

Mallee Regional Innovation Centre

SUBMISSION

to

The Department of Agriculture

on

***Modernising the Research and Development Corporation
System***

December 2019

Executive Summary

The Mallee Regional Innovation Centre (MRIC) is an unincorporated joint venture between the parties of the University of Melbourne, La Trobe University and the Sunraysia Institute of TAFE (SuniTAFE).

Led by Centre Director, Professor Michael Stewardson (The University of Melbourne) and Co-Directors, Associate Professor Ashley Franks (La Trobe University) and David Harris (SuniTAFE), MRIC pairs in-depth knowledge from the Mallee region with the world-leading research capabilities of the University of Melbourne and La Trobe University and through the Australia's award winning large training provider 2019, SuniTAFE, the capabilities of applied research and delivery of training to address emerging skill requirements.

MRIC has staffed offices in Mildura, in the North West of Victoria. The Centre opened on the 6 May 2019 and concentrates on the focal areas of horticulture, water, energy and the environment in irrigated production and natural resource management along the Murray River in the Swan Hill Rural City Council local government area, through the Mildura Rural City Council local government area. The Centre coordinates research and development projects and delivers contracts on a user pays basis.

The purpose of the Centre is to:

Drive collaboration to promote innovation in practical research, development and adoption to address the key challenges in the Mildura and Swan Hill regions in horticulture and natural resource management.

To ensure a successful and sustainable Mallee region through innovation and collaboration, we are focused on:

- Prioritising and fast-tracking R&D projects which will strategically address the key challenges of the region in the four focal areas of horticulture, environment, energy and water;
- Seeking opportunities to foster new areas of development;
- Facilitating the commercialisation of research and development outcomes; and
- Seeking outcomes that are practical, implementable and value add to the region.

To do this we need to:

- Have strong collaborate partnerships;
- Source funding to support projects;
- Compliment established activities;
- Bring in new capabilities where required; and
- Build capability and encouraging the adoption of R&D.

This submission seeks to highlight opportunities for Research and Development Corporations to collaborate with entities like MRIC. And to show a model of collaboration that leverages in the greater research impact for the region, more specifically MRIC's involvements with the One Basin CRC and the Future Drought Fund proposal for the Centre for Drought Resilience Research.

If Australian farmers are to be able to pro-actively support the national goal of reaching \$100 billion in Agriculture by 2030, remain competitive in the global market and all the time continue their stewardship of the land and environment, they will be required to innovate in a cost-effective manner that enables long term transformation. Underlying this will be a platform of R&D.

Terms of Reference

On the 23rd of September 2019, a discussion paper was released with submissions accepted up until 20 December 2019. Advisory panel recommendations to government are noted as the first half of 2020.

To note, the discussion paper *Modernising the Research and Development Corporation System*, with particular reference to:

RDCs enable the sector and government to collectively invest in innovation.

1. Is the current RDC system delivering value for levy payers and taxpayers? In what ways?
RDCs manage and invest almost \$800 million each year in R&D and marketing. We need the most effective and efficient system for delivering this service.
2. What are some of the benefits of keeping the same number of RDCs?
3. What are some of the benefits of changing the number of RDCs?
4. What are some of the cross-sectoral issues being faced by the wider agricultural sector?
5. How can RDCs increase collaboration to ensure better investment in, and returns from, cross-sectoral, transformative and public good research?
6. What are the cultural changes necessary in RDCs to achieve a modern fit-for-purpose RDC system?
7. What other ways are there for increasing investment in cross-sectoral, transformative and public good research?
8. What is the best way for RDCs to engage with levy payers to inform investment decisions?

Further growth in R&D investment can come from the private sector, domestically and internationally.

9. How can we encourage increased investment in the RDC system from the private sector and international partners?
10. How can we form stronger linkages between the RDC system and the food value chain?
11. What changes might encourage improved RDC collaboration with the private sector, including those outside the agricultural sector?

Industry needs access to R&D that meets its needs and delivers on investment. This will reduce the time it takes to adopt new technologies.

12. Where should the balance of investment between R&D and extension lie?
13. How could RDCs play a stronger role in extension service delivery, in light of existing private and state government extension efforts?
14. How could RDCs help researchers, entrepreneurs and others better engage with producers to accelerate uptake?
15. How could industry and levy payers drive increased uptake of R&D?

Currently most RDCs are not permitted to undertake advocacy activities.

16. How might RDCs be able to increase their role in policy R&D and participate in policy debate alongside industry representative bodies?

17. If RDCs were to play a greater role in this area, how could this activity be clearly distinguished from partisan and political activity, which must remain a role for industry representative bodies?

Introduction

The Mallee Regional Innovation Centre's research and development projects will focus on tangible, value add outcomes for the region that encompasses Mildura and Swan Hill government areas and across the border.

What we do

Our role is to:

- collaborate to address the priorities and challenges of the region;
- coordinate research and development (R&D), and facilitate the dissemination, adoption and commercialisation of the results;
- investigates data insights to allow them to capture commercial opportunities;
- engage in R&D that builds excellence, improves resource management and sustainability; and
- builds capability and encourages the adoption of R&D.

We are actively encouraging and supporting innovation, extension and adoption of R&D and engage with industry, business, government and other stakeholders in the region on the issues that matter to them.

Our Vision

Our ambition for the Centre is to contribute to a successful and sustainable Mallee region through innovation and collaboration. Our *MRIC Strategic Plan 2019–2024* outlines our priorities and activities to achieve this.

Our Funders

Funding Agreement

Core funding of \$1.7 million for the Centre was announced by the Victorian State Government in the 2018/19 budget. The University of Melbourne has entered into a funding agreement for a grant that is administered through the Department of Jobs, Precincts and Regions.

Centre Agreement

The Centre partners of the University of Melbourne, La Trobe University and SuniTAFE provide cash and in-kind contributions as per the Centre Agreement.

Scholarships

The Centre is also supported through the Invergowrie Foundation. They have committed to five Invergowrie and McPherson Family Women in STEM PhD scholarships over 5 years.

User-Pay

The Centre is also engaged in User-pays activities. User-pay activities are defined with contractual agreements between one of the partner university's and the proponent wanting research undertaken.

As an enabler, the governance structure of the Centre was designed with a view of how best to support such outcomes.

Steering Board

On the Centre's Steering Board sits the representatives of all parties of the Centre.

Mallee Regional Innovation Centre Steering Board members	
Professor Mark Hargraves - Pro Vice Chancellor (Research Partnerships and External Relations)	Professor Susan Dobbs Deputy Vice-Chancellor (Research and Industry Engagement)
Peter Forbes (Manager Regional Planning and Coordinated, Regional Development Victoria)	Geoff Dea (Chief Executive Officer, SuniTAFE)
Professor Mike Stewardson (MRIC Director, University of Melbourne)	Associate Professor Ashley Franks (Co-Director La Trobe University)
David Harris (Co-Director SuniTAFE)	

Strategic Advisory Panel

Underneath the Steering Board, the Centre is supported by the Strategic Advisory Panel (SAP) who assist in setting the direction for research and development projects that address the challenges and priorities of the region.

The panel is comprised of key regional leaders from a cross section of industry, who individually and as a group bring a depth of expertise and knowledge to the Centre for the betterment of the region.

Mallee Regional Innovation Centre Strategic Advisory Panel Members	
Leonie Burrows (Chair)	Ross Lake (Chair Integrated Water Management)
Ferdi Bergamin (Development Manager, Mildura Fruit Company)	Anne Mansell (CEO Dried Fruits Australia)
Anthony Couroupis (Managing Director, Lower Murray Water)	Peter O'Donnell (Executive Director, Southern Cross Farms)
Jenny Collins (CEO, Mallee Catchment Management Authority)	Stefano de Pieri (Board Member of Mildura Regional Development)
Paul Dillon (CEO, Mallee Rising)	Patrick Timmons (Executive Officer, Rural Financial Counselling Service, Victoria North West)

Academic Panel

The Centre has an Academic Panel which comprised of academics from both the University of Melbourne and La Trobe University and is coordinated and facilitated by the Centre's Innovation Fellow Matthew Toulmin. The academics provide a pivotal testing mechanism when furthering research ideas. The academics can themselves become involved in the Centre's place-based projects or be key to identifying suitable academic expertise from within each of the Universities.

Within the panel there are two levels of engagement of key researchers. The first tier of the Academic Panel is a group of highly interested researchers, who are the first line of contact within the two universities. These academics may choose to engage with projects themselves or act as a conduit into the second tier, the wider sphere of academics within each University.

This second larger tier of researchers is able to review research challenges presented and to provide advice and contacts in response to the key issues that are identified. This approach ensures that we are

able to draw upon research capability from across a wide sphere of researchers as possible. There are ad-hoc teams that target particular projects but who don't have to commit ongoing resources to the Centre.

Academic Panel Members	
University of Melbourne	La Trobe University
Professor Mike Stewardson	Associate Professor Ashley Franks
Professor QJ Wang	Professor Robert Ross
Professor Pablo Zarco-Tejada	Professor Steve Petrovski
Associate Professor Angus Webb	Professor Nick Bond
Professor Andrew Western	Dr Evelien Spelten
Professor Peter Scales	Dr Timothy Clune
Professor Chris Manzie	Dr John Cooke
Professor Ruth Nettle	Professor Aniruddha Desai
Professor Pierluigi Mancarella	
Professor Behzad Rismanchi	

Reference Panel and PhD's

The Centre also activates an informal Reference Panel that is used as a first point of call for testing ideas.

The Centre will also bring early career researchers to the region who will undertake their PhD candidature and where appropriate, other students to work on problems and challenges that are identified in the region.

Innovation Scales

The Mallee region (Mildura and Swan Hill) score very poorly on innovation scales ((in)sight Innovation in Regional Australia, Spreading the Ideas Boom, 2016, p6). Indicators of innovation include patents, trademarks and research. Research is key to challenging how our region is viewed externally and how desirable it is seen as a location of choice for business and industry development. One of the goals of the Centre is to challenge how the region is viewed externally through an innovation lens. Critical to this will be engaging with RDC's.

Availability of Funds

RDC's have a tendency to allocate levy payers funds for projects that then lock the money in for a number of years ahead. This doesn't easily allow for levy payers to be reactive to new and emerging needs.

Cross Sector Research

The Centre is not focused on a single industry or sector. As with the four focal areas of the Centre (water, energy, horticulture and the environment), there are many cross overs between them all, to the point of success relies on a combination of sectors that have cross overs. A prime example is horticulture. Industries like table grapes, almonds and citrus can together face similar, if not same issues. Examples include challenges regarding water and energy. These modern-day convergences mean that there needs to be avenues either through RDC's or other funding bodies to allow for cross sector research and development work.

Region Specific

To take this a step further, there are cross sector regional matters that can be investigated in a place

base setting. Some challenges and opportunities for agriculture are not only shared across industries, but often these are specific to a region, or at least solutions are best targeted through regional programs.

Regional R&D partnerships can also be networked across the country, so they learn and benefit from synergies, however strong regional ownership is critical.

Place-based research and development allows for showcasing of development and milestones of research projects, but also outcomes, access to on the ground researchers and champions of new or emerging techniques. With all these elements in place, the increase in adoption is greater.

This is particularly the case for natural resources management including access to water, energy and land as well as interactions with ecosystems at a landscape scale.

It can also be the case for issues of workforce, skills and critical infrastructure to support supply chains.

The RDC system does not respond well to these needs because they require cross-industry collaboration and geographic focus, which are counter to the prioritization of industry specific and national RDC programs.

The agricultural sector already invest in R&D through the RDC levies so are reluctant to pay again for such regional research. Some mechanism is needed to support this type of R&D capacity in regional area. MRIC shows what is possible but efforts will be limited in their success under current RDC model.

Climate Adaption

Climate adaption and preparation is not only key but a necessity for farmers, as they need to understand and possibly transition into new techniques to become sustainable in what will rapidly become a sector that faces increased variability and volatility, digital disruption, disruption from new players, increased competition for natural resources, increasing consumer expectation and food demands.

In the CSIRO Climate Projections 2019, Mildura is predicted by the 2050's to have a climate more like the current climate of Menindee (NSW) and Swan Hill more like Balranald (NSW). Farmers need to prepare now for the future.

Technology

Digital technology, including automation, will play a significant role and farmers need to be ready to adapt. However, many farmers are time poor and are unlikely to spend funds or time to change practices without some 'proof', of the benefit to their operations.

Again, this is where place-based research is critical. The first two questions any farmer is likely to ask about a new initiative is *How much will it cost me? And much will it make me?* And although farmers can be amongst the most prudent business people, like any industry, they need to be supported through change.

Sustainability

The agriculture industry needs to attract and retain workforce. This includes strengthening generational diversity. Part of this is challenging the perception for the wider community of what a career in agriculture looks like. Outcomes of R&D provide opportunities to engage and interest younger generations and influence their decision making on a career in agriculture, and also influence those around them that support their decision making.

How we work - Innovation Framework

MRIC views innovation as a commitment to develop and implement more effective processes, products and ideas to deliver improved outcomes. Innovation should be an in-built part of every organisation, with its culture driving innovative thinking and creative problem solving.

MRIC's innovation framework makes visible the role of the Centre in supporting innovation in the two primary domains and how it operates as an engaged actor for innovation in the region. The framework

provides a mechanism for focusing resources toward innovation outcomes and provides a robust structure against which to monitor outcomes.

Innovation Theory

Innovation is a process through which there is development and implementation of more effective processes, products and new ideas, technologies or processes to deliver improved value outcomes in society, whether economic, social or value for the environment. Innovation requires technological, social, economic and institutional change.

The innovation framework outlined here is based on open-innovation thinking and co-innovation. This approach recognises that innovation cannot be progressed by one organisation alone, but only through purposeful and collaborative efforts to align people, resources and actions toward an innovation outcome. In this view of innovation, research is a capacity for innovation not the driver, and the focus is on the institutional arrangements, resources, and social processes including social capital that can bring this capacity to support innovation outcomes.

Regional Innovation Systems Thinking

MRIC is based on a “Regional innovation systems-thinking” in recognition that national approaches to support innovation, rely on regional or local systems of knowledge, resources and capacity. By contrast, Regional Innovation Clusters involve firms and other innovation actors at a regional scale working together to access novel knowledge and generate innovation.

MRIC is representative of a regional innovation cluster. A physical and virtual place for interaction amongst local stakeholders to discuss, decide, plan and enact innovation through combining resources, focusing effort and leveraging capability. The Centre is organised to work with the stakeholders, resources and capacity in the region including strong private sector involvement and seeks to leverage this in conjunction with resources and capability from regional, state, national and international actors.

A key feature of the Centre is the prominence of the two universities. MRIC is a relationship broker between those requiring research and the universities. In an innovation system context, this is described as a capacity to co-innovate and requires:

- Skills and competencies that cover science, technology and innovation management practice
- Linkages between producers and users of knowledge
- Relationships and the institutional setting conducive to knowledge sharing and interactive
- Learning
- Flexibility in working habits and institutions that allows dynamic and rapid responses to changing circumstances
- Facilitative and transformational leadership styles, in managing stakeholder divides and in the negotiation of place-based rural innovation
- Governance arrangements that support emergent practice and collaboration
- Presence of brokerage/intermediation roles and stimulating networks of actors
- Supporting new ways of working

MRIC operates both as a provider of innovation capacity (science, education, resources) and as an innovation intermediary. The intermediary role is “an organisation or body that acts as an agent or broker in any aspect of the innovation process between two or more parties”. So, Intermediaries are defined by what they do or which roles they perform rather than by their characteristics. In MRIC, this includes facilitation of the processes to support innovation capacity listed above.

Innovation framework MRIC’s capacity to co-innovate and its intermediary role provide the design

principles or framework for the operation of MRIC (Table 1).

Table 1

Regional cluster co-innovation principle	Put into practice through...	Resulting in ...
Collaborative leadership and governance (Institutional arrangements)	Strategic Advisory Panel	Joint ownership of the vision and mission for the initiative in the region.
Innovation facilitation/brokering	MRIC staff/Reference Panel/Academic Panel	Network creation, capacity building and quicker establishment of project teams.
Activity is focused on priority needs for business/region	Project Working Groups facilitated and supported effectively.	Application of best practice innovation processes
Strong business/private sector involvement	Project Working Groups seek Co-investment Project Working Groups establish an engagement plan for business owners and stakeholders.	Targeted initiatives with a high chance of success
Co-innovation support initiatives	Project Working Groups deploy design thinking and participatory processes to focus on adoption/R&D translation/ successful innovation. Include 'end-users' and all actors with a stake in the innovation. Mobilising science-based R&D.	Adoption and translation challenges identified early and efforts to address them initiated in parallel to R&D.

Partnership and collaboration for innovation

The Mallee Regional Innovation Centre has worked closely with a range of stakeholders to form collaborative partnerships that facilitate the pursuit of R&D projects. This includes the Victorian State Government who have committed through a grant of \$1.7 million to the establish of the Centre.

The Centre also engages with local governments (Mildura Rural City Council, Swan Hill Rural City Council and Wentworth Shire Council), statutory authorities (Lower Murray Water, the Victorian Mallee Catchment Management Authority and the New South Wales Land Management Services), industry peak bodies (Almond Board of Australia, Australian Table Grape Association, Citrus Australia, Dried Fruits Australia, Murray Valley Winegrowers Association) and other regional recognized organisations (Mildura Regional Development).

Critical Mass of Agencies

Mildura is a critical hub for federal and state government agencies and departments and other key stakeholder organisations, with staffed offices to open next year for the Inspector-General Murray-Darling Basin Water Resources, the Murray Darling Basin Authority and Hort Innovation to have a physical presence in the region.

Complementary to that, the region is already home to staffed offices for the Mallee Catchment Management Authority, Commonwealth Environmental Water Office, Agriculture Victoria, Parks Victoria, Lower Murray Water, Western Murray Irrigation, Regional Development Victoria, New South Wales Department of Primary Industry, ALTA (Analytical Laboratories and Technical Services Australia), Bird Life Australia, Trust for Nature and Sunrise21 Mapping and Research.

The region is also home to the SuniTAFE SMART Farm and the CSIRO have a presence through the Koorlong Field Station.

Industry knowledge and expertise is further enriched in the region by the presence of these organisations. The relationship the Centre has built and will continue to build with these stakeholders will enhance the ability to undertake key R&D in the region.

Projects

The Centre is engaged in and supporting R&D projects in region. This includes projects of automation of pruning, collection of hyperspectral data via a plane to investigate nutrient, water or disease stresses, investigation into the use of hydrogen in the region and the One Basin CRC and Future Drought Fund proposal for the Centre for Drought Resilience Research.

One Basin CRC bid and Future Drought Fund

MRIC has joined the One Basin Partnership in support of the One Basin CRC bid and submission to the Future Drought Fund to support the drought resilience of Australian farms and communities through the proposal of the Centre of Drought Resilience Research.

The Centre understands the value of collaboration and the power of the collective in achieving outcomes for our region by joining with other entities. It enables cross sector, cross region R&S and interaction. There is also enormous value in leveraging not only financially for projects, but through the access to wide and varied research skills of such consortiums.

PhD Program

The Centre is in the early stages of supporting what is expected to be a strong cohort of PhD candidatures, that will grow as the Centre's research and development program expands. Currently the Centre has 3 PhD's undertaking research in the region, with another three expected to be in place by mid-2020. One of these three for 2020 will be a PhD that will use the Mallee Regional Innovation Centre as a case study in the context of investigation into regional innovation clusters.

The current PhD's are investigating:

- the *Impact of Flow Regulation and Environmental Watering on Phytoplankton Dynamics in Hattah Lake System* (Looking to determine when it is necessary to control phytoplankton growth to prevent algal blooms),
- assessing the Contribution of Solar-Induced Fluorescence (SIF) on the Estimation of Nitrogen Status in Orchards, and
- interacting effects of environmental flows and climate change on vegetation of a floodplain lake system at Hattah Lakes.

Key Data from the Region

In 2018/2019 the total export value for almonds was reported as \$552 million ⁽¹⁾ (65% Victoria & 24% South Australia) and for over \$500 million for table grapes ⁽²⁾. The horticultural in the region is supporting the national goal of \$100 billion of horticulture by 2030. However, water and climate considerations will challenge the agriculture industries ability to sustain this growth as they grapple with availability, increase local water demands due to increased evapo-transpiration, increase water prices due increased demands, increased heat stress on crops due to increased temperatures and increase the frequency and intensity of extreme events.

As noted in the 2018 Mallee Crop Report by the Mallee CMA –

The main crops, in order of dominance in the Mallee catchment are as follows:

- *almonds; 24,485 hectares (30% of the irrigable area) predominantly grown in the Boundary Bend and Wemen river reaches;*
- *table grapes; 8,965 hectares (11% of the irrigable area) predominantly grown in the Robinvale and Mildura irrigation districts;*

- wine grapes; 8,050 hectares (10% of the irrigable area) predominantly grown in the Colignan to Koorlong river reach and the Red Cliffs irrigation district;
- field crops; 5,685 hectares (7% of the irrigable area) predominantly grown in the Nyah and Boundary Bend river reaches;
- citrus; 4,135 hectares (5% of the irrigable area) predominantly grown in the Colignan to Koorlong river reach;
- olives; 3,815 hectares (5% of the irrigable area) predominantly grown in the Boundary Bend river reach;
- potatoes; 3,410 hectares (4% of the irrigable area) predominantly grown in the Boundary Bend river reach and the Murrayville Groundwater Management Area;
- dried grapes; 3,145 hectares (4% of the irrigable area) predominantly grown in the Colignan to Koorlong river reach and the Mildura and Merbein irrigation districts;
- and vegetables other than carrots and potatoes, 2,685 hectares (3% of the irrigable area) predominantly grown in the Wemen and Colignan river reaches.

2018 Mallee Crop Report by the Mallee CMA, p.7

The region is also home to conservation and natural environments of nature conservations and protected areas. The federal government has committed funds of \$29 million for the Victorian Murray Flood Plain Restoration project, which has seven sites for implementation within the region with an estimated total construction cost of over \$300 million.

The region natural assets are significant for attraction of tourists and cultural significance. In November 2019 the office of the First Peoples of the Milewa-Mallee opened in Mildura.

Further to the challenges of water, the region is challenged by low rain fall, water availability, water deliverability, climate change impact, regulatory framework and access to technical data of the region.

The region is also particularly vulnerable to climate change due and impacts of this are likely to be felt across the region most significantly in the coming decade as the region learns to adapt and change to its new environment.

The Mallee Climate Projections

The CSIRO has released the Mallee Climate Projections 2019 and they state that:

- by the 2050s, the climate of Mildura could be more like the current climate of Menindee, New South Wales, and Swan Hill more like Balranald, New South Wales
- by the 2030s, increases in daily maximum temperature of 0.8 to 1.6°C (since the 1990s) are expected.

Rainfall will continue to be very variable over time, but over the long term it is expected to continue to decline in winter and spring (medium to high confidence), and autumn (low to medium confidence), but with some chance of little change.

Maximum and minimum daily temperatures will continue to increase over this century (very high confidence).

Closing Statement

The Centre believes that the R&D system is critical to supporting the next wave of innovation that will assist our farmers to stay at the forefront of agriculture domestically and internationally. Agriculture needs to be future ready now. If farmers are to work towards growing agriculture to \$100 billion industry by 2030, much more is needed to be done to support them.

As an enabler to this, it means new and different ways of delivering funding for projects outside of the current RDC model.

Innovation will be key the future of agriculture. We must foster and development innovation and

research. Like any good business model, you must review, update and change with the times.

As noted in the discussion paper, climate and water risk have transformed the environment that not only RDC's operate in but the wider agriculture sector of farmers, service industries, supply chains and now too the boards that govern industry. For our farmers to have real and profitable gains, we need to be working hand in hand with them, with projects that they will be able to see will make a real impact in their operations. This in essence means as a nation we need to be spending more on R&D to ensure we remain competitive and viable.

The framework of the Centre and our activities allow us to have feet on the ground, drive collaboration and participation, all with the outcome of having better and improved adoption of R&D. It is an aspiring example of how to engage with farmers of all sizes (small and large) and business across a region, in cross-industry challenges and priorities. The Mallee Regional Innovation Centre showcases an alternative model but also illustrates the funding challenge.

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