ATSE

AGRIBUSINESS

2030

2016 ATSE NATIONAL TECHNOLOGY CHALLENGES DIALOGUE

DIALOGUE SUMMARY

AN OVERVIEW OF THE ATSE NATIONAL TECHNOLOGY CHALLENGES DIALOGUE, HELD IN SYDNEY ON 15-16 JUNE 2016.

In the face of global challenges, Australia must act immediately to secure an economically, environmentally and socially sustainable future for its agribusiness sector.

In the years leading up to 2030, a focus on emerging markets and their growing middle classes will provide the Australian agribusiness sector with significant opportunities. Balanced with this is the changing landscape of consumer expectations, and the varying expectations of the clean and green credentials of Australian produce, in both domestic and international markets. Climate change, biosecurity, the role of foreign investment and issues of food security are all pivotal in shaping Australia's agricultural future.

While technology improvements are not a panacea for the challenges that the agriculture sector faces, the adoption of available and emerging technologies present many potential benefits. The Australian agricultural sector will need to embrace new science and technology to remain globally relevant, competitive and to maximise profitability. To achieve this, the agricultural workforce will need to be digitally competent with appropriate business skills, and investment will be necessary to advance the desired changes in this capital intensive industry. Consistent and clear information across the supply chain will be essential for consumers, industry (and investors) alike to confidently participate in the market.

ADOPTION OF AGRICULTURAL TECHNOLOGY

Technology developments have the potential to provide significant benefits to the agribusiness sector including reducing uncertainty, boosting productivity, lowering input and production costs and reducing environmental impacts. Automation will bring the costs of production down around the world and will change the way business models develop. Physical changes in Australian agricultural practices are already occurring. Robots, drones, satellites and fixed sensors are being used for diverse purposes including improving land and water resource management, and determining the location and health of livestock or crops. Infrastructure that allows the capture of this data and which facilitates data sharing and extraction, is essential to encourage the further uptake of these technologies. The market for data analysis, via brokers or experts in specific fields, is in its infancy, however will likely follow the lead of other sectors with a proliferation of service providers.

The current generation of producers is embracing these changes. Many innovative and potentially revolutionary technologies are commercially available and more are in the research pipeline; however adoption is limited in the sector by access to capital, the absorptive capacity of individual businesses, and access to relevant internet or satellite technologies.

Broad scale change in the agricultural sector is likely to accelerate with the coming generational changeover and will be heavily reliant on science, technology, engineering and maths combined with broader humanities and business focused skills to drive the necessary innovation. Access to infrastructure, capital and tailored programs to assist small-scale producers will assist with the facilitation of sector wide innovation.

The economic factors that will drive progress in the sector will need to incorporate the environmental and social costs associated with agribusiness, such as soil health, crop resilience, waste reduction, energy and water systems, biosecurity and end consumer information and nutrition. The sector should focus on identifying further opportunities in new and high value domestic and export markets, including agricultural equipment and technology services.

BIOTECHNOLOGY IN AGRICULTURE

Advanced precision gene editing technologies present revolutionary prospects in agriculture. Humans have used conventional breeding to introduce useful traits into plants and animals for centuries. Gene editing now allows the high precision addition, deletion or replacement of gene segments or fragments. This enables the introduction of desired genetic variants (or suppression of undesirable ones) and has the potential to improve drought and disease resistance, decrease the use of fertilisers, herbicides and pesticides, and increase nutritional profiles.

The policy and regulatory framework for agricultural biotechnology will need further development to enable the implementation of the advances in technology while respecting the concerns and values of the public. A well-formulated, principles-based regulatory framework that is informed by the complexities of agricultural biotechnology and its potentially diverse applications will be appropriate. A regulatory approach that considers the characteristics of the final product rather than the specific technology used to create it would be appropriate.

CLIMATE CHANGE

The changing climate is a major factor in all aspects of agricultural production, posing very real threats for agricultural producers. Rising global temperatures and sea levels, severe changes in rainfall patterns, more frequent extreme weather events, and land use changes will impact production across Australia. However, by proactively addressing the agricultural challenges that are predicted from climate change, Australia can help to secure local production and export this knowledge internationally.

The development of new technology solutions for the challenges of climate change will be essential to support producers' adaptation responses. Improved meteorological forecasting and better communication to producers will equip Australia's producers with the best climate outlook information available to support their decision making. This will be supported by new services, underpinned by technology improvements including advanced modelling on supercomputer systems. Big data, remote sensors and the Internet of Things have the potential to increase the accuracy of meteorological modelling, and provide real time information and insights.

CROSS-SECTORAL COLLABORATION

Developments in digital technology have enabled new ways of collaborating and sharing information. This presents a range of opportunities in improving research engagement, sharing data, streamlining regulatory processes, and developing new business models. It also presents many challenges, with issues of data ownership and security, interoperability and quality of data. A sustainable agribusiness sector will link agribusinesses, researchers, service and technology providers, consumers, investors, and government. Potentially revolutionary business models already use digital platforms to facilitate problem-solving collaborations between stakeholders.

CONSUMER ATTITUDES

Consumers are driven by complex values-based systems, which are influenced by factors such as ethics, environment, financial status, cultural background and health, which in turn determine what goods they purchase and where from. How the agricultural sector attempts to respond to consumer needs will be driven by which market they are targeting.

Health information around diseases such as diabetes and obesity is often provided in a different context to food purchasing decisions and consumption – representing a significant disconnect. Households are also increasingly seeking information relating to the provenance of the food purchased, including animal welfare. There will be opportunities to use digital technologies to track the provenance, processing, health benefits and transportation of food products and provide this information at the point of purchase. Facilitating the provision of this information to consumers will in turn provide invaluable data to the agribusiness sector.

Climate change and broad social pressures will mean that the role of nutrition in food will become more important. A greater focus on sustainable and nutritionally dense crops such as pulses may ensure global market relevance. Innovative and environmentally friendly protein sources such as insects or laboratory grown protein could perceivably disrupt the market. To maintain its social license, the agribusiness sector (along with the scientific community and decision makers) must listen to and understand broader community views and values and consider how to use new technologies in food production in ways that are socially and environmentally responsible.

AUSTRALIAN AGRIBUSINESS – THE WAY FORWARD

ATSE has identified the following key recommendations for governments, industry and other stakeholders to drive innovation and productivity as emerging from Agribusiness 2030 and subsequent consultation with stakeholders:

KEY RECOMMENDATIONS

1. Provide strong government leadership and enable innovation

1.1. Prioritise the roll-out of high speed internet access, and provide accelerated access to satellite monitoring technology, in regional and remote areas, recognising the intrinsic link between connectivity and innovation and productivity[1].

1.2. Encourage investment in research and collaboration by private and public enterprises to facilitate the ongoing development of advanced technology solutions for agribusiness and the development of emerging markets.

2. Facilitate cross-sectoral collaboration and information sharing

2.1. Support the food and agriculture Industry Growth Centre to further develop ways to enhance collaboration along the value chain among producers, researchers, governments, financial services and end-users.

2.2. Develop protocols to access digital technology and associated agricultural data that enables innovation in agribusiness and decision making in the public interest[2].

3. Advance community understanding and acceptance of agricultural technology

3.1. Undertake research into community awareness and concerns within agribusiness, particularly around technology.

3.2. Utilise the principles of behavioural economics to ensure community concerns about advanced agricultural technology are appropriately addressed via regulations, market monitoring and changing market practices.

3.3. Develop principles-based policy and regulation that enables innovation, while ensuring public confidence.

The development of advanced biotechnology applications in particular is likely to benefit from improved regulation.

3.4. Facilitate trusted information provision that responds to diverse consumer needs and enables them to make informed decisions about food purchases, utilising digital technologies. This should include information on provenance, nutrition and biotechnology.

4. Turn climate change adaptation into commercial opportunities

4.1. Harness technology solutions that enable climate change adaption, for example resource management tools and drought resistant crop technology.

5. Ensure that future generations of agribusiness professionals have the right mix of skills and experience

5.1. Ensure the agricultural sector has access to leading edge skills and knowledge to enable them to close the yield gap, address the challenges facing Australian agribusiness, and play a role in Australia's farming future.

5.2. Actively support and facilitate the development of business and enterprise skills across the agribusiness sector with, for example, mentoring programs and links to networks.

6. Develop an integrated plan for Australia's farming and food future

6.1. Develop a national plan to inform Australia's farming and food future, that considers:

- the context of domestic versus international markets, including the role of free trade agreements;
- the role of technology and opportunities for exporting agricultural technologies;
- current and future community interests;
- foreign investment in key agribusiness infrastructure;
- sustainable agribusiness developments, including products such as aquaculture, pulses and other low environmental impact, high nutrien density products;
- a sustainable future for development opportunities in Northern Australia;
- the changing climate and its impact on the environment; and
- broader socio-political issues such as food and resource scarcity.

6.2. Reinforce the link between agribusiness and the nutritional needs of consumers to prioritise a healthy Australian population.

1 Advanced digital technologies, autonomous machinery, Internet of Things devices, and big data collection and analysis will not be usable without reliable access to high speed internet.

2 Continue to ensure public data is made available through portals such as data.gov.au and that programs such as the National Collaborative Research Infrastructure Strategy, Cooperative Research Centres and the Industry Growth Centres continue. Brokers and intermediaries can mine available data in both public good and private enterprise.

THE ATSE APPROACH

ATSE advocates for a future in which technological sciences, engineering and innovation contribute significantly to Australia's social, economic and environmental wellbeing. The Academy is empowered in its mission by some 800 Fellows drawn from industry, academia, research institutes and government, who represent the brightest and the best in technological sciences and engineering in Australia. The Academy provides robust, independent and trusted evidence-based advice on technological issues of national importance. ATSE intends to progress discussion and adoption of these recommendations with key decision makers, and by continuing to focus on key themes through the ATSE Agriculture Forum.

The ATSE National Technology Challenges Dialogue 2016:

Agribusiness 2030 was held in Sydney 15 and 16 June, 2016 and attended by some 150 industry experts, policy makers and observers who considered and discussed the future of Australia's agribusiness industries.

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