



THE UNIVERSITY OF
SYDNEY

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14 October 2019

Mr Rick Wilson MP
Chair
House of Representatives Standing Committee on Agriculture and Water Resources
Parliament House
Canberra ACT 2600

By email: agriculture.reps@aph.gov.au

Dear Mr Wilson,

Inquiry into growing Australian agriculture to \$100 billion by 2030

Thank you for inviting input from interested stakeholders to the House of Representatives inquiry into growing Australian agriculture to \$100 billion by 2030. We welcome the opportunity to make a submission and trust committee members will find this information useful.

The University of Sydney has a long and significant record of contribution to agricultural innovation in Australia, our region and beyond. For more than 100 years we have been a leader in agricultural research, education and partnerships; forging major advances in the productivity, safety and international reputation of Australia's agricultural products, services and systems.

The Australian environment is a challenging one for agricultural production. As an industry, Australian agriculture has found its competitive edge not in its environment but in agricultural knowledge and innovation. Working within the resource restrictions imposed by climate and geography, we have had no option but to innovate. This has led to the development of world-leading practices and technologies, which we have successfully exported around the world.

These challenges bring opportunities for Australian innovation and industry and we are pursuing multidisciplinary approaches with partners in Australia and overseas to capture such opportunities. Technology and innovation can help through both an innovation-driven increase in efficiency and productivity (see the **attachment** for opportunities and impediments as requested in the terms of reference to this inquiry) and the development of new and more attractive markets that will allow the use of limited soil and water resources to extract the greatest possible economic benefit.

We are keen to discuss both the challenges and opportunities with the Standing Committee if that would be of interest, and would be happy to host committee members together or individually for briefings and site visits tailored to their needs.

Should any further information be required from the University in regard to its response, in the first instance please do not hesitate to contact Professor Alex McBratney, Director, Sydney Institute of Agriculture, 02 8627 1010, sia.director@sydney.edu.au.

Yours sincerely,

Stephen Garton

Attachment: The University of Sydney's submission to the Inquiry



The University of Sydney's submission to the House of Representatives Standing Committee on Agriculture and Water Resources' Inquiry into growing Australian agriculture to \$100 billion by 2030, October 2019

The University of Sydney Institute of Agriculture (<https://sydney.edu.au/agriculture/>)

TOR Part I - OPPORTUNITIES for the primary production sectors realising their ambition to achieve a combined \$100 billion value of production by 2030

The University of Sydney believes that the target for growing Australian agriculture to \$100 billion by 2030 can be achieved if we pursue long-term strategies such as those outlined below.

1. Decommoditisation

Australian agriculture is predominantly geared to producing bulk commodities for world markets, with producers not being able to demand premium prices while stretching their systems to achieve a competitive advantage with negative impacts on ecosystem services and the environment.

With the advent of digital disruption, we should be able to decommoditise our whole agricultural production system, to produce high-value-add, highly-segregated products, which:

- (i) are differentiated for niche markets
- (ii) have provenance, and
- (iii) have associated positive environmental and ecosystem credentials.

This requires a whole-of-supply-chain approach to digital agriculture, from the producer to the consumer, with the latter being in Australia or overseas. Australia has made good progress on the farm-based parts of this system - particularly with smart precision agriculture, with sensors, data-analytics and robotics all starting to make an appearance now. We do not, however, have good on-farm technologies for: segregation of product based on quality, provenance characterisation, and for packaging into smaller portions or aliquots, so that the new products can be put through the new digital supply chains.

The use of distributed ledger technology will be important, so a major priority must be the creation of new, smart, sensorised food-supply chains. Moving from 10 bulk commodities to 10,000 differentiated products is more likely to deliver greater economic benefit for our limited resources. Developing smart and precision measurement and separation processes at all points along the production supply chain will allow the tracking and quality measurement of products from specified locations within a paddock, or from a specific animal to the plate. We are currently developing sensing and information technologies for plant and animal products that can achieve this.

Australia is well placed to take the lead here. Plant and animal products that are differentiated and targeted for niche markets can carry price premiums, and as the middle-class in our region continues to grow, we could aim to feed 100 million middle-class people with high-value, safe, nutritious, and targeted value-added products. To access and grow new and differentiated markets, we will need to continue to innovate and be strategic in our national approach.

2. Research priorities

Australian agriculture has always been a generator and an adopter of leading research. We need to continue to translate research from other disciplines to agriculture; particularly in genetics, synthetic biology, information science, and environmental science. This could be greatly assisted by the Research and Development Corporation (RDC) system apportioning perhaps 20% of its budget for a competitive scheme for more basic science that can be applied to agriculture, which is generic to all commodities and products.

The University of Sydney has invested in developing authentic research environments, such as our research station at Narrabri, in the heart of the wheat and cotton belt in rural north-west New South Wales. We believe that the placement of leading research and researchers in such an environment is extraordinarily effective for delivering research outcomes for producers. An example from that research station is the development of hybrid wheat, which we believe will be a gamechanger in the cereal industry in Australia, and indeed worldwide. We also aim to adapt our local research to facilitate overseas development.

3. Agricultural innovation

While there has been a reasonable investment in the Agtech sector, with associated incubators, we strongly believe that Australia should develop agricultural innovation centres which are multidisciplinary but focused on agriculture. Commercial agro-innovation parks are where research ideas can be translated to add value to agricultural production, and will produce a pipeline of graduates and researchers who can create sophisticated, sought-after, high value products and services, that can attract premium price in the market.

The University of Sydney Institute of Agriculture is committed to partnering with government and industry in new ways to produce the research required, as well as the bachelor and doctoral graduates capable of developing and leading this new approach to agriculture. We strongly support the role that the rural research and development corporations and other industry-government partnership programs play in fostering agricultural innovation. These have a critical role to play in bringing industry, universities and government research agencies together to address Australian priorities. We will also continue our strong emphasis on contributing to stability and well-being in the Asia Pacific region by working closely with our partners and communities to build the safe and sustainable food production systems that are so critical to support economic development.

4. Food security

Australian agriculture has the capacity to produce enough good quality food for 100-125 million people, allowing us to maintain a healthy export industry in addition to feeding our own growing population. The food that we do produce through decommodification should attract the highest prices. This may have implications for more general food security in the world.

Through a successful agribusiness sector, feeding into a vibrant economy, we can therefore afford to invest and utilise our agricultural knowledge and expertise to develop agriculture in the developing world; to ensure the stability and prosperity of our region. To achieve food security for Australia, we will need to develop a highly-skilled sector, with sufficient knowledge to deliver products with the appropriate quality profile.

5. Extension

The traditional model of extension via state and territory governments has fallen away, and has been replaced by commercial services. It is imperative that these services be kept up to date and be applicable to new situations. Incentivising such updating needs to be a priority for government, in particular, the training for both commercial consultants and producers in measurement technologies, including sensors, and the transformation of data generated by such technologies into information that can be used for day-to-day management of on-farm operations.

6. Educational pathways

Universities need to remodel, or at least include new pathways, in their agricultural course offerings, to reflect the exciting, challenging, complex, and multi-disciplinary nature of agriculture. There is an increasing need for translation of research from other disciplines into agriculture and for producing world class researchers within Australia. There is, however, currently a pipeline issue in attracting students from high school into university agricultural degree programs; resulting in the undersupply of graduates. We need to provide more interesting and innovative educational offerings at the university level, to attract a broad range of students to agriculture from secondary to tertiary study. Cross-discipline, school and faculty interaction would also benefit the translation of research from those disciplines, schools, and faculties. This could be partnered with diverse subject areas, in higher degree opportunities in the new Agricultural Centres.

TOR Part II - IMPEDIMENTS to the primary production sectors realising their ambition to achieve a combined \$100 billion value of production by 2030

There are many threats to the future of Australian agriculture, which may hinder our ability to achieve the \$100 billion target. These include:

1. Climate change

It may be that climate change will produce seasonal effects that reduce overall productivity or create high volatility in overall productivity. We need research to understand this effect, in order to manage climate change risk.

2. Carbon neutrality

Australia should be capable of producing an agricultural sector which is at least carbon neutral, if not carbon positive. Australian agriculture is currently carbon negative through the loss of carbon from soil and methane production from animals. If we do not redress this balance then, beside the direct climate-change effect, we will also more than likely lose some of our markets as consumers of our agricultural exports form views about Australia's credentials as a good global climate citizen, doing the right thing by other countries.

3. (Lack of) professionalisation

For Australian agriculture to succeed into the future and meet the challenges of food, water and soil security; diversity protection, and human health, it must become much more professional. We need to professionalise the whole industry - with everyone working in the sector to have a higher level of skill and knowledge than at present - and therefore government should place this as a high priority.

In order to advise and develop the farm businesses of the future, a high degree of knowledge and training will be required. Being an agriculturalist should not be seen as being any different professionally from being a veterinary scientist, a pharmacist, a lawyer, or any other skilled profession. An Australian professional college with government reinforcement to oversee this transformation is required.

4. Natural capital and ecosystem services

In a similar argument to that of carbon neutrality, any lack of quantification and reduction of natural capital and ecosystem services will be perceived negatively by consumers locally and overseas. Community investment in ecosystem service provision and natural capital appreciation is crucial to the future of Australian agriculture.