

Made and grown: the future of biotechnology and biomanufacturing in Australia

Words by Jessica Freitag

Australia stands at a pivotal moment in shaping the future of its agrifood system. How Australia collectively responds to a number of pressures, vulnerabilities and associated opportunities will shape our agrifood system for decades to come.

Multi-year droughts are affecting both the traditional crop and livestock sectors.¹ The dairy industry is grappling with changing climatic conditions, leading to an expected 30 million tonne global milk shortage by 2030.² Meanwhile, the 2024–25 avian influenza outbreaks and subsequent egg shortages demonstrated how rapidly animal disease can destabilise supply chains.³ And looking ahead, global decarbonisation efforts will expose deep dependencies within food and agricultural systems that have long relied on petrochemical inputs.

The report, *Made & Grown – The future of food biotechnology & biomanufacturing in Australia* – outlines how Australia can address these challenges by building sovereign capability in food biotechnology and biomanufacturing.⁴ It was authored by Cellular Agriculture Australia, ANU Agrifood Innovation Institute, Australian Strategic Policy Institute and ANU National Security College.

A strategic opportunity to build resilience

A resilient, sovereign, and future-proof food system is essential – not

only to drive economic growth and regional development, but also to safeguard national security. Building sovereign capability to produce and innovate domestically is essential to reduce external dependency and protect against supply disruptions.

Food biotechnologies such as precision fermentation, plant molecular farming, plant synthetic biology, and cell cultivation enable the controlled, scalable production of a range of foods and ingredients. Innovative companies are working to integrate ingredients, such as proteins, fats and flavours across the food system.

Importantly, these novel production systems are significantly less vulnerable to external environmental shocks. Furthermore, by onshoring production, shortening supply chains, and reducing exposure to volatile global markets, they can enhance food system resilience while supporting emissions-reduction goals.

Australia's position and opportunity

Food biotechnology and biomanufacturing can play a complementary role alongside Australia's existing agricultural sectors, providing powerful value-add and diversification opportunities.

Existing agricultural sectors already provide feedstock inputs for biomanufacturing – such as sugarcane for precision fermentation – whilst creating opportunities for co-located

facilities that convert raw materials into higher-value ingredients.

Biotechnology companies are also exploring how to integrate biomanufacturing within existing dairy processing infrastructure to diversify protein production and improve resilience to supply variability.⁵ These regional development opportunities can diversify revenue, create skilled regional jobs, and increase the value captured onshore for Australia's conventional agricultural industries.

At a national level, Australia is exceptionally well-positioned to capture a significant share of the food biomanufacturing market, estimated to a once-in-a-generation opportunity worth USD\$100 billion by 2040.⁶ Our highly-regarded food safety and quality standards, abundant high-quality feedstock, and world-class research capability provide strong foundations, complemented by an emerging start-up ecosystem that is advancing commercial partnerships, regulatory approvals, and progress toward cost parity. Australia has a clear opportunity to build new bio-industries that create jobs, economic growth, and new export opportunities.

What needs to happen

The *Made & Grown* report highlights that Australia is at risk of losing its early-mover advantage in food biotechnology and biomanufacturing. A lack of coordinated policy direction and limited government investment



is creating barriers to translating research into commercial outcomes. This challenge is becoming more pronounced as other leading jurisdictions, such as China, India and the United States, move swiftly to build infrastructure, incentivise private investment and embed biomanufacturing within their national priorities.

In response, the report sets out 25 recommendations to build sovereign capability and realise Australia's potential to be a global leader in food biotechnology and biomanufacturing. The challenges and opportunities in key priority areas are outlined below.

Clear national direction

A unified national vision is urgently needed to highlight the economic potential of food biotechnology and biomanufacturing and strengthen the case for public investment. The report recommends undertaking economic modelling to build the evidence base required to guide this vision and its associated investment. Alongside this, national policy frameworks should be reformed to explicitly recognise both 'made' and 'grown' food production models and their role in driving both food and national security, with the forthcoming Feeding Australia national food security strategy providing an ideal starting point. It also calls for a national bioeconomy strategy to be developed in parallel with Feeding Australia to ensure alignment, whilst firmly positioning bioeconomy investment as a national priority.

Research and technical innovation

While significant cost reductions have been achieved for biomanufactured ingredients, closing the gap to cost parity requires sustained foundational and translational research. The sector's current challenges centre around infrastructure and process optimisation, strain engineering and cell line development, and the development of food-grade inputs (eg., culture media). The report highlights the importance of dedicated R&D funding mechanisms

prioritising open-access, cross-disciplinary research in these critical areas. Encouragingly, the National Research Infrastructure Roadmap is under review, with both biomanufacturing and cellular agriculture referenced in its *Issues Paper*⁷ – potentially informing future National Collaborative Research Infrastructure Strategy (NCRIS) priorities and funding for research translation.

A future-proof regulatory system

Australia's regulatory system is robust and trusted, but under-resourced, reactive, and not adequately future-proofed to appropriately assess some novel biomanufactured products. The report advocates for additional funding for FSANZ to enable faster assessments of novel foods without compromising safety. It also calls out inconsistencies in definitions across regulators, as well as discrepancies in how FSANZ applies GM food labelling requirements to precision-fermented ingredients based on end-product type. As such, the report recommends that earmarked funding be provided to FSANZ to raise a Proposal to review and update the Australia New Zealand Food Standards Code to ensure it keeps pace with new and emerging industries and technologies.

Access to shared scale-up and commercial infrastructure

The most immediate barrier to scaling biomanufactured food products is the lack of pilot and commercial-scale infrastructure. Critically, shared facilities are scarce and expensive, and Australia currently lacks large-scale commercial manufacturing capacity. To address this bottleneck, the report advocates for government support to subsidise access to existing infrastructure, establish multi-user scale-up hubs, and align funding programs with the capital needs of early-stage biomanufacturers. The Future Made in Australia initiative could enable this, with a sector assessment recommended to identify suitable public funding

mechanisms. The \$15 billion National Reconstruction Fund is also flagged as a major opportunity for investment in scale-up and commercial facilities – but only if investment guidelines and risk tolerance appropriately support emerging industries.

A closing window of opportunity

Australia has the foundations to position itself as a global leader in food biotechnology and biomanufacturing, but we are losing ground to global competitors. Building sovereign capability will require bold action, clear national policy and catalytic investment.

If Australia acts now, emerging food biotechnologies can enhance national resilience, secure food supplies and foster a globally competitive bioeconomy.

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