the desired goals stated in the question.

(ii) What skills including specialised skills and training, will be required in the future and how can these be delivered and uptake encouraged?

These issues have been addressed in our answers to earlier questions.

(iii) How can we attract workers to agriculture – particularly in remote areas?

The development of a multi-skilled workforce trained through VET programmes and its supported continuous employment through regional initiatives that link multiple employers to bridge seasonal gaps in labour demands are two key strategies that government can support in partnership with regional communities.

(iv) How can we promote career pathways for the agriculture sector, including models to enable younger farm workers to gain broader industry experience?

Increasing student aspiration towards and interest in gaining a tertiary agriculture qualification remains a major challenge. CSU addresses this via a number of initiatives including:

- Marketing its courses through career fairs, field days, agricultural shows and school visits;
- Running outreach activities for and with local schools and Aboriginal communities; targeting students, agricultural and science teachers, and careers advisors;
- Supporting the activities of the Australian Council of Deans of Agriculture (ACDA) and their *CareerHarvest* initiative to promote the diverse range of career option in Agriculture; and
- Supporting the Primary Industries Education Foundation (PIEF and related initiatives, such as the Primary Industries Centre for Science Education (PICSE) scheme, to increase the awareness of primary and secondary students of careers in the primary industries.

CSU also supports the formation of Regional Collaborative Agricultural Networks to link schools, VET institutions, Universities and Industry. The focus of such networks must be to promote better infrastructure sharing and coordination, programme designs that facilitate accessible pathways for study (refer below), and programme evaluation. There are benefits for all parties in minimising duplication of resources. Rather, in considering infrastructure and the systems associated with their use (particularly compliance with Workplace Health and Safety) there are obvious advantages in focused consolidation of expertise and networking across sites, with applied research facilities centred on universities and DPI, and TAFEs as key suppliers of practical skills and training, with both supporting general and agricultural high schools within their regions.

- (v) How can rural industries and governments better identify, prioritise and fund research, development and extension?**

This issue has been addressed under Issue 2, question (i).

- (vi) What irrigation, transport, storage and distribution infrastructure are required to support the food and fibre production systems of the future and how should this be funded?**

CSU supports continued Government planning and investment inputs into regional infrastructure development to achieve necessary reductions in the cost per tonne (and carbon outputs per tonne) of transporting agricultural products to ports and processing plants. Clarity and consistency of Government policies and leadership will foster confidence in further private investment across both farming and non-farming sectors of the rural and regional economies.

Issue 7: Reducing ineffective regulations

No comment.

Issue 8: Enhancing agricultural exports

- (i) How can industries and government respond to the key challenges and opportunities to increase or enhance exports?**

As noted in other sections above, there must be a clear focus throughout the supply chain on customer needs and product quality and how these can be delivered through our production, processing and distribution systems. Environmental and animal stewardship delivered through conservation farming, improved husbandry systems, water use efficiency, improved systems for weed and resistance management, environmental flows, etc, and food safety management systems should all be acknowledged and promoted to local and international consumers by both industry and Government to assure confidence in Australian products and the continuing social licence for our agricultural systems.

- (ii) How can the government take best advantage of multilateral and bilateral trade negotiations (including through the World Trade Organization and through free trade agreements (FTAs)) to advance the interests of the sector?**

No comment.

- (iii) How can engagement between industry and government on market access priorities for Australian agricultural products be improved, including to inform negotiations on FTAs?**

No comment.

- (iv) What changes could be made to biosecurity arrangements, both in Australia and in other countries, that would enhance global trade in agricultural products?**

CSU advocates that Government continues its efforts to harmonise risk-based phytosanitary, livestock health and welfare, and other relevant regulations, based on the latest peer-reviewed scientific evidence, to foster and simplify market access and to reduce transactions costs through supply chains.

- (v) How do we provide the appropriate biosecurity controls at minimum cost?**

No comment.

Issue 9: Assessing the effectiveness of incentives for investment and job creation

- (i) How well is the current set of government programmes and incentives directed at the agriculture sector meeting their objectives, in terms of both effectiveness and efficiency?**

No comment.

- (ii) Are government visa arrangements and programmes like relocation assistance, the Seasonal Worker Programme and Harvest Labour Services effective at channelling workers into the agriculture sector and what other approaches should be considered?**

No comment.

- (iii) What have other countries done to inspire agricultural investment?**

Like Australia, New Zealand agriculture operates in an environment of very low government subsidies compared to other agricultural exporting countries and also suffers from low private sector investment. New Zealand will be a key competitor attempting to access the market opportunities offered by rapid income growth in Asia so it will be prudent to maintain oversight of and evaluate the effectiveness of investment mechanisms operating there. Of particular note is the Primary Growth Partnership model (<http://www.mpi.govt.nz/pgp>) which has as its key goal “to encourage more private investment in research and development” through “primarily business-led and market-driven innovation programmes that work across the primary industry value chain”.

- (iv) What has Australia done in the past that has had best effect?**

Several studies ^{e.g.3,6} have clearly shown that higher rates of government investment in RD&E and extension during previous decades have significantly increased agricultural productivity to the great benefit of all Australians. This presents a compelling case for continuing and increasing Government and private investment in RD&E, including exploring alternative strategies for extension, as noted previously.

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