Charles Sturt University

House of Representatives Standing Committee on Agriculture

Inquiry into food security in Australia

9 December 2022

Office of the Vice-Chancellor
Charles Sturt University

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Ms Meryl Swanson MP
Chair, House of Representatives Standing Committee on Agriculture
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By email: agriculture.reps@aph.gov.au

Dear Chair

Charles Sturt University welcomes this opportunity to provide a submission to the House of Representatives Standing Committee on Agriculture inquiry into food security in Australia.

Charles Sturt University is Australia's largest regional university, with more than 43,000 students and approximately 2,000 full time equivalent staff. We are a unique multi-campus institution with campuses in some of New South Wales' fastest-growing and most vibrant regional communities: in Albury-Wodonga, Bathurst, Dubbo, Goulburn, Orange, Port Macquarie and Wagga Wagga with strong connections to surrounding rural and remote communities. We also have smaller campuses and study centres located in other areas throughout rural and regional south-eastern Australia.

Charles Sturt's history in agriculture education, research, and innovation extends back almost 130 years, to the establishment of the Wagga Wagga Experimental Farm. Charles Sturt is now the largest regional university training the future agricultural, environmental and veterinary workforce: we have more than 1600 students in agriculture and environmental sciences, and almost 700 students in veterinary and animal sciences. Combined, they make up around five per cent of total enrolments. According to Department of Education data, we train more than 10% of the country's vets. We also educate students in Food Science and Nutrition who go on to work as nutritionists and dietitians in clinical settings, schools and communities. As around 75% of Charles Sturt graduates go on to work in regional areas, our contribution to the regional workforce in these fields is even more significant, as is our graduates' influence on the lives and health of regional residents, and the sustainability, productivity and profitability of regional businesses.

Our footprint extends across most of NSW's agricultural regions, and we have a long and proud track record in meeting the education, training, and research needs of regional students, communities, and employers. The new University Strategy 2030 builds on these foundations, with a focus on connecting our students with the knowledge and wisdom to shape the world; collaborating with our partners, including industry partners, on research with impact; supporting, empowering, and inspiring our staff and students; and engaging regionally and globally to drive sustainable prosperity.

Our experience, our connections with agricultural regions and business, our key role in educating the agricultural workforce, and globally recognised research strength in agricultural and environmental science mean Charles Sturt University is uniquely placed to comment on issues relating to food security in Australia.

The submission draws on the work of researchers at Charles Sturt University, including projects undertaken with industry and public sector partners. It is focused on two issues covered by the inquiry's Terms of Reference: the challenges and opportunities attached to addressing climate change, and in particular increasing biosecurity threats; and the need to ensure Australia has an agricultural and food production and

processing workforce of sufficient size, and with the necessary knowledge and skills, to ensure Australians can continue to enjoy the variety, quality, availability and affordability of food that they have come to expect.

In relation to these issues, Charles Sturt University recommends:

1. the development of a national food security strategy and action plan, as proposed by the National Farmers Federation and other stakeholders,
2. the recognition of food security as a national security issue impacting Australians' prosperity and wellbeing,
3. public and private sector investment in education and training at all levels, with a focus on training and developing the food industry workforce, and
4. public and private sector investment in research and innovation to improve food supply and security, and supply chain resilience, and with due attention on the beneficial health outcomes on ensuring affordable access to a wide variety of fresh foods.

These recommendations will require coordinated action by governments, industry, and education, training and research organisations.

Australia is, fortunately, blessed with world-class universities in major food production regions, and well-established research and innovation capabilities in universities, the CSIRO, and Rural Research and Development Corporations, all with strong links to industry and regional communities. In many respects the capacity to respond to the challenges and opportunities being considered by the inquiry already exists: what is needed is a commitment to action backed by appropriate investment.

Previous iterations of the Standing Committee on Agriculture have visited the Wagga Wagga campus in the course of previous inquiries. Current and previous members have seen first-hand the world-class teaching and research facilities available. Charles Sturt University would be pleased to welcome the Committee back to campus, and arrange for members to meet students, staff, our industry partners, and local producers and processors.

We would also be happy to provide the Committee with more information on any of the issues or initiatives mentioned here, either through a more detailed submission or by presenting evidence at a public hearing.

Yours sincerely

Professor Renée Leon PSM
Vice-Chancellor & President

Charles Sturt University submission

Key challenges: Climate change

Recent droughts, fires and floods have made clear the scale of the challenge posed by climate change to Australian agriculture, and in turn to food production, processing and distribution. More extreme weather conditions will mean not only lost and more variable production, but more difficulty in getting farm produce to processing and transport facilities, and from there to local, national and international markets.

To ensure the sustainability and profitability of our agricultural sector, Australia needs to innovate at all stages of the food supply system, including ensuring that we can continue to accrue the vital economic and political advantages that come with being a major food exporter.

While Australian is a successful exporter, recent experience has shown a worrying degree of dependency on imported inputs to national food production and distribution systems, such as fertiliser, fuel additives, pesticides and fungicides, technologies, and even packaging and pallets. Boosting domestic production of essential inputs is an important goal and should be an immediate priority, reflected in the Government's implementation of, for example, refreshed science and research priorities and the nascent National Reconstruction Fund.

Water

Water remains a key issue for Australian food production. Despite recent floods – which have underscored the fragility of some regional communities and infrastructure, we may only be a few years away from the next drought, and as a nation Australia has yet to solve the challenge of ensuring sufficient – and equitable – supply of water in drought conditions, or to provide the kind of environmental flows envisaged under the Murray Darling Basin Plan.

The recent flood crisis has, to a certain extent, deflected attention from this issue, and may bolster arguments for the construction of more dams as a way to ensure future supply. Researchers at Charles Sturt University have found that there are other alternatives that could be explored that would make better use of existing water storage infrastructure, rather than prioritising new dams. Changing regulations around water re-use, for example, would boost supply in the Sydney basin and increase long term security of supply from four years to as much as 20 years – all while reducing the drain on regional dams needed for irrigation and regional communities' needs.

Urgent attention is also needed to ensure the security and reliability of existing water supply, which is at risk from threats ranging from pollution from industrial, environmental and other sources, to cyberattack. With only 21 water reservoirs in NSW, the state's water supply is particularly vulnerable to cyberattack – as are the farmers and communities who depend on that supply. An effective response to cybersecurity threats is beyond the means and capabilities of farmers and SMEs, making the need for a systemic approach all the more important.

The response: adaptation, adoption and innovation

The Southern NSW Drought Resilience Adoption and Innovation Hub, hosted by Charles Sturt University on our Wagga Wagga campus, is dedicated to addressing the challenges and opportunities posed by climate change. One of eight Hubs established across the country by the Australian Government, with support from the Future Drought Fund, the Southern NSW Drought Hub works with the University, seven other lead members and a broad network of partners to accelerate the adoption of research, new technologies and new ideas across the Riverina. By co-designing research projects and programs with producers, the Hub helps forge a link between research and practical application. The research and development work of the Hub are complemented by education, extension and knowledge-sharing activities, such as workshops, seminars and field days, to drive up-take by farmers, who otherwise are unlikely to be aware of current research or have the confidence to implement new practices.

For example, the Southern NSW Drought Hub is part of a pilot project to demonstrate the value of track and trace data in viticulture. A collaboration between the NSW Department of Primary Industries (DPI), NSW

Wines, Wine Australia, Plant Health Australia, Onside Intelligence, as well as regional producers, processes and supply chain partners, the project involves geospatial and temporal track and trace technology to follow the movement of plants, machinery and people between properties during a simulated pest or disease incursion. By using a data intelligence platform, the project can map movements and identify locations that pose a significant risk, allowing for rapid identification of exposed or at-risk sites in the event of a real incursion, and the development of rapid, effective and efficient risk-based management responses. Protecting at risk sites in Australia provides a traceability system to maintain domestic and international access to markets for Australia's premium products

The Southern NSW Drought Resilience Adoption and Innovation Hub (and the other seven hubs) are currently funded until 30 June 2024. Renewed investment in these Hubs would ensure that they can continue to develop and apply the ideas that safeguard Australian food production and distribution networks.

The data-driven farm

Increased adoption of new technologies and better use of data will be vital to ensuring continuity of food production and supply as well as an effective national response to climate change – albeit while needing safeguards against the risks associated with cyberattack, data piracy and other threats noted above. The uptake of new monitoring technologies, as well as data gathering and analytics, would support more efficient use of inputs like water and fertiliser, especially as these resources become scarcer and more expensive. Data aggregation across multiple agritech platforms will help turn information into actionable knowledge. Charles Sturt University is leading research into new technologies in agriculture, from the use of virtual reality platforms in biosecurity and chemical safety training, to the development of smart sensors and distributed networks for farms, to innovation in the use of drones, AI and digital technologies. An example of the latter is the University's Global Digital Farm, Australia's first 'hands-free' farm and part of a new high-tech collaboration between Charles Sturt and the Food Agility Co-operative Research Centre.

While digital technologies have the potential to boost productivity, ensure food security, and improve the management of natural ecosystems, they are not yet in wide use. Nor are they well understood. The digital maturity of the agricultural sector has been described as 'ad hoc', with decision-making too often based on limited use of data. The barriers to greater adoption of digital technologies include industry leadership, industry culture, the technologies available, data and analytics, and the level of training or digital literacy of potential users.

The Global Digital Farm can help address these challenges by offering a fully integrated digital learning and research environment working within a full-scale, commercial, mixed farm operation. The project is located on Charles Sturt's 1900-hectare farm, which operates as a commercial enterprise and incorporates a range of broad acre crops (wheat, canola, barley), as well as a vineyard, cattle, and sheep. As Australia's first fully-automated commercial farm, the Global Digital Farm can demonstrate the future of farming through robotics and artificial intelligence and by creating new sustainability and carbon models to drive improvements in farming practice. It serves to showcase the future of farming through robotics and artificial intelligence, and by creating new sustainability and carbon models to drive improvements in farming practice. Many of the technologies being developed or on show at the Global Digital Farm can be adapted for use in distribution systems, providing for more resilient supply chains.

Key challenges: Biosecurity

Recent regional and local developments have highlighted the biosecurity threats to Australia's food supply, including, only this year, a varroa mite incursion and outbreaks of foot-and-mouth disease (FMD) and lumpy skin disease (LSD) in neighbouring countries. The cumulative impact of an FMD and or LSD outbreak in Australia could top $80 billion over 10 years, destroying industries, communities and livelihoods. Climate change is only increasing the magnitude of these threats, with warming conditions spreading the range of some diseases and pests, and higher rainfall increasing the likelihood, and spread, of diseases like lumpy skin.

At present, too much of Australia's response to biosecurity threats to the agricultural sector is reactive, though there are signs – with the development of the new National Biosecurity Strategy, that this is changing.

The response: boosting national and regional capabilities

Charles Sturt University is a national leader in biosecurity, with extensive capabilities that align directly with the 'Ag2030' target adopted by the National Farmers Federation and the Australian Government. The University already delivers leading education in border management through the Centre for Customs and Excise Studies, and we have long-term experience in building capabilities for front-line critical services such as the NSW Police and Ambulance services and the Australian Border Force – all programs involving partner co-design to meet industry requirements.

In a submission to the Senate Rural and Regional Affairs and Transport References Committee inquiry into adequacy of Australia's biosecurity measures and response preparedness, Charles Sturt University outlined our role in strengthening the national biosecurity detection, response and management framework through research and training. The University is home to first-rate biosecurity teaching and research facilities including:

- labs rated for research in genetically modified organisms,
- greenhouses and growth chambers providing full control over temperature, water and other conditions,
- the largest purpose-built facility in the Southern Hemisphere for studying root development (the Rhizolysimeter), and
- the Equine Isolation facility, designed for the confinement, testing and treatment of horses with a range of diseases such as Hendra virus.

The University is also home to the new Biosecurity Training Centre (BTC), funded by the Department of Agriculture, Fisheries and Forestry (DAFF). The Department describes the BTC as a 'key enabler' for *Commonwealth Biosecurity 2030* and the *Commonwealth Biosecurity Action Plan 2022*. The Centre draws on the University's experience, infrastructure and research, the Drought Hub, the AgriPark, and our sector-leading expertise in online education, to strengthen Australia's biosecurity capability by provide training to biosecurity officers across the nation. The BTC offers residential programs in Wagga Wagga and is working toward the provision of mixed mode instruction in satellite training facilities in state capitals, all of which will help build a future ready, skilled and agile biosecurity workforce for Australia and neighbouring countries.

While the initial focus of the BTC is on boosting the nation's ability to prevent biosecurity incursions, the University has begun conversations with DAFF on improving the response to and management of biosecurity threats inside Australia's borders. We are also collaborating with the Department on the framework for the National Biosecurity Committee, to help improve interactions between Commonwealth and state authorities, and on helping near neighbours in the Asia-Pacific (including Indonesia and Timor-Leste) develop their own biosecurity workforce capabilities. Stronger biosecurity capabilities across the region mean earlier detection and more cost-effective management of biosecurity threats, with clear benefits for all the countries involved.

The establishment of the BTC has already attracted interest from prospective industry partners looking to develop the capabilities of their own personnel. Industry engagement with the BTC will support its planned development into a Centre for Excellence for Biosecurity in the Asia Pacific Region by 2024, eventually providing participants with a pathway into undergraduate and postgraduate degrees. The BTC is well on track to train around 300 biosecurity staff in total by the end of 2022 and more than 400 front line border staff over the next 12 months.

Extending the work of the BTC to provide training and other services to neighbouring countries is essential. By working with farmers, processors, and transport and export firms in the Asia-Pacific region we can improve local knowledge about animal and plant diseases and other biosecurity threats, support better coordination of local management and response, and detect and deal with many threats before they reach Australia – all while improving food supply and security in the region. Charles Sturt university is already involved in ACIAR and ASEAN supported projects in South-east Asia, and has regional partnerships in place that would support the extension of biosecurity training to the region.

Key challenges: Workforce

The quality, variety and security of Australia's food supply, and our ability as a nation to respond to the challenges and opportunities discussed above all depend on one vital factor: people. The inquiry's Terms of

Reference include the labour as a key input to food production, and while true this is an issue that goes far beyond the visa conditions for backpackers and international students.

In submissions to various federal and state reviews and inquiries, Charles Sturt University has emphasised the increasingly high-tech nature of agriculture, the sector's increasing dependence on data, and the implications of these trends for agriculture and food production training, education and research. The University's Global Digital Farm, mentioned above, is an exemplar of the way the sector could develop: higher productivity and high profitability through the use of new technologies deployed by highly-skilled, tech-savvy producers,

Charles Sturt already has a major role in building the agricultural workforce and providing new knowledge to the sector, and our experience in the sector makes it clear Australia faces a significant challenge in meeting both needs. There is a national workforce shortage of around 300,000 persons in the agricultural sector, far beyond what can be met by current university production of new graduates – around 900 each year. Across the broader food production sector there are more than 400,000 unfilled jobs, including 86,000 in regional areas. This challenge is exacerbated by poor awareness among school and university students of the range of careers available in the agricultural sector, including in information and digital technologies, and by recent changes to Commonwealth funding for agriculture education which do not reflect, or meet, the actual cost of providing education in agriculture, placing many programs at risk with concomitant impact on the supply of graduates.

The situation is yet more dire at the postgraduate level, with decreasing numbers of students leading to diminished research capability and less capacity to respond to emerging challenges and opportunities – or to provide farmers, processors and consumers with the new knowledge they need.

The Minister for Agriculture, Fisheries and Forestry has established an advisory committee to look at workforce issues, but it does not include any representatives from the education and training sectors. The Australian Council of Deans of Agriculture is seeking to correct this oversight.

The response: a workforce for the future

Charles Sturt university recommends a national response to workforce challenges, involving four key actions:

1. A new approach to the teaching of agriculture (and related fields) in schools, with more on-site experience, especially in regional areas, and an updated curriculum reflecting the increasingly high-technology character of agriculture. This could be complemented by education resources on food security, biosecurity and related issues.
2. This must be matched by changes to the way Agriculture degrees are funded by the Commonwealth, as recent cuts to funding per EFTSL[1] have made many agriculture programs increasingly unviable.
3. Increased industry and public sector investment in research and especially research training, concentrated in regional (i.e. food producing) areas, and based on strong ties between producers, processors, agritech firms and universities.
4. Improving public awareness of the importance of agriculture, and particularly food security, to national prosperity and wellbeing, to regional communities, and to individual health and quality of life.

The challenge and the opportunity: food security for the nation and the region

In closing, Charles Sturt university would like to suggest that the Committee expand its consideration of food security in Australia to encompass food security in the Asia-Pacific region, and the implications of poor food security, within Australia and within the region, for national security.

As a major food exporter, Australia already has a significant role in regional (Indo-Pacific and SE Asia) food security. In addition to direct food supply via exports, there are more than 200 million people in SE Asia who are dependent on Australian research for improving their own food production and security, via programs funded by DFAT, ACIAR and other regional multilateral organisations. There is tremendous opportunity for Australia to build on these partnerships – to become the research partner of choice for developing and

[1] The Commonwealth and student contribution amounts introduced under Job-ready Graduates reduced total funding per Agriculture student from $33,541 in 2020 to $30,959 in 2021. Even with indexation, funding for each Agriculture student in 2023 is below 2020 levels, at $32,320. See: https://www.education.gov.au/higher-education-loan-program/approved-hep-information/funding-clusters-and-indexed-rates

developed countries across the region, with flow-on benefits for Australian industries. Improved partnerships with regional investors, such as development banks, USAID and equivalent European agencies, offers the change to leverage existing small initiatives into bigger programs with greater impact. The benefits for Australia are clear: stronger regional partnerships, improved food supply and security, better national and regional capabilities, and the rapid development and application of new ideas.