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The University of Melbourne's Response to the Victoria's Future Industries Food and Fibre Discussion Paper



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The University of Melbourne Response to the Food and Fibre Discussion Paper

The University of Melbourne welcomes the opportunity to respond to Victoria's Future Industries Food and Fibre Discussion Paper. The issues articulated are emblematic of the major challenges facing the Victorian agricultural sector. The University is keen to work collaboratively with the State Government and key stakeholders to develop compelling solutions across the value chain. The University offers its assistance in convening policy discussions, developing a shared research agenda and other program activity that would advance the Government's innovation and economic strategy. This institutional response will address three of the major discussion points raised in the Food and Fibre paper. The first is leveraging the critical mass of food and fibre innovation, the second is understanding how innovation will drive productivity, enhance value and make a contribution to export growth, and the third is attracting, retaining and building skills to capture funding opportunities.

The University's Collaborative Strengths in Food and Fibre

The University of Melbourne has comprehensive capabilities in research, teaching, innovation and commercialisation in a broad range of disciplines that will enhance the future prospects of Victoria's food and fibre industry. These competencies span the entire value chain, from food and agricultural systems, forestry, aquaculture, veterinary science, plant and animal sciences, to advanced manufacturing, innovation practice, sensory analysis, customer behaviour and marketing insights, workplace leadership, supply chain management, water management and regulatory reform. The University has a proud history of working closely with the State Government and the diverse industrial sectors to fully leverage our capability.

The University's Growing Esteem 2015 - 2020 strategy articulates a focus on greater industry engagement, recognising that innovation is inherently collaborative and is actively seeking to further expand existing research and development precincts, for instance the Parkville Biomedical, South Carlton, Southbank, Dookie and Werribee Precincts, which cultivate meaningful partnerships with external organisations directly.

The University has partnered with the Victorian Government on a number of flagship activities, demonstrating the strength of collaboration to enhance value and impact, including the:

- The Primary Industries Climate Challenges Centre (PICCC);
- Animal Welfare Science Centre (AWSC);
- Horticulture Centre of Excellence; and
- Victorian Centre for Climate Change Adaptation Research (VCCCAR)

The DEDJTR, the University of Melbourne and Ohio State University established AWSC to improve animal welfare by providing expert information, advice and education that is underpinned by key research and capability. The University is a key partner in the Horticulture Centre of Excellence and co-invested with DEDJTR to seed fund key projects that leverage the strengths of the two partners in support of the Goulburn Valley. The VCCCAR was a multi-institutional research organisation whose focus was primarily action-based research. This was developed through collaborative partnerships with universities, government, private and community sectors. The purpose of the research was to assist the development of policy and build understanding and capacity in relation to adaptation across the private and public sectors in Victoria.

The Australian Research Council (ARC) funded "Dairy Innovation Hub" brings together the leading dairy research groups at the University of Melbourne, Queensland and Dairy Innovation Australia (DIAL) to address some of the major dairy research and technical challenges that DIAL and its member companies had identified as constraints to business growth and productivity in the dairy manufacturing sector. Another initiative supported through the ARC Industrial Transformation Research Programme is "Unlocking the Food Value Chain: Australian food industry transformation for ASEAN markets." It connects Mondelez

International through an integrated research program to enhance Asian export opportunities. The Hub is developing product insights and innovative production technologies to enable Australia's largest manufacturing sector to tap into new markets such as India and China.

Leveraging critical mass of food and fibre innovation

The University of Melbourne can provide critical support to address the Victorian Government's strategy to leverage critical mass in the food and fibre sector. The University's Growing Esteem Strategy has accelerated active engagement between the University, Government and industry in order to deliver evidence-based policy and development that is mutually agreed and deployed.

By 2030 the global population – currently growing at around 140 people per minute is predicted to reach 8 billion, with an extra 2 billion people requiring reliable access to a sufficient quantity of affordable, nutritious food. The world's middle class is also predicted to rise from 2.5 billion to 4.9 billion over the same period. The need to feed an extra 2 billion people, coupled with the increased demand for higher quality food from the rising middle class presents a range of global challenges. Firstly, it is the humanitarian challenge to provide nutritional security for the resource-poor, particularly in developing countries. Secondly, the rising middle class presents a major opportunity for Australian agriculture to meet the rising demand for food in higher value markets. Extra food will have to be produced from less land, while reducing degradation, with less water, less energy-rich inputs, less greenhouse gas emissions and in a changing climate. Some have called this unprecedented confluence of pressures the 'perfect storm' of food security. Addressing these challenges will require technological and farming practice innovation, with partnerships between researchers, policy makers and industry extending along the value chain.

Victoria has prime agricultural land and could position itself as the food delicatessen of Asia, a strategy that has been promoted by peak agricultural bodies. This must be done, however, with an equal focus on productivity, quality and the environment through low carbon, energy, nutrient and water-use efficient production systems and aligned with social and community expectations. Victoria could enhance platform technologies for climate ready agriculture. The University has extensive capability to build upon existing food production technologies, sustainable agricultural systems (or sustainable intensification) and develop new innovative technologies, which will enable producers to make more timely and informed decisions that will lead to improved productivity, efficiency, resilience and positive environmental outcomes. This will increase the number of jobs in food production, innovation and regional employment in allied service industries. This will also inform data that is provided to the supply chain, and contemporary approaches to supply chain adaptation and reform, to underpin claims of sustainability and quality.

The University of Melbourne has strong aquaculture capability that is being further developed to support growth in the abalone industry, along with general fisheries. The University has key expertise in sustainable aquaculture, marine ecosystem ecology, coastal oceanography and parasite resistant aquaculture, which should be part of continued endeavours to optimise outputs and address the impact of water pollution.

Biosecurity does pose a significant challenge for the State and Australia as a whole. The University has done significant work on pest disease and earth mites that have impacted on grains and grapevines that attack horticultural crops and soil. Emissions from land systems have detrimental impact on soil and plant systems through agricultural pollution leading to nitrate leaching into ground water. The University is making great strides in the area of forestry through woody biomass production and understanding how trees adapt to the environment. The University has made significant advances in combating these challenges and is strengthening efforts in this regard. There have also been substantial contributions made to the sector in encapsulation and packaging. The University has produced degradable materials for food packaging, which has had industry application with Mondelez Australia.

The University is well placed to play a major role in facilitating change in the food and fibre sectors. These partnership initiatives need to be scaled in line with government and industrial agendas. By its very nature,

most agriculture research, development and engagement has to take place in the regional areas under conditions relevant to farming systems. For this reason, both the DEDJTR and the University have regional research facilities. However, in an environment with declining investment in R&D, there needs to be more critical mass in our research efforts, by combining our resources, assets and expertise into joint collaborative research hubs, clusters and programs. The PICCC is an example of how this can be effective, by brokering larger more collaborative projects that improve the success rate of funding and improve the rate of publication and communication outputs. In many cases, the DEDJTR have world class R&D facilities in the regional areas, while the University has complementary equipment, laboratories and systems analysis skills that can be brought together in joint research projects. There are numerous examples (e.g. PICCC, Australian Grains Free Air CO₂ Enrichment (AGFACE)) where joint project investments and collaboration have led to a higher rate of value adding and peer review publications and international recognition than would not otherwise have been the case.

In turn, this can deliver benefits to businesses in the food and fibre sector. The University supports partnering with DEDJTR to leverage our combined assets to drive innovation and sectorial development in value-adding opportunities and adopting sustainable agricultural systems. The University can assist in developing on-farm technologies and the systems that support their application that can transform both family owned and larger enterprise farms and processors.

Driving productivity and value capture through innovation

The University applauds the Victorian Government's focus on driving productivity in key areas that will lead to valuable outcomes for the sector and economy as a whole. The scale of predicted population growth in our region suggests that at best Australia could meet less than 1% of the likely demand. Accordingly, Victoria should focus on value rather than volume; both higher value products as well as value-adding to our products along the supply chain. The dairy and wine industries are illustrative of value-adding along the supply chain, through the export of wine and processed dairy products. However, industries with highly publicised live export red-meat industry not only have animal welfare issues, but do not value-add to the product in Australia. There is therefore significant scope to value-add to our agricultural commodities, like red meat and horticulture, viticulture, creating regional employment, retaining more of the revenue in Victoria, while capturing the higher prices that a rising world middle class will pay for higher quality food.

University research is making advances in pest control and food safety, with emphasis on minimally processed foods and new approaches to food handling and storage. Our research includes the mode of action of natural antioxidants, fibres, and probiotics, deep understanding of food structure to support assessment of the effect of various processing and preservation techniques on safety, quality, and physio-chemical properties of foods.

Given a history of swift trade restrictions from importing countries when there are doubts about food quality, it is imperative that Australia further develops state-of-the-art product tracing in order to protect its brand reputation as a high-quality supplier, and also to provide assurance of source for imports. Additional University capability can be fostered in the identification of trace elements in food products to allow reliable determination of its geographic origin.

To drive productivity and increase value will require a long term strategy with foundational sector changes. The University supports greater co-location of government and academic staff through physical or virtual centres or hubs that connect metropolitan and regional areas across the sector. Similarly, the University supports the creation of an Agricultural Reference Group, akin to a 'Wentworth Group' for Agriculture or the National Rural Advisory Committee (NRAC), comprised of academics, government, industry and leading farmers. This group could help government set the strategic direction of the State, provide thought-leadership and inform policy developments.

Combining the skills of the sector - government, higher education and industrial organisations will catalyse innovation more efficiently. For instance, the Carlton Connect Initiative (CCI) is creating Australia's premier innovation precinct on the former Royal Women's Hospital site, adjacent to the University of Melbourne's Parkville campus. As an open platform, CCI unites talented people who extend and deepen the application of knowledge throughout the Australian economy. CCI is focused on thought leadership and a collaborative approach to pressing social challenges such as food security and production, precision agriculture, smart cities and smart grids, competing resource use (e.g. CSG/agriculture), transport and infrastructure.

Carlton Connect's ambitions for the Food & Fibre sector are to provide specific mechanisms to support and foster the emergence of new industries and entrants through support for entrepreneurship and innovation programs that enable distributed quality assurance for food and textiles, food supply chains, and climate change adaptation. The initiative also provides support for workforce attraction and retention and skill development through industry co-development of research and training programs, such as the Masters of Food and Packaging Innovation (with Mondelez, Simplot, Mars and others), and the Industry Transformation Research Program-funded hubs in Dairy Innovation (with DIAL) and the Food Value Chain (with Mondelez). This enables sectoral competitive advantage through innovation and access to world-class infrastructure, including sensory laboratories, animal facilities, 3D printing and design laboratories. CCI's flagship initiative, however, is physical co-location of industry and government in a central location to facilitate knowledge sharing and cooperation across the value chain.

The University would support a closer collaboration with the Victorian Government and key sector stakeholders. The University would propose to leverage existing assets such as the Carlton Connect initiative to create a sustainable agricultural systems innovation hub that will enhance the productivity, quality and resilience of the food and fibre sector. The University would also offer to have representatives in an Agricultural Reference Group that is in touch with farmers and industrial organisations and can collaboratively respond to common challenges as well as providing a central point of contact for engagement and translation of new technologies.

Accessing new markets and growing exports

The University supports the State Government's strategy to enhance value-adding in Australia in addition to exporting raw agricultural products such as grains and livestock, primarily live sheep and cows – moving agriculture from a volume to value focus. The application of new technologies and optimising of existing processes to transform raw ingredients into value added food and beverage products and process improvements can enhance industry competitiveness and sustainability. With its greater focus on industry engagement, the University will increasingly contribute to the translation and integration of research and technology in partnership with industry. The University could also provide key capability to assist the agricultural sector double the value of production through focus on value-adding, quality and product differentiation and developing sustainable agricultural systems.

Similarly, as climate change and variability have an increasing effect on the entire food and fibre sector, the University would like to play a leadership role in providing skills, training and technological developments. This has been demonstrated through PICCC, the Primary Industries Adaptation Research Network (PIARN), the Climate Change Research Strategy for Primary Industries (CCRSPI) and VCCCAR initiatives that were all led out of the University of Melbourne. The Graduate Certificate in Climate Change for the Primary Industries is an example of an accredited training course, developed by the University of Melbourne, in partnership with DEDJTR to train their staff and industry.

Water management is another critical challenge for the agricultural sector and the recent extended drought demonstrated the highly deleterious effect water scarcity can have on food production and highlighted the need for not only stronger drought preparedness but more effective water management overall. The University can contribute to water management in Victoria as it has done in partnership with Rubicon Water through the implementation of Total Channel Control and on-farm water distribution

technologies. Total Channel Control coordinates and manages water on an entire irrigation district scale. It is an Internet-of-Things system, consisting of a collection of wirelessly communicating gates that both monitor water level and flow as well as controlling water flow in open channels with great accuracy. Around 70% of the world's diverted water is used for irrigation to produce food and fibre but the efficiency of water utilisation in irrigated agriculture is poor. There is scope to more than double food production without increasing water use through implementation of water control technologies. These technologies are currently being implemented in China, India, Chile, the United States and Europe.

Modernisation of the aging irrigation water distribution infrastructure in the Murray-Darling Basin has almost been completed but significant work still needs to be undertaken at the farm level to further enhance water productivity in food and fibre production. This work is also being aided by work on streamflow prediction, remote sensing of evapotranspiration to better predict crop water stress, remote sensing of crop health and integrated soil moisture and irrigation technologies. Integration of irrigation needs with environmental flows in rivers and broader use of water markets to improve agricultural water productivity, measured as improved yields of food and fibre whilst simultaneously improving environmental outcomes represents a further area to improve impact. The University therefore supports working with the Victorian Government on key initiatives such as enhancing the capability to value add and developing water management infrastructure and reducing evaporation from water storages.

Attracting, retaining and building skills that will help capture future opportunities

The University appreciates that attracting, retaining and building skills within the sector has been one of the greatest challenges for the industry. Academic staff and industrial personnel require business acumen. While the University is moving to include these skills within educational programs, there are two initiatives that are externally facing to increase the professional capacity from within the sector. The first is the Carlton Connect Initiative (CCI) and the second is the Centre for Workplace Leadership (CWL). The critical role the CCI is to build the food and fibre value chain, not only as a market place for its products but as a key innovation cluster, a source of thought leadership and a platform to connect with the business community. There needs to be government policy and investment to encourage early stage and venture capital support for food and fibre sector start-ups/SMEs (consider the relevance of the USDA's SBIR program) and as a means to encourage other industries to engage and support the sector (e.g. manufacturing).

By increasing Victoria's capacity to value add will attract private sector capital and jobs growth. The Centre for Workplace Leadership (CWL), which is located at the University and is currently investigating the use of High Performance Work Practices (HPWP) that could be used to 'workshop' agricultural Small and Medium Enterprises (SMEs) sector constraints to facilitate development of innovative solutions to high performance work practices. These can be applied to a range of education and training courses across the state and to translational research. The CWL has collaborated with Manufacturing Skills Australia, Dairy Australia, Family Business Australia, the Australian Advanced Manufacturing Council, Safe Work Australia, GS1, Department of Industry, Department of Employment, Victorian Department of Economic Development, Jobs, Transport and Resources, and conducted regional forums on skills and economic development in Shepparton, Geelong, Newcastle and Hobart. In addition, the Centre is examining the role of workplace leadership in the uptake of new technologies, which is pivotal to translating research into real world solutions.

The University is a strong contributor to the development and refinement of the skills of those entering and progressing through the industry. As the agricultural industry sees an increasing trend toward consolidation and faces a volatile market, the ability to run a business effectively and efficiently while demonstrating robust leadership skills are becoming more important. In order to take advantage of new technologies and international knowledge, the sector must innovate its practices in business management, an area in which the University offers both insights from research and training opportunities.

Our research and development activities are also unpinned by broad educational programs that place an emphasis on sustainable, environmental and innovative practices to future-proof succession planning. The University has comprehensive training courses that cover the continuum of education, from short courses through to post graduate qualifications with articulation potential along this continuum. In an environment of rapid change, the agricultural workforce must be skilled, flexible and appropriately scaled to meet market demand.

While chronic skilled labour shortages are endemic in the agricultural sector, the University is pleased with the new Bachelor of Agriculture degree that is the fastest growing undergraduate agriculture degree in Australia. Its new curriculum has been designed in consultation with industry so that it is optimally placed to develop the necessary skills and knowledge to address significant real-world issues in an increasingly complex and fast-moving sector. The University understands the diverse and changing needs of today's workforce and offers shorter courses such as the Graduate Certificate in Agricultural Sciences. The University is actively working to strategically engage with regional centres more effectively. Much of this endeavour will occur through the Dookie campus and the Werribee Precinct. The Dookie campus provides over 20 courses and 300 subjects to 3,500 students, and trains almost 200 research higher degree students across the Veterinary and Agricultural Sciences disciplines.

The Master of Agribusiness (now delivered as a major in the Master of Agricultural Sciences) - was specifically developed for agribusiness and agricultural professionals to further their skills and knowledge in business strategy, finance, agricultural and resource economics, entrepreneurship and the environmental issues that impact the sector. This course is a direct avenue where the University can partner with the government to develop the workforce. The Masters of Environment offers specificity that is not offered at any other Victorian universities and provides students with critical insight into environmental challenges and sector constraints. Additionally, the University of Melbourne is the only university in Victorian that offers a professional entry Veterinary Program leading to a Doctor of Veterinary Medicine.

The University has developed significant depth and breadth of experience across a range of areas relevant to the Food and Fibre sector, with particular strength in sustainable agricultural systems. It has consistently demonstrated that its degrees and curricula produce job-ready graduates, and has collaborated with both industry and government in teaching and learning to enhance alignment of its content with the demands of the sector. The new Master of Food Packaging and Innovation at the University of Melbourne is just one demonstration of how the University has worked with the Victorian Government and food and beverage conglomerate, Mondelez International, to ensure its coursework will remain relevant to industry and business needs.

Conclusion

The University of Melbourne thanks the Victorian Government for the opportunity to comment on the Food and Fibre Discussion Paper. We have deep expertise in relevant disciplines and are enthusiastic to make a meaningful contribution to the Government's Food and Fibre Strategy. We can leverage our existing capability to drive innovation, enhance productivity and build business acumen where required across the sector. The University has significant capacity to work on sustainable agricultural systems, water management, forestry, aquaculture, veterinary science, plant and animal sciences, advanced manufacturing, sustainable food packaging, innovation practice, sensory analysis, customer behaviour and marketing insights, workplace leadership, supply chain management and regulatory reform, just to name a few. Some examples to progress innovation can be through opportunities such as co-location, a strategy reference group and partnering through funding programs such as the ARC Industrial Transformation Research Program or Linkage Programs. We are keen to discuss collaborative directions to jointly leverage our resources and infrastructure and advance the Victorian Government agenda.