

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

Q22.

Food and Beverage

Emerging Research Directions: • Advanced precision agriculture integrating artificial intelligence (AI) and big data analytics to optimise yield, soil health, and sustainability. • Digital supply chains incorporating blockchain for traceability and food safety. Critical Research Infrastructure Needs: • High-throughput phenotyping platforms for livestock research. • Expanded regional data repositories and real-time remote sensing networks. Infrastructure at Risk of Becoming Obsolete: • Traditional livestock and crop breeding facilities that do not incorporate digital and genomic innovations.

Q23.

Medical Products

Q24.

Defence

Q25.

Recycling and Clean Energy

Emerging Research Directions: • Development of circular economy strategies for agricultural and regional waste streams. • Bioenergy production from agricultural waste, including anaerobic digestion and biochar technologies. • Decentralised renewable energy solutions tailored to rural and remote communities. • Photovoltaics recycling Critical Research Infrastructure Needs: • Bioenergy pilot plants for converting agricultural waste into fuels and biochar. • Advanced material recovery and recycling facilities for farm plastics and organic waste. • Smart grid and energy storage testbeds to support rural energy resilience. Infrastructure at Risk of Becoming Obsolete: • Conventional waste management facilities that do not support advanced recycling and bioenergy recovery. • Large-scale centralised power infrastructure that does not accommodate decentralised renewable energy integration.

Q26.

Space

Q27.

Environment and Climate

Emerging Research Directions: • Climate adaptation and mitigation strategies tailored to Australian agricultural and rural landscapes. • Enhanced soil carbon sequestration and biodiversity conservation techniques. • Real-time environmental monitoring using remote sensing and machine learning models. Critical Research Infrastructure Needs: • High-resolution environmental monitoring networks integrating satellite, UAV, and IoT sensors. • Climate-controlled research stations for simulating extreme weather events and their impacts on agriculture and ecosystems. • Advanced biogeochemical analysis facilities for soil and water quality assessments. Infrastructure at Risk of Becoming Obsolete: • Standalone meteorological stations without integration into broader predictive AI-driven climate models. • Basic environmental monitoring infrastructure that does not leverage remote sensing and autonomous data collection.

Q28.

Frontier Technologies and Modern Manufacturing

• Agri-tech and smart farming solutions integrating robotics, IoT, and AI. • Advanced bio-manufacturing for agricultural and medical applications. • Quantum computing Critical Research Infrastructure Needs: • Robotics and automation research hubs for precision agriculture and regional industry applications. • Bio-manufacturing and synthetic biology labs supporting next-generation agricultural inputs and therapeutics. • High-performance computing clusters dedicated to agricultural and environmental modelling. Infrastructure at Risk of Becoming Obsolete: • Traditional manual-intensive agricultural research platforms that do not integrate automation and AI. • Computing facilities with limited processing capacity for AI applications.

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

Emerging Research Directions: • Carbon-neutral agricultural practices, including methane-reducing livestock feed and regenerative farming. • Scalable carbon capture and storage solutions suitable for regional landscapes. • Development of bio-based materials and sustainable supply chains. Critical Research Infrastructure Needs: • Carbon sequestration research hubs and soil carbon testing facilities. • Renewable energy microgrid and ancillary service & technologies demonstration sites, high voltage and high current testing. • Bioprocessing facilities for sustainable bio-based material production. • Ruminant methane and GHG measurement chambers Infrastructure at Risk of Becoming Obsolete: • Fossil fuel-dependent energy research facilities. • Traditional feed and fertilizer production plants without a sustainability focus.

Q31.

Supporting healthy and thriving communities

Emerging Research Directions: • Digital health solutions tailored to rural and regional and remote populations. • Sustainable food systems that enhance nutrition and food security. • Mental health and social resilience strategies for regional communities. Critical Research Infrastructure Needs: • Telehealth and remote monitoring research platforms. • Community food security research hubs. • Behavioural and mental health research facilities integrating AI-driven analytics. Infrastructure at Risk of Becoming Obsolete: • Urban-centric health research infrastructure that lacks regional adaptability. • Traditional medical service models that do not incorporate digital health advancements and are inaccessible to people in rural and remote locations.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Emerging Research Directions: • Indigenous-led land and water management practices for conservation and sustainability. • Integration of traditional ecological knowledge with modern environmental science. • Strengthening Indigenous research leadership and participation. • Indigenous knowledge systems and data sovereignty Critical Research Infrastructure Needs: • Indigenous-led research centres focusing on knowledge systems, land, water, and biodiversity management. • Digital archives and knowledge-sharing platforms for Indigenous data sovereignty. • Expanded community-driven research collaborations and field sites. Infrastructure at Risk of Becoming Obsolete: • Research approaches that do not actively involve Indigenous leadership and knowledge. • Static knowledge repositories that do not support interactive and evolving Indigenous research contributions.

Q33.

Protecting and restoring Australia's environment

Emerging Research Directions: • Ecosystem restoration and biodiversity conservation tailored to climate change. • Advanced remote sensing and AI-driven environmental monitoring. • Sustainable water management strategies for regional resilience. Critical Research Infrastructure Needs: • Large-scale ecosystem restoration experiment sites. • AI and drone-based biodiversity monitoring infrastructure including Hyperspectral imaging. • Precision water management and conservation technology hubs. Infrastructure at Risk of Becoming Obsolete: • Manual-intensive environmental monitoring systems. • Water management infrastructure that does not integrate predictive analytics and AI.

Q34.

Building a secure and resilient nation

Emerging Research Directions: • Biosecurity innovations to protect agriculture from emerging threats. • Cybersecurity solutions for digital agriculture and rural industries. • Disaster resilience planning and response strategies. • Livestock traits and quantitative genetics to disease resistance Critical Research Infrastructure Needs: • Advanced biosecurity, quarantine, BC2 and BC3 research facilities for pathogen detection and response, vaccines and Agribiotech. • Cybersecurity labs specialising in rural and agricultural digital security. • Climate adaptation and disaster response simulation centres. Infrastructure at Risk of Becoming Obsolete: • Traditional biosecurity labs that do not integrate genomic and AI-based detection. • Legacy IT infrastructure vulnerable to cyber threats in smart farming applications.

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.

Expanded methane (and other GHG) measurement facilities for ruminants to test genetics and feed supplements' impact on livestock to reduce climate impact of agriculture in Australia and with wider use internationally. Facilities enable comparison of different feed supplement's, pastures and their impact on reducing methane and other GHG, as well as the genetic traits of lines and breeds and differences between individual animals' emissions. Australia (at UNE) already has a large facility (Beef and Sheep) in world terms, however needs expanding to accommodate research and industry need.

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.

6. Institution-Specific Training Programs: o Current Status: Universities offer tailored training programs for their research infrastructure. o Anticipated Shift: Future NRI frameworks may emphasize nationally coordinated training initiatives to ensure a standardized skill set across the research workforce. Isolated programs might be reclassified as institutional responsibilities. education.gov.au For UNE, aligning with evolving NRI definitions will involve integrating more closely with national initiatives, adopting interoperable data practices, and contributing to shared infrastructure projects that reflect the collaborative and scalable nature of future research endeavours.
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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.