



20/21

# ANNUAL REPORT

Enabling the economic development of Northern Australia.



The CRCNA acknowledges the support of its government partners.



The CRCNA recognises the continuing connection to Country of Australia's First Nations peoples and we acknowledge the Traditional Custodians of the land and water on which our staff and researchers live and work. We pay our respects to their Elders past, present and emerging.

The CRCNA also acknowledges the work of our project participants and researchers who have supported the delivery of this report through their research activities and outputs.

DISCLAIMER

This report summarises the research activities and achievements of the Cooperative Research Centre for Developing Northern Australia (CRCNA), up until and including 30 June 2021.

It is possible figures and project participants may change from the time this document was written and published. Current information about the CRCNA and our projects is available at www.crcna.com.au.

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## MINISTER FOR AGRICULTURE AND NORTHERN AUSTRALIA

Hon. David Littleproud MP

I am delighted to have the opportunity to introduce the Cooperative Research Centre for Developing Northern Australia's (CRCNA) 2020/21 Annual Report.



In 2015, the Federal Government committed \$75 million over ten years towards the CRCNA and tasked it to work with industry to resolve long-standing impediments to the economic development of the north – creating prosperity through the delivery of new jobs, attracting new investment and helping more people in the north live long and healthy lives.

To date, the CRCNA has invested \$20 million in more than 53 research and development ventures across Australia, including 18 in 2020/21 alone. A significant milestone for the CRCNA in 2020 was the State of the North report, which brought together the findings and recommendations of the past two years' worth of sector situational analyses to deliver a strong platform for future investment planning and prioritisation.

I am pleased to see genuine collaboration with Indigenous enterprises to expand agriculture, aquaculture and forestry projects. These projects demonstrate our commitment to operationalising the Northern Australia Indigenous Development Accord, signed by the Prime Minister and Queensland, Northern Territory and Western Australia First Ministers.

I congratulate the CRCNA on their efforts so far and look forward to working with them in 2021 and beyond. It is important that the CRCNA's outcomes are not left on shelf, but are operationalised to deliver meaningful change for the north. For too long we have talked about the north's opportunity and potential.

The CRCNA's research gives us the evidence to inform where and how to focus investments to achieve a transformative effect and unlock that potential.

We must make the north a place where more people want to live, work, and invest, because that is where the exponential growth of our nation will come from.

*David Littleproud*

MP



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## CHAIR'S REPORT SHERIDEN MORRIS

2020/21 has been a pivotal year for the CRCNA. We have completed our suite of foundational sectoral analyses and delivered our State of the North 2020 report. Our State of the North report identified the priority areas for the CRCNA's future investment and planning and has informed the Board's vision for the future direction of our CRC.



Our State of the North report concluded that Northern Australia is generally an under-planned, highly contested and 'risky' landscape. As a result, 2020/21 has seen us boost our investment in research collaborations focusing on agricultural decision-making processes, de-risking and investment mobilisation. Our work with the northern jurisdictions on de-risking Northern Australia, has been further supported by our collaboration with the six National Environmental Science Program (NESP) hubs to develop a guide for best-practice integrated environmental assessment (IEA) in Australia culminated in a Northern Australia case-study being developed. As a knowledge broker for the north, the CRCNA prides itself on our ability to work across northern jurisdictions and agencies to deliver important work such as this. Moving forward, we will continue to work with our State and Territory partners to implement the recommendations of this first phase of de-risking work, including expanding our connection with the NESP.

I am personally very passionate about the need to work with governments to improve decision-making flows and processes to de-risk the north's investment landscape and attract the quality investment that is needed to actualise the northern development dream. Sustainable economic growth will only become a reality if there is an aligned strategy across the north's key agencies including the CRCNA, the Office of Northern Australia (ONA), the

Northern Australia Infrastructure Facility (NAIF) and the Indigenous Reference Group (IRG).

Our efforts in understanding and delivering our de-risking work has seen the CRCNA emerge this past year with a clear mandate to deliver transformative R&D across Northern Australia. I am proud to report we made significant progress in re-aligning the focus on the developing Northern Australia agenda in 2020/21. At the centre of this alignment has been the CRCNA Board's decision to connect with and commit to strengthening our relationship with the IRG. During a meeting in March 2021, we took steps to formalise this arrangement through the development of a program of works focused on activating the Indigenous Estate across Northern Australia. We expect to announce this program later in 2021.

We have also made significant investments in health this financial year, committing \$1.8 million towards new health projects focused on delivering new models of care and planning for Northern Australia and novel treatments for Type 2 diabetes. Looking ahead, we will continue to invest in new approaches to delivering health services and models of care across Northern Australia, because we know, the long-term resilience and success of the north depends on having healthy communities with access to quality healthcare services.

As the CRCNA worked to build momentum and excitement around the northern development agenda during 2020/21, the Board took the position that we needed to re-align our internal operations to strengthen our future development and deliver better outcomes for our stakeholders. As such, the Board commissioned an operational review in late 2020. A key recommendation from this review was to separate the company's strategic operations from our day-to-day business operations. Following this restructure, our inaugural Chief Executive Officer Jed Matz decided to leave the CRCNA. Jed and I worked very closely in the early stages of the CRCNA and I thank him for his hard work, commitment and passion for Northern Australia. His work establishing the CRCNA means our new Chief Executive Officer, Anne Stünzner, has a solid foundation from which to grow the organisation.

In 2020/21, the CRCNA held elections for two Director positions however due to the high calibre of applicants with additional skills, and in recognition of the need for gender diversity, we made the decision to appoint a third

Director to the Board, bringing the total number of Board members to seven. I welcome Ricky Archer's reappointment to the position of Director and welcome and our two new Directors, Brendon Douglas and Rebecca Mohr-Bell.

At our last Annual General Meeting, the Board and members also approved 17 amendments to the CRCNA's Constitution. Most notably, changes have been made to allow non-members to nominate for positions on the Board, although non-members still require an endorsement from an existing financial member.

I would like to thank my Board and CRCNA staff for their dedication and drive to deliver for Northern Australia and I look forward to another successful year in 2021/22.

*Sheriden Morris*  
CRCNA CHAIR





## CEO'S REPORT ANNE STÜNZNER

The CRCNA is focused on delivering research which resolves industry challenges through the development and trialling of new technologies, systems and processes. By overcoming identified challenges and providing research based, innovative industry-led solutions, the CRCNA will enable the economic development of Northern Australia.



In our fourth year of operating, we have made significant progress against our strategic objectives. Since the CRCNA started in 2017, we have invested \$20 million towards 53 projects with more than 200 domestic and international research participants. These numbers demonstrate our commitment to maximising our initial \$75 million investment from the Australian Government and delivering benefit back to the Australian tax-payer.

Our third open funding call held in August 2020, attracted 76 submissions and during the 2020/21 financial year, we invested \$7.9 million in 18 new research collaborations. Over the past year, our project leads have engaged with hundreds of stakeholders through webinars, field days, workshops, conferences, and presentations. This level of engagement is at the heart of industry-driven R&D and is crucial to the successful adoption and implementation of research findings.

In November 2020, we delivered a significant milestone with the publication of our State of the North 2020 report at the Developing Northern Australia conference in Rockhampton. Our State of the North report was the culmination of our first three years of R&D investment and demonstrated why Northern Australia has the potential to deliver sustainable, long-term economic development opportunities. Delivering against the report's

recommendations will continue to inform and guide our research investments into the future.

This year we have worked to progress the report's recommendations from our sectoral situational analyses, including work with James Cook University to identify the skills of the north's future aquaculturalists – an important project given our aquaculture situational analysis identified more than 2,500 new jobs will be created as the industry continues to deliver. This opportunity was on show in May 2021, when I attended our Tropical Rock Lobster project launch in Broome. This R&D collaboration, co-funded by the Fisheries Research and Development Corporation (FRDC) and led by Ornatas will be a truly transformative project for Northern Australia. Ornatas and their partners, have an ambitious goal to grow a \$160 million per annum industry for the north, delivering jobs and real economic opportunity for the First Nations communities they will work alongside. This project is another example of the huge potential of the north's aquaculture sector and demonstrates the CRCNA's ongoing commitment to supporting new and emerging industries across the north.

A powerful impact from the CRCNA's investment to date, is the generation of jobs and training opportunities. Our work with the Menzies School of Health Research to identify native foods as new medicines initially engaged two First

Nations trainees at the start of the project. After 12-months, these trainees progressed into undergraduate studies and continuing part-time employment within the division at the Menzies School of Health Research in Darwin. The program also provided short-term laboratory and field training activities to other Indigenous and non-Indigenous trainees and supported two PhD and two Honours students through the School of Chemistry and Molecular Biosciences at The University of Queensland.

Our partnership with the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) also saw five local First Nations staff and contractors employed to support workshops in community and four new practical partnerships were activated during the life of the project.

In the health space, we continue to invest in collaborations which tackle the challenges identified in our health situational analysis, such as information and funding silos and a lack of integrated, place-based planning. By investing in projects testing new ways of delivering healthcare, the CRCNA can play a significant role in helping reduce the cost burden of delivering care to Northern Australians. Further, our telehealth project with Simbani Integrated Research and our remote eye-screening project with CSIRO are also proving how effective these new ways of delivering healthcare can be in terms of better patient outcomes and generating local employment and empowerment opportunities.

The year ahead will open new opportunities for the CRCNA to continue to invest in quality R&D collaborations and to work with industry and governments to enable the north's economic development. We are continuing to build on our foundational work, and with the Board, we have strengthened our focus into four main economic drivers for Northern Australia. These include water security and sustainability, activating the Indigenous estate, policy harmonisation, and enabling infrastructure.

These drivers are supported by critical themes of work to operationalise longer-term investment commitment and outcomes as identified by the State of the North report and the preceding recommendations from our R&D collaborations. These themes include the identification of several large packages of work including:

- A Northern Australia Health Alliance
- Building a farming system around cotton, cropping and cattle industries in northern Western Australia, the Northern Territory and Queensland
- Place-based implementation of the Indigenous Reference Group Accord

- A Northern Australian University Alliance with Charles Darwin University, James Cook University and Central Queensland University around making water work in the north
- Partnering with Infrastructure Australia to identify the key enabling infrastructure requirements across the north to underpin a sustainable investment platform unique to Northern Australia.

These new themes of work build on our existing significant investment of \$2.7 million towards progressing phase two of our de-risking agricultural development work, with projects under development in Queensland, Northern Territory and Western Australia. Our investment pipeline also includes substantial investment in aquaculture research and development partnerships, supply chain analyses and sugarcane industry investment.

In addition to delivering new R&D projects, the CRCNA has also focused on strengthening our networks across the north. We continue to meet regularly with the Office of Northern Australia and the Northern Australia Infrastructure Facility (NAIF), Infrastructure Australia, the Indigenous Reference Group (IRG), and work closely with the jurisdictions to share information and knowledge about emerging programs of work across the north.

I would like to acknowledge the work of my predecessor, Jed Matz, for his work in establishing the CRCNA and delivering a strong foundation of research for us to build on. I would like to thank the CRCNA Board, Chair Sheridan Morris, our Chief Scientist Professor Allan Dale and importantly, CRCNA staff for welcoming me as the new CEO. I look forward to an exciting year ahead.

*Anne Stünzner*

CRCNA CEO



## ABOUT THE CRCNA

### Our objective

“De-risk the development landscape and enable the sustainable economic growth of Northern Australia.”

The CRCNA is funded through the Australian Government’s Cooperative Research Centre Program (CRC-P). We bring together industry, research organisations, all northern jurisdictions and international partners in a collaborative, industry-led research and development venture. Our R&D partnerships deliver real-world outcomes and commercial opportunities which will benefit industries and communities across Northern Australia.

### Northern Australia

The CRCNA defines Northern Australia as being “... all the Northern Territory, those Local Government Areas of Queensland above the Tropic of Capricorn as well as the regional centres of Gladstone, the Gladstone Hinterland and those parts of Western Australia above the Tropic of Capricorn as well as Carnarvon, Exmouth and the Local Government Areas of Meekatharra and Wiluna.”

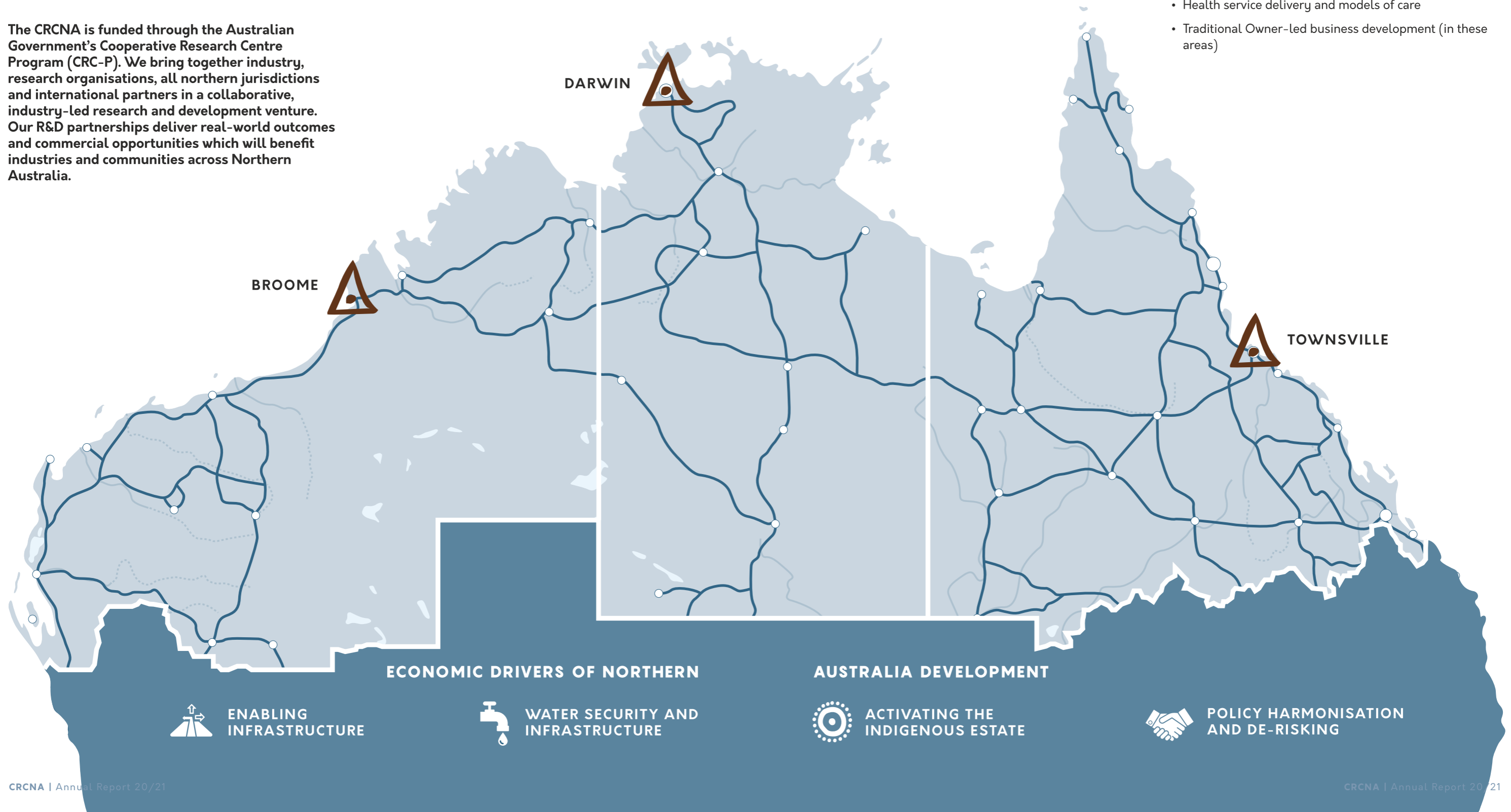
### Where we work

Our research activities can be located outside of this area if the impact of the research falls within the Northern Australia jurisdiction. The CRCNA’s head office is in Townsville and during 2020/21 financial year, our senior Project Managers were based in Broome, Darwin and Townsville.

### Research focus areas

We invest in industry-led R&D collaborations and programs of work which support the development of new technologies, products, systems and services to resolve industry challenges in the areas of:

- Agriculture, food, and aquaculture
- Health service delivery and models of care
- Traditional Owner-led business development (in these areas)





## 2020/21 HIGHLIGHTS



# \$10.9 million

co-contributions secured from project participants (in-kind and cash)

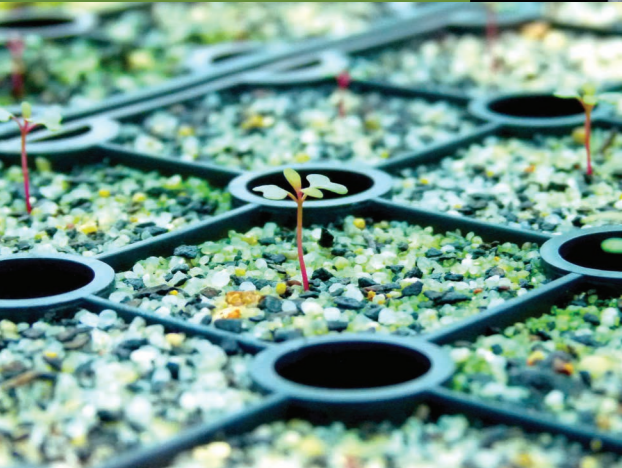
# 4

Co-funding agreements with Research and Development Corporations



# 18

PhD students



# \$7.9 million

invested in new projects

# 194

current project participants



# 18

new projects contracted in 2020/21

## 2020/21 RESEARCH HIGHLIGHTS

### State of the North 2020 Report

The CRCNA launched our State of the North 2020 report at the Developing Northern Australia conference in Rockhampton in November 2020. The report represented a culmination of our sector situational analysis projects and provided a pathway for future investment planning for the CRCNA.

Many of our 2021/22 projects will be a direct result of the recommendations from this report.

**“Northern Australian industries are ready to take advantage of the opportunities that have been identified and now we must bring all key stakeholders together to collectively map the focus areas for investment.”**

— SHERIDEN MORRIS, CRCNA CHAIR

### Research with impact

Researchers collaborating on our ‘Establishing eye screening services to prevent avoidable blindness in Northern Australia’ continue to deliver for the communities in which they are working across in far north Queensland.

Project lead Dr Justin Boyle said of 30 June 2021, his team had trained 30 Cape York-based staff in capturing high quality images of the eye, data entry and reviewing diagnostic advice.

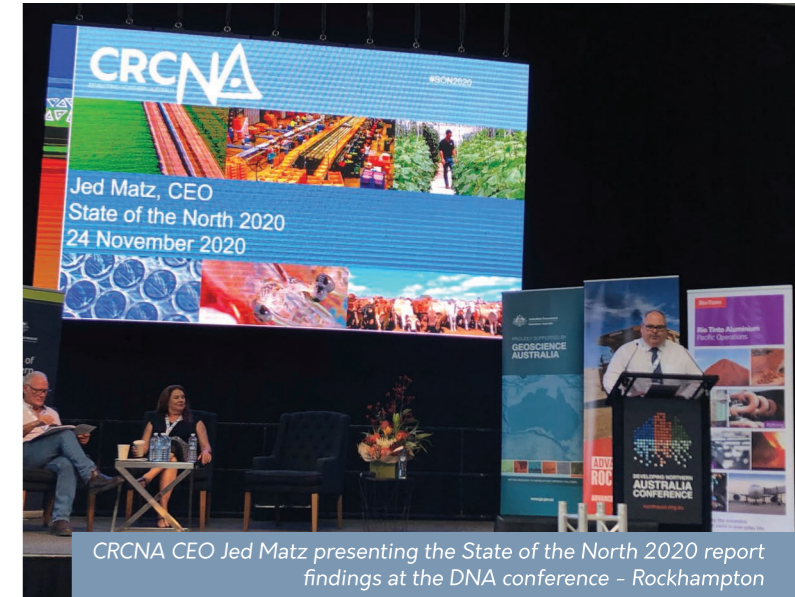
**“The project has strengthened capability in developing decision support systems for remote delivery of health services.”**

- DR JUSTIN BOYLE, CSIRO

### New discoveries

Over the past year, our ‘Improving the efficiency of Kakadu Plum/ Gubinge value chains to grow a robust and sustainable industry’ project team has directly resulted in several First Nation-led enterprises in the Northern Territory and in northern Western Australia increasing their staff, developing new products and increasing sales and market share.

The Northern Territory-based Kiril Park Wild Harvest started harvesting Kakadu Plum to be processed by Kaiyu



CRCNA CEO Jed Matz presenting the State of the North 2020 report findings at the DNA conference - Rockhampton

Superfoods which is also now developing a business model to support the long-term purchasing of native fruits from Traditional Owner-led enterprises, like Kiril Park.

Back in the lab, QAAFI UQ researchers also identified three new Kakadu Plum/Gubinge products and are now exploring how these could be developed into healthy snack options.

**“We can say that we have achieved what we set out to do in this project by facilitating the creation of a Kakadu Plum value chain which is Indigenous-led, owned and controlled as a benchmark for other native botanicals to follow.”**

— PROFESSOR, YASMINA SULTANBAWA, QAAFI UQ







### Mapping future successes

Co-mapping on Country project participants Centrefarm Aboriginal Horticulture Limited, North Australian Indigenous Land and Sea Management Alliance (NAILSMA), the Northern Land Council and Charles Darwin University have delivered a Co-mapping on Country manual. This manual was developed and evaluated at a workshop with Alekarenge Traditional Owners in the Southern Barkly and with Mangarrayi and Wubalawun Traditional Owners near Mataranka. The Alekarenge community now have the canvas map on display in the Centrefarm Alekarenge horticultural training centre. The map is used in the school classroom to share knowledge about Country with the trainees (years 10-12) who are completing certificates in horticulture, and is used by the community for planning and decision-making regarding commercial developments in the region.

### From little things big things grow

In December 2020, Civic Ledger completed the world's first blockchain water market pilot with irrigators from the Mareeba-Dimbulah Water Supply Scheme in far north Queensland. The work Civic Ledger did as part of this CRCNA-funded project (Improving water markets and trading through new digital technologies) contributed to them being recognised as one of the World Economic Forum's 100 Technology Pioneers of 2021.

The World Economic Forum's Technology Pioneers are early to growth-stage companies from around the world that are involved in the use of new technologies and innovation that are poised to have a significant impact on business and society.

With their selection as Technology Pioneer, CEO and Co-Founder, Katrina Donaghy of Civic Ledger will be invited



This canvas is the result of the community coming together and sharing information about special sites, plants and animals to create a map which the community can use for economic development, language and cultural maintenance, teaching children, sharing stories and to facilitate communication with non-Indigenous stakeholders.

to participate at World Economic Forum activities, events and discussions throughout the year. Civic Ledger will also contribute to Forum initiatives over the next two years, working with global leaders to help address key industry and societal issues.

### New species success in WA tropical rock oyster

Our \$570,000 funding contribution towards the Northern Australian Tropical Rock Oyster R&D project continues to support research teams in Western Australia, who had several major breakthroughs in 2020/21.

Researchers from the Western Australian Department of Primary Industries and Regional Development (WA DPIRD) have successfully bred the *Saccostrea echinata* (Blacklip Rock Oyster) - a notoriously difficult species to produce in the hatchery. In September 2020, the team transferred 30,000 of these hatchery-grown spat to new trial sites in the Pilbara (West Lewis and Cossack).

In early 2021, a collaboration between WA DPIRD and Albany Shellfish Hatchery produced a second species of Tropical Rock Oyster, *Saccostrea cucullata* (Hooded Rock

Oyster). *S. cucullata* can produce 4 million seeds per oyster and provided they can be commercially grown to marketable size, Hooded rock oyster could be a game changer for the Tropical Rock Oyster industry in Northern Australia.

The team also completed ground-breaking research on bacterial genomics during larval culture of Tropical Rock Oysters and are in the process of documenting the reproductive cycle and control of *S. cucullata*.

### Big boost to North's future aquaculture industry

A \$4.5 million research collaboration between Ornatas and Maxima (two of Australia's seafood industry leaders) and CRCNA was launched in Broome, Western Australia in May 2021, with an ambitious target to deliver a world-first \$160 million per annum industry, exporting 1,100 tonnes of sustainable Australian-grown Tropical Rock Lobster and creating thousands of jobs in the next decade.

Aquaculture researchers from Ornatas and Maxima have partnered with the CRCNA to trial sea raft grow-out for

Tropical Rock Lobsters in Cone Bay. If successful, the project will open the door to create a whole new industry for Australia.

This project includes additional investment from the Fisheries Research and Development Corporation (FRDC).

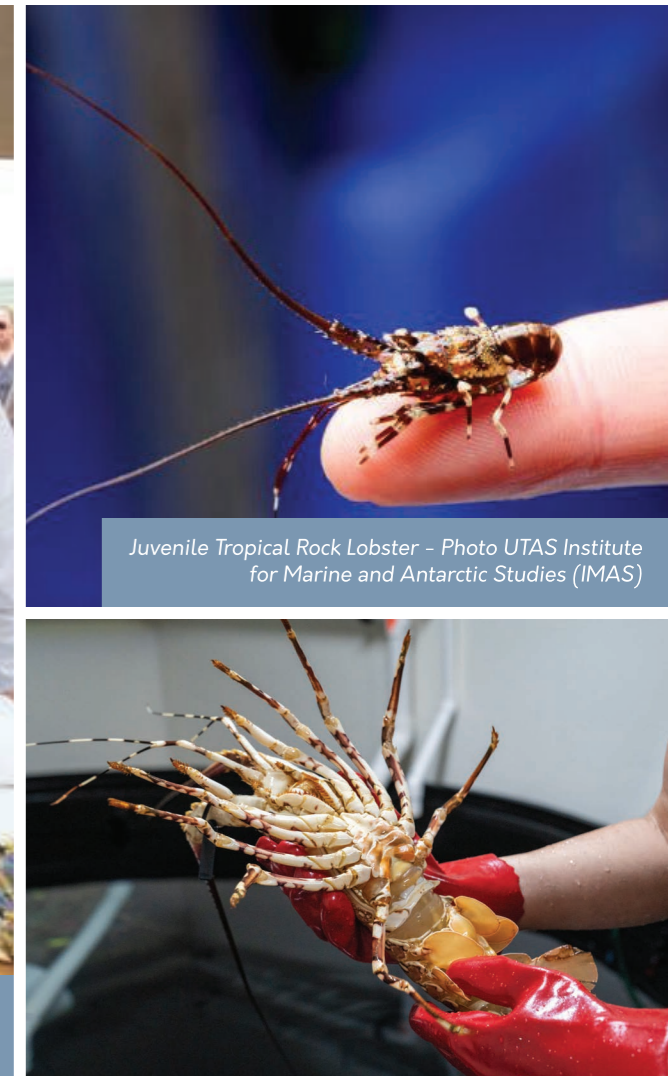
### New data captured for industry

James Cook University researchers, in collaboration with the Australia Prawn Farmers Association, conducted an extensive investigation into Australian farmed prawns pathogens, as part of the CRCNA-funded 'Biosecurity in Northern Australia prawn aquaculture' project. Their work provides a detailed overview of the pathogens and the level of protection provided by the current biosecurity practises that occur in prawn farms in Australia.

A direct outcome of this study has been the significant increase in the volume of pathogen data available to Australian prawn farmers as they prepare risk assessments and biosecurity management plans under the Queensland Government's *Biosecurity Act* (2014).



John Hutton from Maxima Tropical Rock Lobster Company and Ornatas CEO Scott Parkinson at the Broome launch.



Juvenile Tropical Rock Lobster - Photo UTAS Institute for Marine and Antarctic Studies (IMAS)





**CRCNA Director Cr. Peter Long, Kevin Michel MP, John Hutton Maxima, Michel Bermudes WA DPIRD relocating Blacklip Rock Oyster spat from Perth to new trial site off the Pilbara coast, WA.**

**NAILSMA published pivotal document**

The CRCNA’s partnership with the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) culminated in the delivery of a Business on Country (BoC) proposition that sets out the commitments needed from First Nations landowners, government and industry to enable sustainable development on Northern Australia’s vast Indigenous Estate. As part of the project’s research activities, the project team directly engaged with ‘action research’ project sites in north Queensland: Waanyi and Garawa, Normanby and Western Yalanji.

This project employed five part-time or casual local First Nations staff and contractors to support workshops in community and four new practical partnerships were activated during the life of the project.

It is anticipated that adoption of the BoC framework more widely by government agencies, industry, and non-government organisations (NGOs) will lead to effective partnerships with First Nations peoples, which will greatly assist their engagement in the northern economy, reduce risk of failure and enable significant future job creation.

**CRCNA partners with National Environmental Science Program**

The CRCNA partnered with the National Environmental Science Program (NESP) to explore the potential application of Integrated Environmental Assessment (IEA)

in de-risking investment in the north. The key output of the project is a report to guide the application of IEA in Australia, using Northern Australia as a case study. The project will provide a significant basis for future reform in development decision making.

**Applied science driving employment outcomes**

**“Forestry is all about employment for the people of Tiwi.” - GIBSON FARMER ILLORTAMINNI, TIWI PLANTATIONS CORPORATION DEPUTY CHAIR**

The First Nations-owned and operated Tiwi Plantations Corporation and their research partners commenced their new ‘Maximising northern tropical forestry-linking communities and cutting-edge technology’ project in February 2021. The project includes co-investment from industry Research and Development Corporation, Forest and Wood Products Australia. The research team are looking to use the latest plant breeding and forestry management practices to expand the Tiwi Island plantation forestry estate, to capitalise on growing market demand for high-value hardwood products from south-east Asian consumers and develop a skilled and work-ready local workforce.

**“By applying the new genetic and chemical technologies that have evolved over the past 20 years in real, on the ground scenarios, the gains we should see here are going to be multiples of times quicker than the mainland industries have been doing in developing these scientific techniques.” - DR CHRIS LAFFERTY, FWPA RESEARCH AND DEVELOPMENT MANAGER**

**Traditional medicinal plants show promise**

The ‘Enabling a traditional Australian medicinal plants agribusiness’ project led by Integria Healthcare finished in early 2021. During the project, researchers assessed the antimicrobial and anti-inflammatory activity of up to 30 Australian Traditional Medicinal Plants. Preliminary screening conducted during the trials found 14 antimicrobial and five anti-inflammatory plants should be considered for commercial applications.

Of the three Traditional Owner groups who participated in the research, two expressed an interest in continuing the development of an agribusiness.

A long-term impact from this project will be the development of a Benefit Sharing Deed template which can be used to initiate discussions and research for any parties wishing to engage with Traditional Owners this field.

**Educational impact**

Two First Nations trainees completed the 12-month traineeship program as part of our ‘Enabling a traditional Australian medicinal plants agribusiness’ project. These trainees progressed into undergraduate studies and continuing part-time employment within the division at the Menzies School of Health Research in Darwin. Additionally, the program provided short-term laboratory and field training activities to other Indigenous and non-Indigenous trainees. The project also supported two PhD and two Honours students through the School of Chemistry and Molecular Biosciences at The University of Queensland.



Acacia auriculiformis - northern black wattle crushed with water forms a soapy later to stop itching  
Photo: Charles Darwin University





# OUR RESEARCH PROGRAMS



New and developing industries in Northern Australia



Sector and supply chain development



Industry-specific production and supply chain innovation in Northern Australia

Develop Northern Australian health service delivery and models of care



Policy development and investment solutions



Industry-focused education and training program

Building industry and community capacity in Northern Australia in Traditional Owner-led businesses and enterprise







## RESEARCH PROGRAM 1

### Sector and supply chain development

#### Objective

To deliver an evidence base which prioritises sector, supply chain and infrastructure investment to provide timely access to high-value international and domestic markets.

#### A.1.2021063 A situational analysis of the horticulture sector across Northern Australia

This project will conduct a detailed situational analysis of Northern Australia's horticulture sector, in consultation with key stakeholders, for each northern jurisdiction. The project outcomes will enable growers, industry bodies, and governments to adapt and assess the best investment opportunities for the future.

#### A.1.2021004 Sugarcane industry situational analysis: industry consultation and roadmap development

Through undertaking broad industry engagement and consultation, this project will examine the industry's current challenges and future opportunities for development. The objective is to deliver a roadmap for the sugarcane industry which clarifies how the industry wants to develop and how it intends to get there over the next two decades.

#### A.1.2021014 Future-proofing the Northern Australian aquaculture industry's need for skilled staff to 2050

This project will define the Northern Australian aquaculture industry's need for specific skills and education levels, map existing training and education providers and propose improved models for education and training delivery. By evaluating current and future industry workforce needs, and analysing the gaps between industry need and educational output. The project will highlight career pathway gaps and how to overcome these to meet the industry's future needs.

#### A.1.2021028 Mackay Isaac Whitsunday regional agricultural supply chain baseline study

Researchers will build on the projects already conducted for the Mackay-Isaac-Whitsunday (MIW), north Queensland and far north Queensland regions. This project will build on previous work but aim to bring the understanding for the MIW region to the same level as that of the two northern regions to allow all regions to develop collaborative supply chain strategies.

#### A.1.2021074 Water Productivity, efficient and sustainability in tropical horticulture

The project will test the hypothesis that horticulture producers in the tropics are using significantly less irrigation water than is currently being allocated with little or no negative impact on productivity and profitability. This research project will establish sites within existing commercial production systems and use cutting-edge soil moisture monitoring and interpretation irrigation technology and scheduling programs to determine optimum irrigation inputs for key horticultural crops in the tropics.

## RESEARCH IN FOCUS

### Exporting perishable commodities to Asia: Developing a stakeholder collaboration model

Regional economists and supply chain experts worked with central Queensland-based horticultural producers to propose a new collaborative supply chain model to reduce inefficiencies, enhance access to high-value markets and boost profitability.

#### The challenge

Central Queensland University economist and supply chain expert, Associate Professor Delwar Akbar, was inspired to improve supply chain systems after witnessing northern-based producers coping significant crop losses – up to half in some instances – due to inefficient supply chain processes.

Poor coordination among growers, resource providers, processors, marketers and transporters continue to hamper the expansion of high-value perishable agricultural commodities (HVPAC) to Asian markets.

**“In most years, Northern Australia’s fruit and vegetable sector suffers post-harvest losses of between 20-40% and some tropical fruits (during bumper production seasons) have been suffering with pre-harvest losses too. A well-designed, export-oriented supply chain can reduce these losses and improve the farmgate value of produce.”** — DELWAR AKBAR, ASSOCIATE PROFESSOR CQUNIVERSITY

#### The research

The three-year project focused on developing strategic relationships and communication between producers,



**STATUS**  
Completed



**CRCNA PROJECT REFERENCE NUMBER**  
A.1.1718097



**TOTAL PROJECT VALUE**  
\$624,427



**CRCNA FUNDING**  
\$235,454



#### PARTICIPANTS

- Central Queensland University
- Growcom
- Rockhampton Regional Council
- Tropical Pines Pty Ltd
- Passionfruit Australia
- Queensland Department of Agriculture and Fisheries
- Queensland Department of State Development

processors, transporters and markets, specifically in relation to HVPAC which for this project included mangoes, lychees and avocados.

The research approach combined a literature review, two stakeholder workshops, farmer survey in Queensland and consumer survey in China.

By triangulating all the findings from the secondary and primary data analyses and stakeholder workshops, the research team was able to provide strategic policy guidelines on how to improve the HVPAC exports to Asian markets.

#### The outcomes

A suite of publications aimed at informing the next phase of work – a translational project, where farmers and other direct supply chain stakeholders can develop a collaborative agricultural supply chain in the real world has been developed.

**“This project has delivered a paradigm shift in rural economic development from competition to collaboration.”**

— DELWAR AKBAR, ASSOCIATE PROFESSOR CQUNIVERSITY





Jackfruit (*Artocarpus heterophyllus*)

## RESEARCH PROGRAM 2

### New and developing industries in Northern Australia

#### Objective

To grow new and improve developing industries and assist the establishment of new industries in Northern Australia.

#### A.2.2021052 Demonstrating Next-Gen resilient orchard production systems for tropical crops

This project will investigate the use of high-density plantings and trellis systems to examine their suitability for tropical fruit production in Northern Australia. These strategies could provide growers with a production methodology that mitigates the risks associated with tropical cyclones, enabling expansion of the horticultural sector and economic development through new plantings across north Australia. The model crop chosen for the project is jackfruit (*Artocarpus heterophyllus*) due to its versatility and suitability for the tropical north Australian climate.

#### A.2.2021114 Seed handling, crushing and refining infrastructure feasibility study

This project will examine the feasibility of locating a crushing and refining facility for oilseed crops, like safflower, within northern Queensland. The research will be targeted to identify all industries linked with a proposed crushing/refining facility and the interactions between industries by understanding the benefits and calculating regional and rural economic benefits.

#### A.2.1819106 De-risking broadacre cropping options in northern Queensland

This project includes co-investment from the Grains Research and Development Corporation (GRDC).

In Northern Australia multiple constraints create complex problems requiring multidisciplinary teams and private-public partnerships to build farmers' skills and adapt profitable and low risk broadacre cropping practices. This project aims to identify best crop and management options that bridge gaps between present and potential yields. This will be achieved through a participatory on-farm research program to identify relevant research, development and extension (RD&E) activities, and support growers to adopt proven technologies and practices.

#### A.2.1819045 Spicing up Northern Australia with high-value condiment crops

This project will undertake field trials to test the suitability of spices (including cumin, fennel, kalonji, caraway and black sesame) to Northern Australian environments and farming systems and develop agronomic advice to support grower adoption. Through the direct involvement of farmers, advisers and commercial seed companies, this project will build the supply chain links needed to establish a new and viable crop options for northern producers.



#### A.2.1819004 Potential for broadacre cropping in the Northern Territory

This project includes co-investment from the Grains Research and Development Corporation (GRDC) and the Cotton Research and Development Corporation (CRDC).

This project will collate historical broadacre cropping data, natural resource information and an understanding of market opportunities to support the development of viable broadacre cropping systems in the Northern Territory.

The initial focus is on rain-fed and irrigated systems growing cotton and peanut crops, while maize, sorghum, rice and pulse crops will also be investigated as possible 'break crop' options for cotton and peanut producers. A mixture of on-field and simulation techniques will be used throughout this project.

#### A.2.1718116 Developing an oilseed industry in Northern Australia

The project aims to identify a range of adapted oilseed crops which can reach commercial capacity and be a high-value component of a sugarcane farming system rotation. Some of the crops being trialled include sesame, soybeans, safflower, linseed, canola, mustards and nigella.

#### A.2.1819105 Developing broadacre cropping options in northern Queensland

This project includes co-investment from the Grains Research and Development Corporation (GRDC).

This collaboration between with existing and new grain growers within northern Queensland's Gulf River catchments is working to develop local cropping systems agronomic skills. The objective is to provide local landholders and agribusiness personnel the knowledge and skills needed for successful production of grain within existing extensive grazing enterprises across the region.

#### AT.2.1718098 Cherabin aquaculture production as an enabler for Indigenous business development

This collaboration between North Regional TAFE's Broome Aquaculture Centre and the Emama Nguda Aboriginal Corporation will develop an Indigenous freshwater prawn

or Cherabin (*Macrobrachium rosenbergii*) business, whilst building an Aboriginal workforce with transferable skills.

The research will focus on establishing aquaculture techniques for larval production, transport, and grow out of Cherabin with a view to achieving consistent production that meets market specifications.

#### A.2.1819053 Northern Australian Tropical Rock Oyster R&D

This project establishes a collaborative cross-jurisdictional approach to address the most significant technical and regulatory issues which are confronting Northern Australia's fledgling Tropical Rock Oyster industry. The project work is being conducted by research teams in Western Australia and the Northern Territory and includes three sub-projects addressing the different research needs identified.

#### Collaboration in action

On the back of the work of the CRCNA, GRDC and CRDC- supported cropping projects, the Northern Territory Farmers Association has developed a Northern Australia Broadacre Cropping and Cotton resource tool that supports growers to adopt myBMP and best practice inclusive of biosecurity principles.

This will underpin the development of suitable northern resource materials that highlight sustainable best management practice to ensure enduring profitability while minimising social and environmental impacts. This resource will ensure that growers and emerging growers understand and implement Northern Industry Best Management Practice standards to their enterprises.

Several industry partners have collaborated to enable the emergence of the Northern Australia Broadacre Cropping Farming Systems, inclusive of cotton and other crops (sorghum, maize, mung bean, peanuts, sesame) that have a synergistic and rotational fit with growing cotton.

The publication will be available for the 2022 growing season.



## RESEARCH CASE STUDY

### Improving the efficiency of Kakadu Plum/Gubinge value chains to grow a robust and sustainable industry

#### About the project

The University of Queensland's Queensland Alliance for Agriculture and Food Innovation (QAAFI UQ) and Kindred Spirits Enterprises – Traditional Homeland Enterprises will review Kakadu Plum / Gubinge (*Terminalia ferdinandiana*) value chains and explore how best to develop a reliable supply of high quality Gubinge products to the market.

QAAFI UQ researchers will work with First Nations Kakadu Plum/ Gubinge suppliers in the Thamarrurr region of the Northern Territory and the Kimberley region of northern Western Australia to review the existing value chain and identify opportunities, barriers, and solutions.

The project will also trial innovative approaches to local processing and maintaining fruit quality, develop new commercial applications, identify production and facility enhancements, and develop training tools for product costing, start-up businesses, hygienic processing of food and quality assurance.

#### Collaboration

The project team, led by QAAFI UQ Professor Yasmina Sultanbawa, worked closely with Nyul Nyul elder Bruno Dann and Marion Manson who run Twin Lakes Cultural Park and Twin Lakes Bush Food Market located on Bruno's traditional lands near Beagle Bay on Western Australia's Dampier Peninsula.

Bruno and Marion first met Yasmina in 2016 when she delivered a presentation to First Nations communities in Broome on the nutritional and health benefits of Gubinge.

The science confirmed what Bruno and Marion already knew - that Gubinge fruit contains the highest amount of vitamin C of any fruit in the world, the seed is safe to eat and its powerful antioxidant and antimicrobial properties are nutritious and hold preservative properties.



**STATUS**  
Current



**TOTAL PROJECT VALUE**  
\$2,276,370



**CRCNA FUNDING**  
\$454,545



**PROJECT LENGTH**  
3 Years



**PARTICIPANTS**

- Queensland Alliance for Agriculture and Food Innovation (QAAFI) - University of Queensland with support from the Queensland Department of Agriculture and Fisheries (DAF)
- Kindred Spirits Enterprises Pty Ltd – Traditional Homeland Enterprises (T. H. E.)

Bruno and Marion now work closely with the CRCNA's 'Improving the efficiency of Kakadu Plum/Gubinge value chains to grow a robust and sustainable industry' project and the Australian Research Council's Training Centre for Uniquely Australian Foods and mentor postgraduate students.

Marion said she would like to see the growth of the Gubinge industry underpinned by the best of traditional and scientific knowledge, across northern Western Australia.

"At Twin Lakes, we concentrate traditional practices of fire and land management, looking after biodiversity on country and honouring the different landscapes and protected and sacred areas. We can also see the benefits of drawing on modern science and technology such as GPS on orchard locations and drones for wild harvesting because we all cover such vast areas."

**"Our vision is to see traditional Aboriginal groups managing their own bush orchards with mosaic fire tracks mapping out country for easier access," - MARION MANSON, TWIN LAKES CULTURAL PARK.**

#### Commercialisation and utilisation

Bruno, Marion and their families have been leaders of the wild harvest of Kakadu Plum/Gubinge since 2007 and commercially harvesting the fruit since 2009.

Their customers, which include Loving Earth, Roogenic, Kakadu Plum Company, Australian Superfoods, Melbourne Bushfoods and Masterchef Jock Zonfrillo and many other small businesses, use the superfruit for a variety of purposes including food products and pharmaceuticals.

The ethical chocolate company Loving Earth has a long running relationship with Twin Lakes, first releasing Gubinge powder in June 2010. Loving Earth has partnered with Twin Lakes to commercialise two native plants: Gubinge and Jilungin (*Terminalia canescens*), a soothing herb used by the Nyul Nyul community to make traditional Dreaming Tea.

Twin Lakes supply Jilungin to Roogenic make one of their most popular products- a herbal infusion known Native Dreamtime blend.

As demand expands Twin Lakes will continue to work with Kindred Spirits, The University of Queensland, Loving Earth, Roogenic and others to strengthen the supply chains.

#### Education and training

Kindred Spirits Enterprises - Traditional Homeland Enterprises partner with Aboriginal people on their land and within their communities to facilitate local self-sustaining enterprises that focus on the value of the natural resources, ensure long term stability and preserve and promote Indigenous culture and tradition, has been working with Twin Lakes alongside the University of Queensland since 2016, focussing on enterprise development.

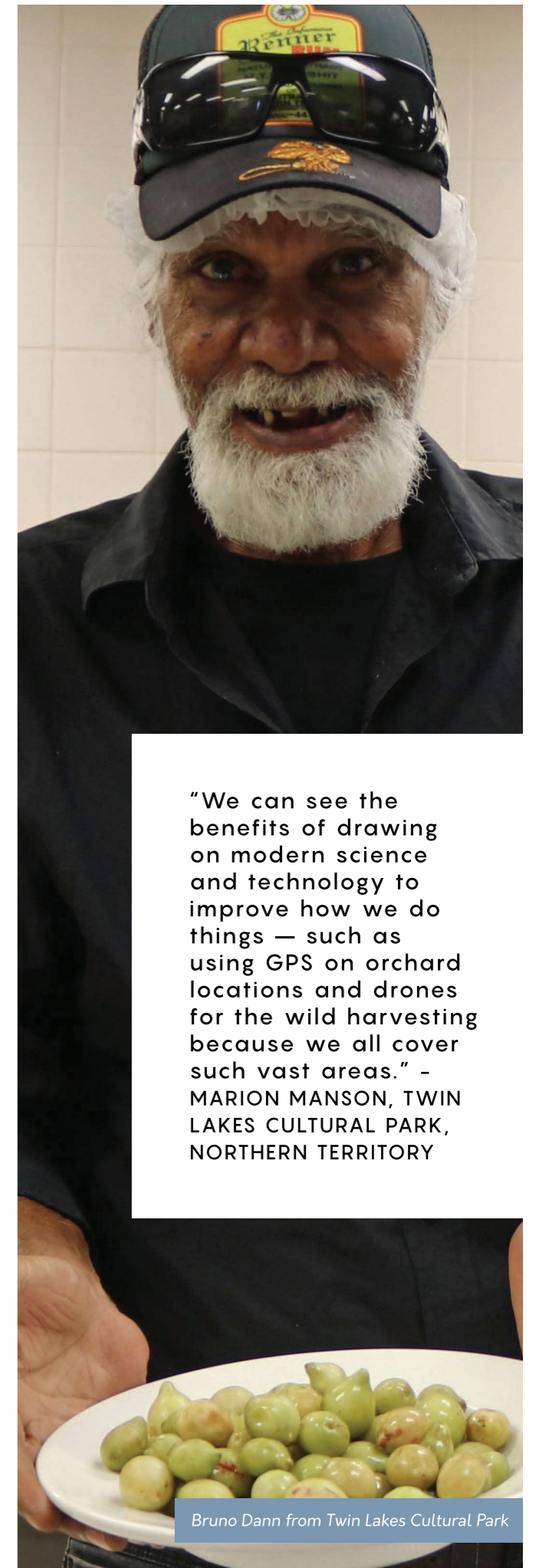
In this time, the native food arm of the business has grown, providing employment for Kimberley-based pickers to harvest Gubinge fruit and Jilungin leaf on their home country. Twin Lakes collects the fruit in a freezer truck and stores it in a freezer shipping container prior to shipping for sale.

#### Social and economic value.

Wild harvest jobs provide a major economic boost for remote Kimberley communities. The season, which starts in December runs to the end of February.

"The money made here by the wild harvest is a positive thing for the community," said Marion.

"Our main role in the CRCNA project is to help research and develop the Australian native food industry. Bruno has developed a relationship of trust with Yasmina and is very comfortable working with her. The combination of traditional knowledge and science has really added value to our products." - Marion Manson, Twin Lakes Cultural Park, Northern Territory.



Bruno Dann from Twin Lakes Cultural Park

**"We can see the benefits of drawing on modern science and technology to improve how we do things — such as using GPS on orchard locations and drones for the wild harvesting because we all cover such vast areas." - MARION MANSON, TWIN LAKES CULTURAL PARK, NORTHERN TERRITORY**





## RESEARCH PROGRAM 3

### Industry-specific production and supply chain innovation in Northern Australia

#### Objective

Support the development and growth of established industries by identifying value-add opportunities, new markets, improving supply chains and enhancing productivity.

#### A.3.2021116 Pioneering Tropical Rock Lobster grow out

Project lead, Ornatas will build on its earlier R&D work breeding juvenile spiny Tropical Rock Lobsters and undertake the critical science required for the next step of production, the grow-out of hatchery-produced juvenile lobsters in sea raft enclosures, with research trials in the pristine waters of northern Western Australia.

#### A.3.2021002 Suitable sugarcane to diversify income and add value

This project is seeking identify and develop new diversification opportunities for sugarcane growers and millers in tropical far north Queensland by examining options to increase the total biomass production per unit of land area. In doing so it will look to screen a variety of diverse sugarcane genotypes and other crops to identify the best performing varieties for the Mossman (QLD) region.

#### A.3.2021051 Developing asparagopsis seaweed cultivation at scale in Northern Australia

The focus of this collaboration is to research and develop the technical capability to grow commercial quantities of red seaweed (*Asparagopsis taxiformis*), which has been proven to reduce methane emissions in cattle, as a component in cattle feed ration or feedstock supplement.

#### A.3.1819007 Sustainable export supply chains for Calypso mango to China

This project aims to grow the export capability of Calypso® mangoes grown in Northern Australia into China. It is on identifying and resolving quality issues within the existing supply chain, by building on previous research and development undertaken by the Perfection Fresh Group. The information gathered will help growers and exporters accurately identify and resolve quality issues and trace back to the source and implement changes.

#### A.3.1819067 Strengthening Northern Australia's horticultural sector through assessing protected cropping value chain linkages and pathways for adoption

The aim of the collaboration is to increase adoption of protected cropping technologies and deliver benefits to farmers and communities across Northern Australia. This will be achieved by increasing the awareness and technical knowledge of protected cropping stakeholders. An RD&E partnership between industry stakeholders and government organisations across northern Queensland, Northern Territory and Western Australia is supporting growers to identify new investments to scale-up commercial protected cropping systems.

## RESEARCH IN FOCUS

### Smart supply chains

Trust Provenance, in collaboration with Manbulloo and Growcom undertook a smart supply chain traceability project with a focus on providing real-time and secure information on all mangoes from the paddock to the retailer, to optimise the journey, identify pain points and ultimately provide better quality fruit to consumers.



**STATUS**  
Completed



**CRCNA PROJECT REFERENCE NUMBER**  
A.3.1718083



**TOTAL PROJECT VALUE**  
\$1,158,181



**CRCNA FUNDING**  
\$472,727



**PARTICIPANTS**

- Trust Provenance Pty Ltd
- Manbulloo Limited
- Growcom



#### The challenge

Food safety, food quality and food traceability, are all in growing demand from consumers and retailers, which is putting growing pressure on farmers. To address this in the supply chain, technologies that allow real-time data collection and analysis to be automated and simple to use are required.

Information systems through the supply chain often don't "talk" which means collection, collating, analysing and acting on data to optimise quality, along with food safety, and food provenance is sub-optimal and fragmented, contributing to a lower quality of fruit, and higher levels of food waste.

#### The research

Using a newly developed blockchain platform to integrate all the systems and information, mango producer Manbulloo, identified critical touchpoints along their supply chain. Real-time data, such as time, temperature and location were tracked, transmitted and uploaded to the blockchain where Manbulloo and other supply chain participants could then access the information through a dashboard interface.

#### The outcome

- Successfully linking Manbulloo's supply chain systems (Freshtrack, MuddyBoots and Emerson data trackers) onto the one viewing platform, securing all data points onto the blockchain and enabling Manbulloo to view the data in real-time from the one platform.

- Helped achieve a record for the highest acceptance rates of fruit into Coles Supermarket, through faster access to more secure and integrated information sets for streamlined decision making and dovetailing into Manbulloo's other quality management system improvements.

"Working with Manbulloo has been a real eye opener for us. Their focus on quality and getting the system and process right, is where we see all Australian producers heading. Australia has a globally leading brand and image which secures our food locally and can demand a premium globally."

- ANDREW GRANT, CEO TRUST PROVENANCE





## RESEARCH CASE STUDY

### Transforming mango futures

#### About the project

Previous R&D by the Queensland Department of Agriculture and Fisheries (DAF) demonstrated new intensive mango management systems, including high-density and trellis designs could significantly increase the quantity and reliability of fruit yields. Added benefits include adaptation to mechanisation and robotics, greater input efficiency and greater cyclone resilience.

For this project, DAF partnered with commercial mango producers Manbulloo Ltd and BJM Enterprises to examine a variety of 'best-bet', high-density mango orchard technologies.

The research concurrently investigated industry transition issues from conventional to next generation systems and answered key orchard management questions arising from the change process.

#### The challenge

Australia's expanding mango industry, with 800 growers and worth over \$200 million annually, will continue growing significantly, if industry priorities of increased orchard productivity, profitability and market expansion are realised. Low and variable

production, however, is an on-going commercial issue, restricting the competitiveness of Australian mango businesses and hampering export growth.

#### The research

##### Canopy systems

The project trialled and compared conventional mango planting systems at three different densities - low (207 trees/ha), medium (408 trees/ha) and high (1,242 trees/ha) and one trellised planting system at high density (1,188 trees/ha).

The mango variety B74 (Calypso®) was selected as the focus variety for this study.

##### Economic analysis

The economic analyses were conducted using an economics calculator file developed by DAF economists. This tool analysed individual input base costs (materials, labour, etc) and used 'best-bet' calculations to determine differences between the establishment and annual variable costs for each canopy system, gross revenue based on fruit yields, quality grades and price per grade for each year up to an orchard lifetime of 30 years. This 30 year lifetime is equivalent to the approximate economic and investment life of many similar orchard investments. These data were then used to calculate gross margin and cumulative nett cash flow per hectare for each orchard management system over the orchard lifetime.



Geoff Dickinson, DAF.

#### The outcome

A key output of the project has been an economic case study which concluded that while the adoption of high-density slim hedge and trellised planting requires a higher level of initial investment, this is rapidly recouped by the higher revenues achieved by increased yield per hectare. Modelling suggests, at their peak, these new high-density and trellised orchards could:

- Produce up to 66 tonnes per hectare per year, more than 3.5 times more than existing low-density plantings
- Improve on-farm efficiency of mango growing, spraying and picking costs
- Reduce annual fruit production costs (per kg/fruit) by approximately 20%
- Improve long-term grower and industry profitability.

The project team have also developed a suite of information videos and a grower manual to support producers wanting to transition to new production systems.



**STATUS**  
Completed



**CRCNA PROJECT REFERENCE NUMBER**  
A.3.1718105



**TOTAL PROJECT VALUE**  
\$1,182,179



**CRCNA FUNDING**  
\$500,000



- PARTICIPANTS**
- Department of Agriculture and Fisheries, Queensland
  - Manbulloo Limited
  - BJM Enterprises Pty Ltd
  - Australian Mango Industry Association

"The project team have spent time analysing the true cost of production and really looked at how they can maximise potential earning for growers. The outcomes from this trial certainly have the potential to increase income for growers."  
- BEN MARTIN, AMIA CHAIR AND OWNERS OF BJM ENTERPRISES



Early trellis crops at the DAF research site Mareeba, QLD





## RESEARCH PROGRAM 4

### Building industry and community capacity in Northern Australia in Traditional Owner-led businesses and enterprise

#### Objective

To de-risk investment in Traditional Owner-led enterprises and enhance the skills and capabilities of Indigenous and Torres Strait Islander peoples.

#### AT.4.1819006 Co-mapping on Country: train the trainer for sustainable development

Centrefarm Aboriginal Horticulture Limited (Centrefarm) initiated a co-mapping project in Mataranka, Northern Territory (NT) with the Traditional Owners of the Mangarrayi and Wubalawun Aboriginal Land Trusts. With funding secured from the CRCNA, Centrefarm has developed an innovative train the trainer model to increase skills and capacity to facilitate this co-mapping work with Traditional Owners. The co-mapping project includes on site workshops with the Traditional Owners of the Mangarrayi and Wubalawun Aboriginal Land Trusts.

The co-mapping project team includes Aboriginal and non-Aboriginal Centrefarm staff directly involved in the co-mapping project, contractors engaged by Centrefarm for the co-mapping project (artist, project facilitator and evaluator) as well as the four co-mapping 'trainee'

participants. The Centrefarm staff have been delivering the overall project coordination, logistics and communication and relationship management with the Traditional Owners. The artist worked with the Traditional Owners on facilitating the co-mapping, while the project facilitator has delivered the initial design of the train the trainer model and supported its implementation and adaptation.



Michaela Spencer Stephen Maliku Dhamarrandji Rosemary Gundjarranbuy. Photo Charles Darwin University

## RESEARCH IN FOCUS

### Maximising northern tropical forestry-linking communities and cutting-edge technology

This R&D venture supports the expansion of tropical hardwood plantations in Northern Australia. In addition to trialling new breeding techniques, the project is also focused on improving the skills and capabilities of a local workforce to support and sustain the long-term growth of the sector.

#### The opportunity

In south-east Asia, market demand for *Eucalyptus pellita* is fast emerging as the preferred species to replace *Acacia mangium* in large commercial tropical plantations mainly due to its resistance to pests and diseases but also the versatility of the wood products.

**“The important outcome of this research is to continue to teach the people of Tiwi how to manage their land and their water around Tiwi.”**  
- KIM PURUNTATAMERI TIWI PLANTATIONS CORPORATION CHAIR

#### The research

The research strategy is focused on three programs. These are:

- 1: Tropical Hardwood Plantation Productivity
- 2: Higher Value Products and future plantings
- 3: Northern Forestry Industry Growth Model

Under 1, existing Eucalypt trials will be assessed for performance. Trials of new planting material will be established. The most promising will be used in spacing and fertiliser trials to optimise productivity.

Under 2, genomic tools and molecular marker technology will target specific domestication traits in selected trees to determine potential for genetic improvement through tree breeding. Processing methods, applications and products,

- STATUS**  
Current
- CRCNA PROJECT REFERENCE NUMBER**  
AT.4.2021001
- TOTAL PROJECT VALUE**  
\$4,680,846
- CRCNA FUNDING**  
\$1,656,048
- PROJECT LENGTH**  
3 Years
- PARTICIPANTS**
  - The Trustee for Tiwi Plantations Corporations Trust
  - University of Melbourne
  - Plantation Management Partners Pty Ltd
  - Forest and Wood Products Australia Ltd
  - Northern Territory of Australia - Department of Industry, Tourism and Trade (DITT)
  - Charles Darwin University
  - Port Melville Pty Ltd

together with sawing and peeling trials will determine higher-value products.

Under 3, researchers and students will work with Aboriginal and rural communities across Northern Australia to document best practice forestry plantation establishment practices and develop a Northern Forestry Industry Growth Model.

#### The outcomes

The research will underpin the plantation management change from an Acacia-based product predominantly meeting global biofuel demand to a Eucalyptus product for higher value pulp markets. This fundamental shift in the plantation production system will underpin the long-term viability of the Tiwi plantations and provide new options for economic development and employment on First Nations-owned lands.

The establishment of plant nurseries and planting programs will provide approximately 35 ongoing local jobs and provide full-time skilled work for up to 120 local people over the next 20 years.

**“All going well, this project will see a real increase to the productivity and value-add we are getting from the plantation estate across Northern Australia.”** — DR CHRIS LAFFERTY, FWPA RESEARCH AND DEVELOPMENT MANAGER





**RESEARCH PROGRAM 5**  
 Develop Northern Australian health service delivery and models of care

**Objective**

Improve and enhance:

1. health-seeking behaviours of northern Australians;
2. early detection of diseases;
3. access to mental health treatment, diagnostic tools and technologies; and
4. workforce skills and capabilities in delivering treatment and diagnosis.

**H.5.2021046 Economic assessment of disability models of care in remote communities**

The research team is proposing to implement and evaluate a flexible new service model in two communities (Nhulunbuy in the Northern Territory and Weipa in far north Queensland) and collect economic data (costs and benefits relating to health outcomes and community engagement) on this model plus two other existing service models. The purpose of the analysis will be to prepare a business case from the studies undertaken which can be used for a funding submission to government agencies for additional health services across Northern Australia.

The new model of care to be evaluated is a student-assisted model where funding is provided for an allied health professional who, in addition to direct service provision, also supervises and mentors allied health professional students to deliver health services.



**H.5.2021068 Integrating health care planning for health and prosperity in north Queensland**

This project aims to improve the responsiveness of health services to the health needs of communities in the north Queensland region. It will provide a unique opportunity to unite health industry partners and engage with local communities to improve efficiencies and effectiveness in service planning and delivery.

**H.5.1920041 Developing a simple, robust telehealth system for remote communities**

This project aims to develop a simpler, more robust, reliable and affordable telehealth system using NBN satellite connectivity and a range of telecommunications and diagnostic tools to enhance telehealth access and for use in remote Aboriginal Community Controlled Health Organisations (ACCHOs).

**H.5.1718035 Establishing eye-screening services to prevent avoidable blindness in remote Northern Australian communities**

A new eye screening service and delivery model will enhance the effectiveness of remote health service delivery, optimise health spending and 'reduce the gap' in health outcomes for people in remote areas, particularly for those at risk of blindness from underlying conditions like diabetes.

This project will implement retinal screening using a telehealth platform developed by CSIRO, where health workers will be trained to use retinal cameras to take photos of patients' eyes in remote communities. Ophthalmologist teams, in larger regional centres, will access this information via web-based technologies and provide review and diagnostic services.







**RESEARCH PROGRAM 6**  
Industry-focused education and training program

**EXPERIENCING SCIENCE IN ACTION**

by AgriFutures  
Horizon Scholar  
Indiana Rhind

I've been extremely passionate about the aquacultural industry for a while now and have been waiting for an opportunity to explore it, so you can imagine my excitement when Ornatas kindly agreed to let me come along for work placement. Of all places, I feel Ornatas was the perfect place to get my first real 'taste' of the industry. All the workers there were extremely friendly and happy to answer the hundreds of questions that I tend to ask, no matter how complex or, frankly, silly the questions were.

They were even happy to let me get 'hands on' with as much as possible and were constantly asking what I was interested in, what I wanted to know more about, and were genuinely interested in helping me learn. One of the best parts about the placement was being able to see all aspects of the farming process, from general care of larval stage lobsters all the way up to broodstock, to other aspects such as water quality testing. It was fascinating just how much care and attention they paid to the lobsters' needs at each individual life stage, continuously updating and improving their diets and habitats to ensure they're as happy and healthy as possible.

Overall, it was an amazing experience and has solidified for me the passion I have for the aquacultural industry. I can't wait to become a researcher myself so I may help grow the aquaculture industry. I cannot thank the team at Ornatas enough!

**Objective**

Increase technology development, skilled employees and R&D capacity within Northern Australia. Through our Education Program, the CRCNA provides a range of activities, educational experiences and professional development opportunities for PhD Scholars, Masters and Undergraduate students as well as those students undertaking studies in vocational institutions, such as TAFE.

**KEY ACHIEVEMENTS IN 2020/21**

**Memorandum of Understanding with Central Queensland University (CQUniversity)**

During 2020/21 we signed a Memorandum of Understanding with CQUniversity, formalising our support for their PhD Elevate Scholarship program. Under the agreement, the CRCNA covers half of the student stipend for three PhD or Masters students each year. Our current student cohort includes three Elevate scholars.

**Four student bursaries awarded**

The CRCNA awards bursaries up to \$5,000 to any student, researcher, industry professional or anyone working or studying in Northern Australia. This year bursaries were used to help students travel to remote locations so they could participate in field research and attend conferences either virtually or in-person.

**First professional development workshop held — Rockhampton, Queensland**

Our first student workshop was held in conjunction with the Developing Northern Australia Conference in November 2020 and attended by 14 students. The event was open to all CRCNA embedded students and scholarship holders. The purpose of the workshop was to offer students and researchers working across Northern Australia a chance to network with each other and CRCNA staff, Board members, project participants and stakeholders.

**AgriFutures Horizon scholarship work placement**

This year the CRCNA extended its support for the AgriFutures Horizon scholarship to include another two students. In a strong example of our commitment to connecting students with industry, we were also able to facilitate a work placement between one of our project participants, Ornatas, and our Horizon scholar Indiana Rhind.

**PhD presentation competition — Developing Northern Australia Conference**

To raise awareness about the CRCNA's education program, we partnered with the Developing Northern Australia Conference organisers, the Association for Sustainability in Business, to run a competition for PhD and Masters students either studying in, or studying a topic related to Northern Australia. Students had to submit a 30-second video of their research-pitch. We had 23 entries from students across Australia.

University of Queensland PhD candidate Adriana Vega Grau won the competition with her research topic 'Helping rehabilitate post-mined landscapes in Northern Australia'. Adriana was invited to attend and present at the DNA Conference in Darwin. Unfortunately, COVID-19 restrictions meant Adriana had to present her topic online.



Indiana Rhind in action at the Ornatas hatchery at Toomulla Beach, north of Townsville.



# OUR SCHOLARSHIP RECIPIENTS

Photo: CSIRO



**Abbey-Rose Cox**  
PHD CANDIDATE

**Research topic / Course:** Mingoke (make better) - Improving mental health outcomes for indigenous youths in the Kimberley.

**University / Institution:** University of Melbourne

**Supervisor:** Professor Sandra Eades - Dean, Curtin Medical School, Curtin University



**Jesus Romo Rico**  
PHD CANDIDATE

**Research topic / Course:** Plasma polymers from natural extracts for wound healing applications.

**University / Institution:** James Cook University

**Supervisor:** Professor Mohan Jacob



**Clément Bresson**  
PHD CANDIDATE

**Research topic / Course:** Enterprise development practice in remote communities: establishing Indigenous seafood ventures in Arnhem Land.

**University / Institution:** The Australian National University

**Supervisor:** Dr Kerins Sean



**Nicola Novello**  
PHD CANDIDATE

**CQUniversity Elevate scholar**

**Research topic / Course:** Crop productivity and grain quality in a changing climate.

**University / Institution:** Central Queensland University

**Supervisor:** Dr Sabine Tausz-Posch

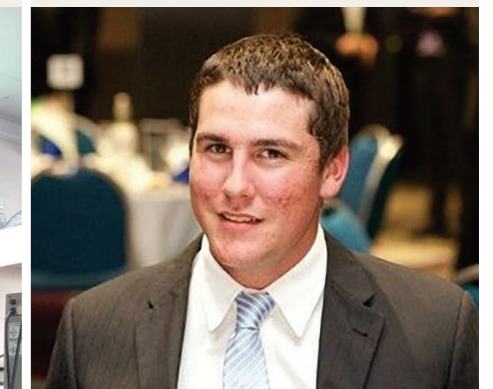


**Scarlett Allende Leiva**  
PHD CANDIDATE

**Research topic / Course:** Breakdown of biomass for energy application using microwave pyrolysis.

**University / Institution:** James Cook University

**Supervisor:** Professor Mohan Jacob



**Sean Kelly**  
PHD CANDIDATE

**Research topic / Course:** Improved measure of idiosyncratic and systematic risk as determinants of firm capital structure and value.

**University / Institution:** James Cook University

**Supervisor:** Associate Professor Riccardo Welters





**Vanya Bosicic**  
**PHD CANDIDATE**

**Research topic / Course:** Assessing the costs and benefits of autonomous aircraft integration into healthcare service delivery for remote Indigenous communities in the Northern Territory.

**University / Institution:** Charles Darwin University

**Supervisor:** Hamish Campbell



**Jon Irish Legaspi Aquino**  
**PHD CANDIDATE**

**Research topic / Course:** Intensification of the redclaw crayfish (*Cherax quadricarinatus*) industry: the importance of sperm quality and male fertility to productivity.

**University / Institution:** James Cook University

**Supervisor:** Associate Professor Damien Paris



**Zarah Tinning**  
**PHD CANDIDATE**

**Research topic / Course:** Microbiota and Tropical Rock Oyster Health

**University / Institution:** Charles Darwin University

**Supervisor:** Dr Anna Padovan



**Paris Capell**  
**UNDERGRADUATE/ MASTERS OF RESEARCH**

**AgriFutures Horizon scholar**

**Research topic / Course:** Bachelor of Science/Master of Science

**University / Institution:** Australian National University



**Rebekah Ash**  
**UNDERGRADUATE, HONS**

**AgriFutures Horizon scholar**

**Research topic / Course:** Bachelor of Agricultural Science (Honours)

**University / Institution:** The University of Queensland



**Indiana Rhind** –  
**UNDERGRADUATE, HONS.**

**AgriFutures Horizon scholar**

**Research topic / Course:** Bachelor of Engineering with Honours

**University / Institution:** University of Southern Queensland



**Somu Bhattacharya**  
**MASTERS OF RESEARCH**

**CQUniversity Elevate Scholar**

**Research topic / Course:** What value is created in use of auto-harvesting technology in the Australian mango supply chain?

**University / Institution:** Central Queensland University

**Supervisor:** Dr Imran Ali



**Rafael Goulart Nogueira Da Silva**  
**MASTERS OF RESEARCH**

**CQUniversity Elevate Scholar**

**Research topic / Course:** Fruit Auto-harvesting

**University / Institution:** Central Queensland University

**Supervisor:** Professor Kerry Walsh



**Patrick Armstrong**  
**UNDERGRADUATE**

**AgriFutures Horizon scholar**

**Research topic / Course:** Bachelor Environmental Engineering

**University / Institution:** Murdoch University



Raelene Collins and Taylah Church at Menzies School of Health Research.





Lake Argyle, WA

## RESEARCH PROGRAM 7

### Policy development and investment solutions

#### Objective

De-risk investment in new, emerging, and established industries by identifying potential investors, policy barriers and solutions.

#### AHT.7.2021021 Leading the CRCNA's de-risking and supply chain investment and impact

This project provides the leadership, coordination, research synthesis and policy impact behind the CRCNA's Phase 2 De-risking and Supply Chain Development Program investments.

## RESEARCH IN FOCUS

### Improving water markets and trading through new digital technologies

Blockchain experts Civic Ledger partnered with far north Queensland producers to test and evaluate blockchain's potential to support and enhance the design and development of innovative water markets in Northern Australia.






#### The challenge

Water markets are complicated, heavily centralised and regulated; they are not transparent, there are numerous intermediaries, and there is increasing concern over speculation and manipulation. The net result is, despite the widely acknowledged benefits of water markets, only 8% of farmers currently participate.

#### The research

The Pilot Project was focused on the Mareeba-Dimbulah Water Supply Scheme (MDWSS) on the Atherton Tablelands in far north Queensland which has over 1,000 water users growing a large diversity of horticulture crops using over 200GL of issued water entitlements per annum from SunWater (Resource Operations Licence holder).

A key element of the Pilot Project was the deployment of Civic Ledger's blockchain enabled peer-to-peer water market and trading platform – Water Ledger. The Water Ledger trading platform was adapted to the MDWSS business and operating rules to observe how blockchain technology can reduce trading costs, improve the efficiency of trade processes, and increase water market transparency.

-  **STATUS**  
Completed
-  **CRCNA PROJECT REFERENCE NUMBER**  
A.7.1920043
-  **TOTAL PROJECT VALUE**  
\$203,438
-  **CRCNA FUNDING**  
\$85,000
-  **PARTICIPANTS**
  - Civic Ledger Pty Ltd
  - Queensland Department of Natural Resources Mines and Energy
  - Royal Melbourne Institute of Technology (RMIT) Blockchain Innovation Hub
  - Griffith University
  - Far North Queensland Growers

#### The outcome

Civic Ledger's work has allowed a thorough examination of the potential of blockchain and smart contract technology and addressed three fundamental challenges for effective and efficient water markets:

- Reduce transaction costs
- Real-time price discoverability
- Interoperability

Overall, the project found that a blockchain enabled water market is likely to address some of the underlying challenges of designing water market governance frameworks.

**"I really do think that blockchain is the future. I don't know when in the future, but the quicker the better from our point of view."**

— JOE MORO, PRESIDENT FAR NORTH QUEENSLAND GROWERS AND MANGO PRODUCER







## FUTURE INVESTMENT PROFILE

Projects which secured CRCNA-funding commitment during 2020/21 financial year but are yet to be contracted or were still under development as of 30 June 2021.

### A.1.1819055 An evaluation of Northern Territory agriculture supply chains and export opportunities

The 12-month collaboration will utilise data modelling to assess the supply chain and export opportunities for a broad range of the Northern Territory's agricultural sectors including aquaculture and forestry. Comprehensive evaluations of reports and extensive stakeholder interviews will provide an insight into current supply chains and how they can be improved.

### A.1.2021013 QLD Silvopastoral trials of commercial pine systems in North Queensland

The project will assess biophysical interactions and trade-offs between tree and fodder growth, and livestock productivity, in commercial pine silvopastoral systems in northern Queensland.

### A.3.2021044 Demonstrating the impact of prawn viruses on prawn aquaculture production

Drawing on the results and findings from their earlier CRCNA-funded study (A.3.1718113 Biosecurity in northern Australian prawn aquaculture), the team from JCU propose to investigate the disease transmission and pathogenicity of the most frequently detected viruses across multiple stages of prawn farming.

### A.3.2021097 Pilbara produce arid agriculture research project

The goal of the Pilbara produce arid agriculture research project (PPAARP) will answer the key research question on what cultivars can be grown in the Pilbara with access to local mine dewater and recycling water in a cost-effective manner to service commercial food and agricultural markets through a produce trial.

### A.3.2021118 Project BGreen

Project BGreen proposes a biorefinery to change the processing of sugarcane from sugar to green hydrogen, monoethylene glycol (MEG), monopropylene glycol (MPG), and green electricity from commercially grown sugarcane. This project is focused on the first phase of a techno-economic business case.

### A.3.2021119 Mackay alternative sugarcane processing facility

A proposal to establish a scale pilot 'demonstration' plant to test a concept to divide the sugarcane stem into components which can then be processed into a variety of different high-value products, including the option of crystal sugar.

### AT.4.2021117 Activating the Indigenous estate - Baseline study of agricultural capacity

This project will examine the unrealised agricultural potential of the Indigenous estate across Australia. It will also align with national policy agendas and closely examine agricultural development in Northern Australia.

### H.5.2021062 Novel therapeutics for diabetes sourced from Northern Australian biota

Far north Queensland biotechnology company Macrobiome Therapeutics proposes to develop new treatments for Type 2 diabetes (T2D) from the protein secretions of parasitic worms. This project will target these proteins and replicate them in the lab using pharmaceutical industry standards. They will test the protein molecules and determine which are best suited to the next stage of development and possible further clinical development and trials.

### AHT.7.2021027 Delivering fit-for-purpose data tools for Northern Australia

The objective of this research project is to deliver a fit-for-purpose data portal for Northern Australia to inform industry, researchers and the community on the socio-economic composition of Northern Australia.

### AHT.7.2021021 De-risking Phase II- NT through sustainable development precincts

A collaboration between CRCNA and the Northern Territory Government's Department of Industry, Tourism and Trade (DITT) will utilise a case-study approach to support improved practice in planning new priority agricultural development areas as part of new Sustainable Development Precincts concept for the Northern Territory.

### AHT.7.2021025 Supporting landholder capacity for quality agricultural development applications

This project will research and provide a detailed needs assessment of landholders in context of supporting landholders to develop quality Agricultural Development Applications across Northern Australia, build partnerships and deliver an evidence-based co-design of appropriate capacity building products to address these needs.



## Governance

### Board of Directors



**Sheriden Morris | Babinda, QLD**  
BAppSc (Hons), GAICD

Sheriden is currently the Managing Director and Company Secretary of the Cairns-based non-profit Reef and Rainforest Research Centre (RRRC) and Deputy Chair of Citizens of the Great Barrier Reef.

Sheriden has extensive experience in environmental research and monitoring management, aquaculture development, agricultural science and agronomy in the sugar cane and banana industries of far north Queensland and served as a Director of Wetland Care Australia and has previously worked with CSIRO and Great Barrier Reef Marine Park Authority (GBRMPA). As an extensive contributor to land and sea management policy, Sheriden has also spearheaded the development and implementation of an innovative aid development program on Australia's northern borderlands with Papua New Guinea.

**BOARD TERM: 2017-2022**



**Don McDonald | Cloncurry, QLD**  
AM OBE

Don is the Chair of MHD Pty Ltd—a family-owned beef cattle operation in Cloncurry in north-west Queensland. Don has previously held Board positions with the Australian Agricultural Company Ltd, Queensland Industry Development Corporation, Kidson Gold Mines Ltd, CSIRO, ATEC Rail Group and the Queensland Royal Flying Doctors. Don is recognised nationally for his commitment to regional issues. In 1988 he was awarded an OBE for his services to the community, in 2001 Don was awarded a Centenary Medal, and then in 2006 he was awarded a Member of the Order of Australia Award.

**BOARD TERM: 2017-2022**



**Cr John Wharton | Hughenden QLD**  
OAM

John is Mayor of the Richmond Shire Council. He received a Member of the Order of Australia Award and Centenary Medal for his service to the community of north-west Queensland and local government. He is the Director of his own company, Wharton & Co Pty Ltd and is a registered real estate agent. John is recognised nationally for his commitment to community service through local government, regional development, natural resource management and primary industry organisations.

**BOARD TERM: 2017- 2021**



**John Bearne | Townsville, QLD**  
AdvDipEng, FAICD, Registered Builder QLD

John has substantial experience as Chair and Director of numerous commercial and not-for-profit organisations previously held positions with the Townsville Hospital Health Service (Chair), Tropical Health Academic Research Centre (Chair), the Jezzine Barracks Community Trust (Chair), the Australian Technical College of North Queensland (Chair) and Yumba Meta (Director). He was formerly the President of the Townsville Chamber of Commerce and is a Life Member of Townsville Enterprise Ltd.

**BOARD TERM: 2017 -2022**



**Cr Peter Long | Karratha, WA**  
BE (Hons), BA, BSc (Env Sc),  
CPEng (1989-2012), GAICD,  
FIEAust

Peter is Mayor of the City of Karratha. A professional engineer and environmental scientist, Peter has lived in the North for 32 years. Before becoming Mayor, he started and ran a combined engineering and environmental consulting business for 25 years. This grew to some 90 personnel with offices in Perth, Karratha and Margaret River.

Apart from his Mayoral and CRCNA duties, Peter currently serves on several Boards including: Astron Engineering (Managing Director), Rangelands NRM (WA), Pilbara Universities Centre (Chair), WALGA State Council, North West Defence Alliance (Chair), Engineers Australia Cyclone Safety Taskforce, Regional Road Group (Chair), Regional Capitals Alliance, Murujuga Rock Art Stakeholder Reference Group.

**BOARD TERM: 2017-2023**



**Brendon Douglas | Darwin, NT**  
BA/LLB (Hons), GAICD

Brendon is experienced in executive leadership in the higher education, commercial, community and public service sectors. He works as the Deputy Director at Menzies School of Health Research and International Fellow at Oxford Academic Health Partners. Brendon is a qualified lawyer, Fellow of the Institute of Managers and Leaders, and has postgraduate qualifications in management. Brendon is actively involved and engaged in policy discussions relevant to the 'north', including the developing Northern Australia agenda and the Northern Territory's Operation Rebound.

**BOARD TERM: 2020-2023**



**Dr Rebecca Mohr-Bell**  
**Katherine, NT** B. Nat. Res.  
Econ, PhD (Economics)

Rebecca is a pastoralist and agricultural economist from Katherine, Northern Territory. Rebecca has extensive experience in supporting agricultural producers to improve their business performance and supporting agricultural organisations with strategic planning and research. With her husband she runs a commercial Brangus herd at Katherine which is focused on breeding a high growth, high fertility animal. Rebecca is a member of several Northern Territory government advisory committees and a member of the Northern Territory Isolated Children's Parents' Association State Council. She has recently been appointed to the Board of Rural Business Support, a non-profit organisation which provides independent business advice to agricultural and small businesses in the Northern Territory and South Australia.

**BOARD TERM: 2020-2023**



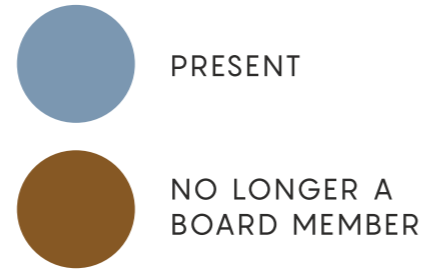
**Ronald (Ricky) Archer**  
**Darwin, NT**

Ricky is a Djungan man from the western Tablelands region of northern Queensland. He has a strong network of on-the-ground land and sea managers across Northern Australia from which to draw from and has demonstrated an ability to connect on-ground work of Indigenous organisations with regional, state and commonwealth priorities. Ricky is currently the Chief Executive Officer of the North Australian Indigenous Land and Sea Management Alliance (NAILSMA). He is involved with numerous organisations and committees enabling strategic input across a diverse field, these include: North Commonwealth Marine Park – Board Member, Northern Territory Aboriginal Land Management Advisory Group – Chairperson, National Feral Pig Action Plan Implementation Committee – Chairperson, National Forestry Stewardship Council, Indigenous Working Group – Member, Indigenous Innovation Alliance – Member.

**BOARD TERM: 2020-2021**



## BOARD MEMBER MEETING ATTENDANCE



		MEETING DATES									
POSITION	NAME	26/08/20	30/09/20	28/10/20	25/11/20	02/12/20	17/02/21	10/03/21	19/03/21	25/06/21	
Chair	Sheriden Morris	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
Deputy Chair	Don McDonald	PRESENT	PRESENT	PRESENT	PRESENT	NO LONGER A BOARD MEMBER	PRESENT	PRESENT	PRESENT	PRESENT	
Board member	John Bearne	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
Board member	Ricky Archer	PRESENT	NO LONGER A BOARD MEMBER	PRESENT	NO LONGER A BOARD MEMBER	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
Board member	Peter Long	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
Board member	John Wharton	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
Board member	Tracey Hayes	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	PRESENT	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	
New Board member	Rebecca Mohr-Bell	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	
New Board member	Brendon Douglas	NO LONGER A BOARD MEMBER	NO LONGER A BOARD MEMBER	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	

## FINANCE AND AUDIT COMMITTEE

The role of the Committee is to provide a consultative forum which make recommendations to the Board on:

- the appointment of the auditor (to be voted on by the membership at the AGM)
- the CRCNA's budget allocations
- financial benchmarks established by the Finance and Audit committee and approved by the Board
- the CRCNA's response to performance against the financial benchmarks
- any matters having a significant financial impact on the CRCNA
- financial matters relating to the CRCNA's borrowing program and any contracts more than the delegation authority requiring Board approval
- any matters referred to it by the Board.



Mustard plant, Mareeba, QLD.

## COMMITTEE MEMBERS AND MEETING ATTENDANCE

POSITION	NAME	MEETING DATE 20/10/20	MEETING DATE 18/02/21	MEETING DATE 20/05/21
Chair	John Bearne	PRESENT	PRESENT	PRESENT
New Committee member	Rebecca Mohr-Bell	PRESENT	PRESENT	PRESENT
Committee member	Peter Long	PRESENT	PRESENT	PRESENT
Committee member	Luke Guazzo	PRESENT	PRESENT	PRESENT



# SUPPLEMENTARY INFORMATION

This section includes:

- CRCNA project participants (current and completed projects)
- Publications
- Embedded students

## PARTICIPANT ACRONYMS

ABFA	Australian Barramundi Farmers Association
ACFA	Australian Cane Farmers Association
APFA	Australian Prawn Farmers Association
AMIA	Australian Mango Industry Association
AustCham ASEAN	Australia-ASEAN Chamber of Commerce
ASMC	Australian Sugar Milling Council
BBIFMAC	Burdekin-Bowen Integrated Floodplain Management Advisory Committee Inc
CCA	Cattle Council of Australia
CDU	Charles Darwin University
CfAT	Centre for Appropriate Technology
CRDC	Cotton Research and Development Corporation
CSD	Cotton Seed Distributors Limited
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CQUniversity	Central Queensland University
DAF	Department of Agriculture and Fisheries – Queensland
FNQROC	Far North Queensland Regional Organisation of Councils
GW3	Greater Whitsunday Alliance
GRDC	Grains Research and Development Corporation
ILSC	Indigenous Land and Sea Corporation
JCU	James Cook University
KPCA	Kimberley Pilbara Cattlemen's Association
MLA	Meat and Livestock Australia
NTCA	Northern Territory Cattlemen's Association
NTFA	Northern Territory Farmers Association Inc (NT Farmers)
NTSC	Northern Territory Seafood Council
NTLEA	Northern Territory Livestock Exporters Association
NT DITT	Northern Territory Department of Industry, Tourism and Trade
NT DEPWS	Northern Territory Department of Environment, Parks and Water Security
PwC	PriceWaterhouseCooper
QAAFI	Queensland Alliance for Agriculture and Food Innovation
QAIHC	Queensland Aboriginal and Islander Health Council
QCGO	Queensland Canegrowers Organisation
QUT DMRC	Queensland University of Technology – Digital Media Research Centre
RDANT	Regional Development Australia, Northern Territory
RDA MIW	Regional Development Australia Mackay Isaac Whitsunday
RCS WA - UWA	University of Western Australia - The Rural Clinical School of Western Australia
SRA	Sugar Research Australia
TAAHC	Tropical Australian Academic Health Centre Ltd
TEL	Townsville Enterprise Limited
T.H.E	Traditional Homelands Enterprises
UQ	University of Queensland
WA DPIRD	Western Australia Department of Primary Industries and Regional Development





## CURRENT PROJECT PARTICIPANTS

CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
A.1.2021004	Sugarcane Industry Situational Analysis: Industry consultation and roadmap development	SRA ASMC QCGO ACFA AgForce Qld
A.1.2021014	Future-proofing the NA aquaculture industry need for skilled staff to 2050	JCU APFA ABFA CDU CQUniversity Skills Impacts Ltd LMC Training Pty Ltd
A.1.2021028	Mackay Isaac Whitsunday regional agricultural supply chain baseline study	GW3 RDA MIW NQ Bulk Ports Bowen Gumlu Growers Association Mackay Airport Pty Ltd DAF
A.1.2021063	A situational analysis of the horticulture sector across Northern Australia	CDU CQUniversity
A.1.2021074	Water Productivity, efficiency and sustainability in tropical horticulture	NT Farmers NT DITT Power and Water Corporation Territory Natural Resource Management Incorporated NT DEPWS AMIA
A.2.2021114	Seed handling, crushing and refining Infrastructure Feasibility Project	GO Resources Pty Ltd Savannah Ag Research Pty Ltd Profeeds NQ Pty Ltd DAF Department of State Development Infrastructure Local Government and Planning Port of Townsville Limited
A.2.2021052	Demonstrating Next-Generation Resilient Orchard Production Systems for Tropical Crops	DAF NT DITT WA DPIRD Manbulloo Limited Aus-Ex Fruit NT Farmers
AT.2.1718031	Improving the efficiency of Kakadu Plum/Gubinge value chains to grow a robust and sustainable industry	QAAFI UQ T.H.E
A.2.1819105	Developing a broadacre cropping sector in northern Queensland	DAF The Trustee for Fry Bloodline TM Trust

CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
A.2.1718116	Developing an oilseed industry in Northern Australia	Farmacist Pty Ltd Olive Vale Pastoral Pty Ltd The Lakeland Farming Trust Savannah Ag Research Pty Ltd (Savannah Ag Consulting)
A.2.1819106	De-risking broadacre cropping options in northern Queensland	QAAFI-UQ Radicle Seeds Australia Pty Ltd GC & SR Rickertt Harris Operations Pty Ltd – Strathmore Station BIJ & RJ Pedracini – Prestwood Station Northern Gulf Resource Management Group Ltd AgForce Elders
A.2.1819045	Spicing up Northern Australia with high-value condiment crops	CQUniversity Agriventis Technologies Pty Ltd Rockhampton Regional Council T.R.A.P Services BBIFMAC Foxwell Farming G Kennedy and I.J Kennedy Kenrose Co Pty Ltd Kennedy Valley Farming NT DITT WA DPIRD
A.3.2021051	Developing Asparagopsis seaweed cultivation at scale in Northern Australia	University of Western Australia Pilbara Blue Carbon Co Pty Ltd Ocean Green Farms Pty Ltd Darryl Corps Family Trust T/A Karratha Earth Moving and Sand Supplies Abrolhos Aquaculture Australia Pty Ltd Future Green Solutions Pty Ltd Rangelands NRM Coordinating Group Inc Australian Producers Consortium Pty Ltd Curtin University
A.2.1819053	Northern Australian Tropical Rock Oyster Research and Development	NT DITT WA DPIRD DigsFish Services Pty Ltd Yagbani Aboriginal Corporation Anindilyakwa Land Council Maxima Rock Oyster Company Pty Ltd Athair Aquaculture Pty Ltd (Albany Shellfish Hatchery) Murujuga Aboriginal Corporation Hexcyl Systems Pty Ltd ZAPCO Aquaculture SEAPA





CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
<b>A.2.1819004</b>	Potential for broadacre cropping in the NT	NT DITT University of Southern Queensland CSIRO NT Farmers DEPWS DAF CSD CRDC GRDC Branir Pty Ltd and the Trustee for Booloomani Unit Trust T/A Tipperary Group of Stations Northern Livestock and Agriculture Pty Ltd (Ruby Downs) Northern Territory Agricultural Company Pty Ltd (Edith Springs Station) The Trustee for DWH Unit Trust T/A 7H Horse and Cattle Co (Carbeen Park) C.O. Frith & E.A. Frith & J.O. Frith T/A Glen Arden Cattle Company
<b>AT.2.1718098</b>	Cherabin aquaculture production as an enabler for Indigenous business development	North Regional TAFE Emama Nguda Aboriginal Corporation
<b>A.3.1819007</b>	Sustainable export supply chains for Calypso mango to China	DAF UQ Perfection Fresh Australia
<b>A.3.1819067</b>	Strengthening Northern Australia's horticultural sector through assessing protected cropping value chain linkages and pathways for adoption	DAF WA DPIRD Carnarvon Growers' Association Inc NT Farmers BTM Hort Pty Ltd Port of Townsville Ltd Pirrone Brothers Produce
<b>A.3.2021002</b>	Suitable sugarcane to diversify income and add value	UQ SRA Far North Milling Council
<b>A.3.2021116</b>	Pioneering Tropical Rock Lobster raft grow-out for Northern Australia	Sea Raft Research Pty Ltd T/A Ormatas Maxima Rock Lobster Pty Ltd PFG Group Pty Ltd JSJ Seafood Pty Ltd Honey and Fox Pty Ltd University of Tasmania
<b>AT.4.1819006</b>	Co-mapping on Country: Train the trainer for sustainable development	Centrefarm NAILSMA NLA CDU
<b>AT.4.2021001</b>	Maximising northern tropical forestry-linking communities and cutting-edge technology	FWPA TPC Port Melville Pty Ltd University of Melbourne Plantation Management Partners Pty Ltd NT DITT CDU

CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
<b>H.5.2021046</b>	Economic assessment of disability models of care in remote communities	Flinders University JCU Northern Territory Department of Health - NT Regional Health services
<b>H.5.1718035</b>	Establishing eye screening services to prevent avoidable blindness in remote Northern Australian communities	CSIRO Queensland Health Laynhapuy Homelands Aboriginal Corporation Marthakal Homeland and Resource Centre Aboriginal Corporation
<b>H.5.1920041</b>	Developing a simple, robust telehealth system for remote communities	Simbani Integrated Research Emerge IT Solutions Laynhapuy Homelands Aboriginal Corporation Puntuturnu Aboriginal Medical Service SkyMesh Pty Ltd Synapse Medical Services VisionFlex Pty Ltd CDU BIZ365
<b>H.5.2021068</b>	Integrating Health Care Planning for Health and Prosperity in North Queensland	JCU TAAHC QAIHC Western Queensland Primary Care Collaborative Ltd (Western Queensland Primary Health Network) Northern Territory of Australia (Department of Health NT) UWA- RCSWA
<b>AHT.7.2021021</b>	Leading CRCNA's De-risking and supply chain investment and impact	JCU



## COMPLETED PROJECTS AND PARTICIPANTS 2018-2021

CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
A.3.1718105	Transforming mango futures	DAF Manbulloo Limited BJM Enterprises Pty Ltd AMIA
A.1.1718097	Exporting perishable commodities to Asia: Developing a stakeholder collaboration model	CQUniversity Growcom Rockhampton Regional Council Tropical Pines Pty Ltd Passionfruit Australia DAF Queensland Department of State Development
A.1.1718117	Northern Australian beef sector industry situational analysis study	CSIRO NTCA KPCA AgForce Queensland CCA
A.1.1718014	Evaluation of the potential to expand horticultural industries in Northern Australia	QAAFI UQ Horticulture Innovation Australia DAF NT DITT WA DPIRD
A.1.1819039	Mackay, Isaac, Whitsunday agribusiness export supply chain mapping study	GW3 North Queensland Bulk Ports RDA MIW Bowen Gumlu Growers' Association
A.1.1718122	Northern forestry and forest products situational analysis	Timber Queensland NT DITT University of the Sunshine Coast DAF
A.1.1718119	Northern Australia aquaculture industry situational analysis study	JCU CSIRO Blueshift Consulting ABFA ILSC
A.1.1718120	Northern Australia rice industry situational analysis study	QAAFI UQ CDU Olive Vale Pastoral Rice Research Australia (SunRice) WA DPIRD DAF
A.1.1718113	Biosecurity in northern Australian prawn aquaculture	JCU APFA

CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
A.1.1819043	Growth of agricultural exports from FNQ through enhanced supply chains	Advanced Cairns Cairns Airport Pty Ltd Far North Queensland Ports Corporation (Ports North) Air Freight Handling Services Pty Ltd DAF JCU FNQROC
H.1.1819103	Northern Australia health service delivery situational analysis	JCU Cairns and Hinterland Hospital and Health Service, on behalf of the Tropical Australian Academic Health Centre Northern Territory of Australia – Top End Health Service RSCWA
A.1.1718118	Northern Australian broadacre cropping situational analysis	Pivotal Point Strategic Directions ST Strategic Services Pty Ltd
A.1.1718104	North Queensland agricultural market and supply chain study	TEL NQROC
HT.2.1718007	Enabling a traditional Australian medicinal plants agribusiness	Integria Healthcare (Australia) Pty Ltd T.H.E Menzies School of Health Research UQ
AT.2.1718054	Building the Traditional Owner-led bush products sector	CSIRO Kimberley Land Council Girringun Aboriginal Corporation Tropical Indigenous Ethnobotany Centre (TIEC) In-Group Investments JCU Australian Native Food and Botanicals
A.3.1718083	Smart supply chains	T-Provenance Pty Ltd Manbulloo Limited Growcom
AT.4.1718111	Business on country: Land use diversification on the Indigenous estate	NAILSMA Darwin Centre for Bushfire Research, Charles Darwin University Northern Land Council The Trustee for the Nature Conservancy Australia Trust
AT.4.1718040	Building horticultural production knowledge and capacity within indigenous enterprise	Growcom Mungulla Station Gudjuda Station
AHT.7.1718129	Northern Australian Communication Analysis	QUT DMRC Premise The Cairns Institute (JCU) CDU – Northern Institute CfAT RDANT
A.7.1718101	Reframing smart supply chains in Northern Australia	JCU CDU





CRCNA PROJECT REFERENCE	PROJECT NAME	PARTICIPANTS
A.7.1718124	Northern Australia agriculture investor identification and analysis	PwC
A.7.1920001 NT	Prioritising, de-risking and brokering agricultural development in the Northern Territory	NAJA Business Consulting Services
A.7.1920001WA	Prioritising, de-risking and brokering agricultural development in Western Australia	NAJA Business Consulting Services WA DPIRD
A.7.1920001	Prioritising, de-risking and brokering agricultural development in northern Queensland	CRCNA
A.7.1920043	Improving water markets and trading through new digital technologies	Civic Ledger Pty Ltd Queensland Department of Natural Resources Mines and Energy Royal Melbourne Institute of Technology (RMIT) Blockchain Innovation Hub Griffith University Far North Queensland Growers
A.7.1819078	Capturing the ASEAN Agricultural opportunity for northern Australia	Australia-ASEAN Chamber of Commerce, Singapore
AHT.7.2021008	Developing online data tools for Northern Australia scoping study	AEC Group Ltd

NAME	UNIVERSITY	CRCNA PROJECT	RESEARCH TOPIC	PROGRAM
Zara Boshier	The University of Queensland	A.2.1718031	Exploring the drivers for NIR spectroscopy technology adoption in an Indigenous-led wild harvested Kakadu plum value chain	Masters
Jiale Zhang	The University of Queensland	A.2.1718031	Exploring the nutritional value and biological potential of <i>Terminalia carpentariae</i> , an Australian native plant	Masters
Amit Khanal	The University of Queensland	A.3.1819007	Improving internal quality at retail - improving production practices to reduce the incidence of Jelly Seed and Stem End Cavity 'Calypso' mango	PhD
Muhammad Assad Ullah	The University of Queensland	A.3.1819007	Improving production practices to reduce the incidence of Internal disorders in 'Calypso' mango	PhD
Dagan Herceg	University of Sydney	A.7.1920043	Blockchain solidity coding	Masters
Ben Rennie	James Cook University	A.2.1819053	Broodstock conditioning techniques and bioremediation ability of the Tropical Black-lip Rock Oyster ( <i>Saccostrea echinata</i> )	Masters

## EMBEDDED STUDENTS

NAME	UNIVERSITY	CRCNA PROJECT	RESEARCH TOPIC	PROGRAM
Freddy Jonotara Hutapea	University of Melbourne	AT.4.2021001	Sustainable plantation management in tropical forests with seasonal rainfall	PhD
Umar Ibrahim Suliankatchi Shaik Abdul Khader	University of Melbourne	AT.4.2021001	Genomic selection and genome wide association studies in <i>Eucalyptus pellita</i> on Tiwi Islands	PhD
Listya Mustika Dewi	University of Melbourne	AT.4.2021001	Elucidating the molecular and genetic control of wood quality of commercially grown <i>Eucalyptus pellita</i>	PhD
Falade Oluwatosin Esther	University of Melbourne	AT.4.2021001	Developing options for wood processing methods and product development to offer guidance for plantation improvement strategies in Northern Australia	PhD
Lipy Adhikari	University of Queensland - QAAFI	A.2.1819106	De-risking broadacre cropping options in Northern Queensland	PhD
David Murtagh	Charles Darwin University	H.5.1920041	An exploration of the factors impacting the productive use of video conferencing-based telehealth in remote Australia	PhD
Eshetu Bobasa	The University of Queensland	A.2.1718031	Impact of wild harvest, region and processing on the quality and functionality of <i>Terminalia ferdinandiana</i> Exell fruits	PhD



## PUBLICATIONS

Akbar, D., Bhattarai, S., Kinnear, S., Rahman, A., Rolfe, J., Schrobback, P. (2020) Models of horizontal collaboration in agrifood export supply chain: the case of Queensland's mango industry. *Australasian Journal of Regional Studies*, Vol. 26, No. 3, pg 211. <https://www.anzrsai.org/publications/ajrs/2020-Volume-26/Issue-3/>

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## VIDEOS AND WEBINAR SESSIONS

### De-risking broadacre cropping options in north Queensland

30 April 2021 • Webinar

### Potential for broadacre cropping in the NT

30 April 2021 • Webinar

### Developing a broadacre cropping sector in north Queensland

30 April 2021 • Webinar

### Spicing up Northern Australia with high-value condiment crops

30 April 2021 • Webinar

### Developing an oilseed sector in Northern Australia

30 April 2021 • Webinar

### Broadacre cropping webinar series - Farmers' reflections

30 April 2021 • Webinar

### Northern Australia health service delivery situational analysis

12 August 2020 • Webinar





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