Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The 2021 Roadmap used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

The development of sustainable process to mitigate the impacts associated with the extraction, processing and utilization of critical mineral should be driven by the implementation of collaborative efforts between the harnessing of biological process. Scale-up and manufacturing facilities are needed. These facilities must require the involvement of the industry sector to demonstrate the feasibility for the deployment of biological systems in mining sites and to evaluate the recovery of minerals from the effluents.

Q22.

Food and Beverage

The use of efficient bioprocesses to develop the next generation of sustainable foods and beverage is limited by the lack of scale-up and manufacturing facilities. A set of facilities where precision fermentation can be scaled-up is required. Bioreactors at different scales (100L, 1000L, 10,000L) should be available to overcome the current limitations and make these processes economically feasible. Similarly, manufacturing facilitates are needed for the growth of the industry sector, principally startups. These facilities will position Australia as a global reference for biomanufacturing. Additionally, the development of an adequate framework for the use of genetically modified organism is needed to educate the population on the advantages of these processes.

Q23.

Medical Products

The current facilities must be maintained

Q24.

Defence

The current facilities must be maintained

Q25.

Recycling and Clean Energy

The current facilities must be maintained, and additional capabilities are required to promote the collaboration across sectors to develop sustainable energies.

Q26.

Space

The current facilities must be maintained and additional capabilities are required to evaluate the performance of manufacturing condition under challenges environments

Q27.

Environment and Climate

The current facilities must be maintained and additional capabilities need to be incorporated to better understand he effects of current practised that have contributed to climate change

Q28.

Frontier Technologies and Modern Manufacturing

There is an urgent need for manufacturing facilities in the areas of precision fermentation

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.
Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

Gas fermentation has demonstrated the potential for the use of microbial systems to mitigate carbon and nitrogen emissions. In this context, there is a need for a domestic facility dedicated to developing gas fermentation process that can be coupled directly to the source of emissions

Q31.

Supporting healthy and thriving communities

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Q33.

Protecting and restoring Australia’s environment

Australia's ecosystems are unique and in risk of deterioration given the current practises in the agriculture, mining and manufacturing sectors. The use of microbial systems native to Australian soils is an emerging approach that can mitigate the impact of these practises and provide a sustainable strategy to restore the environment. In this context, the creation of a faculty focussed on the identification, isolation, and implementation of robust native microbial communities to restore the function in the soil becomes necessary.

Q34.

Building a secure and resilient nation

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.
If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

1) Bioprocesses scale-up and manufacturing facilities. There is a growing ecosystem in the biotechnology sector driven by the need of sustainable bioprocess for the manufacturing of novel food, beverages and high value molecules. While the Synthetic Biology initiatives have contributed to the development t of proof-of-concept processes which have positioned Australia a reference in that capability, the transition to successful enterprises is limited by the lack of manufacturing facilities. These new facilities will have the required infrastructure to implement a robust tech transfer and production platform for novel and sustainable products. the infrastructure requires should include a pilot plant where upstream and downstream processes can be integrated and tested with the ultimate goal to generate a product that can be commercialised. These new facilities should be operated by specialised staff with backgrounds on biotechnology, engineering, bioprocesses, life cycle analysis, downstream processing, commercialisation, among others. These new facilitates could operate in a fee for service model, and also to provide training as required by the industry sector. 2) Sustainable soil management and agriculture improvement facility. The impact generated by current soil management practices needs to be addressed and a facility where novel solution are generated are needed. This facility should rely on the current expertise and infrastructure on soil science, agriculture and systems biology to generate the next generation of soil amendments seeking to use biological systems into efficient agricultural practises that improve the health and productivity of soils.

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the 2021 Roadmap related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

- ◯ Yes
- ◯ No

Q38.

3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

This question was not displayed to the respondent.

Q39.

3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

This question was not displayed to the respondent.

Q40.

3.4 If you answered no, please indicate your (one or more) primary reasons:

This question was not displayed to the respondent.

Q41.

Part 4: Other comments

4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.

See attached file that summarised a report on Precision Fermentation

Q49.

4.2 Optional Document Attachment.
Note: Our strong preference is that answers are provided against the relevant questions in the survey. However, this file upload option is available for submissions in file format, where needed. Please ensure the document includes your name or organisation.

Precision-Fermentation-A-Future-of-Food-in-Australia-1.pdf
1.7MB
application/pdf