

Submission

2016 National Research Infrastructure Roadmap Capability Issues Paper

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The Regional Universities Network (RUN) welcomes the opportunity to provide feedback on the 2016 National Research Infrastructure Roadmap Capability Issues Paper.

RUN's six universities (CQUniversity, Federation University Australia, Southern Cross University, University of New England, University of the Southern Queensland, University of the Sunshine Coast), all headquartered in regional Australia, perform a growing share of Australia's highly ranked research. Much of this is undertaken in close partnership with regional Australian industries and communities and also has global relevance.

The quality of our research is nationally recognised, with key disciplines ranked at the highest international standards in the Excellence in Research for Australia (ERA) assessment, including:

- Agriculture, land and farm management; animal production; crop and pasture production; forestry sciences; geochemistry; geology; oceanography; environmental science and management; soil science; ecology; and zoology;
- Human movement and sports science; nursing; complementary and alternative medicine; other medical and health sciences; psychology and cognitive science; and
- Mathematical sciences including applied mathematics; and materials engineering.

RUN universities recognise the importance of translating research outputs to benefit Australians. Much of the research we undertake is applied and is performed in close partnership with the users of the research.

National research infrastructure plays a critical part in achieving the network's aim of playing a transformative role in our regions.

Further information on RUN's research effort is available at www.run.edu.au.

Question 1: Are there other capability areas that should be considered?

RUN supports the capability areas identified in the 2016 National Infrastructure Roadmap Capability Issues Paper, but would like to identify agricultural research as an area that warrants more focus. There is some mention of agriculture and agricultural research within the capability area of “Environment and Natural Resource Management”. However, as agriculture is such a significant area of priority for the Australian economy and its regional and rural communities, it needs to be highlighted as a separate area of capability.

Agriculture is one of Australia’s key industries, with agricultural production tipped to pass \$60 billion in 2016-2017. With worldwide prices stagnating and supply plentiful in lower cost countries, Australia needs to invest in research, development and infrastructure to ensure its primary industries can remain competitive in the global market. The majority of Australian agricultural research is funded through the Rural Research and Development Corporations (RDCs). The RDCs are commodity-based organisations that are funded through statutory research and development (R&D) levies (or charges) on various commodities along with matched federal funding. As each organisation is established for a particular industry, e.g. Grains Research and Development Corporation, they are focused on challenges for their individual stakeholders and farmer groups.

The Rural R&D for Profit initiative has aimed to overcome this single commodity focus, by funding nationally coordinated, strategic research programs across the primary industries. However, this program specifically excludes the purchasing of infrastructure, major equipment or activities that could be considered part of normal business or ongoing operations, unless integral to delivery of the project. Thus, a program that is focused on the coordination and establishment of enabling agricultural infrastructure for multiple projects appears to be missing.

An example of research infrastructure in the relevant capability area would be the development of a shared dataset that was able to collate data from multiple RDC-funded projects and provide standardised access for Australian researchers. As current projects are funded independently through each RDC, they carry a number of obligations around intellectual property ownership, management, data access and commercialisation.

There needs to be coordination, and investment, at a federal level to ensure that datasets from RDC-funded projects are able to be shared across organisations. This could be managed by designing an appropriate framework to ensure that the data is accessible (with or without restrictions depending on the sensitivity) and appropriately curated to ensure benefit to the key stakeholder groups.

If funded, this database would be to the national benefit, would represent value for money as it would decrease the potential for similar projects to be funded independently across funding bodies, and increase the already strong collaboration between industry bodies, farmers and research groups.

In addition, the dataset could be housed at a regional location to demonstrate the capacity of regional areas to host significant infrastructure projects and the suitability of a shared services model in the regions.

Question 2: Are these governance characteristics appropriate and are there other factors that should be considered for optimal governance for national research infrastructure?

With respect to governance of any new shared infrastructure for agricultural research (including a shared dataset), we propose oversight by an independent body of experts, including appropriate, regional representation.

There should be an opportunity for renewal of the leadership group at least every few years.

Question 8: What principles should be applied for access to national research infrastructure, and are there situations where these should not apply?

Regional universities have a vital interest in national research infrastructure and strongly support equitable access to relevant facilities. However, there are barriers for researchers in regional locations to access facilities.

Access to physical infrastructure is an issue as researchers must cover travel costs.

RUN supports free access to the door of relevant facilities, and arrangements whereby fees are paid for research students to use the infrastructure.

The availability of useful bandwidths in parts of regional Australia to access large amounts of data remains a barrier for regional universities and their researchers.

The NBN has not yet been rolled out to many regions, and there isn't always an AARNet service in close proximity. There are still facilities and instruments, campuses and regions that are either not directly connected to AARNet, or are in locations where AARNet does not have a physical presence.

A few examples from RUN universities follow.

CQUniversity utilises AARNet for its trunk network connections, but where AARNet does not have a service in close proximity, or is not able to negotiate a carrier arrangement with a third party at a reasonable wholesale price, the university is forced to make arrangements with commercial internet service providers, usually at significantly higher unit costs and significantly lower bandwidth.

For most Queensland campuses, CQUniversity (and James Cook University), through AARNet, lease optical fibre atop the high voltage electricity transmission towers operated by Powerlink, and receive fast and scalable bandwidth and redundancy for trunk networks.

Unfortunately, several CQUniversity regional campuses in Queensland, in particular Bundaberg, do not receive adequate bandwidth, because Powerlink does not have services nearby, and AARNet is unable to source an alternative supplier of optical fibre into Bundaberg. AARNet's business model

is for its internal clients to pay upfront for capital costs; unfortunately for AARNet to run dedicated optical fibre from the nearest network breakout point in Gin Gin to Bundaberg is estimated to cost \$3-6 million.

CQUniversity has negotiated a contract with Telstra, but this is only for 100 Megabits per second, compared to 10 Gigabits per second capacity at other AARNet-operated regional Queensland campuses. This does not provide any redundancy, is one 100th the capacity of similar AARNet-provided services, whilst costing a nearly-equivalent amount (i.e. several orders of magnitude more costly on a unit-cost basis). It simply would not be possible to provision an AARNet-comparable network connection to Bundaberg at Telstra prices, and therefore Bundaberg is unable to operate at optimal effectiveness to service the needs of the local stakeholders. In particular, research in Bundaberg is severely disadvantaged by the lack of scalable, affordable bandwidth.

There are difficulties with the bandwidth at the University of the Sunshine Coast's (USC's) Gympie, Maryborough and Hervey Bay campuses. At Gympie and Hervey Bay, USC takes a high cost Telstra GWIP service at low speeds to service the campuses. Maryborough is likely to be connected via a Telstra service in the near future.

Although largely self-sustaining through membership subscriptions, and hence not dependent on ongoing National Collaborative Research Infrastructure funding, further investments in physical network infrastructure (typically fibre or reserved international link capacity) provide significant value to the research sector, by increasing the diversity (and hence reliability), capacity and reach of AARNet. Investment to address these gaps would provide ongoing, long-term returns on investment, not just to a specific institution, campus or facility, but to the nationally and internationally interconnected members of the disciplines that are active at relevant locations.

Investment in network infrastructure would also bring significant value to the communities and locations where AARNet provides connections to regional universities, campuses and facilities. It would give other research and education organisations the opportunity to connect to AARNet, encouraging regional development and boosting regional employment.