

State of the North 2020

A summary of the CRCNA's research findings in agriculture, communications, Traditional Owner-led development and northern health service delivery sectors.

November 2020



Acknowledgements

The Cooperative Research Centre for Developing Northern Australia (CRCNA) delivers industry-led research collaborations across Northern Australia in the areas of agriculture and food, northern health service delivery and Traditional Owner-led business development (in these areas). The CRCNA brings together industry, research institutions and universities, regional development organisations, governments and northern jurisdictions and international partners to deliver industry-led research and development collaborations which de-risk Northern Australian development and attract quality investment, improving the competitiveness, productivity and sustainability of the region's economy and the wellbeing of its communities.

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The CRCNA acknowledges the Traditional Custodians of the lands which our staff and researchers live and work and pay our respects to their Elders past, present and emerging.

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This report provides a summary overview of the CRCNA's research and is not intended to provide a full account of the research activities or outcomes.

For more information about these projects and to access the full research outcomes visit www.crcna.com.au/publications.

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List of abbreviations and acronyms

Term	Full name
ABS	Australian Bureau of Statistics
ASEAN	Association of Southeast Asian Nations
CfAT	Centre for Appropriate Technology
COAG	Council of Australian Governments
COVID-19	2019 novel coronavirus
CRCNA	Cooperative Centre for Developing Northern Australia
CSIRO	Commonwealth Science and Industrial Research Organisation
DAF	Department of Agriculture and Fisheries, Queensland
ERF	Emissions Reduction Fund
ESCAS	Exporter Supply Chain Assurance System
FNQ	Far North Queensland
GBRMPA	Great Barrier Reef Marine Park Authority
GDP	Gross Domestic Product
GVP	Gross Value Production
Ha	Hectares
IRG	Indigenous Reference Council
LGA	Local Government Area
MIW	Mackay-Isaac-Whitsunday
NAILSMA	North Australian Indigenous Land and Sea Management Alliance
NAIF	Northern Australia Infrastructure Fund
NASONG	Northern Australian Senior Officers Networking Group
NESP	National Environmental Science Program
NT	Northern Territory
NT DITT	Northern Territory Government Department of Industry, Tourism and Trade (previously Northern Territory Government Department of Primary Industry and Resources NT DPIR)
NWI	National Water Initiative
PC	Protected cropping
ONA	Office of Northern Australia
QLD	Queensland
R&D	Research and Development
RD&E	Research, development and extension
SMEs	Small to medium sized enterprises
SWOT	Strengths, weaknesses, opportunities, threats
TRO	Tropical Rock Oyster
UAE	United Arab Emirates
VHT	Vapour Heat Treatment
WA	Western Australia
WA DPIRD	Western Australian Government Department of Primary Industry and Regional Development

Minister's foreword



Hon. Keith Pitt MP
Minister for Resources, Water and Northern Australia

I am very encouraged by the strong foundation of research work presented to you in the inaugural State of the North Report from the Cooperative Research Centre for Developing Northern Australia (CRCNA).

In 2020, we've faced significant global challenges, but our investment in and focus on research to identify growth opportunities for our key sectors continued.

This report presents the state of development in key agricultural sectors, communications, Traditional Owner-led business, and health services across the north. The result of extensive research, consultation and engagement, this report provides pathways to improve productivity and competitiveness for our northern agriculture, food and tropical health sectors.

Importantly, the CRCNA has outlined innovative ideas and opportunities to dismantle the barriers to growth, jobs and investment in the north.

The research into reframing smart supply chains for example, found significant potential for economic growth in northern Australia across different industries. With supply chains strengthened our trade volumes intensify and smart digital technologies are adopted. This means a more practical and targeted market approach to expanding our highly sought after products into ASEAN markets.

This report will inform communities, businesses and industries. It will also support policy decision making for economic recovery from the COVID-19 pandemic in the north.

The CRCNA continues to be a core element of the Australian Government's research agenda for developing the north, bringing together industry, researchers, regional organisations and international partners to collaborate on opportunities for growth.

I look forward to working with the CRCNA to deliver on the vision for a more prosperous, innovative and productive Northern Australia for the benefit of all Australians.



The result of extensive research, consultation and engagement, this report provides pathways to improve productivity and competitiveness for our northern agriculture, food and tropical health sectors.

Hon. Keith Pitt MP
Minister for Resources, Water and Northern Australia

Chair's foreword



Sheriden Morris
CRCNA Chair

As the inaugural Chair of the Cooperative Research Centre for Developing Northern Australia (CRCNA), I am proud to deliver the first State of the North 2020 report.

The importance of this report cannot be understated. For the first time, the CRCNA has delivered a comprehensive assessment of the current state-of-play of the dominant and emerging agricultural, communications, Traditional Owner-led development and health service delivery sectors in Northern Australia.

We now have a clear picture of the North's opportunities and a better understanding of what we need to do to capture these opportunities to deliver a healthier, more prosperous Northern Australia for all of Australia.

This State of the North report represents a snapshot in time. It provides new insights, provokes discussion and, hopefully, spark meaningful prioritisation of effort and action by informing new policy and budgetary directions. The report itself is not a silver bullet solution, but it challenges the status quo and articulates what is needed to drive the developing Northern Australia agenda forward.

Our research has provided a detailed understanding of the common impediments to Northern development faced by our sectors. It has also helped focus attention on the need for greater coordination within and across government jurisdictions to unlock opportunity. Many of the identified impediments are well-known, but until now, they haven't been backed by evidence.

The research referenced and discussed in this State of the North 2020 is the result of deep industry engagement providing us, for the first time, data and intelligence specific to Northern Australia.

While our research was primarily conducted in a pre-COVID-19 world, it shows many of our vital agricultural sectors can expand and deliver economic opportunity of national significance. Thousands of jobs can be created across Northern Australia if conditions which support investment, innovation and sustainable growth are made available. As we transition to a post COVID-19 recovery, creating the best conditions for economic growth are critical and the opportunity the North presents must not be overlooked.

Our de-risking work with the Queensland, Northern Territory and Western Australian Governments further highlights the need to do things differently. It encourages all of the major players, State, Territory and Local governments, industry, Traditional Owners, the knowledge sector and the community at large to work together towards a common goal of long-term economic prosperity for the region.

I'd like to thank our project participants and their stakeholders for their contributions towards the research which has informed this report. I would also like to thank the Australian, Western Australian, Northern Territory and Queensland Governments for their ongoing support of the CRCNA.



This State of the North report is by no means the silver bullet, but I believe it will challenge the status quo and provoke serious discussion about what is required to propel the developing Northern Australia agenda forward.

Sheriden Morris
CRCNA Chair

Executive summary



This inaugural State of the North 2020 report provides an overview of the CRCNA's foundational research across key Northern Australian agricultural, Traditional Owner, communications, and health sectors.

The key sectors examined in the first stages of the CRCNA's investment include beef, aquaculture, forestry, broadacre cropping, rice, mangoes, avocados and lychees.

Agricultural supply chains have been examined within the Mackay – Isaac – Whitsunday (MIW), North Queensland, Far North Queensland and the Association of Southeast Asian Nations (ASEAN) regional contexts.

This report is a culmination of the above foundational research projects and as such has identified:

- A baseline of the key agricultural sectors
- Opportunities for development
- Barriers to realising these opportunities
- Potential solutions to the identified barriers.

The research outcomes discussed in this report are the result of analysis and engagement across the various sectors, communities, governments and businesses. As such, the CRCNA is confident the recommendations and next steps outlined have the broad support of industry and economic development groups across the North.

Similarly, key impediments and identified solutions have been developed with industry and socialised across relevant Northern Australian agencies.

The common barriers to development identified across the CRCNA's research in individual sectors and supply chains includes:

- Poor incorporation of agricultural development opportunities in strategic planning
- Significant regulatory and process barriers, particularly in regards to the management of environmental impact
- A continued need to identify and allocate existing water resources in a sustainable way
- Complexities and limits to the resolution of conflicts in land tenure
- Poor regulatory consistency and harmonisation across state/territory jurisdictions. Key areas of concern include health and biosecurity
- Poorly developed governance and ownership models within supply and value chains
- Considerable non-tariff barriers to export
- Low producer desire to export and poor export readiness
- High costs of production relative to the southern states and territories, particularly energy (electricity, gas and liquid fuel) and general insurance
- Lack of quality in-location training and skilling opportunities
- Low standards of public amenity in major centres, hindering the attraction of qualified workers
- Fragmented industry leadership
- Inadequate health funding models
- Low awareness of cooperative industry models.

With wide cooperation emerging between the CRCNA and the Queensland, Western Australia and Northern Territory Governments, this research suggests the need to implement and evaluate the following solutions:

- Commonwealth, State, Territory and local governments working together with industry, investors and other interests to set targets for, and to, prioritise agricultural development in northern Queensland, the Northern Territory and northern Western Australia, with a strong focus on building a 30-year vision and effectively sequencing development
- The development of new collaborative planning models in priority agricultural development areas to use existing legislative frameworks to resolve significant water conflict, vegetation and biodiversity management, native title and tenure resolution and infrastructure and services planning
- The development of improved brokerage, assessment and approval approaches and targeted regulatory improvements aimed at de-risking priority landscapes (across environmental, social and infrastructural risks) in ways that can attract suitable investment/development
- Lifting the investment readiness of landholders to progress sustainable agriculture
- Stronger regionally and locally-based approaches to analysing, planning and resolving access to, and affordability of, energy and communications.

In developing this report, the CRCNA has interrogated the ideas and solutions proposed by the various research projects to deliver a suite of future research priorities for the CRCNA and other agencies. These include :

- Support effective de-risking of priority agricultural areas for investment
- Improve data accessibility for planning and investment
- Develop a strategic and integrated approach to biosecurity
- Review and resolve trade barriers
- Develop financial products to manage weather risk and avenues to reduce costs of production
- Establish a Northern Australian Supply Chain Development Fund
- Commit to strategic investment in sector and workforce development
- Empower industry leadership.

Additionally, in the context of the recommendations of the review of the former Council of Australian Governments (COAG) Councils and Ministerial Forums, consider the alignment of the CRCNA's future work program with the priorities of the Ministerial Forum for Northern Development and its sub-structures:

- Maintain and strengthen the Ministerial Forum for Northern Development, the Office of Northern Australia (ONA) and the Northern Australian Senior Officers Networking Group (NASONG) frameworks
- Continue the role of the Northern Australian Indigenous Reference Group (IRG).

The Northern Australian opportunity

Northern Australia

The combination of a low-risk investment destination, abundance in available resources and proximity to key consumer markets forms a pronounced value proposition for investment in Northern Australia (PwC 2020).

Production capability and potential to expand

Northern Australia covers more than 40% of Australia's land mass and contains up to 17 million hectares of potentially arable soil.

Proximity to, and importance of, Asia

Northern Australia is Australia's closest region to Asia's fast-growing key markets this is enhanced by access to Australia's Free Trade Agreements.

A unique part of the global tropics

Australia has a developed economy and its tropical climate provides a unique advantage to increase agricultural production through better technology and use of land.

Favourable conditions of trade

Australia is a low-risk investment destination with historically consistent growth and ease in investment processes that outperforms similar global economies.



**1,400 TO 2,300
NEW DIRECT JOBS IN
AQUACULTURE IN THE
NEXT 10 YEARS**



**600 NEW JOBS
IN NORTHERN
AUSTRALIAN FORESTRY
IN THE NEXT 10 YEARS**



**A STRATEGIC APPROACH
TO AIR FREIGHT WOULD
UNLOCK HIGH-VALUE
EXPORT OPPORTUNITIES**



**\$13B IN UNTAPPED EXPORT
POTENTIAL FOR NORTHERN
AUSTRALIAN BEEF AND
LIVE CATTLE**



**13M HECTARES
OF NATIVE FORESTS
WITH COMMERCIAL
POTENTIAL**



**DEVELOPING A SOYBEAN ROTATIONAL
SYSTEM WITH SUGARCANE WOULD
GENERATE AN ADDITIONAL \$46M IN
PRODUCTION VALUE**



**ADVANCES IN EHEALTH, TELEHEALTH
TECHNOLOGY AND DIAGNOSIS WILL
IMPROVE HEALTH AND WELLBEING
OF NORTHERN AUSTRALIANS**



**STRONG SUSTAINABILITY
CREDENTIALS CAN
UNLOCK EXPORT MARKET
OPPORTUNITIES IN EAST ASIA**



**\$800M OF UNTAPPED
HIGH VALUE EXPORT
POTENTIAL IN FAR NORTH
QUEENSLAND REGION**



**INTENSIFYING BEEF IN THE
NORTH QUEENSLAND REGION
CAN CREATE AN ADDITIONAL
\$200M EXPORT VALUE**



**GENERATING CRITICAL MASS
OF AGRICULTURAL ACTIVITY
ENABLES VALUE ADDING
THROUGH PROCESSING**



**POTENTIAL FOR A 50-FOLD
EXPANSION IN AREA AVAILABLE
FOR FRESHWATER POND
AQUACULTURE**

The Northern Australian opportunity

Agricultural exports			
	Value of agri exports	% of all export value	% value of agri exported
Northern WA	\$332 million	0.6%	64.8%
Northern Territory	\$339 million	2.3%	43.4%
Northern QLD	\$3.6 billion	5.8%	98.3%

Darwin SA4		
Population		
Current (2019)	147,255	
2031 projection	174,918	1.4% growth
ATSI Population	13,627	9.9% of total
Agriculture, forestry and fishing		
Gross Value Add	\$117.5 m	0.7% of total
Employment	1,101	1.4% of total
Health care and social assistance		
Gross Value Add	\$1,109.4 m	6.8% of total
Employment	8,854	11.5% of total

QLD Far North SA3		
Population		
Current (2019)	35,392	
2031 projection	38,010	0.6% growth
ATSI Population	18,620	57.7% of total
Agriculture, forestry and fishing		
Gross Value Add	\$359.8 m	16.3% of total
Employment	1,567	11.9% of total
Health care and social assistance		
Gross Value Add	\$133.1 m	6.0% of total
Employment	1,610	12.2% of total

Cairns SA4		
Population		
Current (2019)	253,842	
2031 projection	297,635	1.3% growth
ATSI Population	26,048	10.8% of total
Agriculture, forestry and fishing		
Gross Value Add	\$715 m	4.9% of total
Employment	7,128	6.3% of total
Health care and social assistance		
Gross Value Add	\$1,439.2 m	9.9% of total
Employment	17,313	15.3% of total

Western Australia - Outback (North) SA4		
Population		
Current (2019)	97,963	
2031 projection	104,019	0.5% growth
ATSI Population	25,389	27.1% of total
Agriculture, forestry and fishing		
Gross Value Add	\$363.3 m	0.7% of total
Employment	1,448	1.7% of total
Health care and social assistance		
Gross Value Add	\$440.8 m	0.8% of total
Employment	4,825	5.8% of total

Townsville SA4		
Population		
Current (2019)	237,100	
2031 projection	278,697	1.4% growth
ATSI Population	19,202	8.4% of total
Agriculture, forestry and fishing		
Gross Value Add	\$651.0 m	4.2% of total
Employment	4,610	4.2% of total
Health care and social assistance		
Gross Value Add	\$1,504.0 m	9.7% of total
Employment	18,327	16.7% of total



Mackay-Isaac-Whitsunday SA4		
Population		
Current (2019)	173,006	
2031 projection	197,668	1.1% growth
ATSI Population	9,075	5.3% of total
Agriculture, forestry and fishing		
Gross Value Add	\$685.1 m	2.1% of total
Employment	4,882	5.4% of total
Health care and social assistance		
Gross Value Add	\$980.2 m	3.9% of total
Employment	8,487	9.4% of total

Gascoyne SA3		
Population		
Current (2019)	9,308	
2031 projection	9,954	0.6% growth
ATSI Population	1,414	14.9% of total
Agriculture, forestry and fishing		
Gross Value Add	\$149.6 m	9% of total
Employment	561	11% of total
Health care and social assistance		
Gross Value Add	\$36.3 m	2.2% of total
Employment	404	7.9% of total

Northern Territory - Outback SA4		
Population		
Current (2019)	98,674	
2031 projection	104,917	0.5% growth
ATSI Population	50,889	56.2% of total
Agriculture, forestry and fishing		
Gross Value Add	\$662.8 m	6.7% of total
Employment	1,791	5.0% of total
Health care and social assistance		
Gross Value Add	\$796.7 m	8.1% of total
Employment	6,198	17.2% of total

QLD Outback - North SA3		
Population		
Current (2019)	29,862	
2031 projection	28,908	-0.3% growth
ATSI Population	8,042	27.2% of total
Agriculture, forestry and fishing		
Gross Value Add	\$302.3 m	7.5% of total
Employment	1,424	8.0% of total
Health care and social assistance		
Gross Value Add	\$128.8 m	3.2% of total
Employment	1,549	8.7% of total

Central QLD SA4		
Population		
Current (2019)	226,811	
2031 projection	251,478	0.9% growth
ATSI Population	13,675	6.2% of total
Agriculture, forestry and fishing		
Gross Value Add	\$921.2 m	3.6% of total
Employment	6,486	6.1% of total
Health care and social assistance		
Gross Value Add	\$980.2 m	3.9% of total
Employment	11,732	11.0% of total

Source: ABS (2017, 2020c), QGSO (2020), WAT (2019), NTGOV (2019), AEC (unpublished b,c).



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Introduction

The development of Northern Australia continues to be a national aspiration five years on from the Australian Government's 2015 White Paper on Developing Northern Australia. The White Paper provided an important platform for the Australian Government's wider collaborative plan to build a strong, prosperous economy and a safe and secure Australia.

The initial White Paper's focus included building strategic roads, telecommunications, water infrastructure and improving health service delivery outcomes; all with the intention of reducing the costs of doing business in the North and making it a more attractive place to invest, live and work.

With this State of the North 2020 report, the Cooperative Research Centre for Developing Northern Australia (CRCNA) has delivered, for the first-time, data and intelligence specific to the full scope of opportunity on offer. While the opportunity is vast, the North is in need of a long-term, pan-northern (east to west) strategic approach if it is to be fully realised.

The research discussed in this report highlights the need for stronger, more cohesive and coordinated mechanisms for delivering outcomes, measuring change and evaluating success.

The report is broken down into five sections:

- Section 1 provides an overview of the sectors included in the CRCNA's foundational research. These include key agricultural commodities, communications, the northern health service delivery sector
- Section 2 examines the current state of pan-northern agricultural supply chains, with a specific focus on three geographical areas in northern Queensland
- Section 3 summarises common impediments and challenges to development discussed in the preceding research
- Section 4 explores opportunities for governments to de-risk agricultural development across Northern Australia
- Section 5 provides a range of future directions for the CRCNA and all levels of government in Northern Australia.

The CRCNA acknowledges the research findings discussed in this report reflect a snapshot in time. However, they provide a sound platform to support and inform the emergence of new policy solutions, investment directions and continuous improvement in northern development.



Research has also focused on improving Traditional Owner-led business development, communications and digital inclusion and health service delivery and North.



Section 1: Sector overview

Overview of Northern Australia's agricultural sectors

Beef

	Production	Gross value of production	Employment
Northern QLD	5.9 million head 233,500 head live exported	\$3.3 billion in farming \$1.1 billion in manufacturing	8,275 in farming 2,316 in manufacturing
Northern Territory	2.2 million head 376,400 head live exported	\$569 million in farming \$35 million in manufacturing	1,289 in farming 71 in manufacturing
Northern WA	1.3 million head 130,600 head live exported	\$593 million in farming \$8 million in manufacturing	751 in farming 17 in manufacturing

Broadacre

	Production	Gross value of production	Employment
Northern QLD	455,000 tonnes of cereals 101,750 tonnes of pulses 4,150 tonnes of oilseeds 62,400 tonnes of cotton 11,000 tonnes of rice 412,000 tonnes of hay	\$116.6 million from cereals \$94.2 million from pulses \$3.3 million from oilseeds \$77.3 million from cotton \$4.7 million from rice \$32.8 million from hay	721 in farming
Northern Territory	3,900 tonnes of cereals 160 tonnes of pulses 90 tonnes of oilseeds 254 tonnes of rice 167,600 tonnes of hay	\$1.1 million from cereals \$0.1 million from pulses \$0.05 million from oilseeds \$0.1 million from rice \$17.1 million from hay	19 in farming
Northern WA	3,877,000 tonnes of cereals 270,600 tonnes of pulses 542,100 tonnes of oilseeds 242,300 tonnes of hay	\$1,100.5 million from cereals \$100.3 million from pulses \$300.0 million from oilseeds \$25.5 million from hay	51 in farming



Northern QLD catchment: Far North SA3, Outback - North SA3, Cairns SA4, Central Queensland SA4, Mackay - Isaac - Whitsunday SA4, Townsville SA4.

Northern WA catchment: Gascoyne SA3, Western Australia (North) SA4.

Northern Territory catchment: Darwin SA4, Northern Territory - Outback SA4.

Source: ABS (2016 a & b, 2017, 2020a & b), ABARES (2018, 2020), AEC (unpublished a, b, c), PHIDU (2020).

Forestry

	Production	Gross value of production	Employment
Northern QLD	4,900 ha of hardwood plantation 31,800 ha of softwood plantation	\$78.1 million in forestry \$290 million in manufacturing	165 in forestry 599 in manufacturing
Northern Territory	49,000 ha of hardwood plantation 1,900 ha of softwood plantation	\$53.1 million in forestry \$41 million in manufacturing	84 in forestry 85 in manufacturing
Northern WA		\$48.4 million in forestry \$5.5 million in manufacturing	77 in forestry 11 in manufacturing

Note: northern Western Australia and Northern Territory are a combined statistical area in the Australian Plantation Statistics

Aquaculture

	Production	Gross value of production	Employment
Northern QLD	3,900 tonnes of prawns 3,000 tonnes of barramundi 550 tonnes of other aquaculture	\$72.4 million from prawns \$28.4 million from barramundi \$6 million from other \$8.2 million from processing	300 in aquaculture 17 in seafood processing
Northern Territory	2,300 tonnes of barramundi	\$34.5 million from barramundi	39 in aquaculture
Northern WA	570,000 pearl shells 1,000 tonnes of barramundi	\$70.3 million from pearls \$12 million from barramundi \$6.2 million from processing	71 in aquaculture 13 in seafood processing

Mangoes

	Production	Gross value of production
Northern QLD	714,850 trees 26 million kg	\$59.3 million
Northern Territory	347,800 trees 11.3 million kg	\$32 million
Northern WA	107,500 trees 1.5 million kg	\$4.7 million

Avocados

	Production	Gross value of production
Northern QLD	274,500 trees 14.4 million kg	\$71 million
Northern WA	1,260 trees 1,240 kg	\$16 million

Lychees

	Production
Northern QLD	2.4 million kg





Sector analysis: Beef

Chilcott, C., Ash, A., Lehnert, S., Stokes, C., Charmley, E., Collins, K., Pavey, C., Macintosh, A., Simpson, A., Berglas, R., White, E., Amity, M (2020). Northern Australia beef situation analysis. A report for the Cooperative Research Centre for Developing Northern Australia. CRCNA, Townsville.

Current state

- The Northern Australian cattle industry contributes \$5.03 billion to the economy each year: \$3.7 billion at the farm gate and \$1.3 billion from first stage processing.
- 55.33% of land in Northern Australia is used for grazing cattle.
- Production systems are mostly extensive grazing on unimproved pastures. Property sizes are large and principally on family owned grazing properties.
- Australian beef industry is recognised as “clean, green and safe (disease free)”.
- A strength of the industry is in its low-input, low-cost approach, however, it is vulnerable to climate variability (drought).
- Approximately one million live animals are exported per year to South East Asian markets (and 59% of these to Indonesia alone). All live exports are subject to the Exporter Supply Chain Assurance System (ESCAS) that safeguards animal welfare in overseas supply chains.



Key challenges facing the sector

Capital costs and land values for domestic buyers are limiting succession planning and entry for new industry participants. High capital costs also restrict further capital investment in the business to improve operational efficiency.

Fragmented, geographically dispersed supply chains and poor enabling infrastructure like roads and rail creates challenges in transporting cattle to processing facilities and meat to markets in a cost-effective manner.

Low adoption of R&D means low translation of science into practice with traditional approaches to extension no longer effective.

Climate variability impacts on the welfare of cattle, particularly calves, human labour, pasture productivity and potentially increases pest threats.

Limited selling options results in a concentration of processing capacity and live export buyers. This is a key concern for the development of the industry, particularly in WA.

Increasing competition in beef export markets, particularly Indian buffalo into Indonesia and the US and Brazilian beef into Japan and Korea, could displace Australian exports.

Regulatory processes in relation to environmental management, pastoral leases, tenure resolution, animal welfare and live export can create uncertainty and additional costs to industry.

The opportunity

- Capitalising on production system synergies between Northern Australia and ASEAN nations, particularly Indonesia, where Australia can optimise different opportunities (e.g. processing).
- Establishing local meat processing infrastructure to provide alternative markets for local graziers.
- Developing cattle breeds to improve beef quality while maintaining enough tick resistance.
- Evolving from breeding enterprises to breeding and fattening through irrigated agriculture developments that can supply fodder and cheap protein.
- Supporting development of the Indigenous pastoral estate, which contributes to economic development for local communities on traditional lands.



Identified solutions

Implement proven R&D
At an individual property level, applying existing R&D can provide significant improvements in productivity and profitability.

Invest in infrastructure and supply chains
Attract investment in irrigated broadacre cropping to drive industry intensification and to provide diversified income for pastoralists. This could also underpin investment in localised processing facilities and enabling infrastructure.

Future-proof and de-risk investment
Identify the specific nature and magnitude of challenges associated with pastoral interests and native title and identify the most cost-effective solutions for implementation including within the Indigenous pastoral estate.

Assess the biodiversity values of the Northern Australian beef sector to identify management practices and ecosystem market opportunities and to balance biodiversity and maintain profitability.

Invest in biosecurity, especially in surveillance activities through technology and improved stakeholder engagement.

Sector analysis: Rice



Chapman, B., Henry, R., Wurm, P., Bellairs, S., Crayn, D., Smyth, H., Furtado, A., Ford, R., Sivapalan, S., Mason, G. (2020). A situational analysis for developing a rice industry in Northern Australia: Final report. CRCNA, Townsville.

Current state

- Australia contributes just 0.1% to global rice production despite exporting 85% of domestic production to more than 60 countries.
- Northern Australia is seen as an ideal environment for aerobically grown rice, especially as a high-value rotational crop for existing sugarcane cropping. Rice grows very quickly in the North, over approximately 110 days.
- The potential retail value of Australian native rice is between \$50 to \$200 per kilogram.
- Current native rice varieties have exhibited resistance to local pathogens.



Key challenges facing the sector

Biosecurity the North is impacted by a range of pests and diseases not found in the South. As a result, it is likely that crops of the most successful rice varieties grown in the South could easily falter, or even be destroyed, in the North.

Fragmented and dispersed supply chain development inhibit this emerging industry.

Improved or customised milling techniques for wild rice would be required for this industry to be feasible.

Milling, drying and storage infrastructure will drive the future development of the industry, particularly outside of the Townsville region. Additional milling infrastructure and drying and storing infrastructure is required to manage the mould risk from high humidity in the North.

Variety selection is still required as yields and costs of production of southern rice varieties are not favourable for northern production systems. New varieties are needed to thrive in the aerobic production systems in the North.

Opportunity

- Northern regions could focus on different, higher-value varieties that cannot be grown in the south. This would avoid competition and capitalise on the advantages of both agro climates.
- Given the current variability in weather and climate, and the significant restrictions on water availability in southern Australia, the climate of Northern Australia is presenting an extremely alluring option for rice.
- The initiation of one, or multiple, commercial rice production industries in Northern Australia is a feasible option as major new initiatives are needed to fill demands from both local and export markets.
- Rice may present diversification options for producers (particularly in the cane industry), boosting jobs and supporting the local economy.



Identified solutions

Plant breeding and selection of the most appropriate rice varieties (for specific regions) will be crucial to the success of an industry. There is potential to transfer genes from the naturally disease and pest-resistant wild rices found across Northern Australia into existing rice varieties.

Rotational cropping requires coordinated research and development with other industries, such as rotational work with sugarcane.

Indigenous enterprise – wild, native rice could present opportunities for capacity building and up-skilling.

Initiation of one, or multiple, commercial rice production industries is a feasible option in the North as major new initiatives are needed to fill demand from both local and export markets.

Rice may present diversification options for producers, boosting jobs and supporting local economies.

Opportunities afforded by aerobic production in the North present significant advantages over the southern region, which is being so heavily restricted by increasing costs and unavailability of water.

Sector analysis: Aquaculture



Cobcroft, J., Bell, R., Fitzgerald, J., Diedric, A., Jerry, D. (2020). Northern Australia aquaculture industry situational analysis. CRCNA, Townsville.

Current state

- Whilst Australia plays a relatively small role in the global seafood industry, at 0.15% of global fish and aquaculture volumes in 2016, the nation's production supports growing demand from both domestic and Asian consumers.
- Australia has a reputation within the Asian market as a reliable, high-quality supplier of seafood products.
- Global seafood consumption has more than doubled (on a per capita basis) since the early 1960s to approximately 20.5 kg per person in 2017.

Current production capability

- In 2016-17 the Australian aquaculture industry produced 11,182 tonnes of product.
- Around 17% of Australian aquaculture value comes from Northern Australia.
- The three largest contributors are barramundi (33%), prawns (32%) and pearls (31%).
- Annual Gross Value Production (GVP) in the financial year ending 2017 from Northern Australia aquaculture was approximately \$223 million.
- Comparatively, in the financial year ending 2017, Australia's aquaculture industry GVP was approximately \$1.35 billion.



Key challenges facing the sector

Environmental and regulatory barriers persist, despite the Productivity Commission (PC) 2016 findings that there is little evidence suggesting that regulations have systematically impeded the viability or growth of aquaculture businesses.

Biosecurity and disease incursion is the biggest risk to the Northern Australian aquaculture sector.

Market access is a major issue, including the inability to access key markets due to the lack of and/or high cost of the supply chain to market and significant competitive pressure from imports.

Market competition arises from considerable ambiguity around the origin of products in domestic seafood.

Skilled workforce shortages are limiting output, reflecting a national shortage in aquaculture, in addition to unavailability of local/regional skilled staff, and shortfalls in skills training.

A lack of coordinated research for science-based aquaculture policy and implementation.

Infrastructure gaps in local and regional infrastructure, impacting supply chain, input logistics and costs. Infrastructure gaps identified are roads, airports and cold storage capability.

High input costs, including local inputs (labour, water, power), transport/ imported inputs (feed, power, labour, parts and services) and supply chain inputs (transport services/options and connectivity).



Opportunity

- Rising incomes and urbanisation trends on a global scale are anticipated to drive an increase in the proportion of total fish production destined for human consumption over the coming years. As a result, global food fish consumption is anticipated to increase by 17.6% on 2016 levels by 2030.
- The Australian aquaculture industry vision is to grow production volume by 2030 to over \$1 billion

per annum, which will support an additional 1,400-2,300 jobs.

- Northern Australia has 500,000 - 700,000 ha of land suitable for marine farming in earthen and lined ponds. For freshwater pond culture, suitable areas are up to 50-fold larger.



Centre for Sustainable Tropical Fisheries & Aquaculture. Townsville, QLD.

Identified solutions

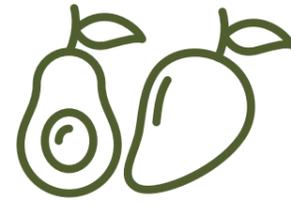
Enabling infrastructure to support development needs to be identified and prioritised to overcome supply chain and services gaps, as well as to generate synergies to develop production hubs.

Improve farm biosecurity to reduce risk and develop capacity. More investment in R&D on transmission pathways is required to develop 'farm guides' for early identification of disease and increase investment in testing laboratories and workforce capacity to test samples and support biosecurity measures.

Market research to better understand consumer trends and future needs will enable the industry to better position itself in higher-value domestic and international markets.

Training and skills to increase training and workforce engagement as well as promote aquaculture career pathways for Australians committed to living and working in the North meet industry growth.

Research and Development via coordinated RD&E grant programs that provide funding to modern, tropical and remote aquaculture needs at different scales of production that will enable improvements in laboratory, on-farm, start-ups, pilot and commercial upscaling processes.



Sector analysis: Mangoes, avocados and lychees

Cao, S., Hine, D., Henry, R., Mitter, N. (2020) Evaluation of the potential to expand horticultural industries in Northern Australia final report . CRCNA, Townsville.

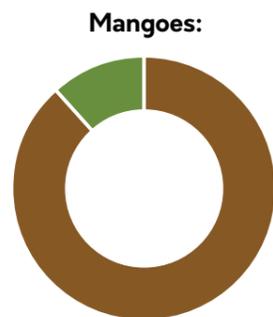
Current state

- Australia's tropical fruit industries have traditionally been focused on domestic consumption. However, some tropical produce grown in the North is exported to high value markets in Asia.
- Mango and avocado exports from Australia predominantly come from Queensland, the Northern Territory and Western Australia.
- 99% of lychees produced in Australia are grown in Queensland.
- Current supply chains for tropical fruit stretch from Northern Australia to southern sea and air freight hubs in Perth, Brisbane, Sydney and Melbourne to export markets in eastern Asia. This occurs because, despite the extra distance and scale, it is currently cheaper to export via southern centres than northern areas.

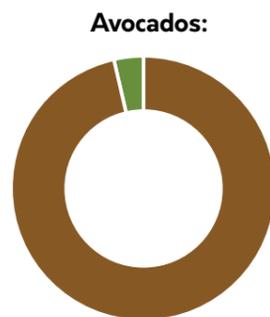


The opportunity

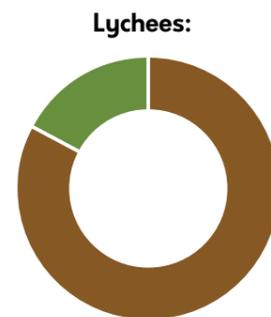
- Direct and regular air freight opportunities out of Townsville, Cairns and Darwin, supported by Vapour Heat Treatments (VHT) facilities.
- Import replacement of avocados imported for domestic consumption.
- Expansion of tree crop production areas with new water infrastructure.



Domestic: 88.42%
Export: 11.58%
(Hong Kong, Singapore, New Zealand, UAE)



Domestic: 96.49%
Export: 3.51%
(Singapore, Malaysia, Hong Kong)



Domestic: 83.01%
Export: 16.99%
(Hong Kong, Singapore, UAE, New Zealand, Saudi Arabia)



Key challenges facing the sector

Weather and climate variability is the primary issue identified by producers.

Cold chain gaps and breakdown in either domestic transit or international shipping is the biggest export supply chain constraint.

Transport / freight costs

Despite the additional distances, most exports are via Perth, Brisbane, Sydney or Melbourne because it's cheaper than exporting from Northern Australia.

Strong international competition from many of Australia's near neighbours, such as Indonesia, India, China, Thailand, Vietnam, Taiwan and the Philippines. These nations are major producers and net-exporters of tropical fruit.

A lack of collaborative relationships within the industry to stage production, supply and market demand and to manage constrained air freight at an industry level. This prohibits existing producers from securing economies of scale and scope when exporting.

Identified solutions

Build or strengthen existing supply chain governance and collaboration arrangements across QLD, NT and WA mango, avocados and lychee sectors.

Better integration of digital technologies like blockchain to inform and enhance marketing decisions.

Establish a knowledge hub to provide high-quality information base for growers.

Improve R&D and collaboration and planning between the industry, the research and the market.



Sector analysis: Forestry and forestry products

Stephens, M., Woods, T., Brandt C., Bristow, M. and Annandale, M (2020). Northern forestry and forest products industry situational analysis. CRCNA, Townsville.

Current state

- Northern Australia is home to 48% of Australia's total forests. This industry is an untapped resource with significant potential for the Northern Australian economy, including 22 million hectares of private forest and 13 million hectares of native forest with commercial potential.
- Forestry also provides carbon sequestration and other ecosystem services, regardless of whether the trees being grown are in plantations or native forests.
- The main production areas for forestry and forest products are around Cape York, Mareeba and Ravenshoe in Far North Queensland, East Arnhem, the Tiwi Islands, the Douglas Daly and Katherine areas in the Northern Territory as well as around the southern Kimberley/Ord River Irrigation Area in northern Western Australia.
- The industry is a significant employer, accounting for approximately 1,500 direct and indirect jobs in northern Queensland.



Key challenges facing the sector

Limited infrastructure the current standard of infrastructure in Northern Australia does not support expansion of the forestry and forest product industry.

Climate variability cyclones pose a risk of catastrophic loss in the forestry industry and there is a lack of financial products to manage the risk. This is limiting investment.

Skilled workforce gaps around silvicultural (forestry management) skill development needs.

The need for a better understanding of commercial inventory of native forests across Northern Australia. This is needed to support new developments.

A lack of high-level policy has created uncertainty for investment in tree plantation development.

Ambiguity on native forest clearing policies exists between governments, pastoralists, miners and native title holders. This impedes the decision-making process for landowners and land managers in terms of what they can and can't clear to expand their operations.



The opportunity

Given the extensive forest resources of Northern Australia, and the potential to target climatically and otherwise suitable expansion of the plantation forestry assets, the opportunities are equally broad and include:

- Expansion of downstream processing and value adding in Northern Australia.
- Economic development opportunities in Indigenous communities in forest management and in wood products manufacturing and supply (East Arnhem Land, NT and Cape York, QLD).
- Development of commercial forestry plantations with mining rehabilitation.
- Investment in carbon incentive and sequestration schemes.
- Collaborating with the pastoral industry on silvopastoral opportunities (forestry on grazing country).
- Growing export market opportunities due to geographic vicinity to growing ASEAN markets.

Future industry: commerciality of native forests (all tenures)

- Supplying a range of domestic and international markets for sawn timber for construction, wood chips, pulp and oils for fragrance and pharmaceutical markets.
- A diverse mix of hardwood, softwood, woodchip and oil processing facilities across Northern Australia.

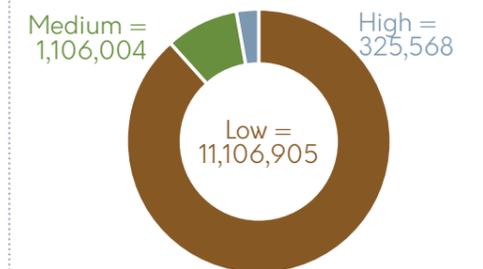
Northern Western Australia (ha)



Northern Territory (ha)



Northern Queensland (ha)



Commerciality is the expected volume yield of commercial sawlog (or veneer log or high-value equivalents) that is available from a forest stand over the long term, assuming good silvicultural practices are followed. Commerciality is derived from a combination of the merchantability and productivity of forest stands.

Identified solutions

Build and maintain the newly formed industry and cross-jurisdictional agency alliance to promote forest sector development across Northern Australia.

Promote Indigenous forestry development through better engagement models and commercial arrangements between industry and Indigenous landowners, and build Indigenous forestry capacity and understanding of commercial forest resources, including through forest resource inventory.

Develop of secure access arrangements for supply from crown native forest land (i.e. leasehold) in northern Queensland.

Develop a market research study into the potential supply and demand for wood products from Northern Australia, including key markets and supply chain needs (e.g. regional infrastructure).

Assess silvopastoral opportunities as a vehicle for new commercial tree plantings.

Review Emissions Reduction Fund (ERF) barriers to carbon market access for forestry activities, with priority on the 'water rule' requirement for new plantations.

Sector analysis: Broadacre cropping



ST Strategic Services and Pivotal Point Strategic Directions (2020). Northern Australia broadacre cropping situational analysis. CRCNA, Townsville.

Current state

- Australia is a well-established producer of broadacre crops. To date, Northern Australian participation in broadacre crop production has been of a far smaller scale than that in southern Australia.
- Shared dam infrastructure exists in the Mareeba/Dimbulah, Burdekin (QLD) and the Ord River Irrigation (WA) areas in addition to mosaic systems across the North, primarily supplied by artesian/groundwater or on-farm captured floodwaters.
- Dryland cropping is higher risk, lower cost and with larger-scale potential but can only be successful in years with regular rainfall events (potentially two to three out of every 10 years).
- Current broadacre crop production is dominated by fodder (forage sorghum or Rhodes grass predominately), soybean in a sugarcane rotation, chickpeas and mungbeans as well as some niche crops such as chia and maize.



Key challenges facing the sector

Water access is a major limitation to expanded broadacre cropping in Northern Australia.

On the ground validation of both irrigation and dryland production is required to assist informed discussion of the potential for broadacre cropping in Northern Australia.

Reliable access to land is problematic as regulation and processes around land use approvals, vegetation management, tenure and leases are complex and hamper producer confidence.

Biosecurity could become a bigger risk potential as year-round crop production introduces the possibility of establishing a green bridge across seasons that could promote the incursion of pests and diseases that could migrate further south into the more established cropping areas.

Market and value chain constraints

Crops that have come and gone in the North and failure has been mostly attributed to price falls below the costs of production and freight to market.

Too big too soon

Northern Australia is littered with cropping failures where development was not staggered in a way to allow for producers to learn from mistakes and successes before scaling-up or expanding their operations.

Climate variability

Dry season cropping in the Northern Australia is characterised by day lengths and temperature patterns that are the opposite of temperate production further South. The difference in the North's growing climate means that, while many agronomic practices can be adapted from production systems further south, some aspects of crop agronomy will require new knowledge to be developed and applied within the North.

Crop genetics

A very wide range of broadacre crops can be grown in Northern Australia, presenting a range of opportunities, but there is the temptation to focus on crops which, with some genetic improvement, could be competitive. This may be a legitimate long-term goal, but it is not suitable for the short-term development of broadacre cropping options.



The opportunity

- Integrated farming systems with a focus on profitable business models rather than an individual commodity. Post farm gate processing development linked to integrated farm enterprises (will enhance enterprise viability and resilience).
- Coordinated, participatory RD&E focused on constraints defined by producers, and coordination of commodity-led research functions.
- Development of flexible cropping options to assist agile management in response to variable rainfall.
- The development of critical first stage processing infrastructure for potential base crops such as cotton or oilseeds.

In October 2020, the NT Land Corporation, in partnership with NT Farmers Association, opened Expressions of Interest for three prospective agricultural land developments, totalling 105,017ha. Notably, one of these parcels (Keep Plains) could see the Ord Irrigation Scheme expand from WA into the NT.

	Future opportunity		
	Primary production (ha, volume and value)	First stage processing facilities, throughput and destination (domestic or international)	Export ports, value/volume exported and destinations
Northern Western Australia	<ul style="list-style-type: none"> • 30,000 ha in ORIA medium term + 30,000 ha long term • 10,000 ha in Pilbara/West Kimberley 	<ul style="list-style-type: none"> • Cotton gins in Kununurra, Katherine, Georgetown and Charters Towers • Feedlot demand for cottonseed/fodder and potentially sorghum grain • Expanded export capacity Townsville 	<ul style="list-style-type: none"> Cotton (min per gin): • Domestic: 20kt cottonseed • Export: 16kt Cotton lint (70k bales) Fodder/forage: Domestic Up to 2.5 mt Chickpea: Export up to 200kt Mungbean: Export up to 100kt Corn: Export 30kt Other crops Export and domestic up to 100kt
Northern Territory	<ul style="list-style-type: none"> • 35,000 ha dryland. • 11,000 ha irrigated mosaic 		
Northern Queensland	<ul style="list-style-type: none"> • 30,000 ha mixed irrigated and dryland in the Gilbert • 20,000ha mixed dryland and irrigated in the Flinders. Max irrigation is 11,000ha • 150,000 – 200,000ha irrigated in Mitchell (if all dams built) • Burdekin 30,000ha irrigated and 120,000ha mixed. • Other opportunities are being assessed and planned 		

Identified solutions

Development of a shared vision for agricultural development across northern jurisdictions or regions involving growers, processors, members of the public, Traditional Owners and native title holders and governments to support discussion and debate on how the opportunities afforded by development of broadacre cropping (or even agriculture as a whole) can be realised while protecting inherent ecological and cultural values.

The development of integrated systems and flexible business models

Crops working in conjunction with another system (e.g. sugar or maize) are focused on short rotational options or integration into a longer fallow with a preference for cash crop options. The variable nature of the environment, especially for dryland production,

requires a flexible approach to cropping that remains integrated with other enterprises.

Capacity building based on learning new systems This is best undertaken in a slow and steady approach, trialling crops on-farm rather than relying just on modelling to determine suitability.

Storage and handling supply chains require development. Scale for broadacre cropping on its own is unlikely to justify specialist supply chains, so working in with other systems is essential. For bulk commodities, this could include sugar, rice and woodchips.

Smarter regulation should involve de-risking government approval processes to access new land and sustainable water resources.

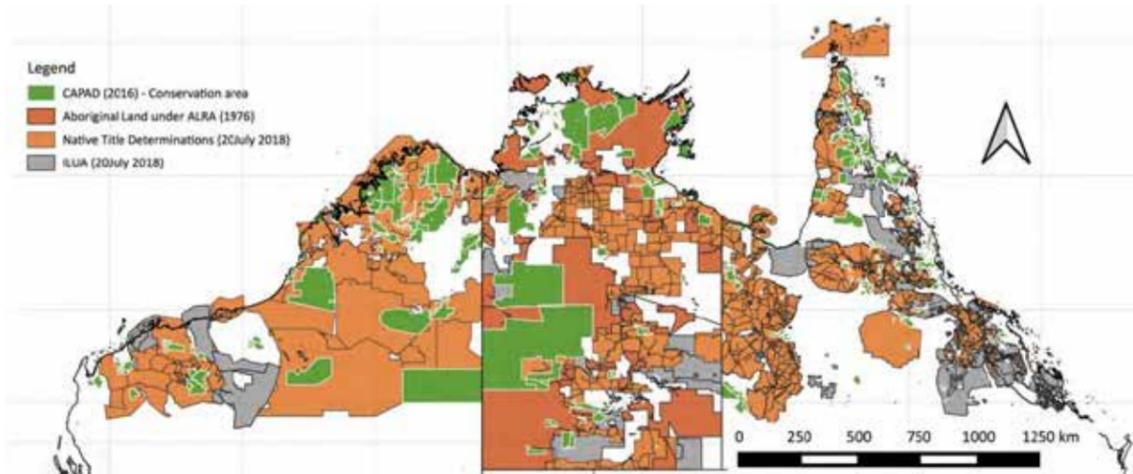


Sector analysis: State of the Indigenous Estate

North Australian Indigenous Land and Sea Management Alliance Limited (2020). State of the Indigenous Estate: background information for identifying and evaluating opportunities for economic development on Indigenous lands. Interim report.

Current state

- Much of the current speculation about the opportunity for agricultural development is focused within the 1.9 million km² of Northern Australia's tropical savannah country. Of this, 28 % or around 53 million ha is owned by Indigenous people – but the asset is yet to generate significant economic activity for the people who own and live on the land.
- In a broader sense, Traditional Owners have rights and interests across 78% of the entire Northern Australian landscape.
- The Indigenous estate is confined mostly to lower elevation regions suitable for agriculture.
- Compared with other land uses, Indigenous lands are disproportionately assigned, at least notionally, to conservation, where protected area management law may impact other commercial activity.
- Traditional Owners across the North have strong aspirations to lead their own development on land and sea country in ways that achieve integrated cultural, economic, social and environmental outcomes.



Indigenous title interests north of 26 degrees south (NAILSMA 2019).

Key challenges

Past development priorities have often been misaligned to Traditional Owner aspirations and interests.

Broad scale mapping of soils and water resources in Indigenous lands is mostly too coarse to inform selection or design and commercial interests of individual developments based on soil quality.

Outsourced labour often arises from limited efforts in enabling Indigenous workforce participation. economic activity, often because they source most labour and other input from outside the regions.

A low awareness of economic opportunities arises from Traditional Owners only recently restoring their rights and interests in land and sea country and a lack of long term support for country-based planning.

Communal ownership of land can complicate and prolong decision-making for large projects.

North Australian governments vary in the extent to which they have recognised or supported Indigenous-led development and the ownership of conservation areas. There is a Traditional Owner expectation that these areas will continue to be used at varying levels of intensity for Indigenous-led management and research services, commercial tourism and other opportunities.

There is a high cost to scale operations
The patchiness of favourable development opportunities across the Indigenous estate increases the costs of infrastructure to support development or to maintain a dispersed operation.

Capital raising opportunities are hard for Indigenous landholders to secure because of complexities in land and sea tenure arrangements.

Public investment in infrastructure are needed to foster opportunity and encourage meaningful development.



The opportunity

There is a deep interest from Indigenous landholders in maintaining connection to land, sustaining the customary economy and meeting cultural obligations as well as delivering culturally appropriate economic benefits. Areas of expressed interest in in approximate order of frequency identified in the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) research to date, include:

- Land and sea management, often Ranger work
- Horticulture, often small scale for local supply
- Pastoralism, often small scale for local supply
- Wild harvest, especially of feral animals
- Fisheries, including aquaculture
- Mining and energy opportunities focused on construction and maintenance services to mines or small-scale quarrying to provide gravel and sand
- Construction and maintenance services, especially fencing and roadworks
- Forestry, usually around harvesting of natural stands rather than establishing plantations
- Furniture making and small-scale manufacture of bush products
- Participation in ecosystem service markets (e.g. Savannah burning/ carbon industry)
- Cultural tourism/ culture-based tourism.



Identified solutions

Supporting Traditional Owners across Northern Australia to develop a prospectus encompassing the wide range of economic development opportunities possible across a wide range of sectors.

Long term and stable partnerships are required the support the long term capacity building needed to strengthen the governance of Traditional Owner land and sea institutions.

Long term and stable support for Traditional Owners to drive future thinking and country-based planning at the right scales that make sense to them culturally.

Workforce development and training opportunities for local communities will be needed to enable greater development to become available and to manage the potential biophysical, socio-economic or cultural impacts.

In addition to the NAILSMA work, these issues are also being strongly recognised and responded to by the Australian Government through the formation of the Indigenous Reference Group (IRG) and the development and implementation of the Northern Australian Indigenous Development Accord.

As these processes are being carried out at the pan-northern level, Traditional Owners will be in a stronger position to lead the achievement of their own development aspirations and avoid having to be responsive to externally driven development interests.

Prioritise planning for, and investment in, critical infrastructure that will assist the economic opportunities available to communities on Indigenous lands.

Explore new approaches to better structuring and financing Indigenous-led development.

The creation of improved pathways to de-risk investment for Indigenous-led development.

Traditional Owners have proven capacity to deliver ecosystem services from global and national markets that can facilitate new and culturally appropriate development and employment opportunities.

Increased participation in established industries in Northern Australia, as well as in services that support key industries (such as construction for mining developments).

Sector analysis: Health service delivery



Edelman, A., Grundy, J., Moodley, N., Larkins, S., Topp, SM., Atkinson, D., Patel, B., Strivens, E., Whittaker, M. (2020) Northern Australia health service delivery situational analysis. CRCNA, Townsville.

Current state

- Healthcare and social assistance employs 13% of the region's 1.3 million people; the largest employing sector in Northern Australia.
- Northern Australian populations experience higher rates of potentially preventable hospitalisations and avoidable deaths.
- There are multiple funding streams, service providers and training, educational and regulatory frameworks for health service delivery.
- For past 5 years, circa \$7.9 million or 11% of Australian Research Council and National Health and Medical Research Council funding for Northern Australia focused on health services research.
- 2% or \$76 million is the proportion and amount of health and medical research funding from major government funding bodies received by Northern Australian institutions from 2015-2019.



Photo: Charles Darwin University

Key challenges facing the sector

Ongoing health workforce shortages and high turnover.

Siloed systems of governance, finance and planning.

The failure of health services to provide integrated and optimal care across stages of the patient journey or to involve communities in co-design.

Under-resourcing, particularly of critical prevention services.

Financing models that reward occasions of service rather than prevention or quality of outcomes.

Rising costs of health care and lost productivity due to poor health.

Vulnerability to emerging infectious diseases and natural disasters.



The opportunity

- Improving the stability and cultural responsiveness of the health workforce in the North and supporting locally-led needs-based planning and research.
- Substantial changes in technology, such as eHealth and telehealth technology and diagnostics, which will allow considerable improvements in the health and wellbeing of people living in Northern Australia.
- Health services in Northern Australia have the potential to be at the forefront of tropical health solutions, delivered in Australia and across the booming middle-income markets of Asia and the Tropics. This includes health export opportunities to a rapidly growing and urbanising Asian region that are demanding high quality health services.
- There is significant potential for the discovery of proteins, peptides and small molecules derived from tropically based parasites, spiders and marine fauna from Northern Australia that show promise as novel therapeutics for treating human inflammatory and chronic diseases or as vaccine targets, which are in global demand.

Health export opportunities include:

- Health workforce education and training
- Health research
- Medical tourism
- Knowledge transfer in workforce models; human resources planning and system administration; non-communicable disease management, and tropical and remote health.



Identified solutions

Rural recruitment of rurally-based health professionals to assist with the retention of the local health workforce, particularly in medical "generalist" (and other health professional) roles.

Investment in an Aboriginal and Torres Strait Islander health workforce requires the development strategies, including in innovative community roles and in leadership positions.

eHealth and telehealth training can ensure health professionals in rural and remote areas can work to their full scope of practice in team-based models using tele-health. This will help overcome the geographical barriers to health access and reduce patient travel costs.

Primary health strengthening of comprehensive primary health care is one of the most effective strategies for both improving health outcomes and containing health care costs.

Cross jurisdictional planning

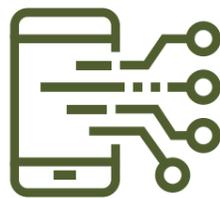
Establish a permanent cross-jurisdictional health service delivery and workforce network will enable shared strategic planning and implementation of new initiatives across the northern region and appropriately fund cross-jurisdictional systems.

Community control

Continuing to expand Aboriginal Community Controlled Health Service models of community governance will address some key macro policy issues impacting the health of northern communities (housing policy and alcohol management).

Determine need and mechanisms to finance appropriate health service delivery models for rural and remote health service delivery.

Sector analysis: Communications and digital inclusion analysis



Marshall, A., Dezuanni, M., Wockner, K., Babacan, H., Burgess, J., Crawford, J., Foth, M., Gregory, R., Mitchell, P., Neale, T., Rogers, S., Wallace, R. (2020). Northern Australia communications analysis. CRCNA, Townsville.

Current state

- Access to high-quality, affordable social services (health and aged care, education, green/blue/recreation spaces, arts/culture, social housing and justice and emergency services) has a direct impact on the social and economic wellbeing of all Australians. While Australia has high-performing social infrastructure, it could be improved by updating assets and networks to create more digitally equipped and flexible spaces for service delivery.
- Building and maintaining communications infrastructure across large distances in Northern Australia is a challenge. However, significant national investment in communications infrastructure has occurred across Northern Australia in recent times.
- Investment has been driven by the National Broadband Network, national telecommunications companies Telstra, Optus and Vodafone as well as several private network operators like Vocus and AARNet and private service providers like Centre for Appropriate Technology (CfAT), Hitnet and Wi-Sky. While Australia's mobile footprint includes over 99% of the population, however, it covers only one-third of total landmass.
- Some 65% of agriculture, forestry and fishing businesses across regional Australia primarily rely on broadband provided by means other than fixed-line services (ABS 2017). This is significant because fixed-line services are more reliable and affordable than mobile, fixed wireless and satellite services. These insights focus on the agriculture, forestry and fishing industries, which are prevalent in Northern Australia, but they also echo the broader challenges for Northern Australian businesses and individuals to get online and to effectively and safely participate in the digital economy. These issues have been significantly exacerbated during the COVID-19 pandemic.
- Use of telecommunications in Northern Australia is evolving with the: (i) adoption of digital health, including and telehealth; (ii) changes to better allow for educational data use in regional and remote localities in Northern Australia; and (iii) increasing number of operators who specialise in on-farm digital technologies entering the market in Northern Australia (e.g. ecosat, Farmbot, Unidata, loTag, Observant and GoannaAg).



Key challenges facing the sector

A **policy mismatch** arises when policy and programs developed at the national level (often for urban participants) do not always translate well into regional, rural and remote communities in Northern Australia.

There is often a **disconnect between federal, state and local level** policies related to digital infrastructure provision and inclusion.

Technical and digital literacy

Telecommunications is often focused on getting people connected, but little attention has been paid to the question of what happens next.

Narrow solutions arise from a tendency towards monopolistic, nationally developed infrastructure systems, such as the Telstra network and the NBN, where smaller providers can often fill niche market gaps.

Lack of a technologically neutral Universal Service Obligation to provide universal access to voice and data connectivity.

Local governments and other key regional organisations do not always highlight digital connectivity as a strategic priority.



The opportunity

- Australia's digital economy will be worth \$139 billion by 2020 (7.3% of GDP).
- Bolstering telecommunications infrastructure in Northern Australia will ensure the North can share in the benefits of increased digitisation in the economy.
- Developing, attracting and retaining a digitally skilled population that will socially and economically progress the region.
- Generating economic activity through improved supply chain efficiencies.
- Supporting the creation of new technology-driven industries and businesses that are needed to help diversify and grow regional economies. Economic diversification through digital innovation is expected to lead to new professions and industries.
- Improving liveability and wellbeing of Northern Australian communities by fostering the important link between digital inclusion, wellbeing and social cohesion.



Identified solutions

A proposed five-year road map developed as part of this situational analysis is based on three overarching recommendations:

1. **Invest in digital connectivity infrastructure and innovative solutions** for ubiquitous, affordable and robust access. In the short term, fill immediate deficits in connectivity infrastructure (no service and under service) with innovative placed-based solutions. In the longer term, plan and invest in pan-northern and region-wide solutions.
2. **Devise, fund and support a cohesive digital inclusion ecosystem strategy** across industries, all levels of government, and the community sector. In the short term, connect and resource organisations and businesses to share knowledge and resources across sectors and geographies.

3. **Promote place-based tactics for workforce development through building digital capacity** In the short term, sponsor community-based digital literacy and mentoring programs. In the longer term, incentivise and support regional businesses and educational institutions to embed digital knowledge and skills development into local programs.

Overall, whole-of-region, cross-sectoral, multi-level investment and planning is required for digital inclusion in Northern Australia. Any strategic plan must engage and employ well-supported local organisations, communities and businesses who will implement place-based solutions.

Section 2: Agricultural supply chains



Supply chain: Northern Australian agricultural supply chains



Marshall, A., Dezuanni, M., Wockner, K., Babacan, H., Burgess, J., Crawford, J., Foth, M., Gregory, R., Mitchell, P., Neale, T., Rogers, S., Wallace, R. (2020). Northern Australia communications analysis. CRCNA, Townsville.

Key challenges faced by agricultural supply chains

Opportunities and barriers for supply chains in Northern Australia display commodity, industry and region-specific characteristics.

Table 1 below provides a summary of the common supply chain barriers identified across the CRCNA's sector situational analyses and regional supply chain projects.

Table 1: Supply chain barriers across Northern Australian commodities and sectors

Supply chain barriers in Northern Australia	
Summarised common challenges	Considerations and risks
<ul style="list-style-type: none"> Challenges of access to transport, air, sea, rail, road Lack of interoperability Lack of adequate storage facilities, particularly cold storage Lack of refrigerated container freight access Infrastructure challenges Regulatory fragmentation across jurisdictions and/or regulatory burden Workforce skills gaps and shortages High cost of energy and power 	<ul style="list-style-type: none"> Provenance, certification, traceability Challenges of access to markets, particularly in Asia and non-tariff barriers Difficulty attracting supply chain investment Challenging digital connectivity Water allocation and access for production Lack of processing facilities and limited value-adding Challenges of production and scaling up Lack of coordination multi-purpose/multi-sector supply chains Long established supply chain patterns, risk aversiveness by producers

Source: ACIL Allen 2020; Babacan & Tremblay, 2020a; KPMG, 2020; KPMG, 2019; AustCham, 2019

For industry-specific supply chain characteristics refer to Babacan and Tremblay (2020a), ACIL Allen (2020), KPMG (2019, 2020) and Akbar et al. (2019).

The overall findings of these regionally-focused studies have concluded that:

- Cooperation is needed along supply chains and there is a need to develop multi-purpose/ multi-sector supply chains.
- Freight networks and logistical connectivity between production stages need to be more efficient.
- Multi-purpose/multi-sector enabling infrastructure is needed. Infrastructure gaps exist in areas such as transport, storage, biosecurity, export facilities and digital connectivity.
- The emergence of high value products (such as cotton) are crucial in driving new supply chains.
- The cost of doing business is much higher in Northern Australia, particularly for freight.
- There is a need for horizontal integration across supply chains and to 'value-add' via appropriate processing, storage, packing and handling facilities.
- Requisite investment in research, data and human capital is needed.



The opportunity

- There is significant potential for economic growth in Northern Australia across different industries if supply chains can be strengthened, trade volumes intensified, digitally smart technologies adopted and a more targeted market approach taken, particularly export to ASEAN countries.
- Since the outbreak of the 2019 novel coronavirus, the critical role supply chains play in our lives have been highlighted, presenting an opportunity to re-think northern supply chains.
- The Australian Logistics Council estimates for every 1% increase in efficiency gained in the supply chain sector, GDP will be boosted by \$2 million (ALC, 2016:3). With Northern Australia constituting approximately 12% of Australia's GDP, this was equivalent to \$187 billion in 2016-17 (Dale et al, 2020:8).

Identified solutions

Development of a focused vision for Northern Australia, where Commonwealth, State and Territory governments work with pan-northern stakeholders to identify spatial priorities and sequence for agricultural development.

Within geographic or sectoral priorities, invest in support for collaborative supply chain development which engages relevant stakeholders in deliberative planning, coordination and investment-focused partnerships.

Establish a Northern Australia Supply Chain Development Fund to enable supply chain collaboration and partnerships, strategic business case development and implementation.

In priority supply chains, identify, prioritise and develop freight and non-freight business case options/models for either priority infrastructure or targeted subsidies.

Work with Infrastructure Australia and relevant jurisdictional agencies to adopt alternative pan-northern and regional frameworks for the planning and assessment of future infrastructure investment, particularly based on agricultural development potential, the whole of supply chain and wider economic, social and sustainability considerations.

Establish improved mechanisms for major supply chain infrastructure planning and feasibility assessments and coordinated finance in Northern Australia (e.g. via Regional Deals).

Develop a partnership-based Northern Australia supply chain collaboration/coordination architecture for the development, testing and continuous improvement of hub-spoke supply chain models in Northern Australia.

Explore options for establishing more durable sub-regional trading strategies or blocs for Northern Australian agriculture, focusing on building value in the supply chain within Northern Australia.

More active and strategically focused coordination of government trade-effort, including industry and relevant stakeholder investment efforts to engage in ASEAN markets and supply chain relationships.

The Australian Government to prioritise Northern Australian agendas in trade development strategies, particularly measures for understanding and accessing markets and developing deeper and more value-rich supply chain networks.

Develop a North Australian Education Hub with a focus on regional engagement, coordinated workforce education/training and research in partnership with key Northern Australian Universities, other education providers (e.g. schools, vocational institutes) and key stakeholders. The Hub should work with a view to supporting industry needs including supply chain industry skills needs, workforce shortages and gaps in Northern Australia.

Support third party facilitated development of regional/place-based supply chain workforce strategies and plans.

Supply chain: The ASEAN region

AustCham ASEAN (2019). Capturing the ASEAN Agricultural Opportunity for Northern Australia. Final Report. CRCNA, Townsville.



Current state

- AustCham ASEAN states between 2014-16, Australia's agriculture exports to ASEAN countries exceeded an annual average of A\$10.7 billion, accounting for 21% of Australia's total agricultural exports. Many of these products originate from Northern Australia.
- Regulations impact exports include tariffs and quotas placed on products entering ASEAN markets, such as: import license regimes, price controls, relevant technical market access conditions such as sanitary or phytosanitary restrictions and reciprocity of product certification schemes (e.g. for Halal).
- Additional export challenges include the degree to which customs processes in ASEAN countries are efficient, fairly and uniformly applied, available information is reliable, and regulation is stable.

Below are some key trends in the ASEAN food sector that will rapidly accelerate demand for high quality agri-food products:

- Urbanisation – 49 million people will be added to ASEAN cities over 2018-25, causing an increase in consumption and loss of land through urban expansion
- Improved trade environment – 67% of surveyed firms believe improved market access is a key benefit of ASEAN regional integration
- Advancements in food technology – investments in innovative food packaging and cold storage systems improving shelf-life of fresh produce
- Focus on sustainability – opportunities in Asia from sustainability focus in food worth US\$1 trillion through to 2030.



Key impediments to development

- **Lack of beef processing facilities:** the lack of abattoirs in the North has been a critical gap in the beef production system. Although the NT's Batchelor abattoir re-opened in December 2019 (after closing in 2003) there are minimal processing locations in remote northern Western Australia and northern Queensland. In many instances, it has also proven cheaper to transport live cattle to ASEAN as opposed to other abattoirs in Australia. Lower cost of production is a key factor in maintaining price competitiveness.
- **Certification schemes:** processing of live cattle directly in Halal markets (e.g. Indonesia) is cheaper than processing within Australia – removing the need for producers to obtain Halal certification prior to exports which is not uniformly accepted across ASEAN markets.
- **Product standards:** market access is inconsistent due to variations in product standards and transparency across ASEAN countries, creating major compliance issues.
- **Climate and weather variability:** extreme weather events are a major threat to northern cattle herds. The repeated failure of the monsoon season in many parts of Northern Australia has resulted in many producers reducing their herds in anticipation of a longer dry season with minimal pasture to support their herds.
- **Non-tariff trade barriers:** irregular changes to import laws and restrictions and inefficient bureaucracy are major challenges to agri-food trade across ASEAN, and these impose high operating costs on exporters.
- **Live export certification:** experts have indicated that Indonesian, Vietnamese and Thai customs authorities are unfamiliar with Australia's Exporter Supply Chain Assurance System (ESCAS), often duplicating supply chain certification and monitoring requirements that are covered by ESCAS and adding additional costs to exports for Australian businesses.

The opportunity

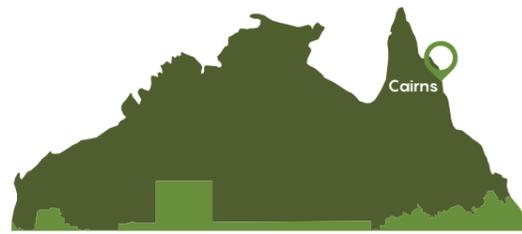
- Live cattle and beef are considered as key export opportunities for Northern Australia to ASEAN countries as they have the most upside opportunity (i.e. untapped export demand) and supply feasibility. Future live cattle (A\$7.5 billion) and beef (A\$5.5 billion) opportunities are significantly larger than other product opportunities.
- Major countries for beef and live cattle opportunities are Vietnam, Indonesia and Malaysia.
- New varieties of sesame are being trialled, which are suited to northern production and may be suitable for export opportunities.
- Avocados and macadamias could be considered as "smaller bets" as they have relatively high supply feasibility in Northern Australia but low forecasted export demand although, there are efforts being made in both industries to increase production and develop export-oriented growth strategies in north Asian markets.



Identified solutions

- **Increasing supply of complementary products:** exploring an export strategy for bovine genetic materials, including semen, embryos, and germplasm would provide an alternative export product for Northern Australia producers who may have to reduce herd size and diversify export produce caused by climate variability.
- **Macadamia market research:** developing a market research study for Australian macadamias in ASEAN region (building on this current research effort) which would go deeper into understanding major importers, retail partners, distribution networks, and the competitor landscape.
- **Reduce trade barriers:** leading and coordinating a strong alliance of key partners in developing and implementing an ongoing engagement with regulators in ASEAN Member States will work address the key regulatory impediments noted by Australian producers (related to quotas and non-tariff barriers).
- **Intensification:** supporting beef intensification and increases in herd productivity across animal lifespan will ensure sustainable development and help create high-skilled jobs in veterinary sciences and herd management.

Supply chain: Far North Queensland



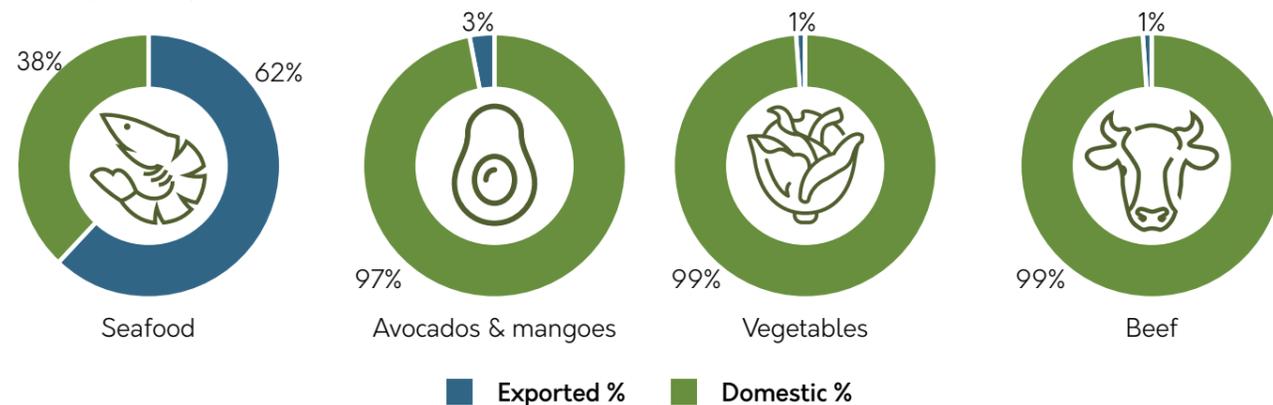
KPMG Australia, Advance Cairns (2020) Export 2030 – delivering fresh food fast : the opportunity to double high-value food exports from Far North Queensland. CRCNA, Townsville.

Current state

- Far North Queensland (FNQ) is an abundant producer of high-quality food products, including a diverse horticultural industry, a world-recognised beef, sugar and seafood industries and an array of boutique and niche export products such as dairy, coffee and native foods.
- The region is highly productive and has the potential to continue to grow as future export opportunities are identified.
- The region is well-placed to leverage these opportunities through Cairns Airport as an air freight export node with several existing international routes to Hong Kong, China, Indonesia, Japan and Singapore.
- Except for seafood, there is a disproportionate emphasis on domestic market opportunities rather than air freight exports via Cairns Airport.



Figure 2: Proportion of FNQ domestic supply vs international export (%)
Source: (ABS, 2019). id



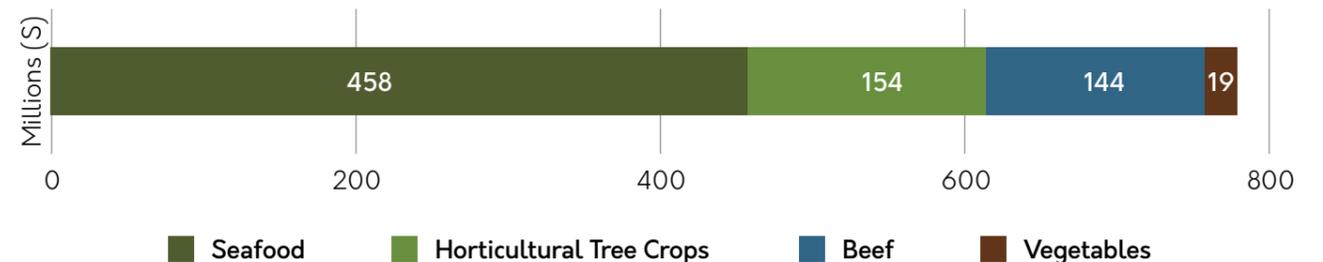
Key impediments to development

- Production:** constraints on expanding output from the region includes seasonality of supply, constrained access to key domestic and international destinations and development of new water infrastructure.
- Logistics:** most freight suppliers in the region have established supply chains connecting FNQ to southern markets in Brisbane, Sydney and Melbourne and are focused on supplying these markets, instead of diversifying.
- Processing:** lack of processing and export treatment infrastructure within 100km of Cairns Airport is a barrier to developing higher value opportunities.
- Export relationships:** lack of market connections for most producers beyond freight forwarders is a barrier to pursuing export market opportunities.



The opportunity

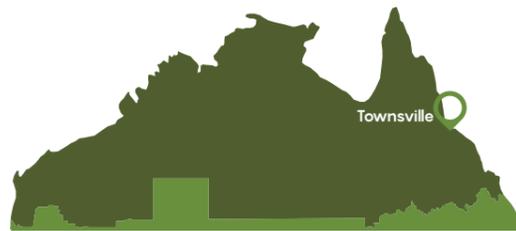
- Far North Queensland has a vision to double high value food exports from Cairns Airport by 2030.
- Doubling high value food exports will result in:
 - Regional de-risking strategy with reduced domestic market reliance
 - Strengthened regional tourism and food positioning
 - Increased local industry and regional resilience
 - Increased sales channels to international markets
 - Increased Gross Regional Product through extra and higher value economic output.
- Additional job opportunities throughout Far North Queensland .
- Key export markets include: China, Singapore, Japan, Indonesia and Hong Kong.
- Priority export products include seafood, horticultural tree crops, vegetables and beef.
- There is an estimated \$800 million of untapped export potential from key export markets for priority export products.



Identified solutions

- Develop infrastructure:** upgrading the road network, telecommunications connectivity as well as new export freight aggregation and treatment facilities and water infrastructure will enable increased volume of supply.
- Export readiness:** expanding air freight capacity, establishing an export distribution hub and increasing awareness and utilisation of existing infrastructure at Cairns Airport will increase export confidence and empower local producers to consider export alternatives.
- Collaboration:** developing and maintaining cross-commodity relationships will improve export relationships and identify opportunities for collaborative R&D between industry and local research institutions.
- Regional marketing:** developing a regional brand will enhance market access and generate value-add opportunities.

Supply chain: North Queensland



KPMG Australia, Townsville Enterprise, Premise, AEC (2019) North Queensland market and agricultural supply chain study. CRCNA, Townsville.

Current state

- North Queensland is a major agricultural producing region of Australia. In 2016–17 the region’s agriculture, forestry and fishing sectors contributed over \$1 billion to total gross regional product of \$15.5 billion.
- Traditional livestock and cropping systems such as beef and sugarcane currently represent most of the industry production and employment, supported by small areas of high value annual horticulture.



Key impediments to development

- **Access to water resources:** while there are a number of potential new irrigation projects that may provide increased opportunities for agriculture in northern Queensland (including Hells Gates and the Gilbert River Irrigation Project west of the in-scope region), there are a number of legislative and policy barriers to realise these opportunities.
- **Import protocols:** market access for most food products is only limited by lack of import protocols and inability to meet specific import or export requirements. Many countries have strict phytosanitary regulations, and this can create significant market access hurdles, whereby strict evidence of pathogen and pest free status must be proved upon arrival.
- **Economies of scale:** production at scale is required to underpin investment in sea (controlled atmosphere containers) and air freight (commercial or dedicated freight services), supported by the development of markets for products suited to both or either method of transport.
- **Weather risk:** cyclones pose a risk of catastrophic loss in the forestry industry. These risks are well understood, but the lack of financial products to manage the risk is limiting investment.
- **Lack of processing infrastructure:** with a processing capacity of 1,800 head per day, Townsville is one of two Queensland beef processors north of Rockhampton, the other being Nippon’s export plant in Mackay (also known as Borthwick). The Townsville abattoir only processes grass-fed cattle for the domestic market, while Borthwick process both pasture and grain fed cattle.
- **Workforce expertise:** key constraints also include ageing expertise in agricultural production and processing capabilities as well limited training opportunities in these roles.
- **Infrastructure gaps:** a lack of supply chain (e.g. grain storage and drying, as well as cold storage), processing facilities (e.g. abattoirs, mills) and water storage are limiting production output.



The opportunity

- Focusing on key emerging and established markets, there are opportunities for export into a number of priority markets with unmet demand for new and expanded agricultural production potential:
 - › Korea
 - › China
 - › Malaysia
 - › Indonesia
 - › Hong Kong
 - › Singapore
 - › Thailand
 - › Japan
 - › India
 - › United Arab Emirates
- Intensifying beef can generate a 190,000 head per annum feed lotting industry creating an additional \$200m of export value and another 50 FTE jobs.
- Developing a perennial horticulture industry (macadamias and/or avocados) could generate an additional \$213m of production value and create an additional 800 direct FTE jobs.
- Developing a 500ha onshore aquaculture industry (rock lobster) could generate an additional \$150 million in production value, creating 300 extra FTEs in the region.
- Developing a 36,000-ha soybean industry, in rotation with existing sugarcane cropping would generate an additional \$46 million in production value, with \$18 million generated from exports.
- Five key products have been identified to supply these markets based on the prevailing agronomic conditions in north Queensland.
 - › Beef
 - › Avocado
 - › Macadamia
 - › Soybeans
 - › On-shore aquaculture



Identified solutions

- **Supply chain analysis:** undertaking a full commercial feasibility and detailed economic modelling of each priority product value chain will inform producers and commercial operators of the risks and opportunities in the sector, as well as drive the required investment both on-farm and in transport, bulk water, product storage and processing infrastructure across the supply chain.
- **Infrastructure investment:** upgrading infrastructure, such as irrigation and water development, road and rail transport upgrades, additional processing, cold storage and feedlot developments will enable diversification opportunities and increase value of production from existing farming land.
- **Air freight:** a dedicated air freight route(s) from Townsville Airport would provide direct and reliable air freight to key international markets.
- **Innovative ownership structures:** establishing cooperative/collaborative ownership structures may facilitate the development of supply chains where stand-alone ownership models are unviable.
- **Market access:** securing protocol access and reducing non-tariff barriers in priority markets will unlock opportunities for the region.

Supply chain: Greater Whitsunday



Acil Allen Consulting, Greater Whitsunday Alliance, CRCNA (2020) Regional agribusiness supply chains: report to Greater Whitsunday Alliance and the CRC for Developing Northern Australia. CRCNA, Townsville.

Current state

- Gross value of production for the Mackay Isaac Whitsunday (MIW) region is \$1.1 billion
 - › Beef cattle generates \$474 million GVP (42% of land area) from 1.04 million head of cattle
 - › Sugarcane generates \$344 million of GVP (30% of land area) from 8.79 million tonnes of cane produced annually
 - › Horticulture generates \$400 million of GVP (16% of land area) from 230,000 tonnes of produce
 - › Broadacre crops generates \$121 million of GVP (11% of land area) from 235,000 tonnes of product
- › Aquaculture generates \$21.2 million with 1,450 tonnes of seafood produced.
- The MIW region has solid and diverse production base with capacity for growth, both in terms of increasing supply and developing new and alternative products.
- The aquaculture industry is set for major increase in productivity following the purchase by national aquaculture company Tassal of two sites in the Whitsunday and Mackay Local Government Areas (LGA). There is sentiment that it's best to grow existing markets from products such as prawns and barramundi that do well in the region, rather than try new aquaculture products.



Key impediments to development

- **Regulatory burden:** agriculture is affected by regulation at local, state and federal levels across the whole supply chain. In agriculture, the regulatory burden is considered to have a significant and disproportionate impact on small businesses.
- **High input costs:** electricity costs continue to be prohibitive for farming intensification through irrigation.
- **Scale issues:** Due to the dominance of the beef cattle and sugarcane industries, other industries like horticulture and aquaculture suffer from scale issues.
- **Non-tariff trade barriers:** phytosanitary barriers and protocol negotiations are the largest barriers to export of horticultural products. Although the Australian government and industry supports exist, the fragmentation of small producers makes it difficult to get the protocols needed high on the agenda.
- **Restrictions on water resources:** agricultural productivity is constrained by water availability and accessibility. Droughts, competing water uses from mining and urban growth and climate variability all influence water use in agriculture.
- **Ageing workforce:** the region's farmers are ageing, and it's estimated that around 23% of the industry's workforce is likely to retire by 2022. This is particularly relevant to the sugarcane industry where the average age of a cane farmer is reported to be older than 65 years, many of whom have no succession plan. There is also a lack of younger, innovative farmers with capital available to purchase these properties.
- **Skills and training:** the closure of agricultural colleges in the region and in neighbouring regions is likely to bring with it a loss of skill and capability in the younger population. An overall national shortage of skilled staff for aquaculture may also affect the growth of this emerging industry locally. Access to skilled, senior personnel is affecting key parts of the industry now.
- **Complexity of exporting:** creating the right incentives to export is challenging. Some farmers are just not interested in the extra work required, some do not have the capability and others are not willing to take the risk.



The opportunity

- Global mega trends are providing opportunities for the region:
 - › Specific focus could be placed on the opportunity to create and promote a regional brand that encompasses concepts of 'regionality', 'natural' and 'affordable' for local and global consumers
 - › Sustainability in supply chains is potentially a big growth area. This could be in terms of sustainable production methods, packaging or using food waste products
 - › There is potential for China to consider the use of ethanol blend fuel for vehicles. Should this occur then demand for the product will rise and Mackay Isaac Whitsunday will be well placed to capitalise on production and export given the ethanol plant at Plane Creek and access to Mackay Port
- › Plant-based proteins may also be an area for growth, as chickpeas and other lentils are grown in the region
- › There is the possibility with higher value produce such as fish or seafood, or some vegetables and fruits such as mangoes and avocados to consider premiumisation, effectively marketing a product to enhance its premium dimensions.
- Within the Mackay Isaac Whitsunday region, particularly the Mackay LGA, there are several pieces of underutilised infrastructure that, if scale is achieved, can be used to increase value in the region. For example: Mackay Port has underutilised capacity and potential for storage, as well as grain segregation capacity that could benefit niche grain cropping.

Identified solutions

- **Cross-sector collaboration:**
 - › Cane growers could benefit from discussions with croppers beyond the Eton Ranges to coordinate the production of a single crop such as soybeans, to get production to scale across the region
 - › Horticulture and aquaculture could work together on potential for cold-chain logistics and storage
 - › Cane, cropping and horticulture could collaborate around green waste opportunities for the region.
- **Infrastructure collaboration (across regions):** the majority of product whether for domestic consumption or export travels South via road or rail to Brisbane. The exceptions being live export cattle and bulk grains. Potential exists for collaboration with air and sea freight out of Cairns Airport and port, which is roughly half the distance of Brisbane.
- **Data collection and access:** improve agricultural data collation, synthesis and management within the region. Priority should also be given to obtaining access to CSIRO's Transit Model.
- **Businessskills:** improving soft-skill capability will help producers navigate regulation, meet the market demand and consumer preferences and provide options for adapting to structural adjustment or developing new markets.
- **Infrastructure investment:** road upgrades to reduce impact of flooding on freight movement will decrease travel times and costs for freight transport. Priorities of additional water infrastructure include Urannah Dam, Connors River Dam, Stage 2 Burdekin Falls Dam and associated water supply and distribution into MIW region.
- **Green and red tape:** a whole of government review of regulation and legislation that impacts on agriculture, aquaculture and fisheries will enable streamlining and harmonisation.
- **Supporting generational change:** develop skills and training to build capability for existing sugar cane farmers and new entrants to sugarcane farming and to assist with succession planning.

Section 3: Common challenges facing Northern Australian development

The CRCNA's investment in the key sector and supply chain situational analyses has delivered a comprehensive assessment of the current state of play for each sector and the future opportunities which are possible if the right support is made available.

The following section provides a summary of the common challenges which have been identified by this foundational research.

These challenges have been categorised into the following themes:

- Planning, regulation and tenure
- Export barriers, supply and value chains
- Infrastructure
- Workforce development, retention and liveability
- Governance and leadership



Planning, regulation and tenure

Statutory planning and development approval:

- Lack of policy clarity about where sustainable agricultural development will be acceptable to three levels of government and the community.
- **Vegetation management:** the need for improved vegetation planning to facilitate agricultural development under Queensland's and Western Australia's vegetation management system and further vegetation management planning in the Northern Territory.
- **Great Barrier Reef policy:** new reef regulations in Queensland will require the development of new approaches for maintaining and growing productivity and profitability of agriculture and aquaculture in the Great Barrier Reef (GBR) catchment.

Water resource planning and governance:

- More effort will be required for water resources to be fairly assessed and allocated to manage competition for limited resources and to enable sustainable development of higher value land uses.
- Poorly developed water asset ownership models (water infrastructure) in new development proposals.

Complexities and limits to the resolution of land tenure:

- Complexity in the tenure resolution and property diversification processes (aimed at lifting investment security and productivity) cause concerns for Traditional Owners, pastoralists, investors and financial institutions.
- **Security of forestry resources:** regulatory and tenure issues, such as access to, and security of, forestry resources is the key development barrier for the forestry industry.

Poor regulatory consistency and harmonisation:

- Poorly harmonised State/ Territory/ Commonwealth regulations are complex and can be difficult to navigate.
- Areas of concern are around water regulation, vegetation management, and land tenure as mentioned above. Additionally, biosecurity, data sharing, workforce mobility and infrastructure planning requires greater coordination.

Biosecurity planning and investment:

- A need to continue to improved coordination across jurisdictions.
- Insufficient investment in biosecurity exposes Northern Australia to significant biosecurity threats, particularly in the agriculture and aquaculture sector.



Wild rice, NT. Photo CSIRO.

Export barriers, supply and value chains

Product movement:

- Poorly coordinated regulation associated with product movement is deterring investors.

Supply chain governance:

- Poorly developed governance, collaboration and ownership models within supply and value chains.

Market access:

- Some industries have export potential but have limited or no access to favourable market opportunities due to non-tariff trade barriers.

Export readiness:

- Many agricultural industries and individual producers in Northern Australia have export potential, but they do not have a good understanding of, and access to, knowledge about consumer preferences in developing markets or the established supply chains to enable exports.

Producer desire to export:

- Perceived challenges associated with costs and payment directs producers towards domestic supply. Improving awareness of market opportunities may change producer perception.

Barriers to accessing appropriate financial products:

- A lack of financial products (insurance) to manage climate variability and weather risks in the North is a key barrier to development for several industries, such as forestry and perennial agriculture (tropical fruit).

High cost of production:

- High input prices, relative to the south and international competition (particularly transport, insurance, electricity and fuel).



Infrastructure

Insufficient enabling Infrastructure:

- Lack of processing, storage and supply chain infrastructure that supports industry expansion (mills, bulk storage and drying, feedlots, abattoirs, cold storage, export treatment facilities and water infrastructure).

Lack of planning and investment coordination across sectors:

- Decisions made about enabling infrastructure are often made in information silos or within individual sectors without consideration for opportunity for multi-user/ multi-purpose facilities.

Workforce development, retention and liveability

Skilling and workforce deficits:

- Lack of quality and quantity of training and skilling opportunities in the North is a barrier to existing operations as well as a key threat to realising development potential.

Health funding models:

- A lack of coordination and planning across northern jurisdictions in respect to workforce attraction and retention thereby impacting on service delivery models.

- Unclear funding models for supporting place-based or collaborative approaches to health service delivery.

Liveability in Northern Australia:

- Attracting and retaining an appropriately skilled workforce goes beyond skilling and salaries. To attract the skilled workers to support industry development, northern communities need to be at least as liveable as southern or capital city areas.

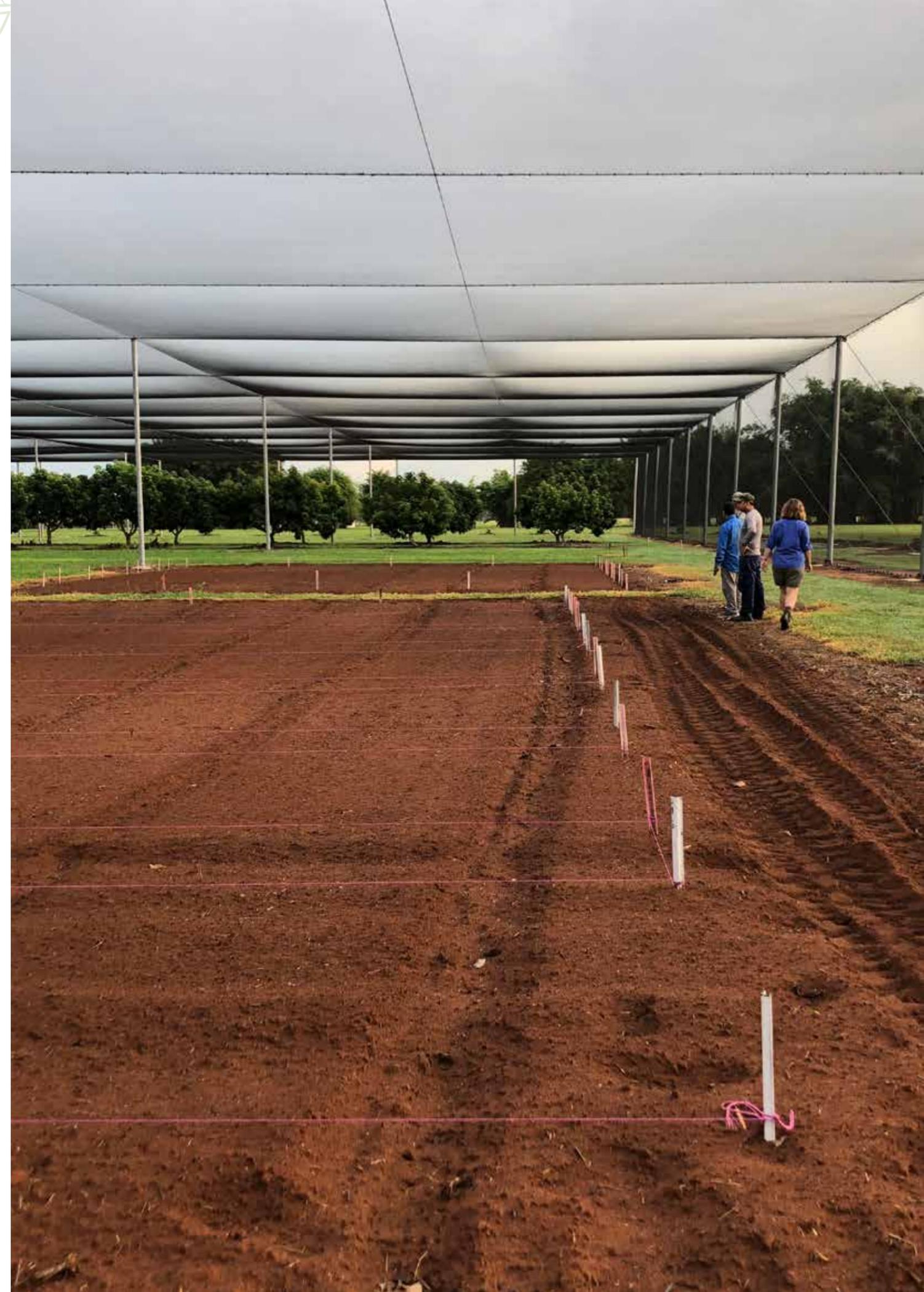
Governance and leadership

Emerging but weak governance systems and ownership models:

- Producer reliance on centralised or corporatised ownership models managing water infrastructure and for the development of supply chain development, processing and marketing infrastructure is limiting increased value adding and access to high value markets in existing farming areas.
- Opportunities exist for cooperative and industry ownership models, but they need to be better conceptualised, collaboratively explored and developed.

Fragmented industry leadership:

- Capacity limitations/ unsupported/ under-resourced industry leadership presents a challenge for data collection, industry cooperation and advocacy. This is a particular issue for sectors with a highly diverse range of products (e.g. horticulture, aquaculture, grains).





Section 4: Investor identification and regulatory de-risking

This section provides a summary of the CRCNA's collaborations with the Queensland, Western Australian and Northern Territory jurisdictions to de-risk and support the development of new agricultural activity across Northern Australia.

Full versions of the Queensland and Northern Territory reports discussed in this section are available at www.crcna.com.au/publications.

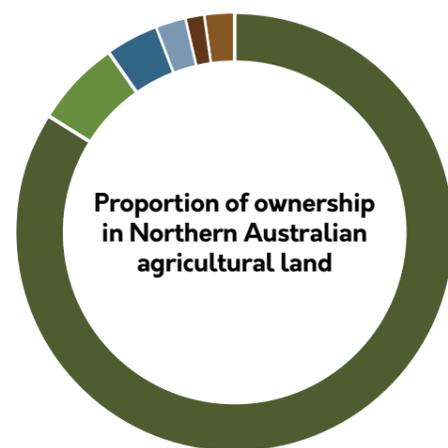
The Western Australian report is expected to be publicly available early 2021.

Agriculture investor identification and attraction

PriceWaterhouseCoopers and CRCNA (2020) Northern Australia agriculture investor identification and analysis report. CRCNA, Townsville.

Current state

- Northern Australia contains up to 17 million ha of arable soil that may be suitable for agriculture.
- Water:
 - 350 and 725 GL per year of potential new surface water storage has been identified in Flinders and Gilbert catchments respectively
 - Similar assessments for other northern catchments may identify additional viable water resources
 - 600 GL per year of extractable groundwater could be available for irrigation across the North.



- 84% Australia
- 6.5% China
- 3.9% United Kingdom
- 2.2% Singapore
- 1.3% Vietnam
- 2.1% other

- 58.7% Australia
- 7.7% China
- 5.9% Hong Kong
- 4.8% United States of America
- 4.4% Brazil
- 3.3% United Kingdom
- 3.3% Japan
- 2.2% Canada
- 1.1% New Zealand
- 8.6% other

Source: PwC 2020

Key impediments to development

- Regulatory barriers:** greater governance strength ensures lower risk; however, it may be perceived as too difficult or risky to navigate and deter investors.
- Lack of coordinated planning:** there is currently a lack of strategic framing and coordinated planning in Northern Australia to develop specific areas of the region.
- Access to, and cost of, utilities:** rural Northern Australia often lacks adequate access to utilities and where they do exist, access may be costly. The perceived cost, risk and time of needing to develop required utilities may deter investors from Northern Australia.
- Complex land tenure:** Northern Australia is subject to various types of land tenure which are governed differently across jurisdictions. Understanding and navigating land tenure processes can be costly and time consuming for investors.
- Cost of freight and a more expensive supply chain:** currently, logistics is the largest single cost item in the production of many agricultural industries – as much as 48.5% of farm-gate costs in some instances.
- Lack of necessary infrastructure:** lack of adequate supply chain and transport infrastructure to access international and domestic consumer markets.
- Exist strategy for investments:** the market for Northern Australian agricultural properties and investments is considerably less liquid compared to southern jurisdictions and overseas locations.
- Insufficient data:** Northern Australia lacks complete and detailed data about key investment considerations such as soil quality and water availability including comprehensive cropping information that investors can easily access.
- Lack of adequately skilled labour.**



The opportunity

- Production capability and potential to expand:** Northern Australia covers more than 40% of Australia's land mass and contains up to 17 million ha of potentially arable soil and 60% of the water that falls in Australia.
- Favourable conditions of trade:** Australia is a low risk investment destination with historically consistent growth and ease in investment processes that performs similar global economies.
- Proximity and importance to Asia:** Northern Australia is Australia's closest region to Asia's fast-growing key markets that is enhanced by access to Australia's Free Trade Agreements.
- A unique part of the global tropics:** Australia has a developed economy and its tropical climate provides a unique advantage to increase agricultural production through better technology and use of land.

Short-term investor target groups

Australia	Hong Kong	New Zealand	Thailand
Argentina	India	Singapore	United Kingdom
Brazil	Indonesia	South Africa	United States of America
Canada	Ireland	South Korea	Vietnam
China	Japan	Taiwan	
Germany	Malaysia		

Identified solutions

- Strategic framing:** establish an overarching strategic framework that presents a consolidated vision for the prioritisation, promotion and staging of agricultural investment in Northern Australia. This framework should be endorsed and supported by three levels of government across each jurisdiction and clearly articulate the targeted investor opportunities.
- Priority Agriculture Development Areas:** State and Territory governments could investigate potential for Priority Development Areas for agriculture and associated programs for de-risking investment. Like how the Queensland Government declares Priority and State Development Areas and how the Northern Territory Government release new land for agricultural development in mid 2020.
- Supply chain development:** governments need to investigate key supply and value chain infrastructure barriers by facilitating collaborative governance arrangements, feasibility assessment and infrastructure to increase the viability of future agriculture investment.
- Property identification:** in priority development areas, governments need to engage with landholders and producers to provide targeted education regarding investment opportunities.
- Coordinated investment brokerage:** jurisdiction-based case officers, supported through Austrade, would be able to support investors and facilitate investment in agriculture.
- Knowledge building:** develop a continuously improving investment fact sheets or an Investor Awareness Pack for each of the jurisdictions in Northern Australia including the positive investment case studies and information:
 - Agricultural prospects and priorities
 - Soil quality information
 - Native Title considerations
 - Availability, security and price of water
 - Foreign Investment Review Board and taxation regulations and process
 - Federal and State tax implications
 - Tenure information and implications for development
 - Agricultural gross margins and supply chain characteristics
 - Protocol and biosecurity measures by industry and jurisdiction
 - Development assessment and approval frameworks and regulatory processes.

De-risking decisions for investment in agricultural development

CRCNA Chief Scientist, Professor Allan Dale

Introduction to prioritisation, planning and the regulatory environment

This State of the North 2020 report identifies major opportunities for growing the value of agriculture in Northern Australia. The several contributing supply chain and sectoral analyses show that the agricultural sector, potential investors and the wider community have communicated their frustration with the processes for prioritising, planning, assessment and approval processes and timeframes of new developments.

To realise the development prospects in each sector and supply chain, a clear prioritised schedule of development is needed. Equally, a recent audit and review of the operation of the Commonwealth's Environmental Protection and Biodiversity Conservation Act suggests that current regulatory arrangements also might not be adequately protecting environmental and cultural values, while also hindering opportunities for development.

Industry and community interests have raised specific concerns about impediments to new investment and the achievement of sustainable agricultural development. For these reasons, the CRCNA has led a wider collaboration between industry, the community and the Northern Territory, Queensland and Western Australian Governments to explore the issues facing the development of new agricultural activity (in new and existing agricultural areas) across Northern Australia.

Specific concerns raised have included:

1	2	3	4	5
Biodiversity and Vegetation management: Lack of policy clarity about where agricultural development will be acceptable to three levels of government and the community.	Water allocations and licensing: Lack of policy clarity about who benefits from water allocation and what type of development will meet the needs of environmental flows.	Land tenure: Complexity in tenure resolution and property diversification processes to deliver productivity improvements and investment security for both Traditional Owners and pastoralists.	Insufficient infrastructure, supply and value chain planning: Limited scale-relevant planning to ensure the appropriate infrastructure, services and labour force requirements are in place.	Agricultural commodity movement: Logistical and biosecurity complexity frustrates the movement of agricultural produce within and beyond Northern Australia.



What is agricultural development and de-risking?

In this Northern development context, agricultural development is a general term related to a variety of agricultural and aquacultural expansion processes and practices that create entirely new production systems, and increase the value of current production systems. Examples include: development of new irrigated and dryland cropping systems, horticulture, the emergence of new agricultural services, and the intensification of cattle production. Such developments might involve public or private sector investment, and traverse a range of planning, assessment and approval processes.

In all cases, agricultural development in Northern Australia needs to occur in an economic, socially and environmentally beneficial way. It must also contribute to an increasingly diverse, integrated and value-rich agricultural processing and services economy. Further in this context, the term de-risking refers to the way that policies, regulations and planning, assessment and approval processes (of governments and agricultural development investors) aid or enable sustainable and legitimate investment in agricultural development.



Wild rice. Photo: Charles Darwin University.

The role of governments in de-risking and facilitating investment

Successful development outcomes require:

- Clear signals to industry about where development opportunities could be progressed through appropriate prioritisation and planning activities that align water, vegetation management, biodiversity, tenure security, infrastructure, supply chains, labour force opportunities and the aspirations of Traditional Owners
- Collaboration and cooperation (and the prioritisation of development efforts) between different levels of government, industry, community sector interests
- Adequate data for analysis and a strong research and development program to enable cost effective evidence-based decision making and risk management
- Effective facilitation of the relationship between the proponents and government, and single point coordination for facilitating regulatory requirements
- Quality development applications from project proponents.

De-risking occurs in three different contexts

The research discussed as part of this State of the North 2020 report has identified three distinct contexts which influence the critical investment decisions surrounding new agricultural development across Northern Australia.

1

De-risking major new (water-based) infrastructure projects for irrigation in greenfield landscapes.



2

De-risking collaborative decisions to increase development investment and productivity in existing (water-based) agricultural or aquaculture development schemes.



3

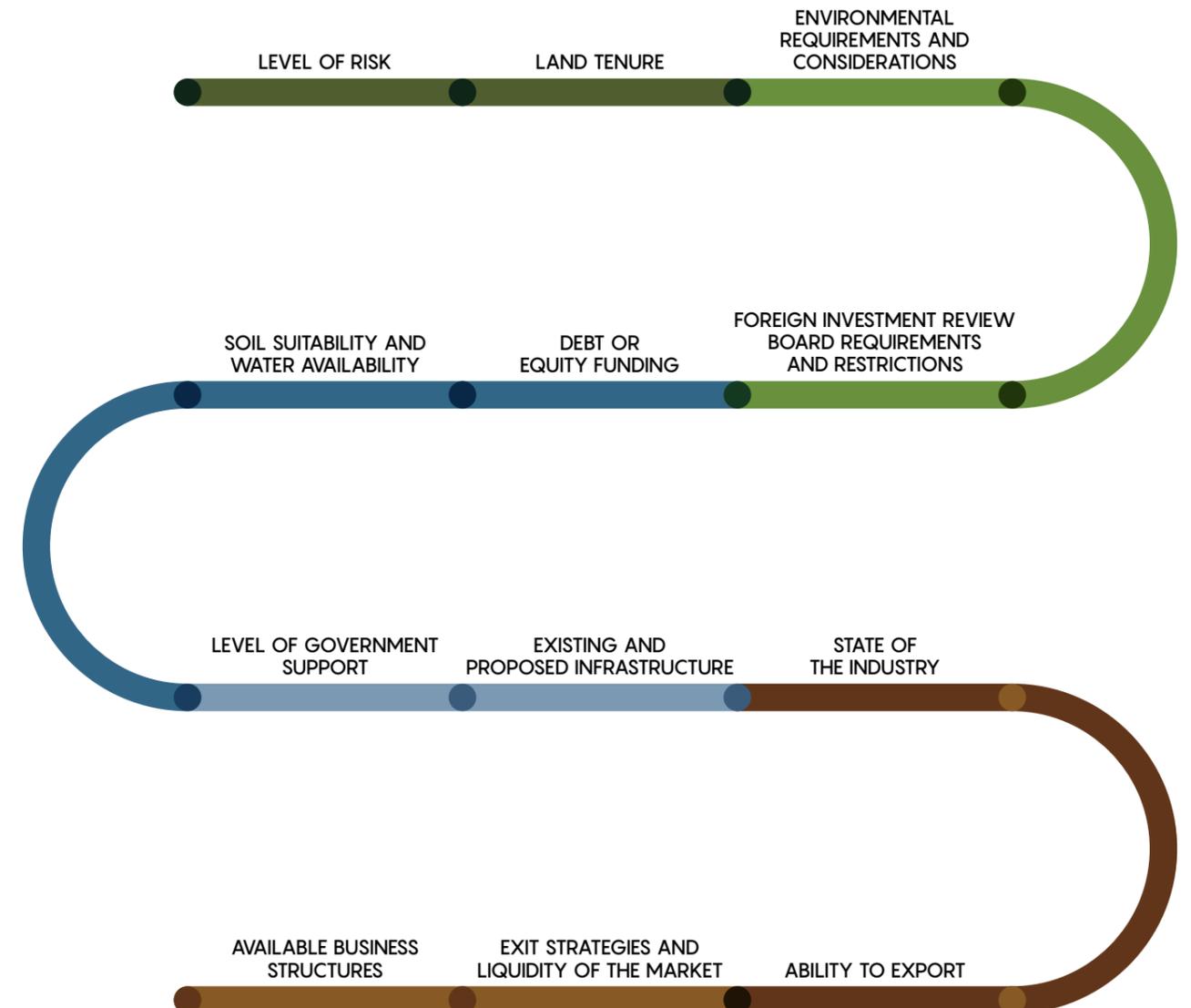
De-risking the decisions of existing individual property owners or new property purchasers to intensify/diversify their production.



These three contexts have been explored in all three jurisdictions to understand their relative importance to the current de-risking process on agricultural development across Northern Australia.

Common risks that need to be managed by agricultural investors

Across all development contexts, there are common risks investors must manage:



Source: PwC 2020

De-risking investment in northern Queensland

Dale, A.P and Marshall, A. (2020). Facilitating quality agricultural development in northern Queensland. CRCNA, Townsville.

Summary of the prioritisation, planning and development assessment process

Over the last three decades, Queensland has undertaken significant policy and regulatory reform to improve decision making that aims to improve certainty and security for agricultural investors. These reforms have included establishing statutory approaches to the allocation of water rights, improved mechanisms to resolve tenure insecurities.

At the same time, regulations have also been established to protect and better manage environment values and natural resources. In many cases, these reforms have emerged from the need to meet international, Commonwealth and state policy and strategic obligations (e.g. reform required under Council of Australian Governments (COAG) National Water Initiative (NWI)

or the Commonwealth's Environmental Protection and Biodiversity Conservation Act).

While these regulatory developments have been important, there is evidence that the processes and approaches for de-risking landscapes for agricultural investment and environmental protection can be problematic within the regions (e.g. see Cobcroft et al, 2020; Chilcott et al, 2020; ST Strategic Services and Pivotal Point Strategic Directions, 2020).

Importantly, there is considerable evidence that this wider range of policy and regulatory settings might also not be effectively and adequately delivering protection of the North's environmental and cultural values.

Summary of regulatory environment

Instrument	Jurisdiction	Type	Purpose
State Development and Public Works Organisation Act (1971)	QLD	Major Project Coordination	Provides for State planning and development (including agriculture projects of State significance) via a coordinated system of public works organisation for environmental and other coordination issues.
Regional Planning Interests Act (2014)	QLD	Land Use Planning and Development	Provides for a transparent and accountable process for the impact of proposed resource activities and regulated activities on areas of regional interest to be assessed and managed.
Nature Conservation Act (1992)	QLD	Biodiversity Protection	Provides for the legislative protection of Queensland's threatened biota and enables declarations on presumed extinct, endangered, vulnerable, rare or common species.
Planning Act (2016)	QLD	Land Use Planning and Development	Provides for an efficient, effective, transparent, integrated, coordinated and accountable system of land use planning and development assessment to facilitate ecological sustainability.
Water Act (2000)	QLD	Water Planning and Allocation	Provides for the sustainable management of water and the management of impacts on underground water.
Heritage Act (1992)	QLD	Protection of Cultural Heritage	Provide for the conservation of Queensland's cultural heritage for the benefit of the community and future generations. This Act does not apply to Aboriginal or Torres Strait Islander places.
Aboriginal Cultural Heritage Act (2003)	QLD	Protection of Indigenous Heritage	Purpose of this Act is to provide effective recognition, protection and conservation of Aboriginal cultural heritage.
Torres Strait Islander Cultural Heritage Act (2003)	QLD	Protection of Indigenous Heritage	Purpose of this Act is to provide effective recognition, protection and conservation of Torres Strait Islander cultural heritage.
Environmental Protection Act (1994)	QLD	Biodiversity Protection	Provides for the management of activities impacting on the Great Barrier Reef.
Vegetation Management Act (1999)	QLD	Vegetation Management	Provides for the management of remnant and regrowth vegetation.
Land Act (1994)	QLD	Land Administration	Provides for consolidation and amendment of the law relating to the administration and management of non-freehold land and deeds of grant in trust and the creation of freehold land.
Environment Protection and Biodiversity Conservation Act (1999)	Commonwealth	Biodiversity Protection	Provides for the protection of the environment and the conservation of biodiversity.
Aboriginal and Torres Strait Islander Cultural heritage Act (1984)	Commonwealth	Protection of indigenous heritage	Enable the Commonwealth to intervene and, where necessary, preserve and protect areas and objects of particular significance to Australia's Aboriginal or Torres Strait Islander peoples from being desecrated or injured.
Native Title Act (1993)	Commonwealth	Native title Resolution	Provides for native title in relation to land or waters and for related purposes.

Key challenges in the prioritisation, planning and assessment process

The research does find that, to achieve investment and sustainable agricultural outcomes in northern Queensland, significant effort is needed to address dilemmas that arise from:

- A lack of clearly articulated agricultural development priorities across northern Queensland
- Poor frameworks for integrated, collaborative planning at the catchment or sub-regional scale between governments, the private sector and the community to progress agricultural development

- Fragmented and sometimes conflicting policy and process settings in project assessment and approval that are unable to resolve tensions (and opportunities) concerning development, the environment and Indigenous interests in northern Queensland landscapes
- A limited focus on raising the capacity of agricultural development interests to develop and prosecute investment ready proposals that can easily achieve their regulatory obligations.



Opportunities to further de-risk investment

With wider cooperation emerging between the CRCNA, the Queensland Government, industry and the community sector, this research suggests the need to evaluate and to implement some of the following solutions:

- Commonwealth, state/ territory and local governments working together with industry, investors and other interests to set targets for and to prioritise agricultural development in northern Queensland, with a strong focus on building a 30-year vision and effectively sequencing development
- Lifting the investment readiness of landholders to progress sustainable agriculture

- The development of improved brokerage, assessment and approval approaches and targeted regulatory improvements aimed at de-risking priority landscapes (across environmental, social and infrastructural risks) in ways that can attract suitable investment/development
- The development of new collaborative planning models in priority agricultural development areas to use existing legislative frameworks to resolve significant water conflict, vegetation and biodiversity management, native title and tenure resolution and infrastructure and services planning.

De-risking investment in the Northern Territory

NAJA Business Consulting Services (2020). De-risking, brokering and prioritising agricultural development in the Northern Territory. CRCNA, Townsville.

Summary of the prioritisation, planning and development assessment process

The opportunity for agricultural development in the NT is enormous, but the development of agriculture has generally failed to meet its potential or industry aspirations. As part of the CRCNA's research efforts, the Territory has explored proposed innovative and NT-specific policy, regulatory and other solutions to facilitate agricultural development which balances economic, environmental and social outcomes. Key

constraints and opportunities have been identified that inhibit or facilitate agricultural development in the NT. Given the importance of the Commonwealth's Aboriginal Land Rights Act in respect to land tenure in the Territory, particular attention needs to be focused on supporting the development aspirations of Traditional Owners.

Overview of the regulatory environment

Instrument	Jurisdiction	Type	Purpose
Environmental Assessment Act (1982)	NT	Biodiversity Protection	Provides for an environmental impact assessment and approval system to ensure that projects that have a significant impact on the environment are subject to appropriate assessment and approval processes.
Heritage Act (2011)	NT	Protection of cultural heritage	Provides a mechanism to conserve the Northern Territory's cultural and natural heritage.
Northern Territory Aboriginal Sacred Sites Act (1989)	NT	Protection of indigenous heritage	Provides for the reservation and enhancement of Aboriginal cultural tradition in relation to certain land in the Territory.
Waste Management and Pollution Control Act (1998)	NT	Waste control	provide for the protection of the environment through encouragement of effective waste management and pollution prevention and control practices and for related purpose.
Plant Health Act (2008)	NT	Biosecurity	Provides for the control of pests, certification of plant health and related purposes.
Planning Act (1999)	NT	Land Use Planning and Development	Provides for appropriate and orderly planning and control of the use and development of land.
Water Act (1992)	NT	Water Planning and Allocation	Provides for the investigation, allocation, use, control, protection, management and administration of water resources.
Northern Territory Environment Protection Authority Act (2012)	NT	Environmental Decision Making	Established the Northern Territory Environment Protection Authority.
Crown Lands Act (1992)	NT	Crown Land Administration	Provides for the administration of crown lands.
Pastoral Lands Act (1992)	NT	Pastoral Land Management	Provides for the conversion and granting of title to pastoral land and the administration, management and conservation of pastoral land.
Environment Protection and Biodiversity Conservation Act (1999)	Commonwealth	Biodiversity Protection	Provides for the protection of the environment and the conservation of biodiversity.
Aboriginal and Torres Strait Islander Cultural Heritage Act (1984)	Commonwealth	Protection of indigenous heritage	Enable the Commonwealth to intervene and, where necessary, preserve and protect areas and objects of particular significance to Australia's Aboriginal or Torres Strait Islander peoples from being desecrated or injured.
Aboriginal Land Rights (NT) Act 1976	Commonwealth	Land Rights	Provides for the granting of Traditional Aboriginal Land in the Northern Territory for the benefit of Aboriginal people.
Native Title Act (1992)	Commonwealth	Native title Resolution	Provides for native title in relation to land or waters and for related purposes.

Key challenges in the prioritisation, planning and assessment process

There are several key constraints that inhibit agricultural development in the Northern Territory, which relate to:

- Insufficient prioritisation of agricultural development via strategic land use planning leading to tenure resolution and the progression of non-pastoral use permits
- Limited support to strengthen the capacity of Aboriginal-led development initiatives
- Fragmented development approval processes arising from regulatory complexity and delay
- Insufficient attention to supporting positive native title dealings through innovative and well-resourced Indigenous Land Use Agreements
- A need to improve relationships, culture and trust between parties involved in the system
- Poorly developed logistics and infrastructure, telecommunications and information gaps.



Opportunities to further de-risk investment

Removing impediments to growth by de-risking investment will lift the speed limits on growth. The Northern Territory can enable sustainable agricultural development by exploring and implementing the following solutions:

- Develop and trial new approaches to improve tenure security for investment
- Establish agricultural precincts based on agreed evaluation criteria
- Enable Aboriginal agricultural development through partnerships and support
- Infrastructure to facilitate agriculture with a focus on telecommunications, roads, energy, water and processing
- Unlock regulatory barriers to agriculture through facilitation, improved timelines, streamlining and case management
- Provide a supportive development environment via R&D, capacity building and targeted grants
- Improve relationships and culture by establishing a group representing government, industry and Traditional Owners, with a focus on developing principles on building trust in the system.

De-risking investment in northern Western Australia

NAJA Business Consulting Services (2020). De-risking, brokering and prioritising agricultural development in northern Western Australia. CRCNA, Townsville.

Summary of the forthcoming prioritisation, planning and development assessment process

Solutions to key policy, regulatory, budgetary and regional development challenges at the Commonwealth and Western Australian State Government-level need consideration, analysis, solution building and negotiated resolution. In partnership with the State's key government agencies, the Commonwealth, industry and other

stakeholders, the CRCNA and Western Australian Government have jointly explored the issues at hand and proposed innovative and WA-specific policy, regulatory and other recommendations. This work aims to facilitate agricultural development which balances economic, environmental and social outcomes.

Overview of the regulatory environment

Instrument	Jurisdiction	Type	Purpose
Biosecurity and Agriculture Management Act 2007 (BAM Act)	WA	Biosecurity	Prevents new animal and plant pests (vermin and weeds) and diseases from entering and spreading in Western Australia. It also controls the sale of agricultural products that contain violative chemical residues.
Environmental Protection Act (1986)	WA	Development Assessment, Approval and Compliance	Provides for an Environmental Protection Authority, for the prevention, control and abatement of pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment. Also incorporates controls on clearing native vegetation.
Soil and Land Conservation Act (1945)	WA	Soil Protection and Conservation	Provides for the conservation of soil and land resources and to the mitigation of the effects of erosion, salinity and flooding.
Rights in Water and Irrigation Act (1914)	WA	Water Rights, Planning and Allocation	Provides for rights in water resources, to make provision for the regulation, management, use and protection of water resources, and related purposes. The Act also established Regional Water Plans.
Biodiversity Conservation Act (2016)	WA	Biodiversity Protection and Management	Provides for the conservation and protection of biodiversity and biodiversity components in Western Australia.
Land Administration Act (1997)	WA	Land and Tenure Administration	Provides for consolidation and reform of the law about Crown land and the compulsory acquisition of land. Also incorporates the Pastoral Purposes Framework.
Native Title Act	Commonwealth	Native title Resolution	Provides for native title in relation to land or waters and for related purposes.
Environment Protection and Biodiversity Conservation Act (1999)	Commonwealth	Biodiversity Protection	Provides for the protection of the environment and the conservation of biodiversity.

Key challenges in the prioritisation, planning and assessment process

The identified issues and challenges in northern Western Australia are predominantly in the areas of:

- The need to better prioritise agricultural development and consequent efforts involved in strategic land use and infrastructure planning (e.g. transport, communications, etc.)
- A need to improve strategic focus in market development and support
- Limited support to strengthen the capacity of Aboriginal-led development initiatives
- Insufficient research and development and data supporting agricultural development
- Regulatory assessment and approval processes that would benefit from improved alignment and case management
- A need to strengthen relationships, culture and trust among parties involved in the system.



Opportunities to further de-risk investment

In order to achieve strong pathways to sustainable (economic, environment, and social) development, Western Australia could explore and implement the following initiatives:

- Continue building a culture of trust and collaboration within government and industry
- Address the efficiency of regulatory processes via improved approval timelines and process reform
- Enable Aboriginal economic development and streamlined land leasing
- Target infrastructure to facilitate agricultural development
- Strategic de-risking through coordinated and targeted research
- Develop a proactive case management framework that supports approval navigation
- Provide market development support and industry incentives
- Develop de-risked agricultural land.

Section 5: Future directions

This section discusses potential new solutions for consideration in the current review of the White Paper on Developing Northern Australia as identified within the CRCNA's foundational research projects.

The CRCNA has also considered what future research investments it may undertake to support these solutions, and these are also discussed in this section.

CRCNA future research investment themes

All future research investment made by the CRCNA should aim to:

1

Narrow the research discussion from what's possible to what will deliver real economic, commercial and sustainable impact.

2

Generate targeted data to de-risk and support planning and investment decisions now and into the future.

3

Identify research pathways to achieve the developing Northern Australia priorities and aspirations including those of Traditional Owners.

Common emerging themes in Northern Australian research priorities:

- Improved governance, planning, decision making and regulation
- Reduced barriers for higher value use of land and water resources
- Continued technology and knowledge developments which drive productivity
- Improved infrastructure, supply and value chains
- An appropriately skilled workforce which meets the long-term needs of the North
- Improved understanding of, and access to, information about consumer preferences in developing exports markets.

The CRCNA's acknowledges its role in supporting industry-led research collaborations which resolve the common challenges identified in this State of the North 2020 report. Some of the areas the CRCNA may look to progress further RD&E co-investment are discussed in the following section.

As of November 2020, the CRCNA had committed circa \$4 million towards research proposals which address priority areas identified in the sector situational analyses projects and further progressing similar work in the sugarcane, horticulture and Indigenous agriculture sectors.



Photo: Perfection Fresh



Raelene Collins and Taylah Church.
Photo: Charles Darwin University.

Planning regulation and tenure

De-risking investment:

- The CRCNA has earmarked circa \$2 million to progress its de-risking work with industry and Northern Australian governments. The intention is to build research collaborations which resolve the common impediments to development and provide support for pan-northern solutions.

Identifying development opportunities:

- Help de-risk landscapes and natural resources in the North by identifying suitable geographic areas closest to existing supply chain infrastructure and with critical mass of natural resources.

This can be done through developing an online tool, which could interface with existing systems, and can be used to:

- › Identify existing soil and water resources to support higher value use
- › Quantify the direct benefits of developing these opportunities
- › Quantify the wider economic benefits of development.
- Examine opportunities to ensure highest economic and social use of land and water, specifically:
 - › Integration of forestry into agricultural (particularly grazing) systems
 - › Developing new agricultural varieties and production systems suitable for northern landscapes and climates.

Best practice planning, project assessment, approval and regulation:

- Formulating best practice governance (including planning and regulation), assessment and approval processes for jurisdictional adoption in Northern Australia:
 - › Water resources (resources, allocation and trading)
 - › Vegetation and biodiversity management
 - › Nature, biodiversity and conservation
 - › Indigenous interests and cultural heritage
 - › Forestry regulation (including security of access to the resource)
 - › Farming practice and farm input regulation.

Pastoral leases and land tenure:

- Examine and identify opportunities to resolve conflicting tenure issues to enable investment opportunities for Traditional Owners and other land managers in the North.

Biosecurity audit of Northern Australia:

- Identify common gaps in biosecurity capacity, resources and infrastructure and propose future investment models/ solutions.
- R&D programs which strengthen surveillance activities through technological development and improved stakeholder engagement and skills.
- Commence R&D on transmission pathways and develop 'farm guides' for early identification of disease across sectors (possibly with other agencies).



Export barriers, supply chains and value chains

Ownership:

- Develop innovative ownership models for supply and value chain infrastructure and marketing bodies.

Collaboration and coordination:

- Support the development of governance structures that facilitate the development and delivery of coordinated plans and strategies.

Look to Asia:

- Explore options for establishing more durable sub-regional trading strategies or blocs for Northern Australian agriculture, focusing on building value in the supply chain within Northern Australia, including options for purpose-built or shared supply and value chain hubs with neighbouring countries.

Research and data collection:

- Invest in data-rich models of supply and value chain planning across sectors in Northern Australia.

Cost of freight:

- Support the identification, prioritisation and development of freight and non-freight business case options/models for either targeted subsidies or priority infrastructure, in line with identified supply chain priorities.

Other costs of doing business:

- Identifying place-based or regulatory reform to enable step-changes in production costs.

Specifically:

- › Energy (electricity, gas and liquid fuel)
- › Communications
- › Freight (road, rail and air)
- › Insurance.

On-farm productivity:

- Identify potential productivity gains and improved efficiencies for key agricultural sectors.



Infrastructure

Enabling infrastructure:

- Identify supply and value chain infrastructure, finance and governance requirements to unlock and develop natural resources for the whole of supply chain and wider economic, social and sustainability considerations, including the aspirations of Traditional Owners (inclusive of feasibility, economic impact assessment and cost benefit analysis).

Place-based, scalable infrastructure solutions:

- Identify place-based, novel technical solutions and partnerships that can be replicated across Northern Australia.

Focus areas include:

- › Public infrastructure: roads, rail, ports, bulk water and channel systems, telecommunications, electricity and gas
- › Processing and value adding infrastructure: mills, bulk storage and drying, feedlots, abattoirs, cold storage and export treatment facilities
- › On farm infrastructure: fences, water infrastructure, harvesting equipment, on-farm storage and yard infrastructure.



Governance and leadership

Traditional Owner-led development:

- Continue to invest in Traditional Owner-led business development research.

Industry associations:

- Support, empower and upskill industry associations to lead the development of their industries in Northern Australia.

Workforce development, retention and liveability

Northern Australia workforce development strategy:

- Develop a coordinated workforce development strategy for Northern Australia to 2035 to identify critical gaps in the agricultural and health sectors, opportunities for Aboriginal and Torres Strait Islander communities and key barriers to workforce mobility.

Digital inclusion and knowledge:

- Promote the development of digital capacity in the Northern Australian workforce, with an emphasis on technology opportunities in health, Traditional Owner-led business, education and agricultural sectors.

Liveability:

- Undertaking economic analysis of the costs and benefits of regional, rural and remote urban renewal opportunities to enhance liveability to enable better attraction and retention of a qualified workforce.

Local recruitment and training:

- Training and employing rurally based professionals to assist in the retention of the local workforce.



DAF Researcher Heidi Wittl planting a melon trial Ayr, QLD.
Photo: Élio Jovicich

Health planning:

Cross-jurisdictional planning:

- Build a business case for establishing a cross-jurisdictional Northern Australian health system network as an independent body to harmonise processes between jurisdictions and investigate effective governance/operational models drawing from experience of past initiatives.

Mapping community need:

- Map community need, against existing service delivery and workforce for Northern Australia.
- Identify gaps in integrated care in Northern Australia and present solutions informed by economic modelling.

Scalable and place-based planning models:

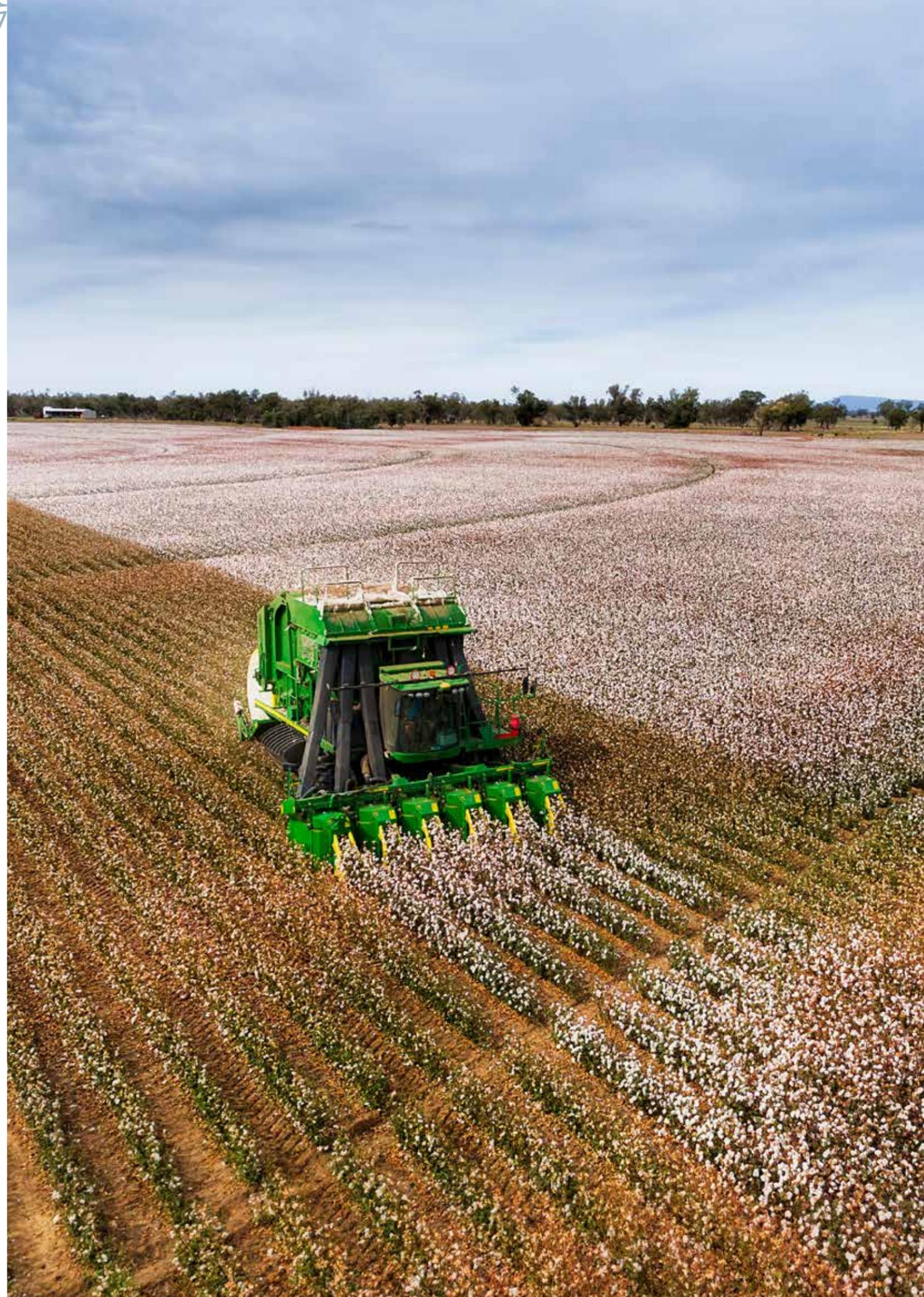
- Exploring optimal models and principles for place-based planning, involving a review of present models of place-based health services/workforce planning for lessons learned.

Northern Australia

To enable the development of Northern Australia, there are a several new solutions needed.

The cross-cutting themes of the challenges emerging in this State of the North 2020 report require new and improved solutions for consideration in the current review of the White Paper on Developing Northern Australia.

Based on the CRCNA's stakeholder engagement and knowledge arising from its early strategic research investments, the following concepts represent ideas which will support positive development outcomes.



Planning, regulation and tenure

Support effective de-risking of priority agricultural areas for investment:

- Cooperation has emerged between the CRCNA and the QLD, WA and NT Governments to support the development of new agricultural activity and value in the North. Unfolding work in this space suggests the need for explicit policy clarity and certainty around:
 - › where sustainable agricultural development will be acceptable to three levels of government and the community
 - › what water resources are available and who will be able to benefit from water allocation and water release processes and trading
 - › tenure resolution and property diversification processes to deliver productivity improvements and investment security for Traditional Owners, and the pastoral and forestry industries
 - › scale-relevant planning to ensure the appropriate infrastructure, services and labour force requirements are in place.

Harmonising governance and planning:

- Harmonising regulations and approvals processes will improve the ease of investment across Northern Australia, particularly for enterprises looking to geographically diversify their operations.

Export barriers, supply and value chains

Review and resolve trade barriers:

- To enable increased or diversified export of agricultural product from Northern Australia, a dedicated Northern Australian program of strategic trade barrier identification and removal needs to commence in partnership with Department of Foreign Affairs and Trade is required.

Access to financial products:

- Identify opportunities to incentivise provision of affordable insurance products to better manage climate variability and weather risk in Northern Australia.

Improve data accessibility and research and development planning and investment:

- Northern Australia has significant data deficiencies that increase uncertainty in investment and regulatory decision making. Strategic investments to better use and communicate existing and new data generation (e.g. through National Environmental Science Program (NESP); Cooperative Research Centre (CRC) proposals) is required.
- Expand the current CRCNA model to include increased RD&E investment in:
 - (i) Traditional Owner-led business development (in partnership with the Indigenous Reference Group)
 - (ii) New RD&E investment in additional industry sectors such as tourism
 - (iii) Health services planning and delivery.

A strategic and integrated approach to biosecurity:

- By integrating biosecurity considerations, responses and expertise across the agricultural, health and Indigenous development sectors, there is an opportunity to build foundational knowledge, improve monitoring systems and rapid response protocols across Northern Australia.

Cost of production:

- Act on key costs holding back the development of Northern Australia, specifically by:
 - › Addressing the high cost of cyclone risk from general insurance products
 - › Addressing price disparities in liquid fuels between Northern and Southern Australia
 - › Introducing greater security and affordability in energy and communication networks.

Infrastructure

Northern Australian Water Infrastructure and Supply Chain Development Investment:

- A second defined tranche of Northern Australian-specific investment (for ongoing water assessment and feasibility studies, water allocation planning, pre-development land use and associated Infrastructure planning, and for new capital development).
- Feasibility and cost/benefit analysis can play a key role in identifying commercial opportunities and encouraging investment in supply and value chain infrastructure that provides a wider economic and public benefit. A fund similar to the Water Infrastructure Development Fund for developing and investment in supply and value chain collaboration and infrastructure would enable strategic de-risking of investment.
- Greater coordination of concessional finance opportunities and arrangements, including earlier and more collaboration from the Northern Australian Infrastructure Fund (NAIF) and other financiers in supporting transformational development opportunities.

Regional Population and Infrastructure Investment Plans:

- By adapting the current Commonwealth Regional Deals framework, there is an opportunity to:
 - › Target regions where significant population growth is achievable
 - › Drive tri-lateral agreement (Commonwealth, State, Territory and Local governments) about the longer term development and population vision
 - › Align up to 10 years of significant and enabling land use planning and public infrastructure investment (including both energy and telecommunications) through respective budget processes
 - › Identify opportunities to enable additional private sector development and investment.

Workforce development, retention and liveability

Regional population and migration strategies:

- In association with the proposed Regional Planning frameworks outlined above, the Commonwealth could support the establishment of a clear population vision for Northern Australia. This work can also focus on improving the liveability of the North's major regional centres as a means of improving migration and population retention within these regions.

Strategic investment in sector and workforce development:

- More investment and focus is needed to expanding the tertiary and technical training opportunities in identified critical skill areas. Areas of critical concern include:
 - › Aquaculture
 - › Siviculture and silvopastoral systems
 - › Data and digital capability
 - › Health and health-related services
 - › General farming skills and agri-business know-how.

Governance and leadership

In the context of the recommendations of the review of the former Council of Australian Governments (COAG) Councils and Ministerial Forums, consider the alignment of the CRCNA's future work program with the priorities of the Ministerial Forum for Northern Development and its sub-structures.

- Maintain and strengthen the Northern Ministerial Forum for Northern Development, the Office of Northern Australia (ONA) and the Northern Australian Senior Officers Networking Group (NASONG) frameworks.

Without these arrangements, the basic architecture for cross-jurisdictional coordination in implementing and adapting the White Paper would not exist. These governance frameworks are also an appropriate avenue to implement findings from the CRCNA's foundational research on de-risking agricultural investment.

Continue the role of the Northern Australian Indigenous Reference Group:

- The Northern Australian Indigenous Reference Group (IRG) is currently progressing an important body of work, developing several priority actions, and creating the foundation for Indigenous led development across Northern Australia. Commonwealth commitment to further development and implementation of the IRG's accord-based actions will be important.

There is also capacity to see the IRG process become a strong framework for broader economic dialogue between Aboriginal people and Torres Strait Islanders with the Commonwealth in the North.

Establish an independent cross-jurisdictional Northern Australian health system network:

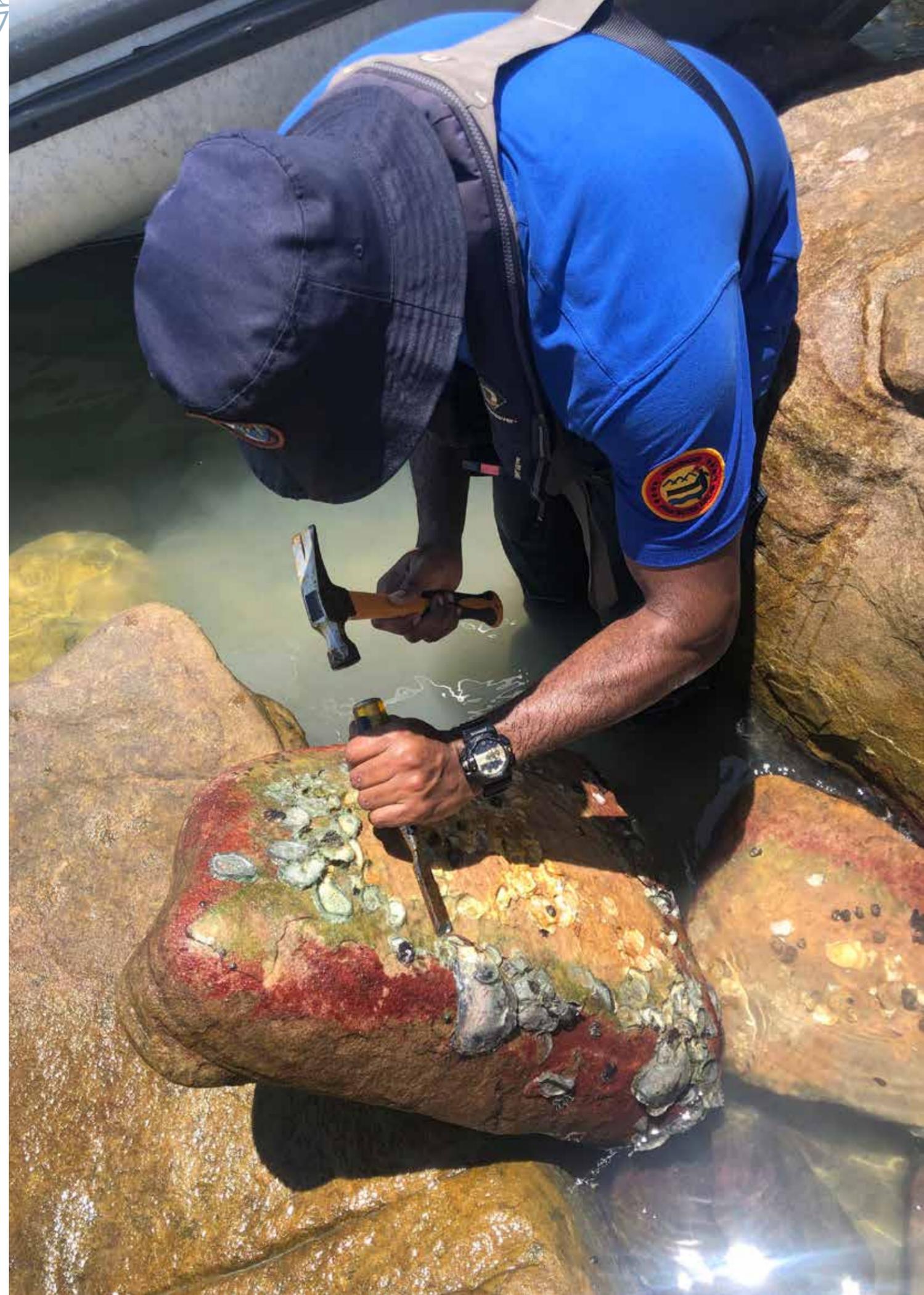
- More effort is needed in Northern Australia to coordinate governance and leadership, better design health information systems and prioritise essential medicines and technologies.

A strong cross-jurisdiction partnership arrangement would create a mechanism to:

- › Share and create knowledge across the North
- › Enable data linkage and data interoperability
- › Join up credentialing and registration processes to support effective health workforce mobility
- › Enable cross-border service provision to account for population movements across jurisdictional borders
- › Deliver uniform/shared clinical practice guidelines
- › Provide advocacy opportunities around effective financing models and northern-focused health policy.

Industry leadership:

- Empower key industry associations to:
 - › Enable better industry cooperation and collaboration across Northern Australia
 - › Collect data relevant to their industry, including agronomic and productivity information, as well as domestic and export market intelligence.



Conclusion

In delivering its State of the North 2020 report the CRCNA has, for the first time, benchmarked the state of our northern development trajectory across key agricultural sectors, communications, Traditional Owner-led business and health service delivery sectors. The research examined the existing and future opportunities, strengths, threats and weaknesses of each sector and found many cross-sectoral synergies and common impediments to future development for the individual industries and Northern Australian development.

The body of evidence this research has delivered highlights the need for greater policy harmonisation and further coordination between the Australian Government, the CRCNA and the Queensland, Northern Territory and Western Australian Governments to de-risk and support the development of new agricultural activity and investment in health service delivery and models of care across the North.

It is clear by exploring solutions and policy responses which benefit multiple users across multiple sectors within a pan-northern (east to west) context, sustainable development which underpins healthy and liveable communities, can happen in Northern Australia.



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BROOME • DARWIN • TOWNSVILLE

HEAD OFFICE – TOWNSVILLE
(07) 4401 5035 | enquiry@crcna.com.au

QUEENSLAND
qldmanager@crcna.com.au

WESTERN AUSTRALIA
wamanager@crcna.com.au

NORTHERN TERRITORY
ntmanager@crcna.com.au

