



**Australian
National
University**

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Committee Secretary
House Standing Committee on Industry, Science and Resources
PO Box 6021
Parliament House
Canberra ACT 2600

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Subject: Inquiry into Food and Beverage Manufacturing in Australia

Dear Committee,

Please find attached a submission from the Australia National University's Agrifood Innovation Institute regarding the House of Representatives Standing Committee on Industry, Science and Resources' inquiry into Food and Beverage Manufacturing in Australia.

Sincerely

Professor Owen Atkin
Director, Agrifood Innovation Institute



Australian
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University

Food and Beverage Manufacturing in Australia

Submission – Agrifood Innovation Institute

The Australian National University's (ANU) Agrifood Innovation Institute's (AFII) mission is to improve the profitability, sustainability and equitability of agrifood systems, aiming for transformative solutions to national and global challenges. AFII sits as the nexus of academia, industry, and government, bringing an integrated approach where diverse stakeholders come together to innovate and create a sustainable future for all. We play a crucial role in building transdisciplinary capacity and new pathways into agrifood careers.

AFII welcomes the opportunity to provide a submission to *the Inquiry into Food and Beverage Manufacturing in Australia*. Australia's food sector is rapidly evolving, embracing new technologies and finding ways to address crucial issues such as reducing food waste and limiting water consumption. Our world-class agricultural sector is a key player in this evolution, developing opportunities to make food and beverages more nutritious, tastier, safer, and cleaner while addressing the challenges of a changing climate and finite resources. Our submission will cover agrifood in general, as the agricultural and food sectors are strongly intertwined.

The Australian agrifood sector plays a critical role in meeting the food and beverage needs of Australia, while also contributing to global food security: 70% of Australian primary production is exported overseas. However, to sustain this capacity in the face of a rapidly changing climate and global geopolitical challenges, a transformational change in the way we grow, manufacture and distribute food is needed. Failure to do so would have major negative consequences in Australia and overseas.

Technology is now a critical element in food production and manufacturing, from the development of more nutritious and resilient crop varieties used in broadacre agriculture to the use of high-productivity vertical farming, allowing food growth and production of custom ingredients needed for biomanufacturing across a range of scales and locations. Start-ups and the industrial sector have already embraced this trend.

Canberra-based innovation in areas relevant to the food and beverage sector: Nourish Ingredients, Samsara Eco and Membrane Transport Engineers

Nourish Ingredients began at CSIRO, moving to ANU as a start-up when it became a member of the AFII Agrifood Hub and began collaborative research with the ANU Research School of Chemistry. Nourish Ingredients uses advances in precision fermentation to produce the potent fats needed to give alternative protein products (e.g. plant-based meats and dairy) the taste and experience that consumers want, without altering the meat-free status of the product.

Samsara Eco is a start-up that originated from the ANU Research School of Chemistry; they use enzymes to revert complex polymers into simple monomers that can be used to make new plastics without using fossil fuels, leading to a potentially truly circular process for packaging.

Membrane Transport Engineers – a current member of the AFII Agrifood Hub uses knowledge of plant transport proteins to design bespoke filtration systems capable of harvesting nutrients, metals and minerals from complex wastewater solutions – and in doing so, enable resources to be reused, recycled and repurposed.

The above are three examples of how fundamental knowledge is used to create products needed in the food and beverage sector to address complex challenges. None would have existed if it were not for Australia's cutting-edge research sector and talent. All might choose to leave Australia if the innovation ecosystem does not cater to their needs, be it regarding policy

and regulation, scale-up opportunities and investment, or fostering and growing a workforce with the required skills and knowledge.

More broadly, 302 Australian companies were registered in 2022 as being involved in food and agriculture biotechnology, according to AusBiotech¹. This category includes all organisations that develop and sell technological innovations (chemical and biological) to improve or create new processes for food, agricultural or environmental purposes. The sector is quickly growing, with increasing acceptance and/or interest from consumers². Decision-makers are also increasingly recognising the role such tools will play in our future, with 'biotechnologies' being included as a category in the [List of Critical Technologies in the National Interest](#).

As a country, Australia cannot afford to miss the opportunities this evolution of agrifood will lead to. We need to work collaboratively, bringing all players to the table, from policymakers and decision-makers to technical experts, industry and entrepreneurs, and consumers, to develop and support the sector as it evolves. Innovators – such as Nourish Ingredients and MTE – may leave if we do not build support systems, policy frameworks and clear road maps to ensure access to an environment that supports innovative culture through appropriate regulatory structures and investment in capacity development, knowledge economy and infrastructure. The Australian research sector has a crucial role to play in the current evolution of our food sector. Australian universities are recognised as global leaders with expertise and capabilities crucial for tackling complex challenges. Universities such as the Australian National University recognise that singular disciplines cannot fully address large-scale issues; because of this, the university sector has embraced interdisciplinary approaches to projects that address complex industrial, governmental and societal challenges, pooling resources across Science, Technology, Engineering and Math (STEM) and Humanities, Arts and Social Sciences (HASS) fields. STEM disciplines are often seen as the obvious fit for tackling the challenges linked to food production. However, HASS disciplines are also critical: experts trained in community and science engagement, for example, understand processes for bringing people and communities together around common values.

¹ Australian Biotechnology Sector Snapshot 2022, AusBiotech:
<https://www.ausbiotech.org/documents/item/707>

² A prosperous future: Biotech. Biotechnology opportunities for Australia and the United States, KPMG, 2023: <https://assets.kpmg.com/content/dam/kpmg/au/pdf/2023/prosperous-future-biohealth.pdf>

Initiatives to leverage HASS expertise: National Security College at ANU

The National Security College (NSC) at ANU is spearheading an initiative to leverage significant HASS expertise thanks to their Genes & Geopolitics team. The team prioritises the economic, security and sustainability dimensions of Australia's burgeoning bioengineering sector. The team operates across 3 key, interlocking areas:

- scaling up Australia's biomanufacturing capacity
- developing regional government frameworks for novel bioengineering technologies
- comprehensive public and stakeholder engagement to assess views, increase awareness and disseminate findings.

Partnering with ANU Research School of Social Sciences, the Centre for the Public Awareness of Science, and CSIRO, the team conducted the first nationwide study on public perceptions of synthetic biology. This effort aims to navigate social challenges in bio-innovations. Through collaboration with the Australian Department of Foreign Affairs and partners, the team has developed new synthetic biology frameworks tailored for the Indo-Pacific region.

Engaging stakeholders and scientific researchers nationwide, they have also formulated a strategic plan for Australia's industrial biomanufacturing. This initiative enhances Australia's HASS capacity for genetic engineering and biomanufacturing, focusing on agrifood, waste management, and sustainability issues.

AFII is a good example of Australian universities embracing the need for interdisciplinary approaches that enable complex agrifood challenges to be addressed. By building partnerships between research and industry, and using the principles of co-design, AFII is creating an environment and system that seamlessly transitions university research, capability, knowledge and outputs into impactful agrifood innovations. This collaborative effort provides opportunities to significantly advance agricultural productivity, which is crucial for future generations of farmers and consumers.

Areas of interest for the food and beverage manufacturing sector that could benefit from input from the academic sector include (among others):

- Synthetic biology and precision fermentation, developing custom-designed biological systems and sustainably manufacturing valuable, customisable ingredients at scale
- Plant molecular farming, using plants to produce valuable proteins, potentially improving agricultural productivity, and advancing sustainable manufacturing practices
- Waste management, developing processes to fully leverage value-adding by-products, either as products for human/animal consumption or as substrates to grow micro-organisms in fermentation processes
- Consumer views and behaviour, understanding perceptions and preferences regarding new technologies, such as cultivated meats, plant-based products, and precision fermentation in a shifting societal environment
- Governance, policy, and regulation, developing and evaluating frameworks as a tool to secure and maintain social licence and customer acceptance
- Strategic training and workforce development is essential to ensure the needed skills and expertise are available to support and grow agrifood industries. This will need to be employed at multiple levels; training new talent, upskilling those currently in the industry to meet emerging needs, and retraining those in aligned or complementary sectors.

Identifying and addressing future industry capability needs and challenges, enhancing industry engagement in education and training, and expanding potential career pathways in the agrifood sector will be essential.

Climate change and associated extreme weather events are impacting the agrifood sector globally. The pressure on our food systems will keep increasing. To solve long-term challenges, and address the areas of interest listed above, priorities need to be set at the national level and all stakeholders need to agree on a bold, step-change approach to have a durable positive impact on food security, health and economic well-being. This includes adopting new approaches – based on the principles of co-design – to ensure Australia’s food systems remain resilient, agile and economically viable for the coming decades.

A long-term (beyond 10 years), outcome-focused and dedicated investment model for innovation and research is needed to harness the strengths of existing systems and accelerate the delivery of priorities on a national scale. Such an approach would encourage collaboration, instead of competition, and would allow researchers, industry, government and wider society to explore opportunities in a more flexible, multidisciplinary approach. Our current medium-term investment model tends to segment and silo disciplines, restricting options and limiting outputs. To remain competitive, Australia needs to be bolder in its research and innovation investments, and in its policy and regulation development. As a country, we need to foster research-industry collaboration at a much bigger scale. An example of this is the proposal for a 10-year, \$500 million [National Initiative for Crop and Community Resilience](#) (NICCR) from ANU, the University of Adelaide, the University of Queensland and the University of Western Australia. NICCR would leverage Australia’s knowledge and experience in cutting-edge research to co-ordinate long-term interdisciplinary programs that meet the complex biological, technological, economic and societal needs of agriculture, support industries, supply chains and communities. Funding for joint, innovative projects would also help develop stronger links among sectors, with increased support for start-up development fostering a growing culture of entrepreneurship – a crucial element needed to ensure growth in the food and beverage sectors.

Looking forward, the future of the Australian food and beverage sector looks bright. However, to realise this future, we need to act to remain a leader in the Asia-Pacific region and bring all players together, from policymakers and decision-makers to technical experts, industry, entrepreneurs, and consumers. Innovation organisations like AFII, along with the wider university sector are well positioned and ready to help realise this future.