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STRATEGY & IMPLEMENTATION PLAN

FOR ENHANCING AGRICULTURAL PRODUCTION & EMPLOYMENT IN NORTH WEST QUEENSLAND

DAF-18004 FINAL REPORT
v1.03; December 2018

CORIOLIS

Queensland Government

QUEENSLAND GOVERNMENT
Department of Agriculture and Fisheries

STRATEGY & IMPLEMENTATION PLAN

for Enhancing Agricultural Production & Employment in North West Queensland

DAF-18004 FINAL REPORT

DECEMBER 2018

V1.03

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Client Brief

SCHEDULE 1 – REQUIREMENTS

The Supplier must provide the Services specified below to the Customer, in accordance with the Requirements described in this Schedule.

PURPOSE

The Queensland Department of Agriculture and Fisheries (DAF) as lead agency (the customer), are seeking to secure the services of a suitably qualified consultant/service provider or consortium, to develop a long-term strategy and associated implementation plan for enhanced agricultural production and employment in North Western Queensland.

The strategy will focus on expansion, diversification and intensification opportunities linked to the regions agriculture, fisheries and forestry sectors.

The strategy will be developed in collaboration with key stakeholders across the supply chain and link with allied components of the broader regional economic diversification strategy.

This body of work will form an integral component of an overarching long-term regional economic diversification strategy for the North West being led by Queensland Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP).

BACKGROUND

Reference is made to the recently completed Strategic Blueprint for Queensland's North West Minerals Province (NWMP), the key recommendations and findings of which were as follows:

- Need for regional resource based economies to diversify their economic base to facilitate longer-term economic and community resilience;
- Imprimatur and funding to explore more broadly and build on economic strengths other than mining (Eg. agriculture, fishing, forestry and tourism), and pursue opportunities to facilitate more diversified drivers of economic growth;
- The NWMP has a strong agricultural base including extensive grazing/beef cattle production, and horticulture and cropping;
- The sector represents the second largest employer in the NWMP, behind mining;
- Acknowledge there are opportunities to increase agricultural diversification, and growth in the NWMP based on a number of current and emergent demands and drivers;
- Three (3) strategic priorities have been identified as central to securing the future of the NWMP:
- Facilitate continued resources sector development
- Diversify the regional economy and create employment opportunities
- Work with businesses and communities to deliver integrated and appropriate services
- Under the auspices of Strategic Priority Two, a 'Regional Economic Diversification Strategy for North West Queensland' is to be developed.
- As part of this overarching strategy, DAF has been tasked with developing a strategy to expand commercially viable agriculture related opportunities in the NWMP over the long term, inclusive of a plan to implement key recommended actions.
- Running concurrently DAF will also be supporting opportunities to leverage agricultural research projects and associated investment. The primary vehicles to progress this body of work will be the CRC for Developing Northern Australia and the Centre of Excellence for Rural Economies.

PROJECT AREA

Refer Page 6 of the Strategic Blueprint defines the NWMP (Attachment 1)

From an agriculture, fisheries and forestry perspective it is acknowledged that a broader project area will to be considered inclusive of the Gulf Rivers and parts of central Queensland, having due regard for associated supply and value chains.

SCOPE

The consultant/service provider or consortium will assist the customer by taking the lead in:

a) Developing a strategy to expand commercially viable agriculture related opportunities in the NWMP over the long term; and

b) Prepare a costed implementation plan for key recommendations emanating from the strategy; and

There will also be a role in assisting the customer to engage and communicate the findings and recommendations of the strategy and implementation plan back to key stakeholders (government, industry and community)…

DELIVERABLES/OUTPUTS AND OUTCOMES

The consultant/service provider or consortium will deliver:

a) A long-term strategy for enhanced agricultural production and employment in North Western Queensland, and

b) A costed implementation plan

The Strategy and Implementation Plan will inform the overarching Economic Diversification Strategy being prepared for the NWMP.

The successful supplier may want to consider preparing stand-alone reports and reporting mechanisms for each of the major activities or actions associated with their proposed approach/methodology.

This strategy covers the North West Minerals Province and associated linkages and supply chains

KARUMBA
Port

CAIRNS
International Airport
Cairns Airhub
Port

TOWNSVILLE
Airport
Upgraded Port
Road & Rail Hub

Source: "A Strategic Blueprint for Queensland's North West Minerals Province", Queensland Government; adapted by Coriolis

Note that this strategy and implementation plan forms part of a suite of reports and should be read as a set

Executive Summary

WHAT IS THE PROBLEM?

North West Queensland's population has been declining for several decades. This has had flow-on effects for the region's industries, businesses and communities. There has been considerable government attention given to the issue, most recently in "The Strategic Blueprint for Queensland's North West Minerals Province." The Blueprint identified agriculture as a sector with real potential to grow and diversify the regional economy.

This strategy and implementation plan is designed to identify opportunities for increasing and diversifying agricultural production in the North West Queensland region.

The agriculture industry is already the major employer in the region outside of the mining centres of Mount Isa and Cloncurry. Agriculture is targeted as it has the potential to "create" significant new employment that is not dependent on regional population (unlike many service industries). However, agricultural employment in the region has been falling, primarily due to changes in the cattle sector.

IS THERE AN OPPORTUNITY IN AGRICULTURE?

North West Queensland consists primarily of warm semi arid and tropical savanna climates, with some warm desert climate around Mount Isa. North West Queensland currently has an almost singular focus on cattle.

There are other countries with very similar conditions that can be treated as strong "climatic peers" for the region. These "peer" countries, predominantly from sub-Saharan Africa, provide a performance benchmark that North West Queensland should aspire to meet. As one example, matching the productivity of Eritrea would result in North West Queensland increasing the value of its agriculture production by ten times. North West Queensland currently produces an average of 1 kilogram of crops per hectare, well below Mali's 124 or Ethiopia's 426 kilograms.

Peers produce a much wider range of products for export, including cattle, cotton, sorghum, shea, castor, sesame, mungbean, mango and cassava. These are all products in high demand in world markets.

HOW CAN NORTH WEST QUEENSLAND WIN?

To compete with these peers, North West Queensland can deliver a region that combines a modern, well developed economy, with African climatic conditions, that is close to key markets and enjoys a excellent reputation as a safe and trusted supplier.

North West Queensland can meet the needs of the customers for these products, particularly those whose supply chain reaches into Africa.

North West Queensland can compete. It is "The Right Place to Grow" many dry climate products, with the land, sunshine, water and resources required for success. North West Queensland is the size of Japan or Germany, with the population of Monaco. In addition, it has plenty of land for considerably lower cost than other regions of Australia. Water is available and the region gets high sunshine hours with mild winter temperatures.

WHERE CAN WE GROW?

North West Queensland has three horizons for agricultural growth. Horizon 1 focuses on growing and building upon the mature cattle industry in the region. Horizon 2 supports emerging products through investment in irrigation infrastructure. Horizon 3 involves developing new dryland products that are new to the region.

Executive Summary

With investment across these three horizons, North West Queensland can create **$1.35 billion** in new agricultural growth. This would create up to **4,800 new jobs** in the region, significantly boosting population with all the beneficial flow on effects. Realising growth across these three horizons will require focus and effort by all stakeholders.

HORIZON 1

North West Queensland has an opportunity to produce more high quality, high value cattle. The region has a demonstrated capacity to stock cattle at higher densities than other similar regions in Australia. There are significant opportunities for additional dryland fodder production to support backgrounding operations and for further emphasis to be placed on the region's 100% pasture-fed position. Other opportunities for growth include increasing land productivity, improving herd genetics, management practices and supply chain efficiency and targeting high value, stable markets. Horizon 1 is working and delivering results. Work on the beef industry in Queensland is ongoing and there are low needs for new government action beyond "business as usual."

HORIZON 2

North West Queensland can achieve substantial growth through investment in regional water projects and infrastructure. Currently, very little surface water in the Gulf region is captured and used for agriculture. While the area is not a tropical paradise, it does receive more rain than many countries, including many climatic peers. However, this rainfall varies significantly by location, season and from year-to-year.

There are significant amounts of surface water in the region available for agricultural development, with three general unallocated water releases since 2012.

Development of diversified agriculture in the region will come from continued investment in both the large proposed and in-progress projects in the region. Projects such as the Gilbert River Irrigation Scheme, Richmond Agricultural Project and 3 Rivers Irrigation Project (among others) would unlock over 100,000 hectares of irrigated land for development. There are also a number of smaller opportunities for developing irrigated agriculture in the region, where water allocations have been acquired by existing land owners. Increased irrigation will enable strong synergies and create a positive growth loop in the region.

Research identified six crops, along with goatmeat, as opportunities in Horizon 2. In addition, cotton, sorghum and mungbean are crops that are able to be grown under dryland or irrigated production systems in parts of the region. Mangoes, grapes and peanuts are more water intensive crops that would work but require irrigation.

Horizon 2 has a number of regional water projects being progressed. Work on these projects is ongoing and they are progressing.

HORIZON 3

Horizon 3 looks at new products not traditionally grown in the North West Queensland region, or indeed in Australia at all, and are therefore outside of the "comfort zone". These products, grown by climatic peer countries, are drought tolerant, mechanised and non-perishable. Cassava, sesame, castor, shea and jojoba can also be further processed into valuable starch and oil products.

Horizon 3 is potentially transformative for the region and yet receives very little funding currently. A key recommendation of this strategy is that significant new government action is required to realise this clear opportunity for regional transformation.

Further analysis of the "Horizon 3" opportunities is available in a set of related reports.

Executive Summary

HOW DO WE IMPLEMENT?

Significant investment of time and resources is required to realise North West Queensland's three horizons of growth. We propose a vision for a vibrant and robust diversified agriculture sector, which in turn leads to increased regional production, employment and population.

To support and deliver this vision, the region has four clear, sustainable drivers of growth: (1) a modern economy, (2) an African climate, (3) a location close to key markets, and (4) a reputation as a safe and trusted supplier.

Any government activity will need to be in partnership with regional stakeholders, industry and entrepreneurs.

Key actions are required across all three horizons:

HORIZON 1

Key actions for supporting cattle industry growth under Horizon 1 include:

- Drive on-farm competitiveness
- Enhance supply chain efficiency
- Develop feed grains & fodder crops
- Support regional processing
- Improve regional reputation
- Add value through cattle R&D

HORIZON 2

Key actions for supporting investment in water projects under Horizon 2 include:

- Leverage existing allocations
- Support project proponents
- Enable landholder development
- Support major infrastructure projects
- Improve processes and systems
- Invest in growth

HORIZON 3

Key actions for supporting diversification into new crops under Horizon 3 include:

- Coordinate development
- Develop identified opportunities
- Promote opportunities to attract investment

Progress is not linear; the three horizons support each other and build on growth.

WHAT RESULTS CAN WE ACHIEVE?

With synergised investment of time, passion and capital across the three horizons, the opportunity exists to create $1.35 billion in new agricultural growth in North West Queensland, bringing 4,800 new jobs to the region.

North West Queensland has a clear agricultural diversification action plan to realise the opportunity

PRELIMINARY/PROPOSED

VISION	NORTH WEST QUEENSLAND DEVELOPS A VIBRANT AND ROBUST DIVERSIFIED AGRICULTURE SECTOR, LEADING TO INCREASED PRODUCTION, EMPLOYMENT AND POPULATION IN THE REGION			
DRIVERS	MODERN	AFRICAN CLIMATE	CLOSE TO MARKETS	SAFE &TRUSTED
HORIZONS	HORIZON 1 Grow & build cattle	HORIZON 2 Support emerging projects & products	HORIZON 3 Discover & develop new options	
ACTIONS	SUPPORT CATTLE INDUSTRY GROWTH 1. Drive on-farm competitiveness 2. Enhance supply chain efficiency 3. Develop feed grains & fodder crops 4. Support regional processing 5. Improve regional reputation 6. Add value through cattle R&D	SUPPORT INVESTMENT IN WATER PROJECTS 1. Leverage existing allocations 2. Support project proponents 3. Enable landholder development 4. Support major infrastructure projects 5. Improve processes and systems 6. Invest in growth	SUPPORT DIVERSIFICATION INTO NEW CROPS 1. Coordinate development 2. Develop identified opportunities 3. Promote opportunities to attract investment	

Source: Coriolis analysis

WHAT IS THE PROBLEM?

01

+ Project Background
+ Falling population

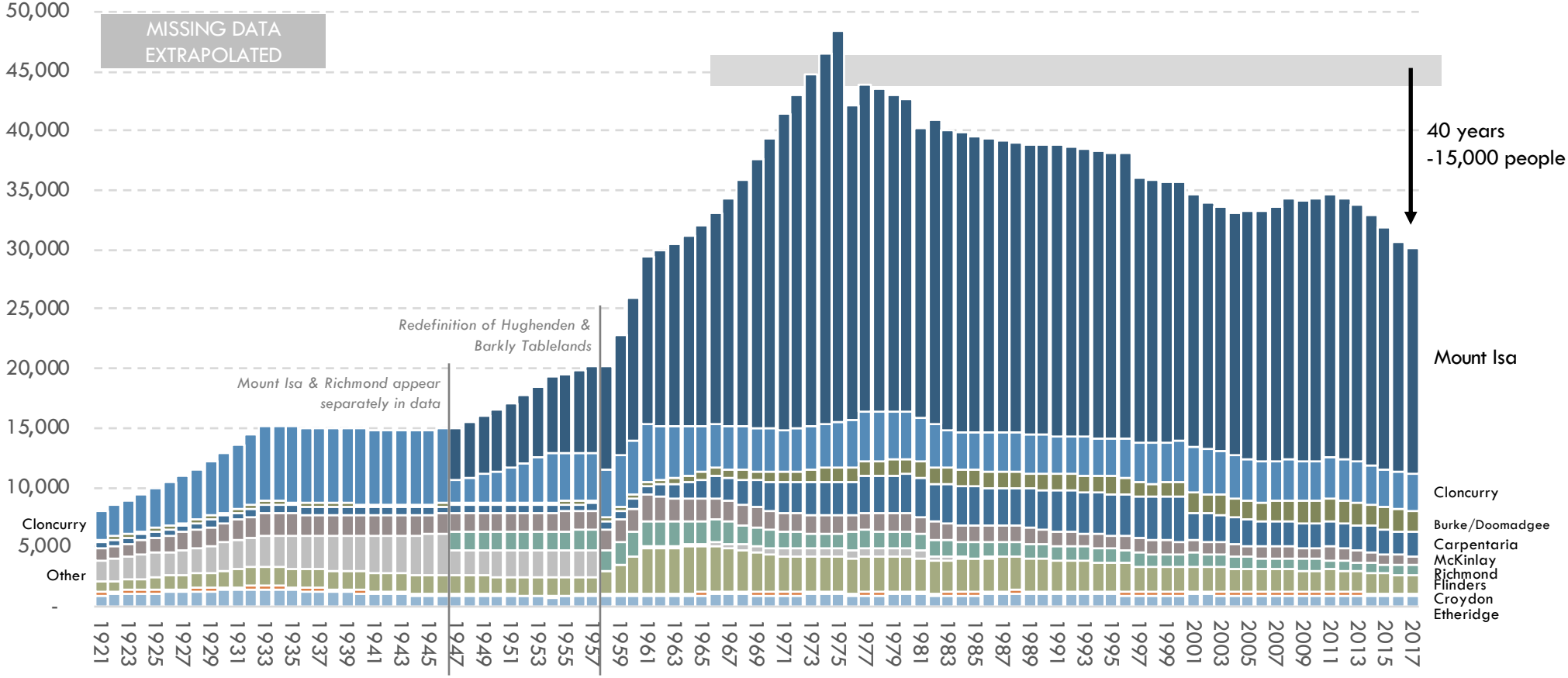
North West Queensland's population is in decline and diversifying agricultural production is a potential solution

- Total regional population has been declining since the mid 1970's; longer for some areas
  - Regional population is trending down across most regions
- The Strategic Blueprint for North West Queensland identifies agriculture as having the potential to grow and diversify the economy; this research seeks opportunities for increasing agricultural production in the region to create significant new employment
- WHY AGRICULTURE?
  - Agriculture has the potential to "create" significant new employment
  - Agriculture is the major employer outside Mount Isa/Cloncurry
- HOWEVER
  - Agricultural employment in the region has been falling at 4% per year, primarily due to changes in the cattle sector
  - The total area of agricultural holdings in North West Queensland is declining
  - Increasing agricultural production in North West Queensland faces a range of key challenges

Total regional population has been declining since the mid 1970's; longer for some areas

REGIONAL POPULATION IN NORTH WEST QUEENSLAND

People; 1921-2017

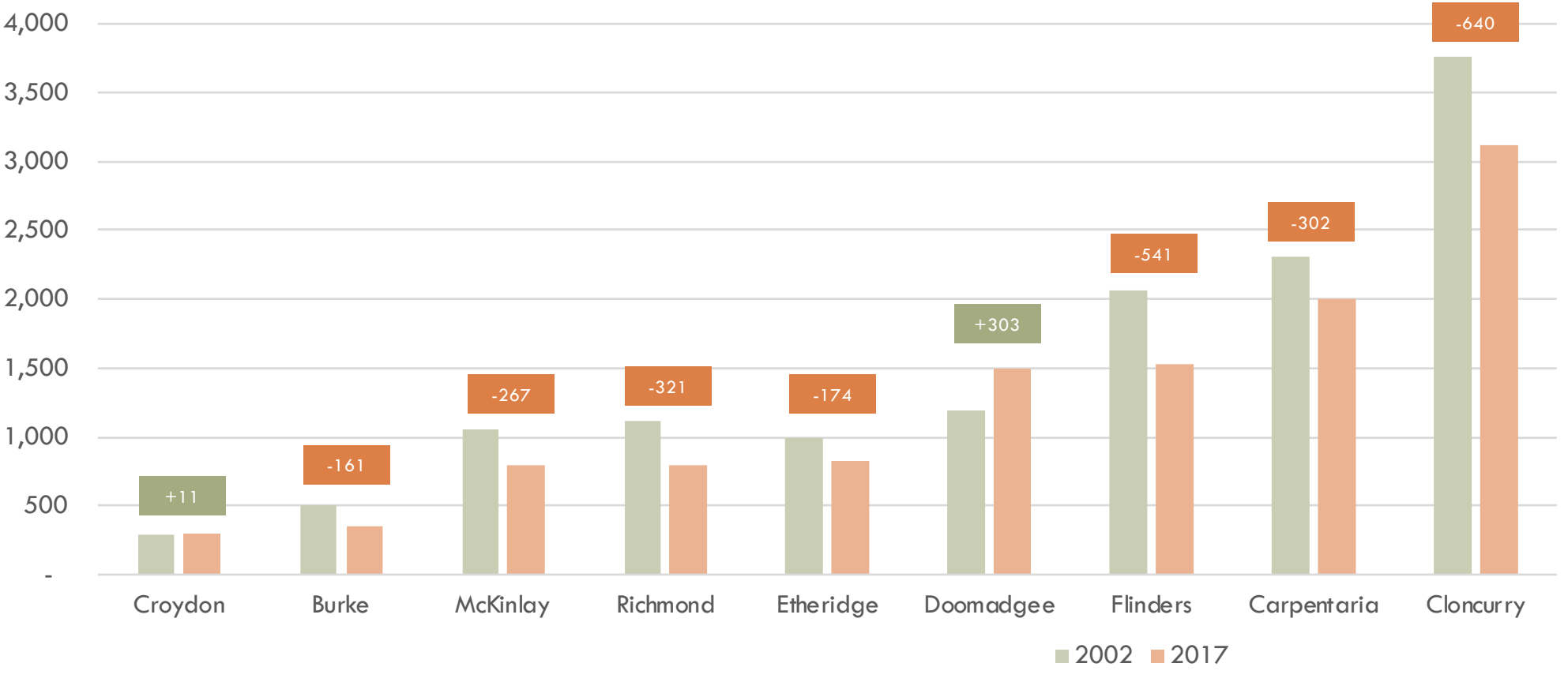


Source: wide range of ABS (and predecessor organisation) publications; Coriolis modelling & analysis

Regional population is trending down across most regions

REGIONAL POPULATION IN NORTH WEST QUEENSLAND EXCLUDING MOUNT ISA

People; 15y change; 2002 vs. 2017



Source: various ABS publications; Coriolis analysis

The Strategic Blueprint for North West Queensland identifies agriculture as having potential to grow and diversify the economy

VISION
Strong and prosperous industries, businesses and communities in the North West Minerals Province

STRATEGIC PRIORITY 1
Facilitating continued resources sector development

STRATEGIC PRIORITY 2
Diversifying the regional economy and creating employment opportunities

STRATEGIC PRIORITY 3
Working with businesses and communities to deliver integrated and appropriate services

- *Support key enabling infrastructure*
- *Continue to support the development of the Jemena Northern Gas Pipeline*
- Develop a regional economic diversification strategy for North West Queensland
  - *Complete an infrastructure audit*
  - Scope opportunities for increasing agricultural production
  - *Investigate tourism opportunities*
  - *Improve the digital presence of regional start-ups and established businesses*
- Support opportunities to leverage agriculture research projects
- *Build entrepreneurial capacity for existing and emerging sectors*
- *Optimise employment opportunities -facilitate training and development*
- *Prioritise youth employment*

This research seeks opportunities for increasing agricultural production in the region to create significant new employment

Key actions to be delivered in developing the strategy include:

DEVELOP A REGIONAL ECONOMIC DIVERSIFICATION STRATEGY FOR NORTH WEST QUEENSLAND

The Queensland Government will develop a long-term regional economic diversification strategy to leverage and identify development opportunities in key sectors including resources, agriculture, enabling infrastructure, tourism, and business and industry…

SCOPE OPPORTUNITIES FOR INCREASING AGRICULTURAL PRODUCTION

The state's North West presents unique prospects for further agricultural development. In recognising these opportunities across the Province, the Queensland Government will be developing an integrated North West Queensland agriculture plan. The plan will focus on continuing to grow a sustainable and diversified agricultural sector, and will be developed in collaboration with key stakeholders across the supply chain and linked with the broader regional economic diversification strategy.

…

SUPPORT OPPORTUNITIES TO LEVERAGE AGRICULTURE RESEARCH PROJECTS

The Queensland Government has already committed $1.5 million over three years to stimulate research activity to progress the development of new agriculture opportunities across North Queensland.

This funding will support opportunities to leverage industry-led research and development being undertaken through the Cooperative Research Centre for Developing Northern Australia for increased agriculture production across the Province and other parts of North Queensland.

The Cooperative Research Centre for Developing Northern Australia, currently being established in Townsville, is intended to provide a collaborative research platform to address challenges that have constrained agricultural and broader development in the north and includes a $75 million commitment over 10 years from the federal government.

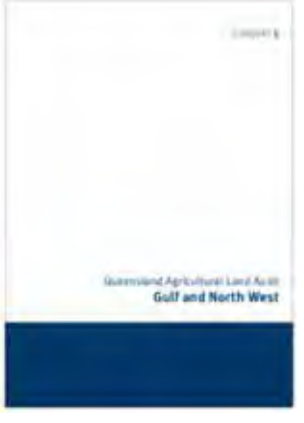
p17-19

Source: North West Minerals Province "A Strategic Blueprint for Queensland's North West Minerals Province"

This work builds on past government strategies, reports and blueprints covering part or all of the region

EXAMPLE STRATEGIES AND PLANS

Select recent strategies;

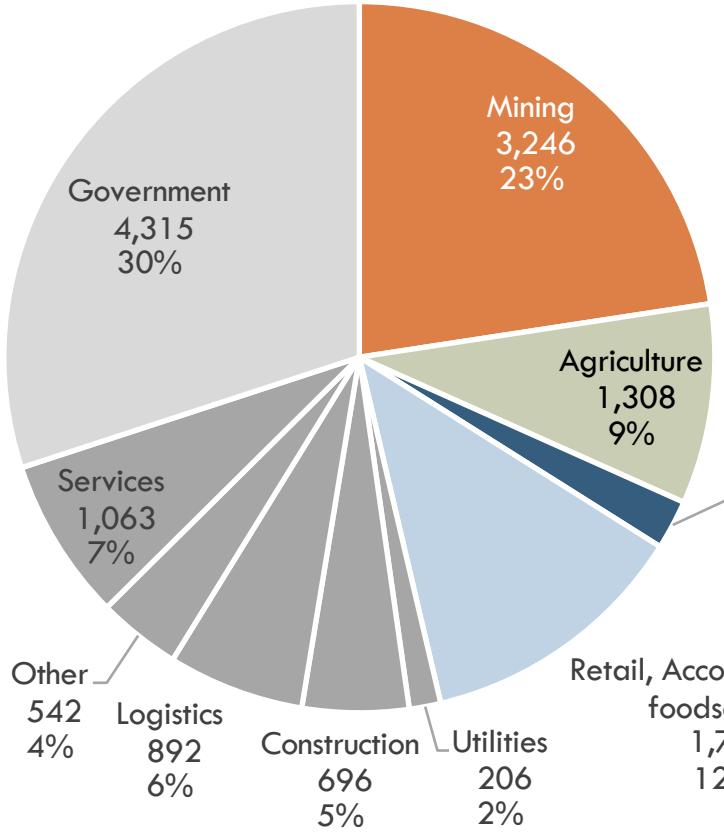


Source: various websites; Coriolis analysis

Why agriculture? Agriculture has the potential to "create" significant new employment

REGIONAL EMPLOYMENT IN NORTH WEST QUEENSLAND BY SECTOR

People; 2016



54%

Primarily dependent on regional population rather than "creating" new employment

34%

Mining, agriculture and manufacturing are the key sectors that can "create" significant new regional employment

12%

Primarily locals, but also directly benefits from tourism

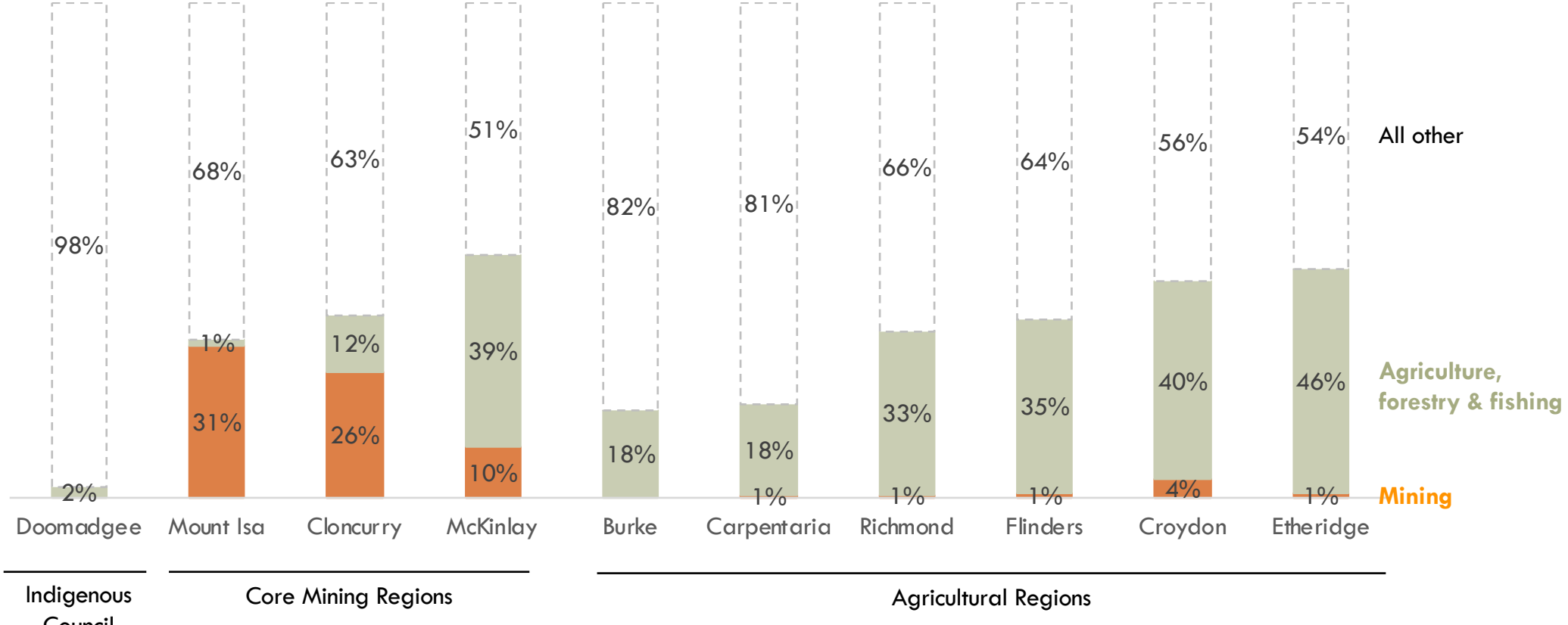
TOTAL = 14,370 people employed

Source: ABS Regional Statistics by LGA – Economy and Industry; Coriolis analysis

Agriculture is the major employer outside Mount Isa/Cloncurry

SHARE OF TOTAL REGONAL EMPLOYMENT IN MINING & AGRICULTURE

% of employed persons; 2016

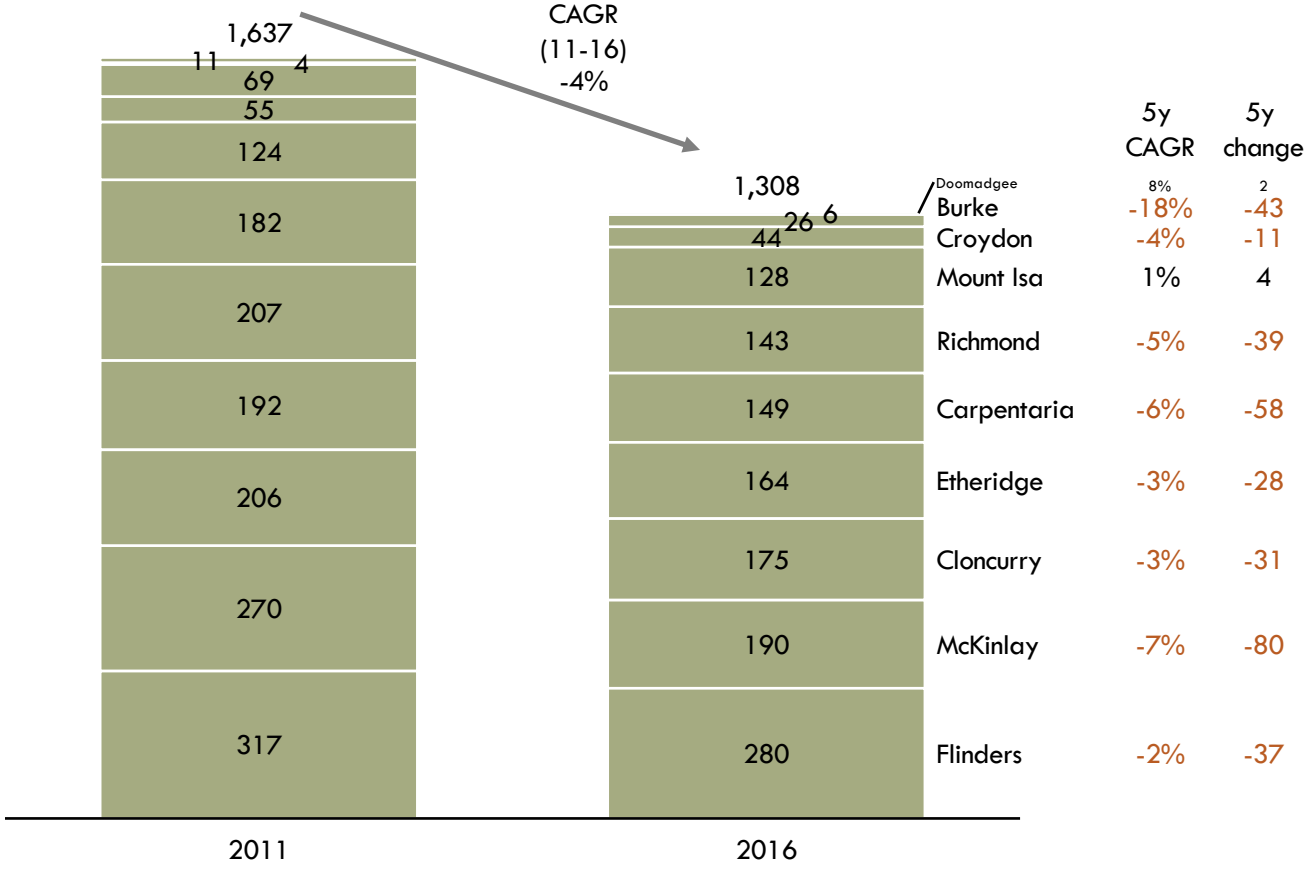


Source: ABS Regional Statistics by LGA – Economy and Industry; Coriolis analysis

Agricultural employment in the region has been falling at 4% per year, primarily due to changes in the cattle sector

EMPLOYMENT IN AGRICULTURE, FORESTRY & FISHING IN NORTH WEST QUEENSLAND

People; 2011 vs. 2016



	5y CAGR	5y change
Doomadgee	8%	2
Burke	-18%	-43
Croydon	-4%	-11
Mount Isa	1%	4
Richmond	-5%	-39
Carpentaria	-6%	-58
Etheridge	-3%	-28
Cloncurry	-3%	-31
McKinlay	-7%	-80
Flinders	-2%	-37

KEY DRIVERS

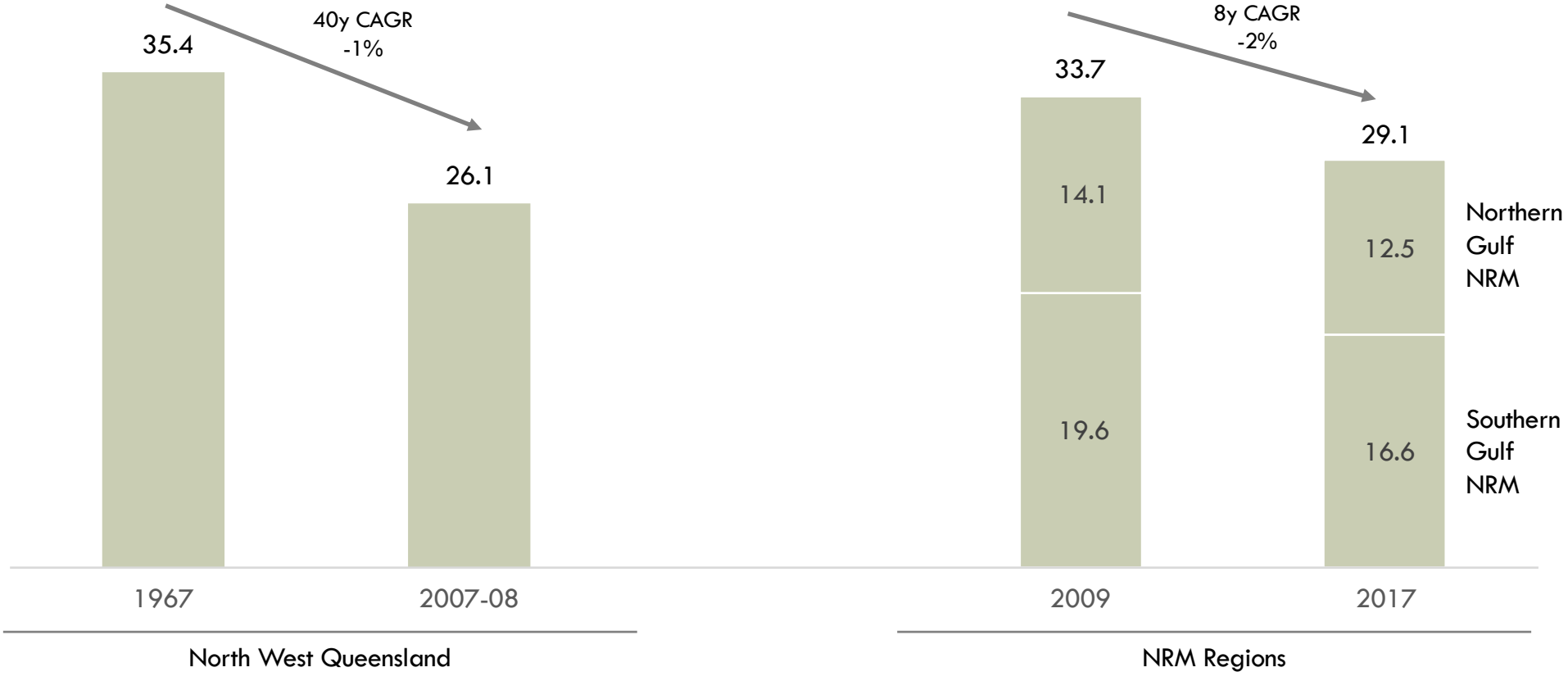
Drought
Consolidation
Productivity
Changing Activities
Changing Land Use

CAGR = Compound Annual Growth Rate; Source: ABS Regional Statistics by LGA – Economy and Industry; Coriolis analysis

The total area of agricultural holdings in North West Queensland is declining

TOTAL AREA OF AGRICULTURAL HOLDINGS IN NORTH WEST QUEENSLAND REGION

Hectares; m; 1967-2017



CAGR = Compound Annual Growth Rate; Source: wide range of ABS (and predecessor organisation) publications; Coriolis modelling & analysis

Increasing agricultural production in North West Queensland faces a range of key limitations or challenges

See Appendix for full discussion

Source: Coriolis analysis

IS THERE AN OPPORTUNITY?

02

+ The case for North West Queensland

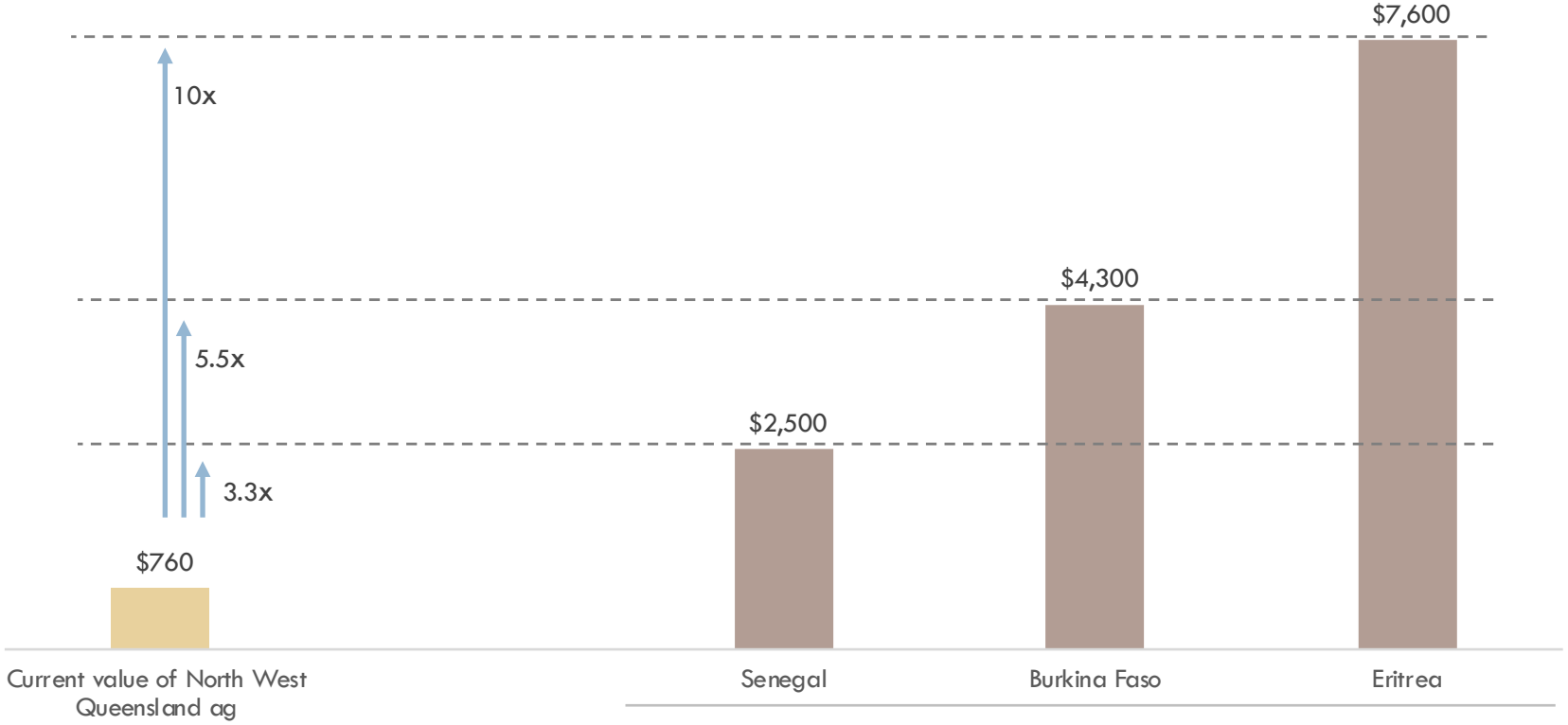
Climatic peers strongly suggest North West Queensland can dramatically increase agricultural production

- North West Queensland should aspire to match the performance of African climatic peers
  - A range of countries have a similar climate to the region and can be treated as strong peers
  - North West Queensland is not currently intensively farmed relative to these strong climatic peers
  - Strong climatic peers produce a lot more overall agricultural value per square kilometre
- Climatic peers are achieving export success by producing a wider range of products for export; products that markets want to buy
- Success is possible; North West Queensland is "The Right Place to Grow"; it has the land, water and resources required for success provided they can be utilised
  - North West Queensland covers a vast area the size of Japan or Germany
  - Land is cheap compared with other parts of Australia
  - The region gets high sunshine hours and has warm average temperatures
- Only North West Queensland can deliver a region that combines a modern, developed economy with African climatic conditions

North West Queensland should aspire to match the performance of African climatic peers

NORTH WEST QUEENSLAND POTENTIAL VALUE OF AGRICULTURAL PRODUCTION

A$; m; nominal 2017

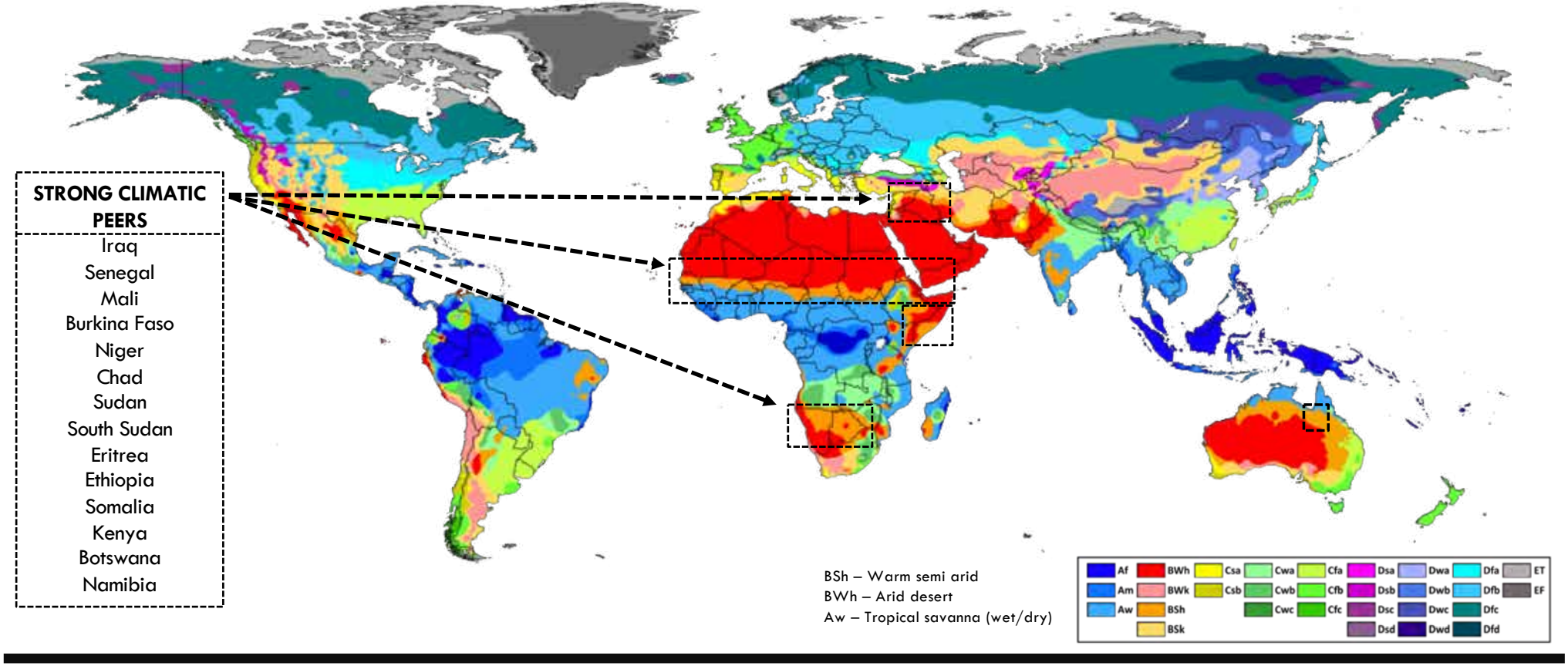


Source: UN FAOSTAT; ABS; Coriolis estimates and analysis

A range of countries have a similar climate to North West Queensland and can be treated as strong peers

REGIONS WITH STRONGLY SIMILAR CLIMATIC ZONES TO NORTH WEST QUEENSLAND

Koppen-Geiger Classification

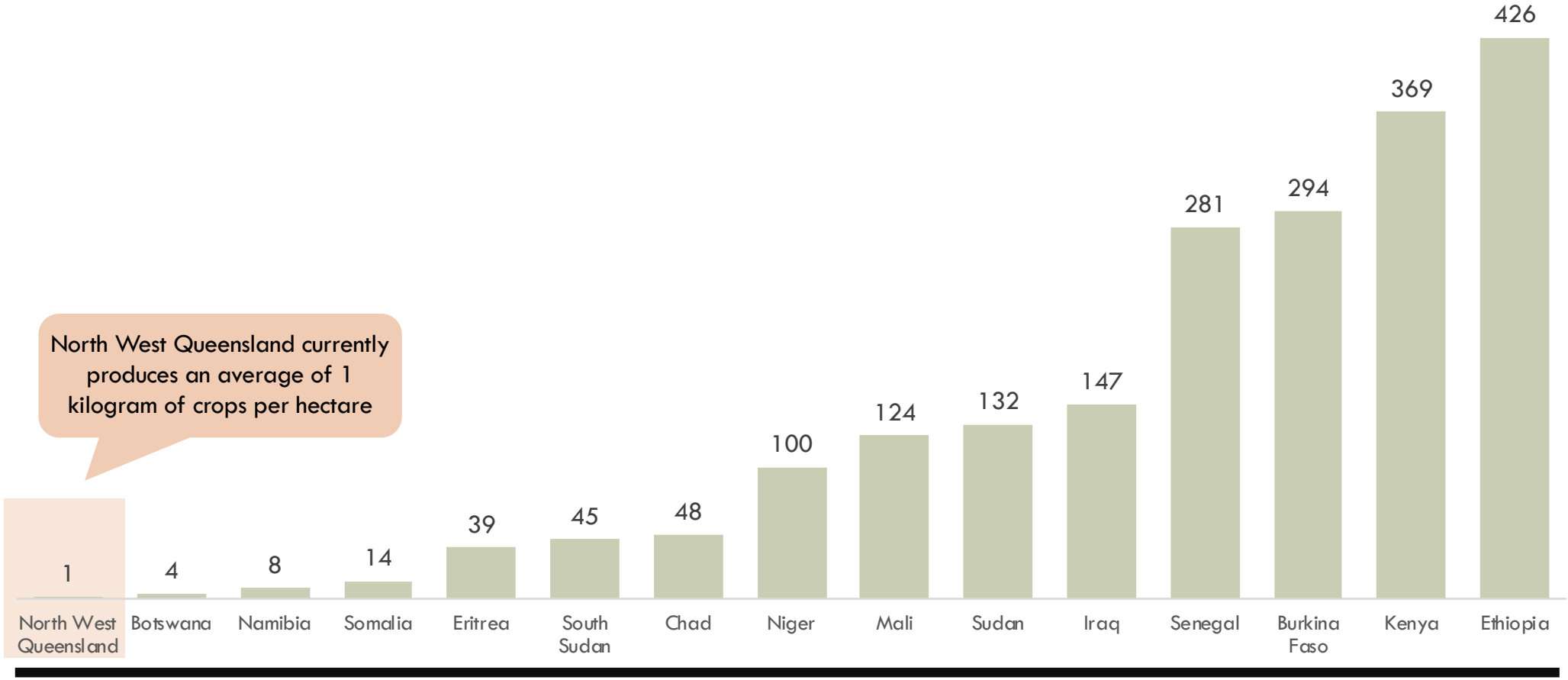


Source: WikiCommons CC BY-SA 4.0 (By Peel, M. C., Finlayson, B. L., and McMahon, T. A.(University of Melbourne); Vectorized by Ali Zifan. - Hydrology and Earth System Sciences: "Updated world map of the Köppen-Geiger climate classification"; CC BY-SA 4.0); adapted by Coriolis; Coriolis analysis

North West Queensland is not currently intensively farmed relative to these strong climatic peers

TOTAL CROP PRODUCTIVITY/INTENSITY: NORTH WEST QUEENSLAND VS. PEERS

*Kilograms/ha; total land area; 2016 or 2016/17**

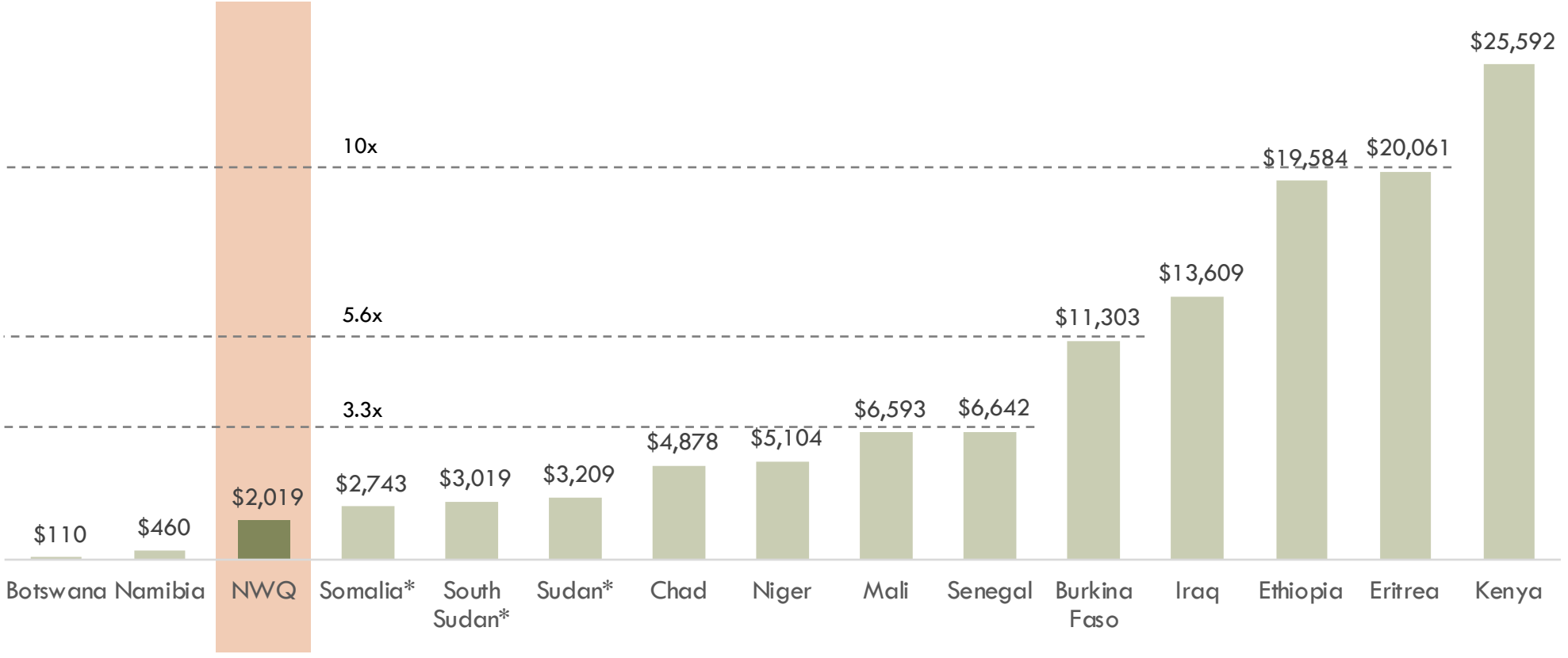


*Note: includes arable crops, root crops, vegetables, tree crops and fruit; * NWQ uses 2016/17. Source: World Bank; UN FAOSTAT; ABS; Coriolis estimates and analysis*

Strong climatic peers produce a lot more overall total (plant and animal) agricultural value per square kilometre

VALUE OF AGRICULTURAL PRODUCTION PER TOTAL SQUARE KILOMETRE

*US$/km²; all agriculture/total land area of country; 2015 or 2016/17^*



*^NWQ GVP 2016/17; *Uses International Currency; Source: World Bank; UNFAO; ABS; Coriolis estimates and analysis*

Climatic peers are achieving export success by producing a wider range of products for export; products that markets want to buy

NORTH WEST QUEENSLAND

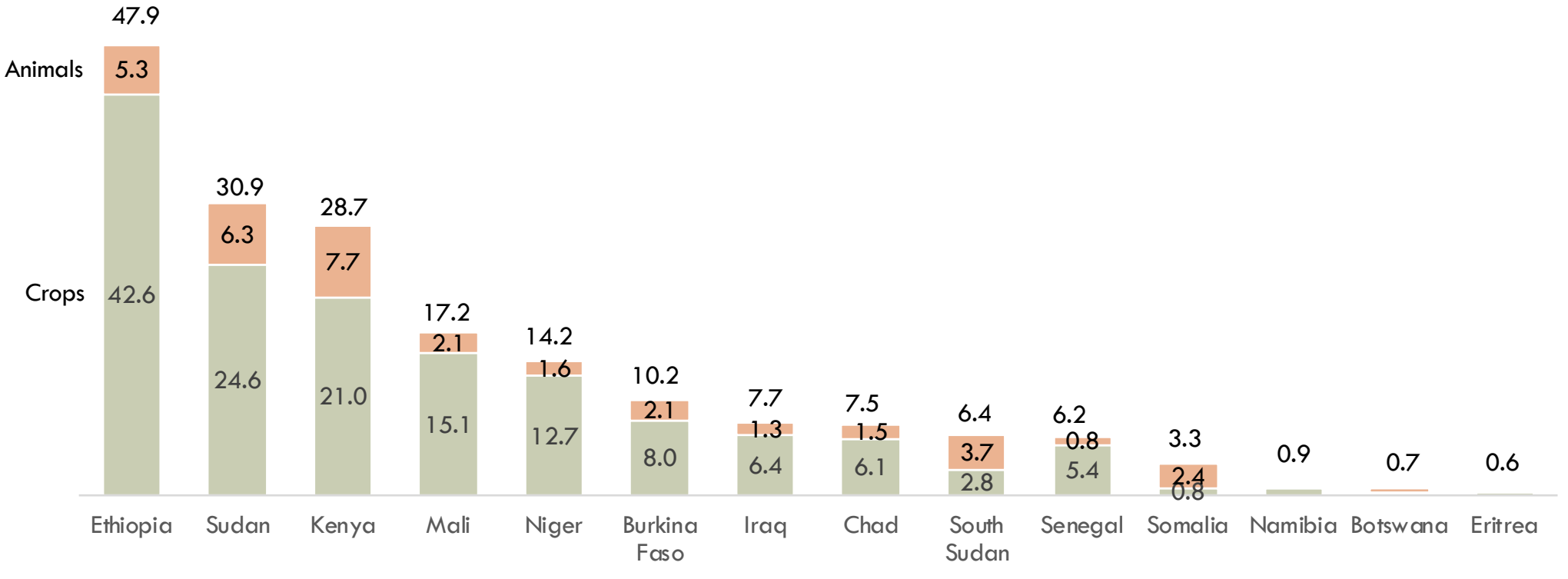
AFRICAN PEER GROUP REGIONS

Source: Coriolis analysis

Climatic peers are producing significantly more crops

AGRICULTURAL PRIMARY PRODUCTION BY CLIMATIC PEERS

Tonnes; m; 2016



Source: FAOStat; Coriolis estimates and analysis

Success is possible; North West Queensland is "The Right Place to Grow"; it has the land, water and resources required for success provided they can be utilised

- Large total area 375,486 km^2
- Over 28m hectares of agricultural holdings in the region
- Diverse climatic conditions
- Low cost land currently underutilised
- Fertile soils suitable for agriculture

- Plentiful seasonal rainfall
- Multiple existing dams in the region
- Numerous additional dams proposed or in progress
- Proposed dams will be transformative to regional agriculture

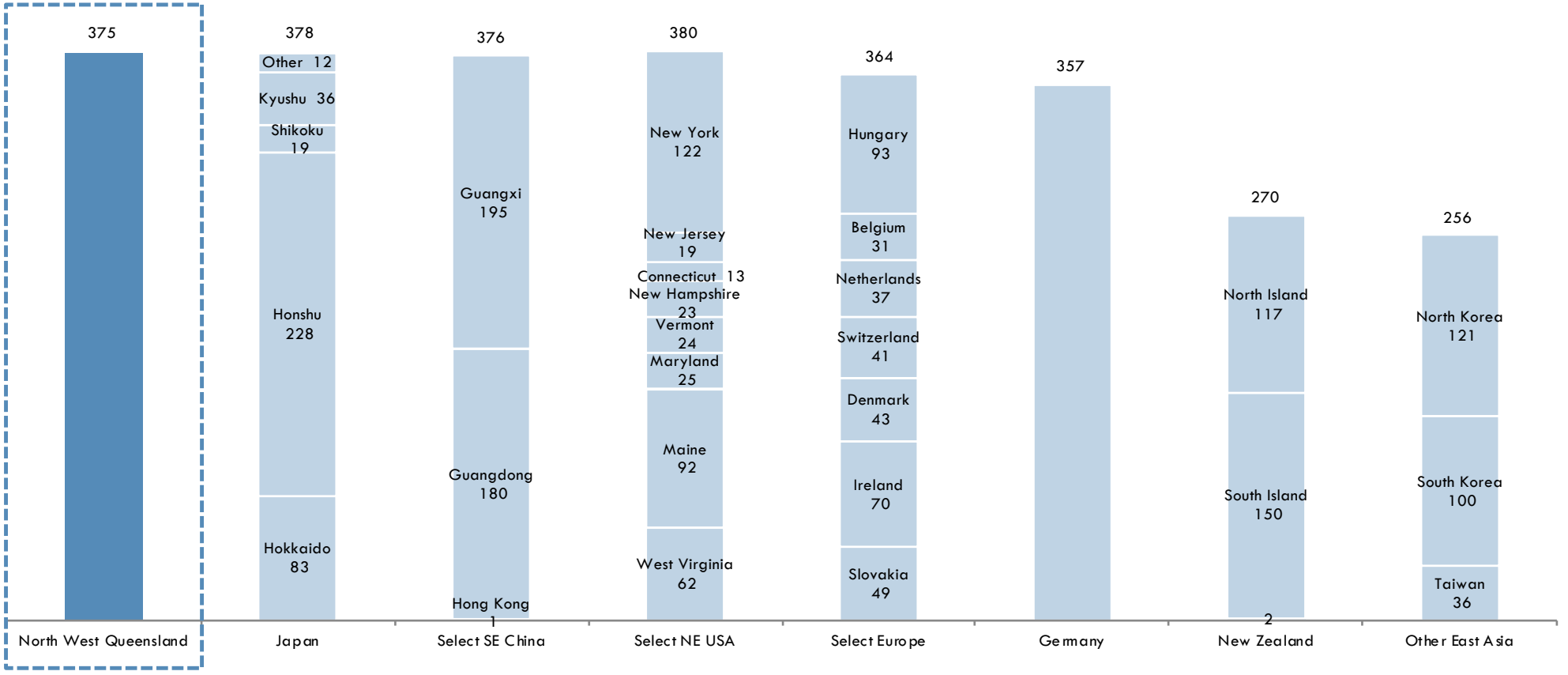
- World class supply chains
- Easy access to Port of Townsville and Cairns Airhub
- Ongoing investment in infrastructure
- Skilled and educated regional population
- Readily available equipment, genetics, systems and support services

Photo credit: CC BY-SA 3.0 (Ravenspear82); purchased

North West Queensland covers a vast area the size of Japan or Germany

TOTAL AREA: NORTH WEST QUEENSLAND VS. SELECT REGIONS

Km^2; 000; 2018

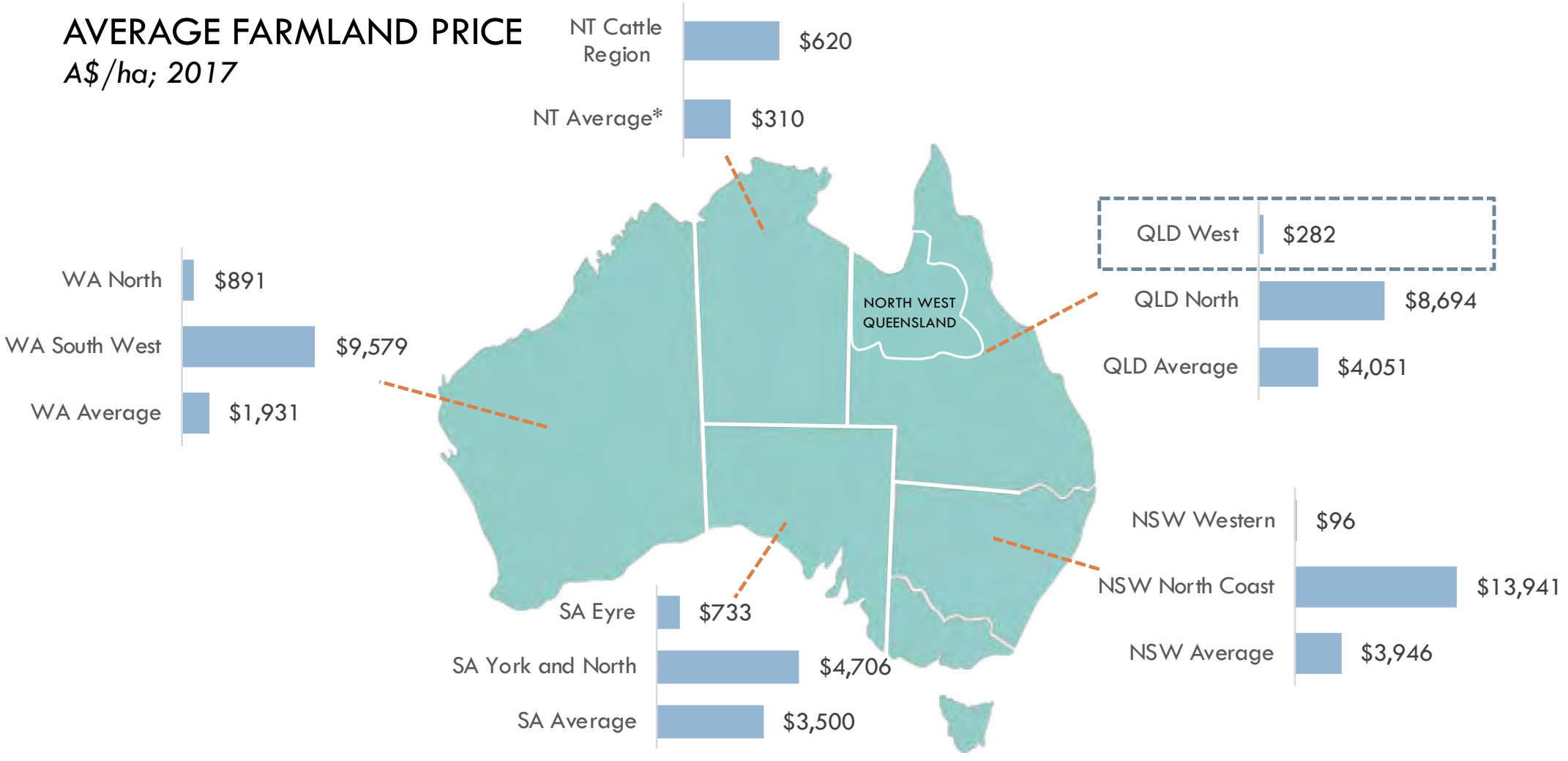


Source: CIA World Fact Book; Wikipedia; Coriolis analysis

Land is cheap compared with other parts of Australia

AVERAGE FARMLAND PRICE

A$/ha; 2017

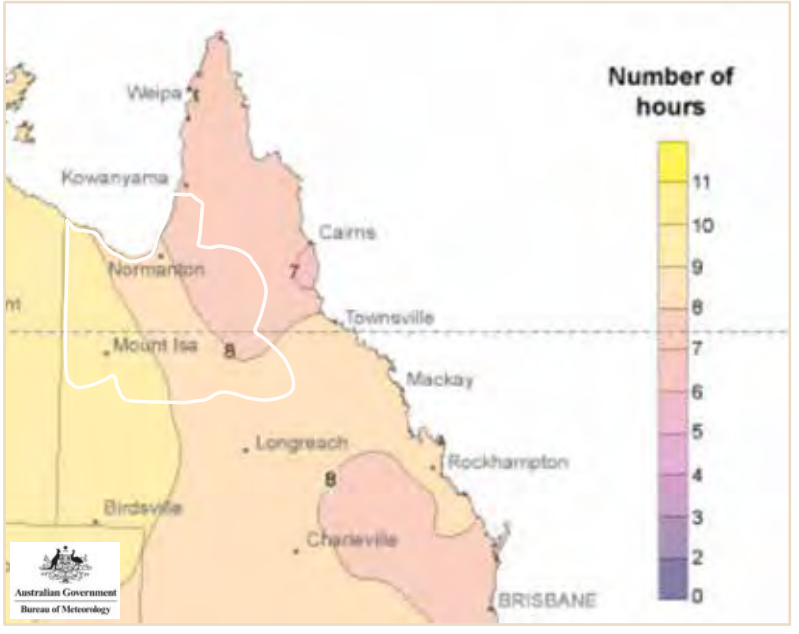


**NT Median Indexed; Source: Rural Bank, Australian Farmland Values; Coriolis analysis*

The region gets high sunshine hours and has warm average temperatures

AVERAGE DAILY SUNSHINE HOURS

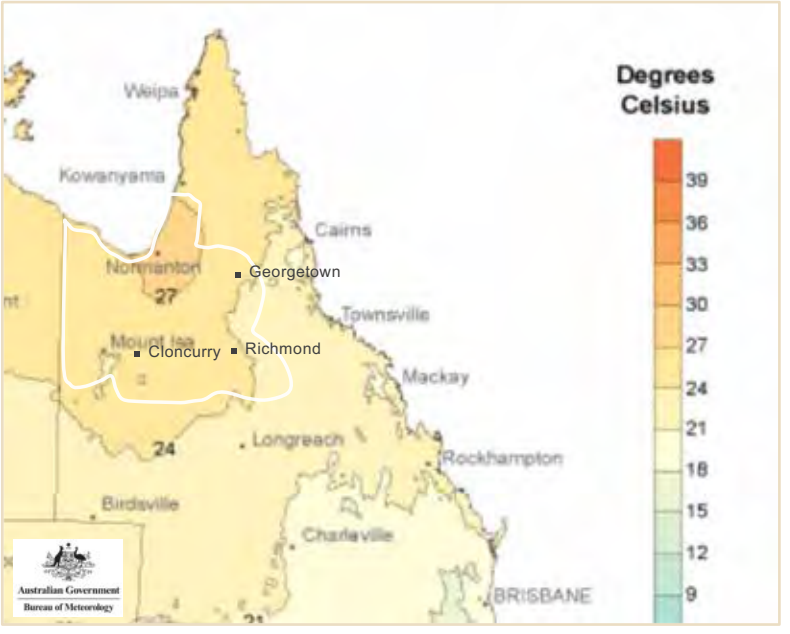
Annual, 2018



Average 7-9 hrs

AVERAGE DAILY MEAN TEMPERATURE

Annual; temperature; °C



	Max.	Min.	Over # years
Normanton	42.9	6.7	18
Cloncurry	46.9	2.9	25
Richmond	45	-1	21
Georgetown	42.8	0.5	14

Only North West Queensland can deliver a region that combines a modern, developed economy with African climatic conditions

Efficient, world class, modern production system

- Very large, highly efficient farms
- World class agriculture production systems and proven capability
- Modern distribution infrastructure
- Well funded science and research
- Highly skilled at producing arable crops at scale in an arid climate
- Skilled and educated farmers
- Long history of agriculture and global trade in QLD

Crops suited to regional conditions and climate

- Warm semi arid and tropical savanna climates with some warm desert
- Long sunshine hours
- Wet and dry production possible
- Counter seasonal production
- Potential of triple cropping
- Supplied to world market by climatic peers and produced successfully in the region

On the doorstep of East and South East Asia

- Strong demand from high value markets
- Excellent proximity to high demand markets in East & South-East Asia
- Short transport times and distances
- In the same (or similar) time zones
- FTA agreements with most key trading partners

Modern, efficient economy with strong rule of law

- Protected by Australia's island location and strong biosecurity
- Strong reputation with consumers as a safe and secure food producer
- Strong investor protection, highly ranked in "ease of doing business" and rule-of-law
- AAA sovereign risk rating

Photo credit: Dollar Photo purchased by Coriolis Research

WHERE CAN WE GROW?

03

+Three Horizons of Growth

North West Queensland has three horizons for agricultural growth

THREE HORIZONS OF GROWTH FRAMEWORK: NORTH WEST QUEENSLAND

Model; 2017

HORIZON 1

Grow & build cattle

HORIZON 2

Support emerging projects & products

HORIZON 3

Discover & develop new options

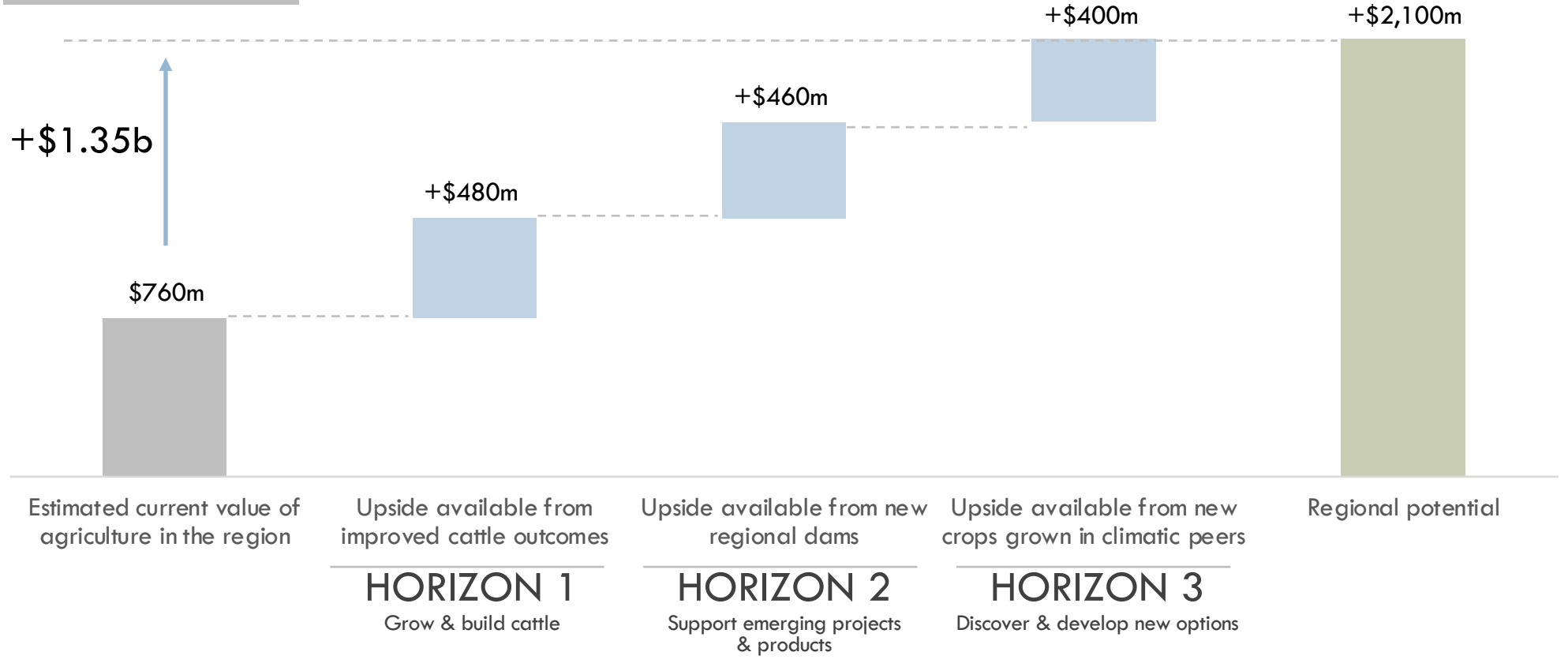
Source: Coriolis analysis

With investment, North West Queensland can create $1.35b in new agricultural growth across these three horizons

GROWTH BRIDGE: POTENTIAL UPSIDE FROM THREE GROWTH HORIZONS

A$; m; nominal 2017

INDICATIVE/DIRECTIONAL



Source: ABS (7121.0; 7503.0); MLA; UN FAO; UN Comtrade; other Coriolis research; Coriolis estimates, analysis and modelling

This revenue growth bridge uses the following assumptions

HORIZON 1 (Cattle improves as follows)

1,920k cattle 608k turnoff (est. at 32% of head; Queensland average)	x	Turnoff of 184k new cattle (better management)	x	+20% more $/kg for cattle (better quality and branding)	x	+20% more weight per cow (more fodder/feed crops)	=	HORIZON 1 $480m

HORIZON 2 (All proposed land comes online at +33% better than cotton, but at cotton productivity (i.e. employment ratios))

+115,000 ha (As listed report)	x	$4,000 ha (Cotton is $3,000)	=	HORIZON 2 $460m

HORIZON 3 (New African crops perform as modelled elsewhere and create employment at AU average)

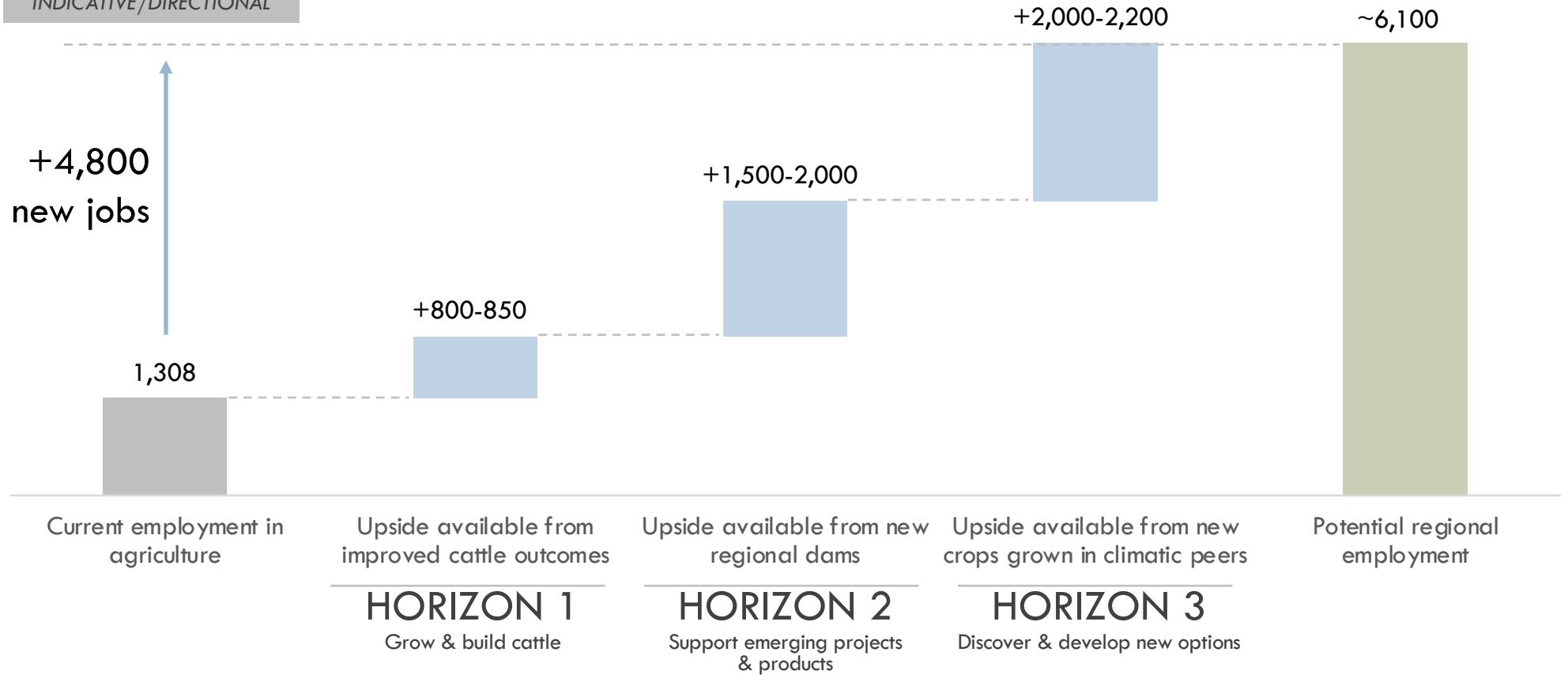
Sesame $250m (See report)	x	Mung $70m (See report)	x	Shea $40m (See report)	x	Other $40m (Jojoba, castor, etc.; see S1/S2 report)	=	HORIZON 3 $400m

Creating this level of agricultural growth in North West Queensland could create up to 4,800 new jobs

GROWTH BRIDGE: POTENTIAL UPSIDE FROM THREE GROWTH HORIZONS

A$; m; nominal 2017

INDICATIVE/DIRECTIONAL



Source: ABS (7121.0; 7503.0; 6291.0); MLA; HIA; Cotton Australia; UN FAO; UN Comtrade; other Coriolis research; Coriolis estimates, analysis and modelling

This employment growth bridge uses the following assumptions

HORIZON 1 (Cattle improves as follows)

HORIZON 1 $480m	/	$581,040 Revenue/employee (Current North West Queensland regional average)	=	HORIZON 1 800-850 jobs (826)

HORIZON 2 (All proposed land comes online at +33% better than cotton, but at cotton productivity (i.e. employment ratios))

+115,000 ha (As listed report)	x	0.0172 Jobs/ha (Cotton average)	=	HORIZON 2 1,500-2,000 jobs (1,973)

HORIZON 3 (New African crops perform as modelled elsewhere and create employment at AU average)

HORIZON 3 $400m In new ag revenue	/	$189,540 Revenue/employee (AU total ag average)	=	HORIZON 3 2,000-2,200 jobs (2,110)

Realising growth across these three horizons will require focus and effort by all stakeholders

THREE HORIZONS OF GROWTH FRAMEWORK: NORTH WEST QUEENSLAND

Model; 2017

	HORIZON 1 Grow & build cattle	HORIZON 2 Support emerging projects & products	HORIZON 3 Discover & develop new options
Strategic Focus	– Defend and extend profitability of core business	– Expand and grow emerging businesses & products	– Discover and develop new options for growth
Key success factors	– Efficiency & cost control – Process innovation – Scale/consolidation – Supply chain	– New infrastructure (e.g. dams) – Skills at navigating government – Investment/resources/funding – Speed, flexibility & execution	– Vision & mindset – Risk taking – Market insight – Culture & incentives
Key metrics	– Profits, margins, costs	– Revenue, growth – New investment	– Discovered options – Developments explored/trialled – Investment, number of investors – Quantity /volume of investment
Example products	– Pastoral livestock (cattle) – On-farm feed crops (e.g. sorghum) – Potential for regional abattoir	– Water intensive products – High value dryland where possible – Including cotton, grain sorghum, mung, mango, peanuts and grapes	– Climatically suited products – Crops produced in climatic peer group regions that are demanded in key markets such as Asia – Including sesame, shea, castor, cassava and jojoba

Source: Coriolis model

Progress is not linear; the three horizons support each other and build on growth

GROWTH

Fodder
Animal Feed

GROWTH

Fodder
Animal Feed

GROWTH

Horizon 1 for North West Queensland agriculture is growing and building on the region's world class cattle operations

THREE HORIZONS OF GROWTH FRAMEWORK: NORTH WEST QUEENSLAND

Model; 2017

HORIZON 1

Grow & build cattle

HORIZON 2

Support emerging projects & products

HORIZON 3

Discover & develop new options

Source: Coriolis analysis

North West Queensland has an opportunity to produce more high quality, high value cattle

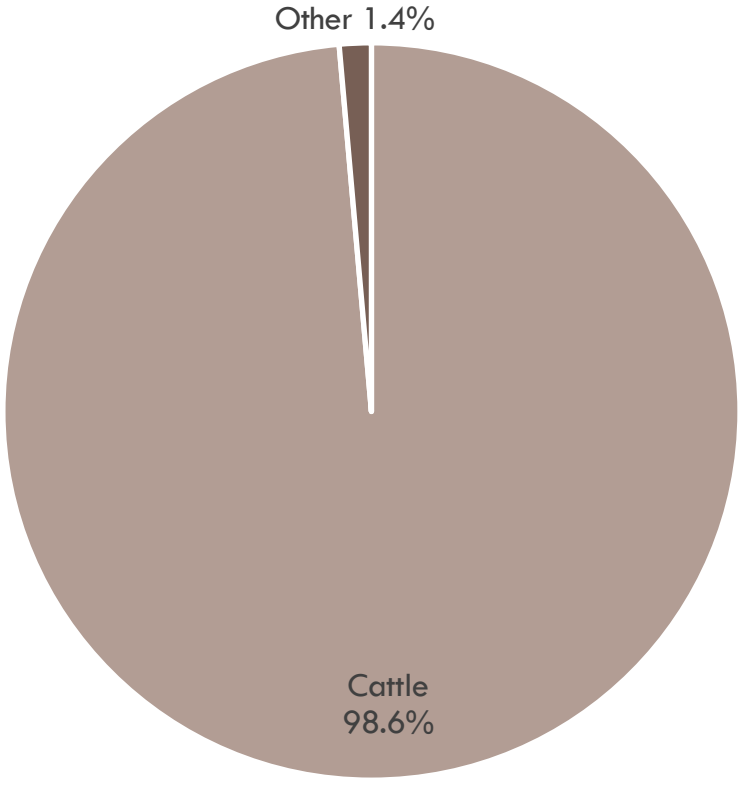
- The North West Queensland Cattle industry is large and productive, but relatively mature
  - 99% of regional agricultural production currently comes from cattle, with a regional turnoff of around 800k head/year
  - North West Queensland has a demonstrated capability to stock cattle at higher densities than other similar regions due to its productive climate
  - Regional cattle numbers have stabilised recently, following a long period of growth achieved, in part, by "replacing sheep"
  - Regional cattle farming is improving efficiency and productivity through consolidation into fewer, larger farms

- North West Queensland's success in cattle is driven by strong drivers and real comparative advantage
  - The North West Queensland cattle industry has opportunities for further growth
  - There are significant opportunities for additional dryland fodder production to support backgrounding operations
  - The region has two distinct supply chains: live animals for export and domestic processing supply
  - A new abattoir could be developed to support the region

99% of regional agricultural production currently comes from cattle, with a regional turnoff of around 800k head/year

VALUE OF REGIONAL AGRICULTURE

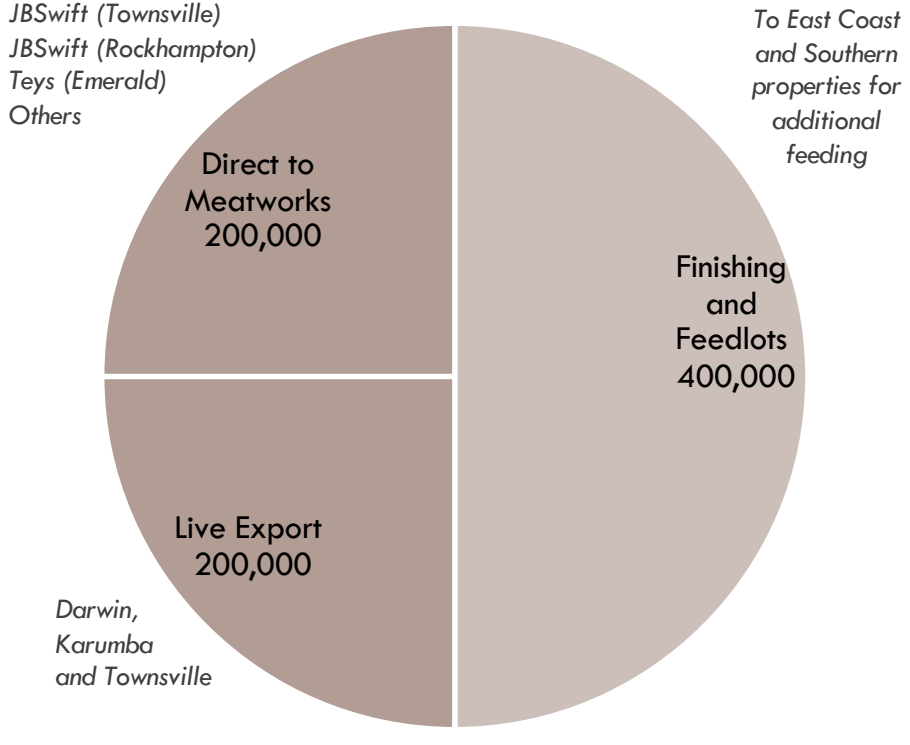
GVP; 2016/17



TOTAL VALUE: A$780m

REGIONAL CATTLE TURNOFF BY DEST.

Head of cattle; 2017



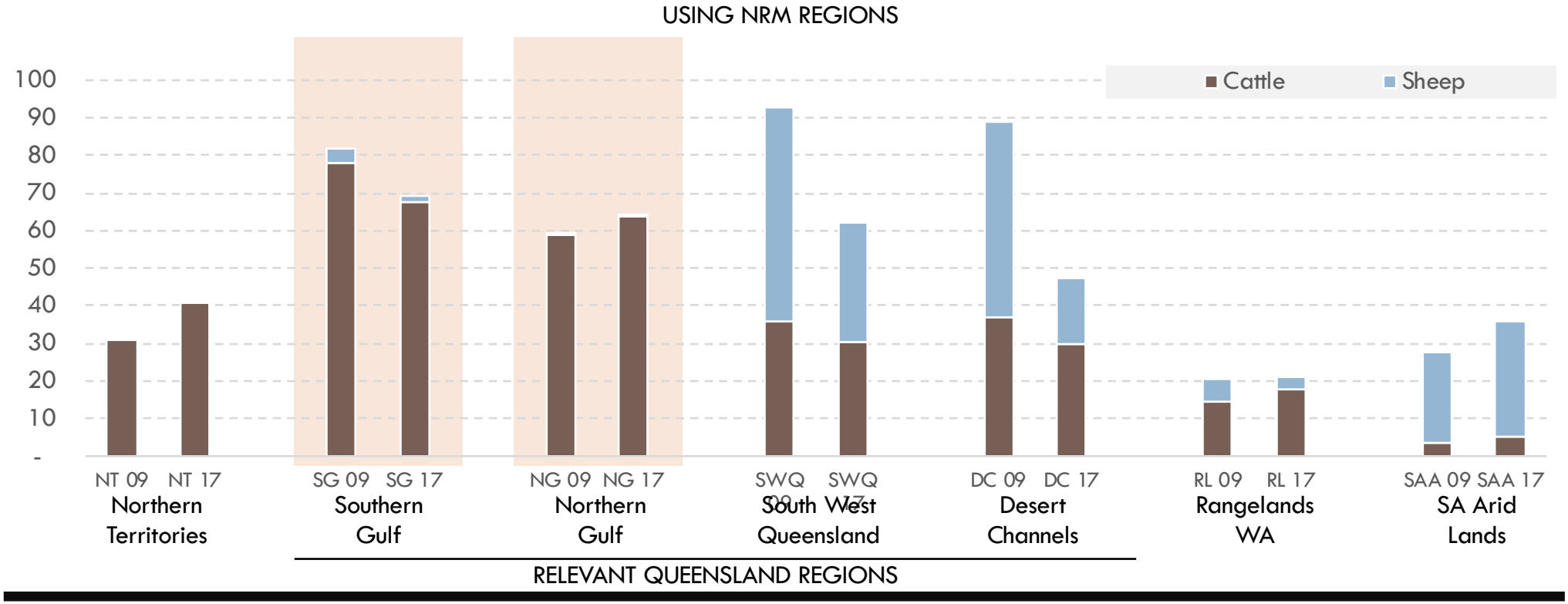
TOTAL = 800,000 head

Source: ABS: Value of Agricultural Commodities Produced; Coriolis estimates and assumptions

North West Queensland has a demonstrated capability to stock cattle at higher densities than other similar regions due to its productive climate and a greater area of accessible productive native grasslands

NUMBER OF CATTLE & SHEEP PER 1000 HECTARES OF AGRICULTURAL HOLDINGS

Head/1000 ha; 2009 vs. 2017

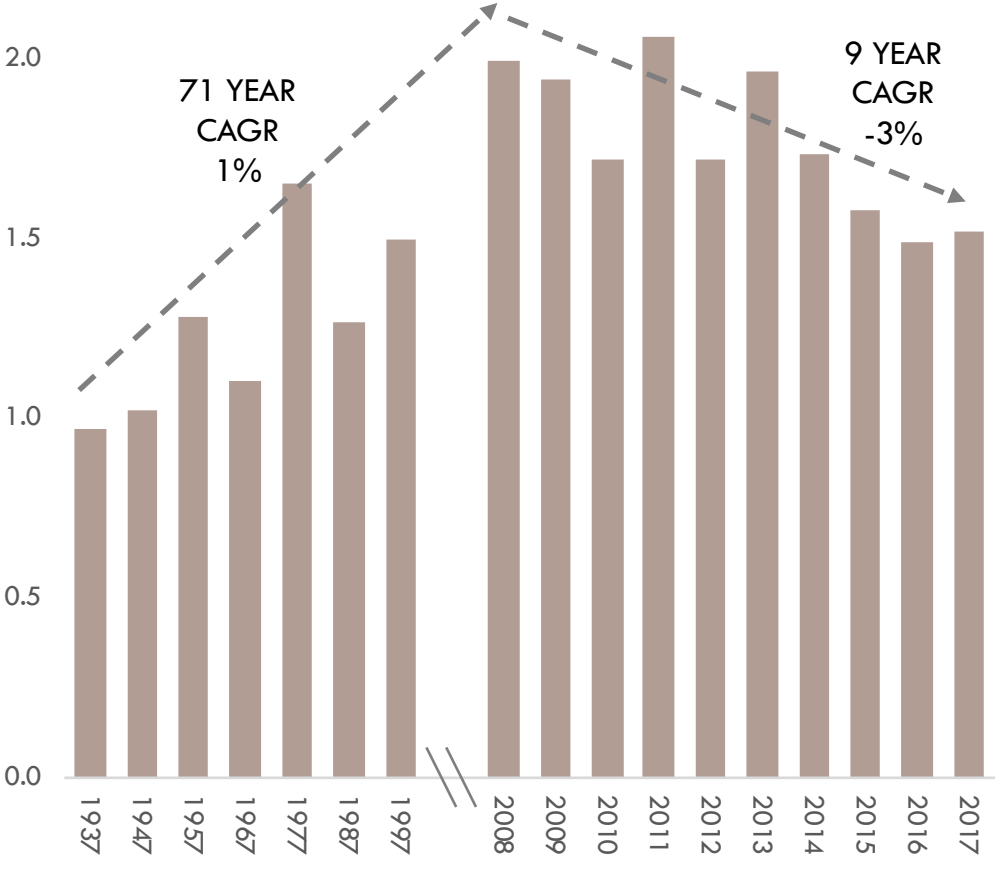


Source: ABS 7121.0 2016-17; Coriolis analysis

Regional cattle numbers have stabilised recently, following a long period of growth achieved, in part, by "replacing sheep"

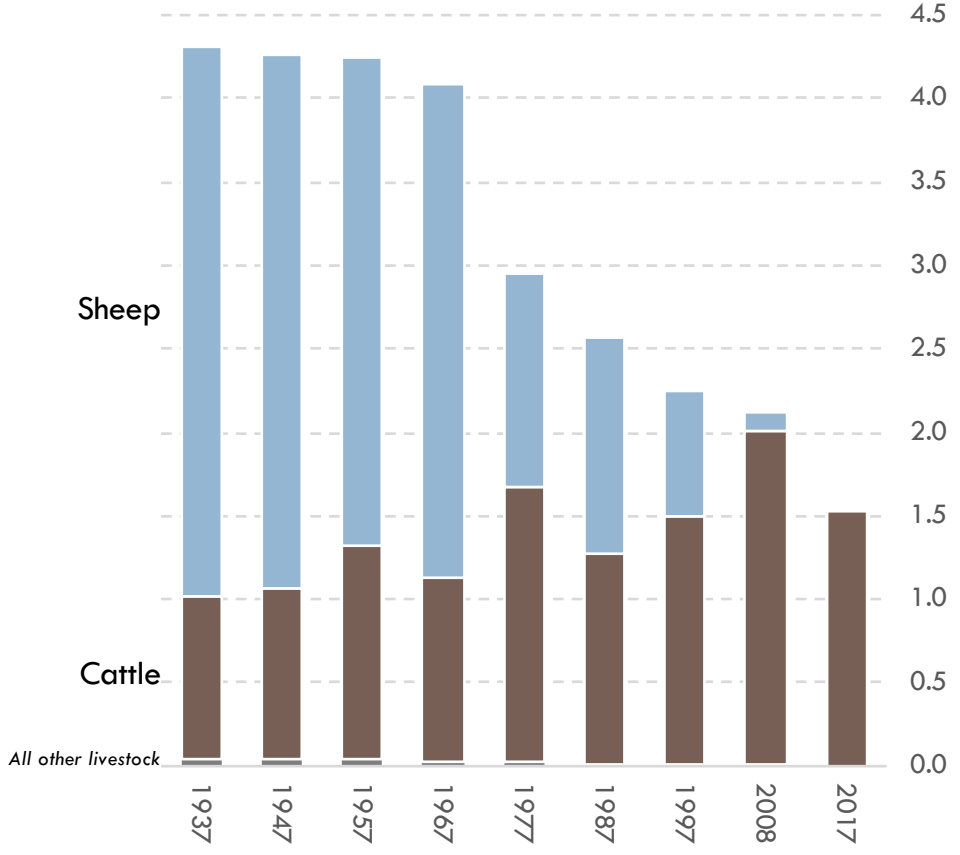
NUMBER OF CATTLE IN REGION

Head; point-in-time inventory; 1937-2017



OF LIVESTOCK IN REGION

Head; m; 1937-2017

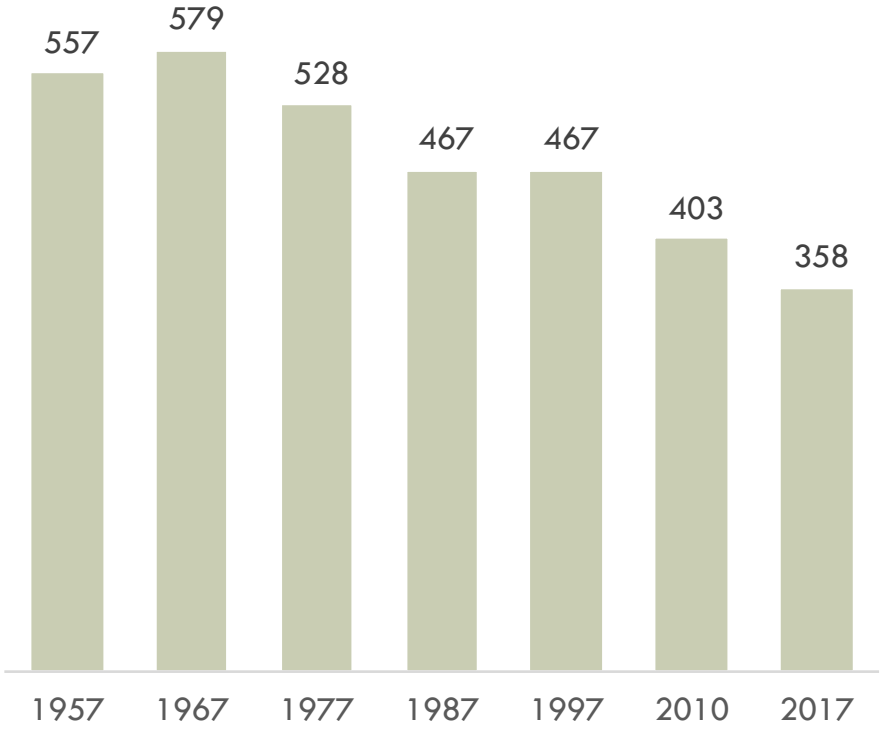


CAGR = Compound Annual Growth Rate; Source: wide range of ABS (and predecessor organisation) publications; Coriolis modelling & analysis

Regional pastoral or beef enterprises are improving efficiency and productivity through consolidation into fewer, larger farms

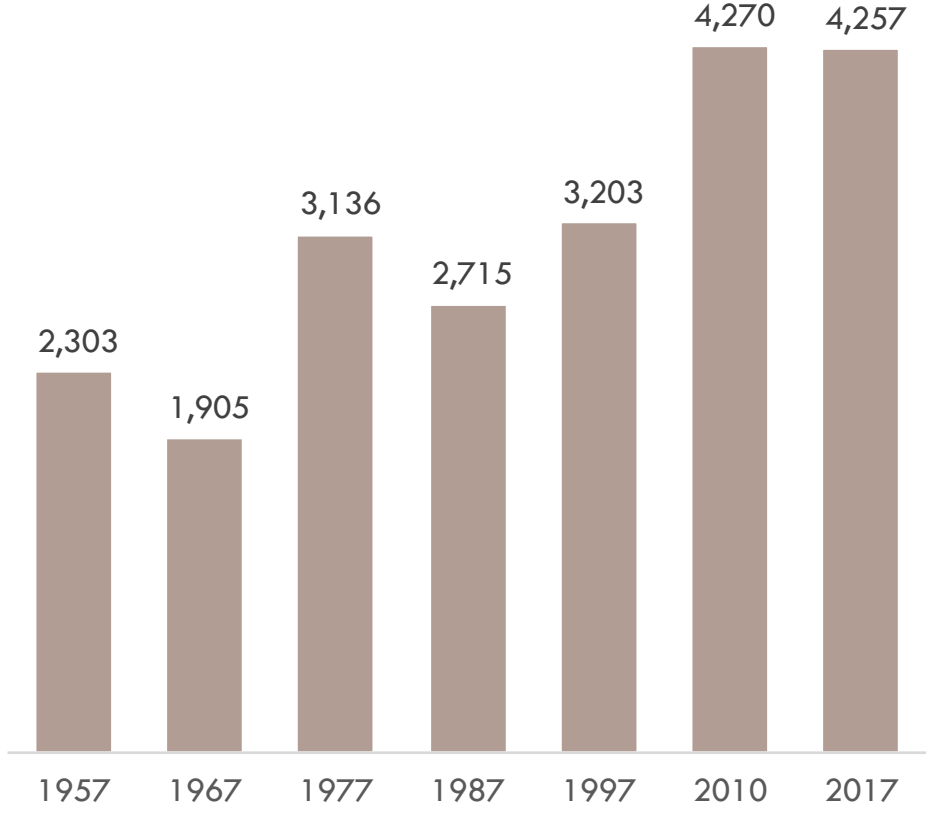
NUMBER OF FARMS WITH CATTLE

Units; 1957-2017



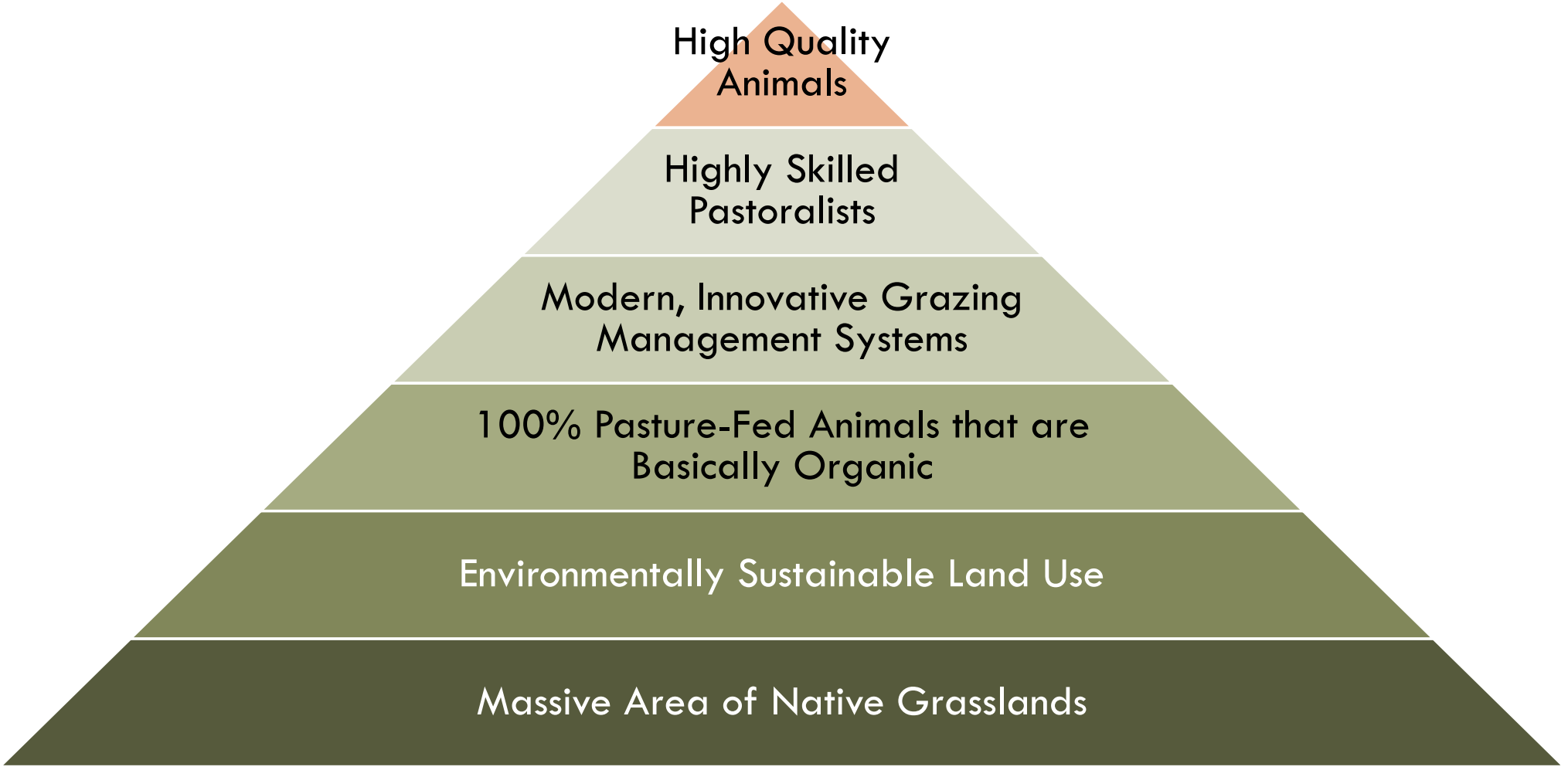
AVERAGE HEAD OF CATTLE/FARM

Head/units; 1957-2017



Source: wide range of ABS (and predecessor organisation) publications; Coriolis modelling & analysis

North West Queensland's success in cattle is driven by strong drivers and real comparative advantage

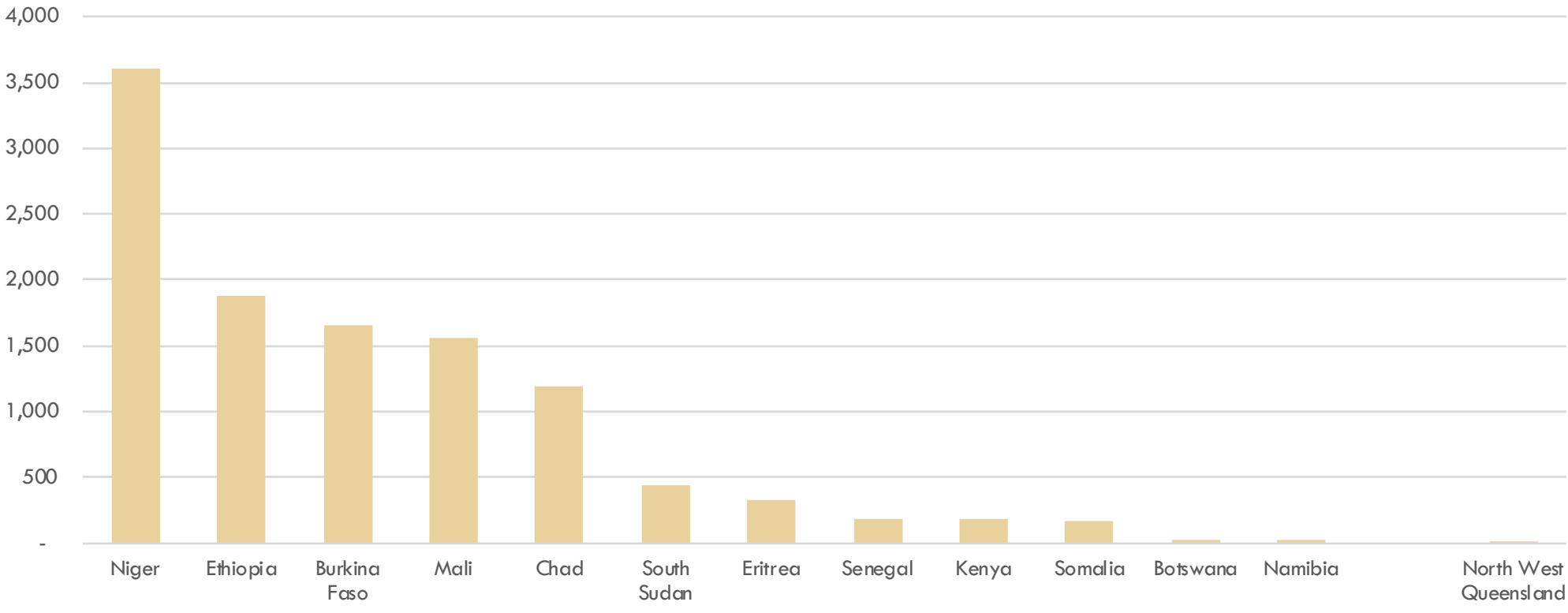


Source: Coriolis analysis

There are significant opportunities for additional dryland fodder production to support backgrounding operations

EXAMPLE: AREA PLANTED IN SORGHUM: NORTH WEST QUEENSLAND VS. PEERS

Hectares; 000; 2016 or 17



Source: UN FAOSTAT; ABS (7121.0); Coriolis analysis

The North West Queensland cattle industry has opportunities for further growth

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Land can be made more productive	- Some properties can improve grazing management systems	- Invest in additional water stations - Invest in fencing to allow break feeding to manage feed
Quality of local cattle not being recognised or realised	- Local cattle do not achieve superior prices - Other regions are achieving success through strongly focused on feedlotting and Wagyu cattle	
More calves can be produced in the North	- Northern region primarily breeding stations - Feed quality/availability impacts conception rate, and increases turn-off rate	- Further investment in premium genetics - Emphasise and develop grass fed premium - Invest in production of on-site forage production (e.g. dryland sorghum, leucaena) to maximise weight gain, especially in Downs country (no clearing required) - JV partnerships between cattle operations and crop operators to utilise products as supplementary feed
Improve operations on backgrounding properties	- Opportunities to add more weight to cattle on backgrounding properties - Opportunities for added vertical integration to meet feedlot demands - On-site feed enables cattle to be held longer and reach higher weights - Opportunities to utilise potential new regional crops (e.g. Cotton seed as supplementary feed)	
Supply chain efficiency can be improved	- Inefficiencies exist in places - Quality can be improved	- Further invest in holding yards, sale yards, washdown facilities, rail cars, etc.
Progress regional abattoir	- Regional cattle are not currently processed in the region	- Construction of new regional abattoir
Target high value, stable markets	- Opportunities exist to supply into the boxed beef and export market for pasture-fed, clean green cattle	- Invest in developing vertically integrated supply chains to high value markets - Emphasise and develop grass fed premium

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

Horizon 2 for North West Queensland agriculture will be enabled by investment in irrigation infrastructure

THREE HORIZONS OF GROWTH FRAMEWORK: NORTH WEST QUEENSLAND

Model; 2017

HORIZON 1

Grow & build cattle

HORIZON 2

Support emerging projects & products

HORIZON 3

Discover & develop new options

North West Queensland can achieve substantial growth through investment in regional water projects and infrastructure

- North West Queensland can create growth through improved access to water
- North West Queensland receives a lot of water, very little of which is currently used for agriculture
  - While the area is not a tropical paradise, it does receive more rain than many countries
  - However, rainfall varies significantly by location, by season and year to year
- There are significant amounts of water in the region available for agricultural development
  - Development will come from continued investment in both the large proposed and in-progress projects in the region
  - Major proposed water projects in the region could unlock 115,000ha of productive farmland and enable strong growth
  - As an example of other, smaller developments in progress, Etta Plains has 19,500 ha of potential crop land and available water
- Increased irrigation enables strong synergies and creates a positive growth loop for the region
- Research highlights seven products – cotton, sorghum, mung, mango, grapes and peanuts - as Horizon 2 opportunities for North West Queensland (particularly under irrigation)

North West Queensland can create growth through improved access to water

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Opportunities exist to improve availability of surface water in some locations	- Use of natural rainfall is (obviously) free - Timing of rainfall can be inconsistent and variable, particularly in some areas - Diversion of surface water requires a water "allocation" from government - Allocations do not guarantee water as take, as this is limited at times of drought and no-flow/low-flow - Funding for development costs to divert and hold surface water are possible	- Produce high value and climatically suitable products - Access accurate weather forecasting - Manage timing - Invest in irrigation - Explore JV with existing surface water allocation holders - Investment in establishing water infrastructure for existing allocations
Opportunities exist to store and utilise water as required	- Large amounts of water are available at some times - There are multiple potential solutions for water storage on site	- Investment in ring tanks - Investment of weirs, channels and small dams - Investment in large dams
Massive regional growth will be unlocked by water projects	- Existing dam water (e.g. Lake Julius) expensive and currently unavailable - Dams require substantial investment - Major infrastructure projects can have long timeframes	- Water projects must be developed to enable transformative regional growth - In parallel, implement short/medium term projects using products and locations that do not require large scale infrastructure

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

North West Queensland receives a lot of water, very little of which is currently used for agriculture

"The Gulf of Carpentaria **receives 25.6% of the nation's water run-off**, yet less than 1% of the Gulf's water is allocated for town, mining, industrial and irrigated agricultural use. According to Gulf Savannah Development, hydrological assessments show that an average annual volume of about 23 million megalitres of water is discharged from the rivers of the Gulf. Compared with the Murray Darling Basin, where the volume of water is 23,734 gigalitres per year, the Gulf region's catchments receive 95,615 gigalitres per year." *Australians for Northern Developing & Economic Vision (ANDEV), March 2014*

"North Queensland's **Flinders catchment**, comprising an area of approximately 109,000 km2, drains into the southern Gulf of Carpentaria…**Dryland and irrigated cropping currently occupy less than 0.02% of the landscape**… The Flinders River is Queensland's longest river and its largest tributary is the Cloncurry River…The Flinders River has a streamflow of, on average, 2543 GL/year." *CSIRO, Agricultural resource assessment for the Flinders Catchment, 2013*

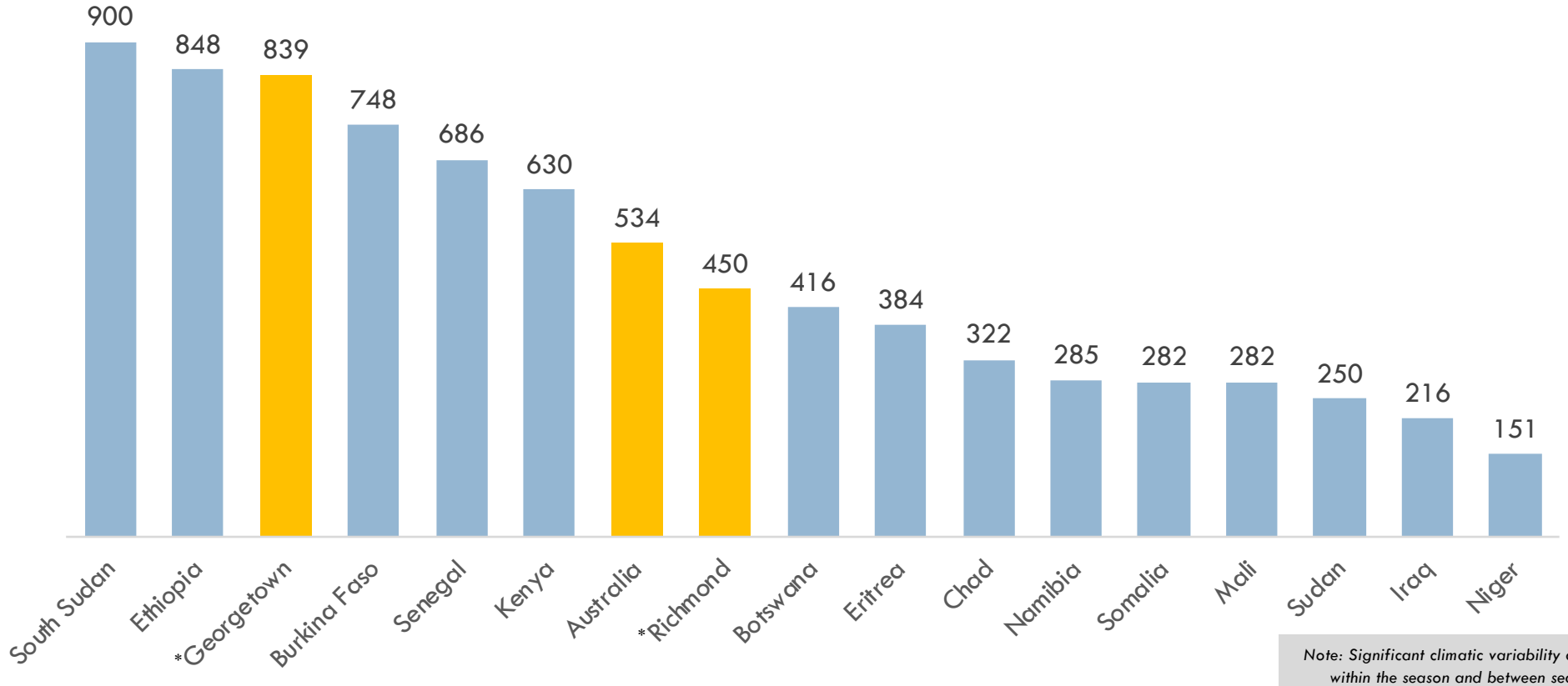
"North Queensland's **Gilbert catchment**, comprising an area of approximately 46,000 km2, drains into the southern Gulf of Carpentaria…**Dryland and irrigated cropping currently occupy less than 0.02% of the landscape**… The catchment has two major rivers, the Gilbert and the Einasleigh, with a combined streamflow at their confluence of, on average, 3706 GL/year." *CSIRO, Agricultural resource assessment for the Gilbert Catchment, 2013*

Source: Submission to the Joint Select Committee on Northern Australia; Submission 147, Appendix C, March 2014; CSIRO

While the area is not a tropical paradise, it does receive more rain than many climatic peer group countries

TOTAL AVERAGE ANNUAL RAINFALL NORTH WEST QUEENSLAND VS CLIMATIC PEERS

Average precipitation in depth; mm/year; 2014



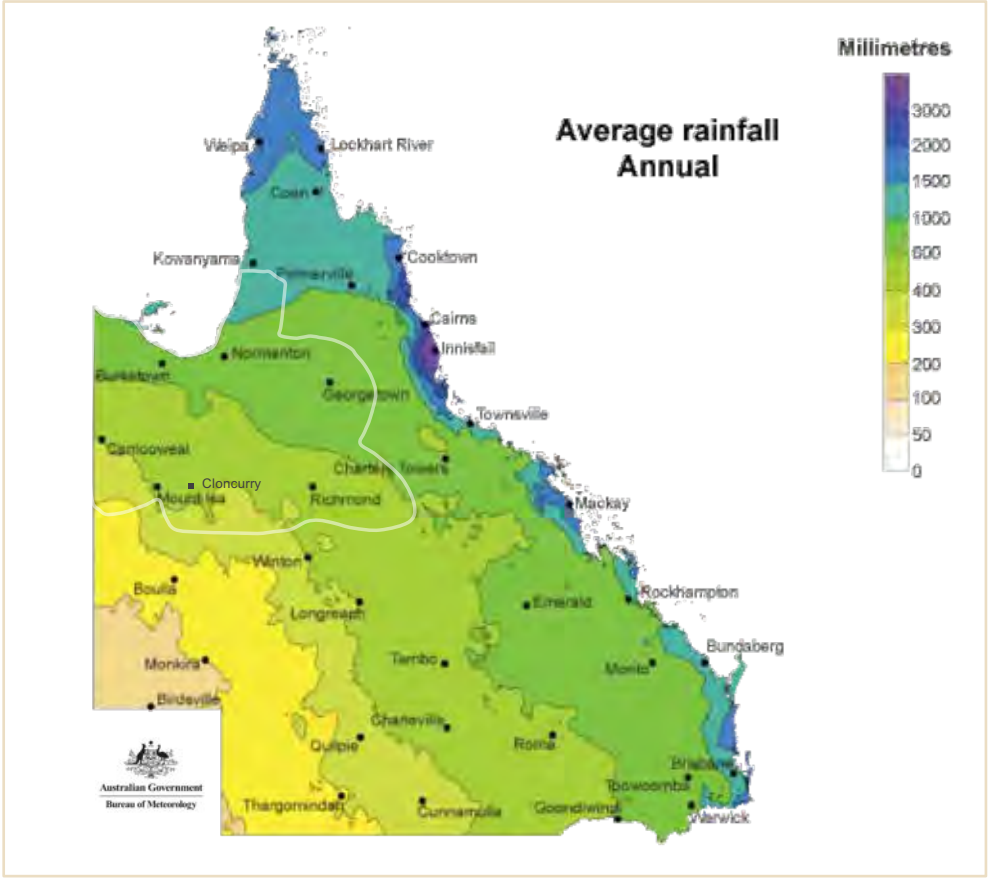
Note: Significant climatic variability apparent within the season and between seasons

**Georgetown 14 year average; Richmond 21 year average; Source: World Bank; Bureau of Meteorology, Australia; Coriolis analysis*

However, rainfall varies significantly by location, by season…

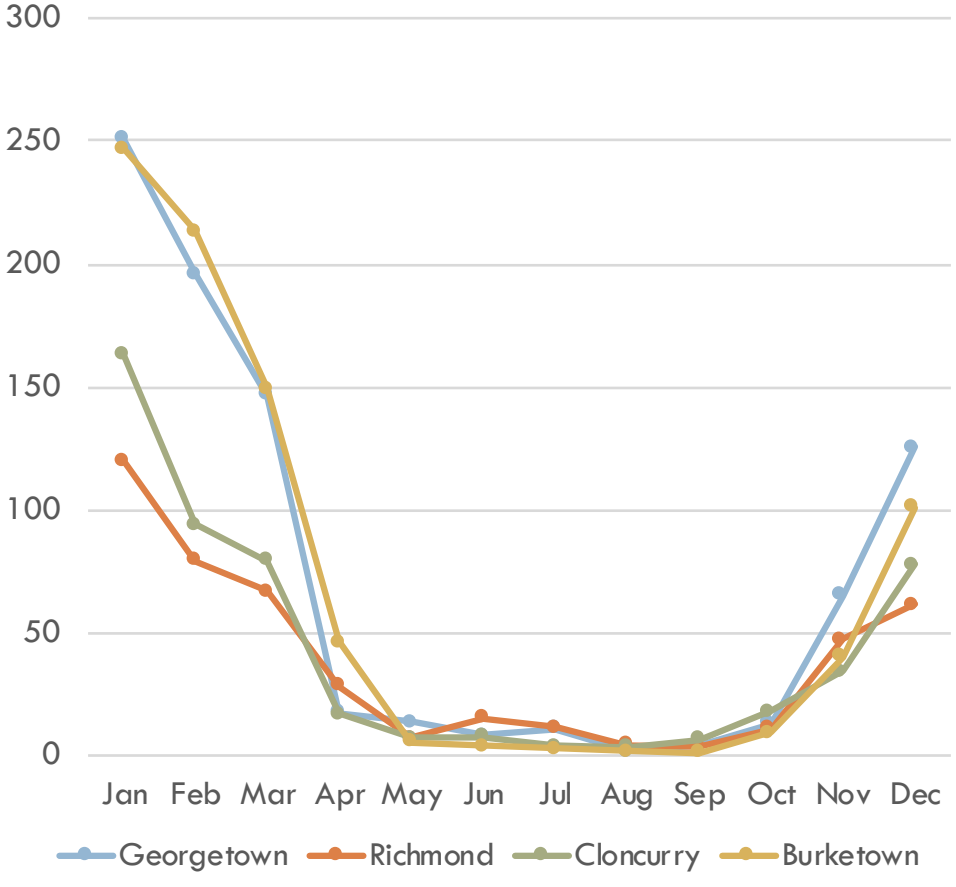
AVERAGE ANNUAL RAINFALL

Annual; average over 30 years



MEAN MONTHLY RAINFALL BY AREA

*mm; long term**

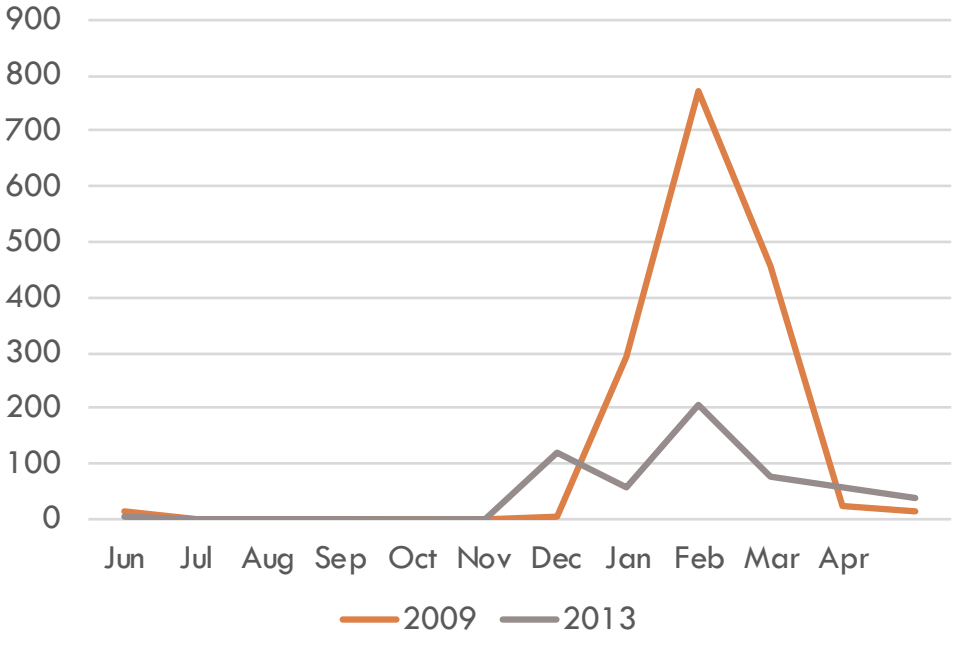


** Georgetown 14 year average, Richmond 21 year average; Cloncurry 25 year average; Burketown 17 year average; Source: Commonwealth of Australia - Bureau of Meteorology; CC3.0; modified by Coriolis; https://creativecommons.org/licenses/by/3.0/au/*

...and year to year

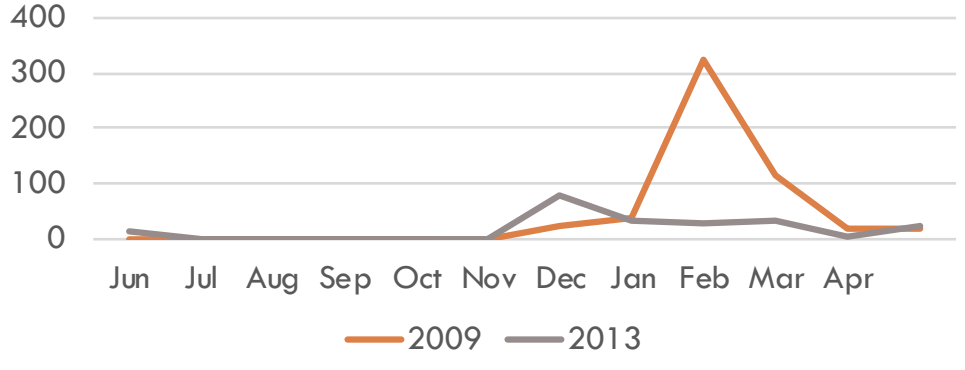
GEORGETOWN TOTAL MONTHLY RAINFALL

mm/total rainfall 2009vs2013*



RICHMOND TOTAL MONTHLY RAINFALL

mm/total rainfall 2009vs2013*



** Georgetown 14 year average, Richmond 21 year average; Source: Commonwealth of Australia - Bureau of Meteorology*

There are significant amounts of water in the region available for agricultural development

SURFACE WATER GENERAL UNALLOCATED VOLUMES AND RELEASES

ML; Water Plan (Gulf) region; 2018

	TOTAL VOLUMES OF "GENERAL UNALLOCATED WATER" (ML) AS OF SEPT 2017*	EXISTING IRRIGATION PRIOR TO 2012 (ML)	GENERAL UNALLOCATED WATER RELEASES SINCE 2012 (ML)		
			GRANTED JULY 2012	GRANTED NOV 2015	GRANTED AUG 2017
Flinders River Catchment	239,650	17,280	80,000	92,500	7,500
Gilbert River Catchment	467,000	9,115	14,200		Process ongoing
Other Catchments	24,900			7,500	
Gulf Total	731,550		94,200	100,000	Process ongoing

PRELIMINARY
Review of secondary sources out of scope

**Current as at 2 September 2017. Source: DNRM Water Resource (Gulf) Plan 2007 Sale of unallocated water: tender assessment report 2013 & 2017; Water Plan (Gulf) 2007; CSIRO; Coriolis analysis*

Development will come from continued investment in both the large proposed and in-progress projects in the region

PROJECT	LEAD PROPONENT	DETAIL	CURENT STATUS
15 MILE PROJECT	Flinders Council	- Multiple operations proposed at site with multiple business proponents involved: Table grapes (60ha), F&V (60ha); Abattoir and associated feedlot, CYCN Investment (918ha) - Water sourced from shallow groundwater	- Coordinated Project Status (DSD) - IAR in progress - Issues – restrictions on land clearing
GILBERT RIVER IRRIGATION SCHEME	Etheridge Council	- Developing business case to manage 390,000ML; building dam at **Green Hills** to deliver 200,000ML water and open up 20,000ha; land and water parcels sold separately; 173 jobs and Gross benefit to region $536m - Mixed land tenure/native title - Builds on previous Green Hills and Dagworth feasibility study (existing crop/hay operations at Forest Home)	- MIPP2 (DSD) funding to develop business case – based on capital costs of $220-360m - 10,000ML available on the market but expensive $600/ML ($6m investment)
3 RIVERS IRRIGATION PROJECT	Stanbroke Pty	- Plan to irrigate 15,000ha cotton on Glenore Station, proposed ginnery, employing 75 people, current operation dryland - Water allocation from lower Flinders River – 150,000ML/yr - Applying to change land to freehold	- Coordinated Project Status (DSDMIP)
CLONCURRY BIOFUELS PROJECT	Cloncurry Council	- Biofuel Feasibility Study, 4ha farm trials of various crops, proposal for 500ha site; Proposed water from either: Lake Julius, or proposed **Cave Hill Dam**	- Cave Hill Dam Feasibility Study complete - Looking for NAIF funding, expensive development costs - Lake Julius options high cost ($3,000/ML currently to mining operations)
RICHMOND AGRICULTURAL PROJECT	Richmond Council	- Weir, channel and ringtank for irrigation project; proposal to draw 100,000ML/yr to water 11,000ha; 250,000ML ringtank, 10 blocks, initial cost ~$50m	- Have funding for detailed design plan (MIPP2) - Applied to office of Coordinator General for Coordinated Project status; water allocation required
NORTH WEST QUEENSLAND WATER STORAGE	MITEZ	- Proposed dam at **Cave Hill** to provide instream storage of 248,000ML in the Cloncurry River would cost $250m; water would cost approximately $6,200/ML aim to provide sufficient, affordable water to develop an irrigated agriculture precinct (sorghum to support feedlot and abattoir) - Funded by the NWIDF	- Feasibility Study for Dam complete

NWIDF – National Water Infrastructure Development Fund. Source: DSDMIP, Coordinator General projects; various websites; Coriolis interviews; Coriolis analysis

Major proposed water projects in the region could unlock 115,000ha of productive farmland and enable strong growth

MAJOR PROPOSED WATER PROJECTS IN VARIOUS STAGES OF DEVELOPMENT

As of late 2018

PROJECT NAME	PROPOSED WATER SUPPLY	PROPOSED AREA IRRIGATED
Gilbert River Irrigation Scheme	200,000 ML	20,000 ha
3 Rivers Irrigation Project	150,000 ML	15,000 ha
Richmond Agricultural Project	100,000 ML	11,000 ha
North West Queensland Water Storage (Cave Hill Dam)	248,000ML	4,000-12,000ha
Dismal Creek Depression (Strathmore Station)	350,000 ML	35,000 ha
Other (Smaller, enterprise driven projects)		~25,000 ha
TOTAL	1,048,000 ML	~115,000 ha

PRELIMINARY
Review of secondary sources out of scope

Source: various websites; Coriolis interviews; Coriolis analysis

As an example of other, smaller developments in progress, Etta Plains has 19,500 ha of potential crop land and available water

EXAMPLE: ETTA PLAINS CROPPING INVESTMENT OPPORTUNITY

Latest available

AJM Pastoral
Property 28,442ha (120km North Julia Creek)

- 19,500ha potential cropping land
  - 9,500ha identified for irrigation agricultural development
  - 10,000ha dryland cropping

- 39,500ML water allocation from the Flinders River

- Gravity feed irrigation, sloping land suitable for irrigation
- Opportunity for irrigation and dryland
- No clearing required (Downs Country)
- Black soil, self-cracking

- Options for sale, long term lease, JV

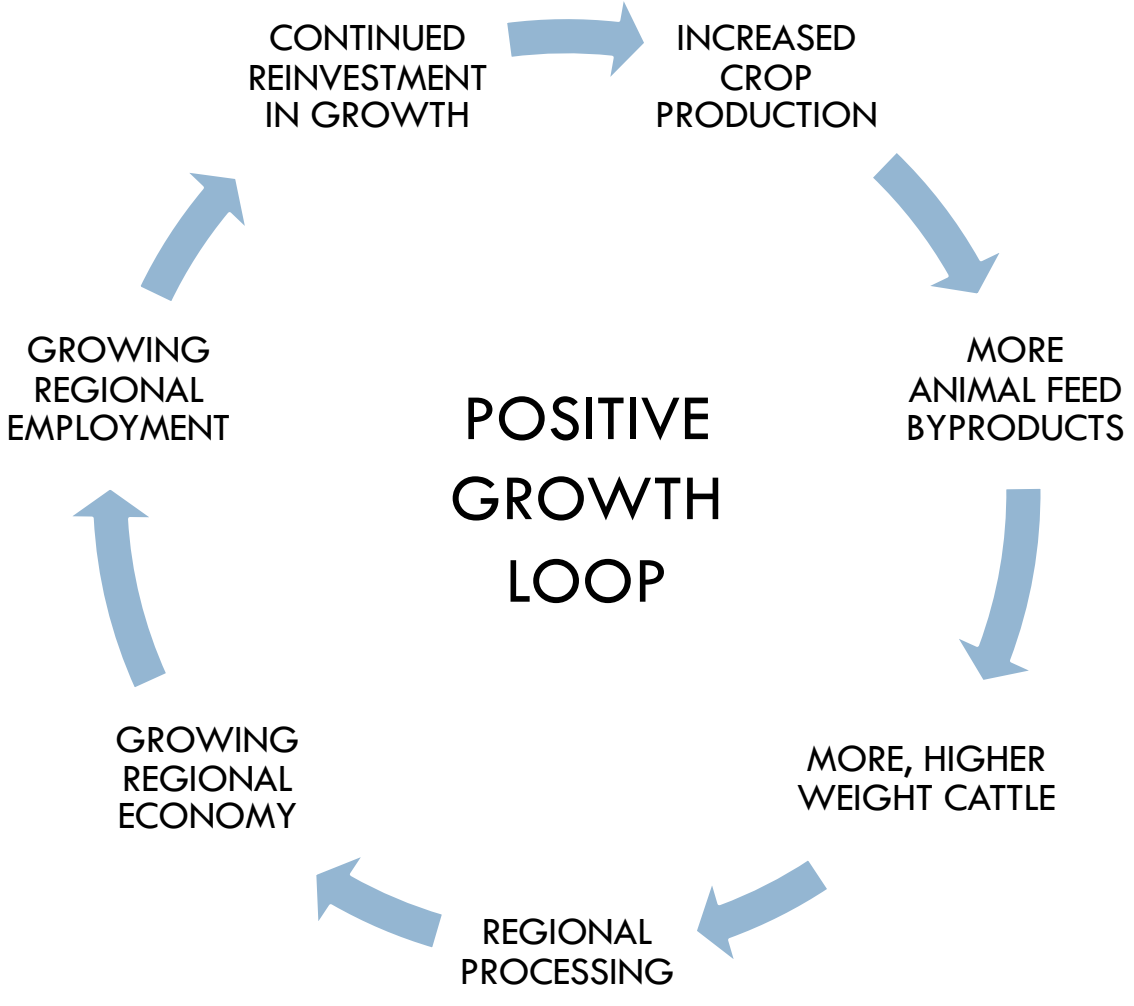
- Grazing Homestead Perpetual Lease (GHPL) in conversion to Freehold on (Lot 1 on CE3, Lot2 on MF18)

EXAMPLE CROPPING OPPORTUNITIES*

CROP	YIELD (T/HA)	PRICE (A$/tonne); 2013	WATER USE (ML/HA)
Sorghum (grain)	7-9	220-280/t	3.5
Cotton	7-9 bales	440/bale	8-10
Mung bean	2.5-3	900/t	6-8
Sorghum (fodder)	n/a	n/a	2-4
Chickpea	2.5-3	450/t	3

*Source: Coriolis interview, *AJM Pastoral promotional material*

Increased irrigation enables strong synergies and creates a positive growth loop for the region



Source: Coriolis analysis

Research highlights seven products as opportunities for North West Queensland in Horizon 2

HORIZON 2 – CAN BE IRRIGATED OR GROWN DRYLAND

HORIZON 2 – ANIMALS

HORIZON 2 – WATER INTENSIVE CROPS

Source: Coriolis analysis

Horizon 3 for North West Queensland agriculture is new products not traditionally grown in the region and outside "comfort zone"

THREE HORIZONS OF GROWTH FRAMEWORK: NORTH WEST QUEENSLAND

Model; 2017

HORIZON 1

Grow & build cattle

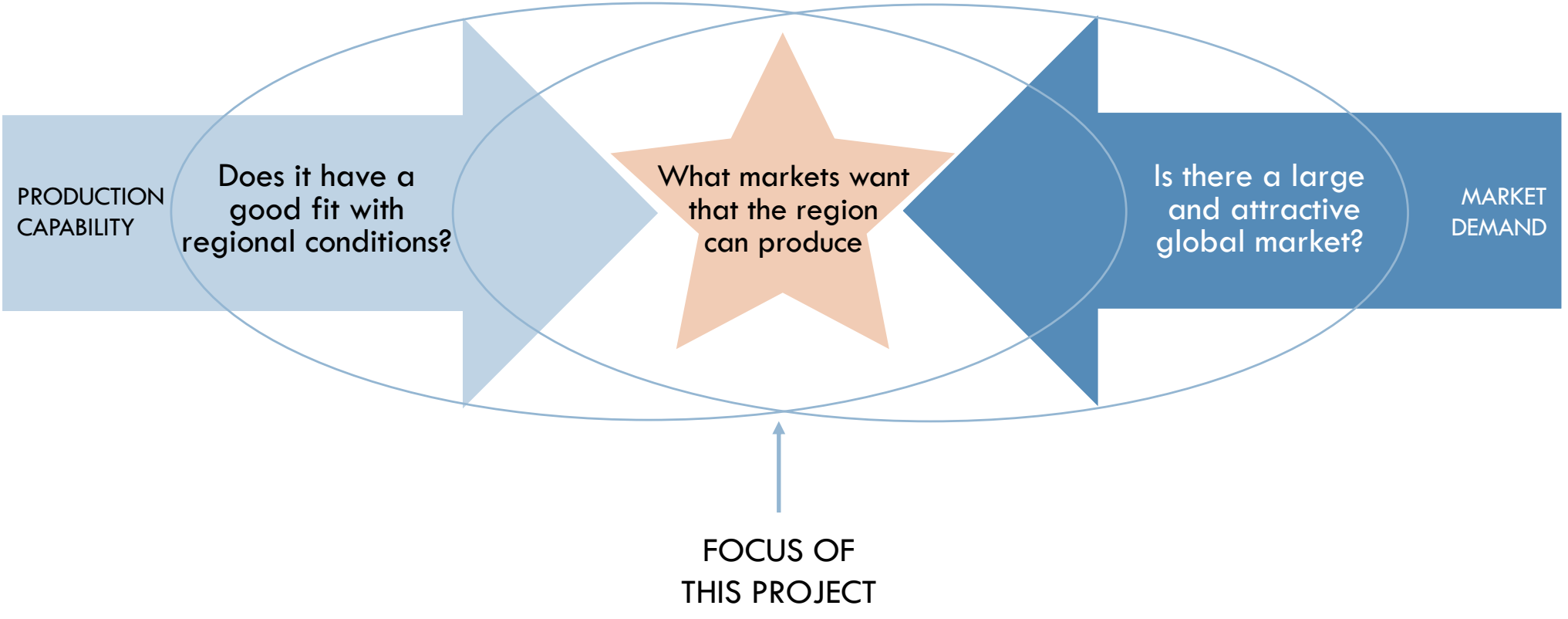
HORIZON 2

Support emerging projects & products

HORIZON 3

Discover & develop new options

Research sought high potential products that both fit regional conditions and had large and attractive global markets



SEE RELATED REPORT FOR DETAILED ANALYSIS

Source: Coriolis analysis

One hundred new and emerging products were considered for the region

SEE RELATED REPORT FOR DETAILED ANALYSIS

ANIMALS

AQUACULTURE

Barramundi
Prawn
Redclaw Crayfish
Silver Perch

MEAT

Buffalo Meat
Camel Meat
Emu Meat
Goatmeat
Kangaroo Meat
Ostrich Meat
Rabbit Meat
Wild Pig

DAIRY

Buffalo Milk
Camel Milk
Goat Milk
Sheep Milk

FIBRE/LEATHER

Alpaca Fibre
Crocodile
Goat Fibre

BROADACRE/FIELD CROPS

ANIMAL FEED

Amaranth
Bambatsi
Canary Grass
Grain Sorghum
Lablab
Leucaena
Lucerne
Maize

INDUSTRIAL

Blue Agave
Castor
Cotton
Flaxseed
Guar
Hemp
Jute
Kenaf
Mustard
Safflower
Stevia
Sugarcane
Sunn Hemp
Triodia ("Spinifex")

FOOD

Bambara
Canola
Chia
Chickpea
Coriander
Fenugreek
Fonio
Lentil
Mate
Mungbean
Native Rice
Peanut
Pearl Millet
Peppercorn
Quinoa
Rice
Sesame
Soybean
Sunflower
Teff

HORTICULTURE

Bitter Melon
Cassava
Chilli
Cucumber
Horned Melon
Melon
Okra
Onion
Pumpkin/Squash
Snake Bean
Sweet Corn
Sweet Potato
Taro
Yam

TREE CROPS

NUTS

Cashew
Coconut
Jojoba
Pistachio
Shea
Tung

FRUIT

Baobab
Custard Apple
Date
Desert Date
Jackfruit
Lemon/Lime
Mango
Marula
Pitaya
Pomegranate
Table Grape
Tamarind

NATIVE FOODS

Native Foods
(Desert limes, Davidson plum, Kakadu plum, wattleseed, caperbush, wild orange, wild passionfruit, conkerberry, ruby saltbush, desert fig, doubah, emu apple, quandong, bush tomato, parakeelya, bush potato, pencil yam, peppercresses, large pigweed, mulga seeds, dogwood seeds, witchetty bush seeds)

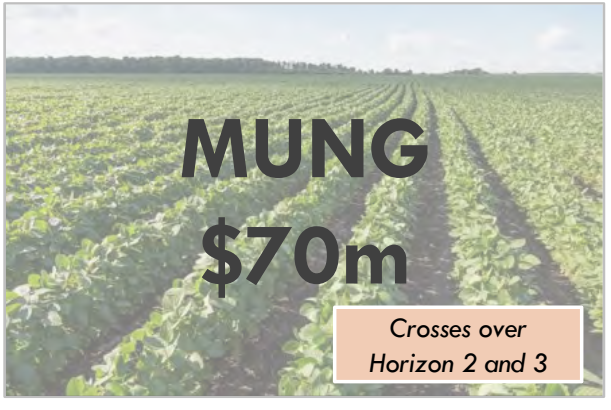
PLANTATION

African Mahogany
Eucalyptus Oil
Indian Sandalwood
Oil Palm
Pongamia
Mallee

Source: Coriolis analysis

Six new Horizon 3 products with high potential for growth were identified for North West Queensland

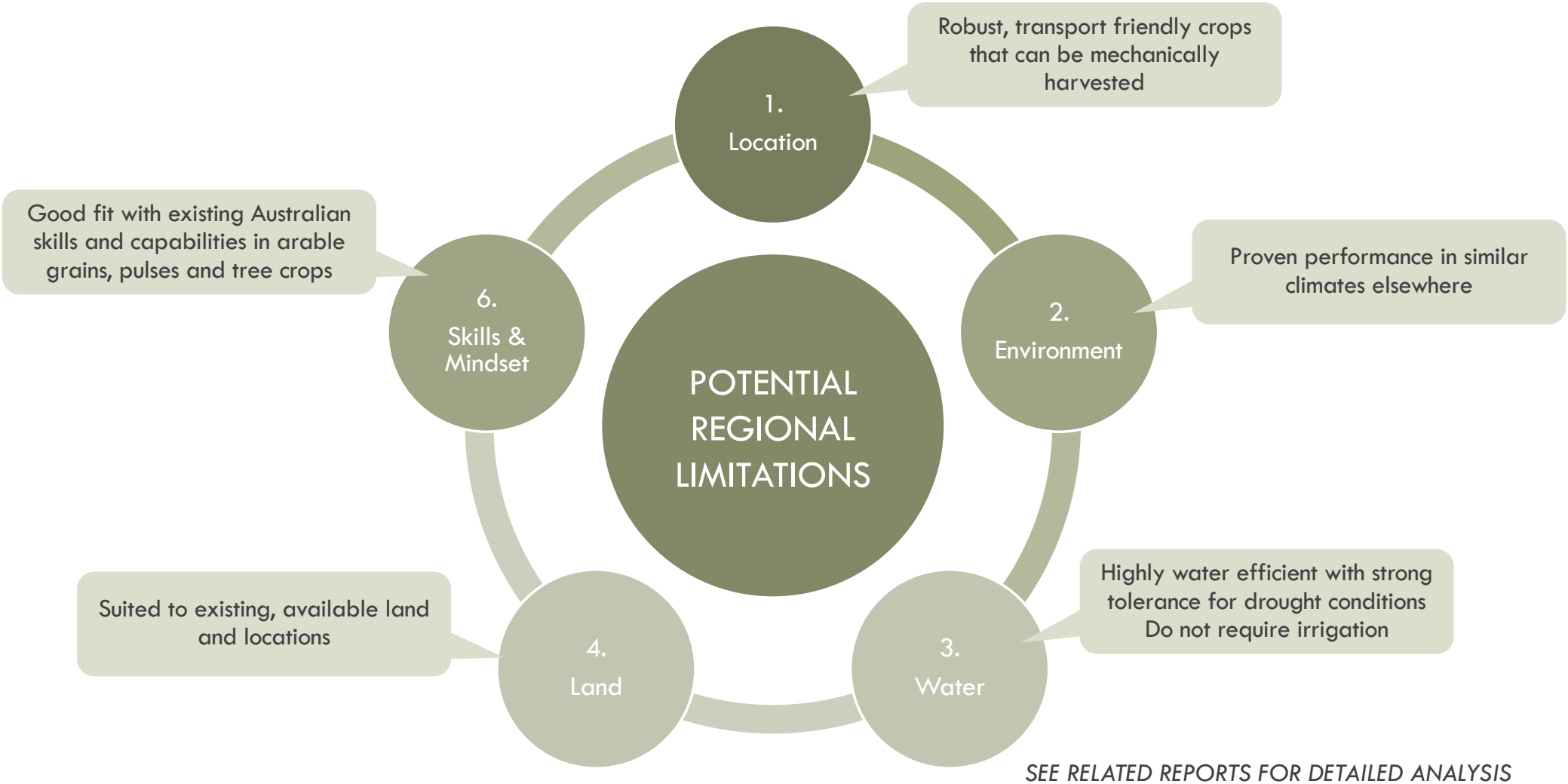
IDENTIFIED POTENTIALLY TRANSFORMATIVE HORIZON 3 OPPORTUNITIES



SEE RELATED REPORTS FOR DETAILED ANALYSIS

Source: Coriolis analysis

The identified Horizon 3 crops can progress rapidly as they overcome regional limitations



SEE RELATED REPORTS FOR DETAILED ANALYSIS

Source: Coriolis analysis

HOW DO WE IMPLEMENT?

04

+ Government actions required to deliver on implementation

Significant investment of time and resources is required to realise the opportunity in North West Queensland

HORIZON 1
Grow & build cattle

HORIZON 2
Support emerging products

HORIZON 3
Discover & develop new options

Primarily existing/ongoing funding

Required new funding

Source: Coriolis analysis

North West Queensland has a clear agricultural diversification action plan to realise the opportunity

PRELIMINARY/PROPOSED

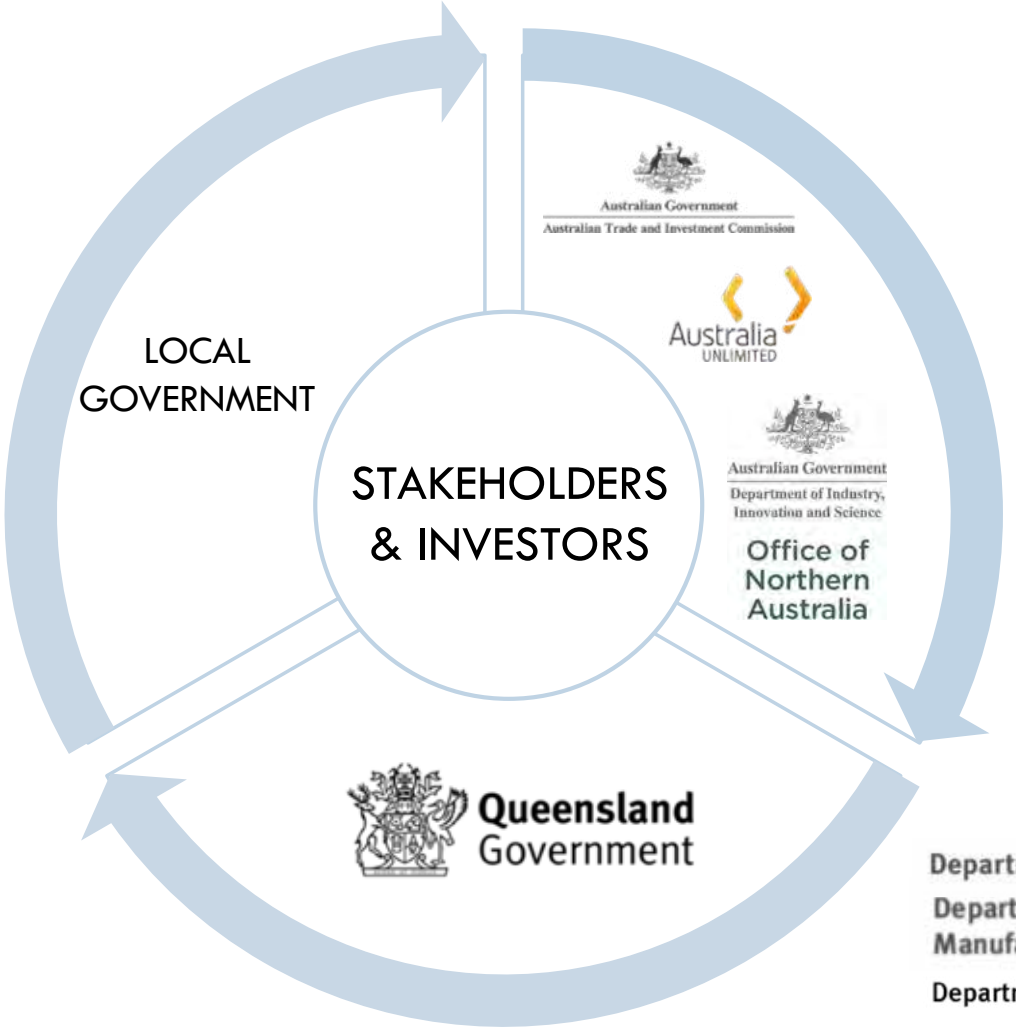
VISION	NORTH WEST QUEENSLAND DEVELOPS A VIBRANT AND ROBUST DIVERSIFIED AGRICULTURE SECTOR, LEADING TO INCREASED PRODUCTION, EMPLOYMENT AND POPULATION IN THE REGION			
DRIVERS	MODERN	AFRICAN CLIMATE	CLOSE TO MARKETS	SAFE &TRUSTED
HORIZONS	HORIZON 1 Grow & build cattle	HORIZON 2 Support emerging projects & products	HORIZON 3 Discover & develop new options	
ACTIONS	SUPPORT CATTLE INDUSTRY GROWTH 1. Drive on-farm competitiveness 2. Enhance supply chain efficiency 3. Develop feed grains & fodder crops 4. Support regional processing 5. Improve regional reputation 6. Add value through cattle R&D	SUPPORT INVESTMENT IN WATER PROJECTS 1. Leverage existing allocations 2. Support project proponents 3. Enable landholder development 4. Support major infrastructure projects 5. Improve processes and systems 6. Invest in growth	SUPPORT DIVERSIFICATION INTO NEW CROPS 1. Coordinate development 2. Develop identified opportunities 3. Promote opportunities to attract investment	

Source: Coriolis analysis

Stakeholder, investors and all levels of government need to work collaboratively to realise the opportunity and create change

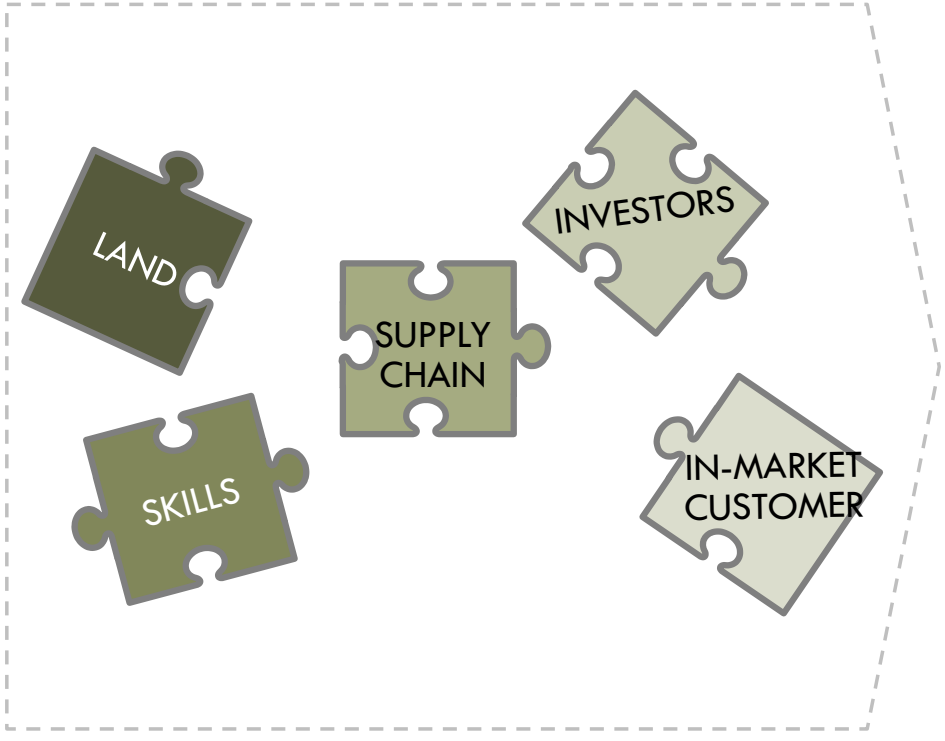
KEY STAKEHOLDERS

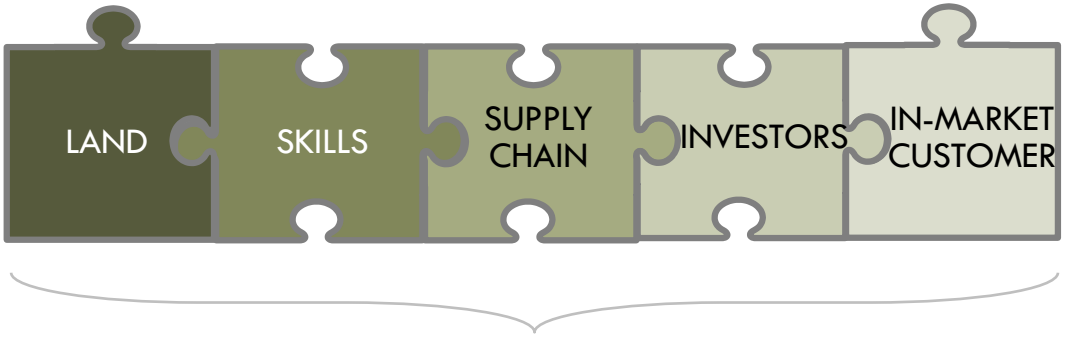
Model; 2018



Source: Coriolis analysis

A focused implementation team is needed to bring together the critical "pieces of the puzzle" required to deliver on the plan





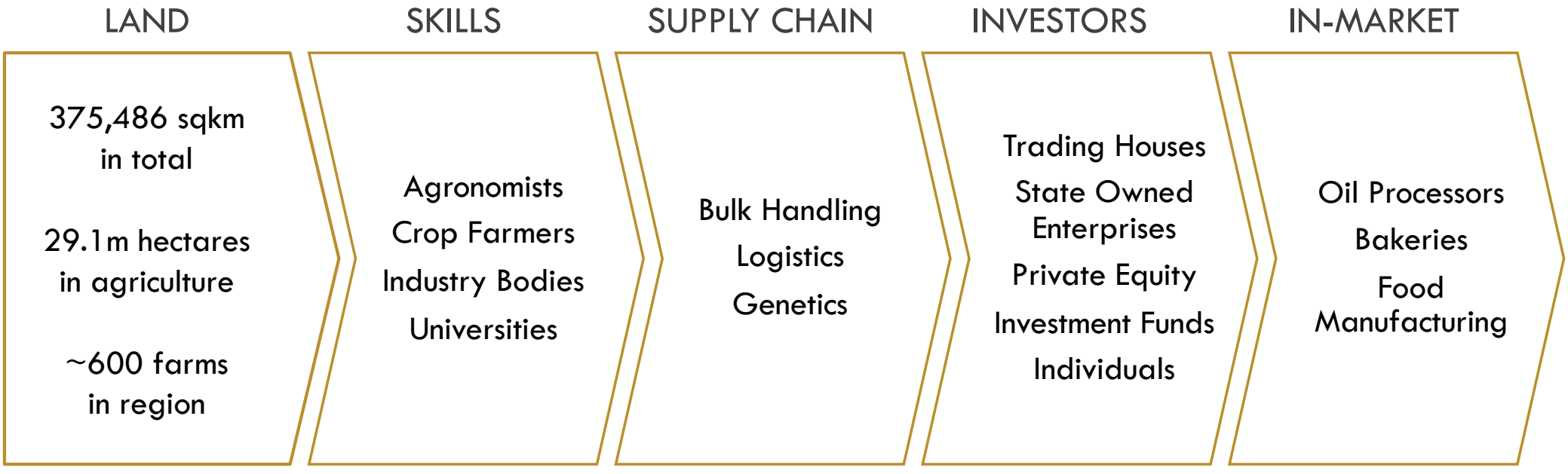
CLEAR NEED FOR AN IMPLEMENTATION TEAM TO PLAY A ROLE

Source: Coriolis analysis

As an example, realising the North West Queensland sesame opportunity requires multiple pieces to come together

EXAMPLE: "PIECES OF THE PUZZLE" REQUIRED TO REALISE THE SESAME OPPORTUNITY

Model; 2018



Source: Coriolis analysis

Why do we need a focused implementation team?

North West Queensland has a clear opportunity to transform regional agriculture by adopting identified crops from Sub-Saharan Africa that are in high demand in world markets. North West Queensland has the same climate. North West Queensland also has all of the key elements required for success: land, water and resources.

But success in this transformation is not assured or likely to be easy. The challenge is what Milton Friedman called "the Tyranny of the Status Quo," the resistance to change that is inherent in any large group, organisation or society. North West Queensland's pastoralists will not wake up tomorrow and suddenly become sesame farmers tied into complex global supply chains in East Asia. This nascent opportunity will not happen with "business as usual." Action is required to catalyse investment and transformation.

Any review of organisational success throughout history will immediately reveal that transformative results are exclusively delivered by small, well resourced teams with a clear mandate and mission. Projects as diverse as the Lockheed SR-71 Blackbird, the original Apple Macintosh computer and the first Beatles album were all delivered by small, highly focused teams.

If the Government of Queensland wants to deliver on the transformation of North West Queensland agriculture it needs to form and fund a focused team with a clear mandate and mission.

This focused team will require an investment by government of between $8m to $10m over four years to deliver growth. This investment is small relative to the $400m/year in potential ongoing new revenue and 2,000+ regional jobs that can be created.

The team requires three specific roles to enable regional agricultural diversification:

1. Development Coordination

We need to own up to the practical and indisputable fact that new land development in North West Queensland is not easy. The development process is long and complex.

Shepherding and coordinating new development through the required processes is the first critical role of the implementation team.

2. Opportunity Development

The three identified high potential opportunities are at varying stages of development in the region. Mungbeans and sesame are a year or two away from scaled up roll-out, while shea has a longer development pathway ahead. All three require both on the ground field work and wider supply chain development and optimisation work.

Nurturing the conditions required for success is the second critical role of the implementation team.

3. Opportunity Promotion

There are large and growing markets for all the high potential products identified, being specifically sesame, shea and mungbeans. However, there are also challenges with existing suppliers and supply chains. Therefore, as documented, there are clear and strong market demands for new supply of all the products identified.

For each high potential product research has identified specific firms that participate in the post farm value chain. For example, key firms in the shea nut/butter value chain include AAK (Sweden), Bunge (USA), Fuji Oil (Japan) and 3F Industries (India). These firms, and others, need to be made aware of the North West Queensland opportunity.

Promoting the opportunity in North West Queensland to specific high potential targets is the third critical role of the implementation team.

- - - -

Only a small, well resourced and focused team can transform regional agriculture in North West Queensland.

Source: Coriolis analysis

The team needs to deliver on (1) development coordination, (2) opportunity development and (3) opportunity promotion

SUPPORT DEVELOPMENT

ATTRACT INVESTMENT

- Opportunity Prioritisation
- Project Management
- Resource Alignment

- Opportunity Work-up
- Required R&D
- Location Identification
- Supply Chain Optimisation
- Identifying Gaps, etc.

- Investment Identification
- Introduce Partners
- Develop & Deliver Messaging
- Investment Promotion

Source: Coriolis analysis

The Strategy and Implementation Plan and its team needs to be constructed around realising the opportunities

STRATEGY IMPLEMENTATION TEAM: KEY ROLES, OBJECTIVES AND ACTIONS

Model; 2018

KEY TEAM ROLE	KEY TEAM OBJECTIVES	REQUIRED SUPPORTING ACTIONS
1. Development Coordination	Opportunity Prioritisation	- Identify and understand regional opportunities - Evaluate opportunities across key criteria - Prioritise high potential opportunities
	Project Management	- Support new and emerging projects - Coordinate stakeholders and processes - Facilitate on schedule project development/delivery
	Resource Alignment	- Identify required resources required for delivery - Enable coordinated resource delivery - Leverage existing available resources
2. Opportunity Development	Opportunity Work up	- Plan development and delivery across stage gates - Support "investment ready" opportunity development - Assign roles and responsibilities
	Required R&D	- Audit existing activities, resources and needs - Deliver focused R&D field trials - Leverage existing research and resources
	Location Identification	- Assess specific requirements of opportunities - Engage with local proponents and stakeholders - Verify alignment with specific opportunities
	Supply Chain Optimisation	- Audit existing situation and potential needs - Determine optimised delivery model - Facilitate investment at key bottlenecks
2. Opportunity Development	Identifying Gaps, etc.	- Deliver gap analysis to highlight priority needs - Identify solutions to mission critical gaps - Facilitate solutions from existing providers
3. Opportunity Promotion	Investment Identification	- Screen, identify and develop high potential investors - Engage with high potential targets - Leverage state and federal in-market resources
	Introduce Partners	- Create real opportunities for engagement with region - Facilitate "pieces of the puzzle" coming together - Encourage engagement with all potential stakeholders
	Develop & Deliver Messaging	- Develop clear messaging on specific opportunities - Deliver clear pitch to key stakeholders and investors - Engage with all critical audiences
	Investment Promotion	- Identify key markets and events to target - Leverage existing Australian networks (e.g. AusTrade) - Activate potential investors to engage with region

Source: Coriolis analysis

This focused team will require an investment by government of between $8m to $10m over four years to deliver growth

GOVERNMENT INVESTMENT IS REQUIRED IN TEAM DIRECTLY TO FACILITATE GROWTH

Estimate; Year1-4

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	4Y TOTAL
1. Development Coordination	$0.5-0.7m	$0.5-0.7m	$0.4-0.5m	$0.4-0.5m	$1.8-2.3m
2. Opportunity Development	$1.1-1.4m	$0.8-1m	$0.7-0.9m	$0.7-0.9m	$3.3-4.3m
3. Opportunity Promotion	$0.4-0.5m	$1.2-1.6m	$0.6-0.8m	$0.6-0.8m	$2.8-3.6m
TOTAL	$2.0-2.6m	$2.5-3.3m	$1.7-2.2m	$1.7-2.2m	$7.9-10.3m

DIRECT TEAM IMPLEMENTATION COSTS
DOES NOT INCLUDE ALL WIDER STRATEGIC ACTIVITIES
(See appendix 1 for additional details of those)

** Assumes some salaries are paid by parent organisations contributing to a "virtual team"; Source: Coriolis analysis*

This focused team needs to primarily work on delivering the three transformative Horizon 3 opportunities documented elsewhere

These opportunities will not happen with "business as usual"
Action is required to catalyse investment and transformation

Source: Coriolis analysis

APPENDICES 05

+A1: Detailed Actions

+A2: Improvement Opportunities

+A3: Current Trials

+A4: Stakeholder Engagement

+A5: Glossary

APPENDIX 1
DETAILS OF STRATEGY & IMPLEMENTATION PLAN

NOTES ON DETAILS OF STRATEGY & IMPLEMENTATION PLAN

This section provides details of on the ongoing service and resource delivery required in agriculture in North West Queensland and the goals, tasks and actions required to deliver on the strategy and implementation plan for regional diversification of agriculture in North West Queensland.

Numbering is a proposed/preliminary priority listing for each heading.

However, this would be open for negotiation by stakeholders.

There are ongoing requirements to continue to support cattle industry growth in the region (Horizon 1)

PRELIMINARY/PROPOSED

VISION	NORTH WEST QUEENSLAND DEVELOPS A VIBRANT AND ROBUST DIVERSIFIED AGRICULTURE SECTOR, LEADING TO INCREASED PRODUCTION, EMPLOYMENT AND POPULATION IN THE REGION			
DRIVERS	MODERN	AFRICAN CLIMATE	CLOSE TO MARKETS	SAFE &TRUSTED
HORIZONS	HORIZON 1 Grow & build cattle	*HORIZON 2* *Support emerging projects & products*	*HORIZON 3* *Discover & develop new options*	
ACTIONS	SUPPORT CATTLE INDUSTRY GROWTH 1. Drive on-farm competitiveness 2. Enhance supply chain efficiency 3. Develop feed grains & fodder crops 4. Support regional processing 5. Improve regional reputation 6. Add value through cattle R&D	*SUPPORT INVESTMENT IN WATER PROJECTS* *1. Leverage existing allocations* *2. Support project proponents* *3. Enable landholder development* *4. Support major infrastructure projects* *5. Improve processes and systems* *6. Invest in growth*	*SUPPORT DIVERSIFICATION INTO NEW CROPS* *1. Coordinate development* *2. Develop identified opportunities* *3. Promote opportunities to attract investment*	

Source: Coriolis analysis

HORIZON 1: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
HORIZON 1 - SUPPORT CATTLE INDUSTRY GROWTH					
1.1	DRIVE ON-FARM COMPETITIVENESS				
1.1.1	Focus on net margin per hectare as a measure of profitability and kilograms of beef produced per hectare as a suitable measure of efficiency	1-2 years	DAF; MLA	◑	●
1.1.2	Increase the number of pastoralists receiving further training in business management and planning	1-2 years	DAF; MLA	●	◑
1.1.3	Develop measures such as improved grazing management practices, increase soil fertility and land renewal to increase grass utilisation on livestock farms	1-2 years	DAF	●	◑
1.1.4	Facilitate the further development of educational resources and information on best practice pasture management	6 months	DAF	◑	◑
1.1.5	Develop knowledge transfer programmes and farmer education to ensure improved grassland management	1-2 years	DAF	●	●
1.1.6	Explore and develop use of precision technologies, Ag-tech applicable to extensive grasslands based production (e.g. remote soil moisture, feed monitoring and sensing)	1-2 years	DAF	◑	○
1.1.7	Promote the use of latest on-farm data collection technologies to inform real time decision making processes	1-2 years	DAF; service providers	●	○
1.1.8	Expand baseline data collection for region to allow measurement of productivity gains	1-3 years	DAF; ABS; ABARES; MLA	●	○
1.1.9	Exploit potential of improved genetics to add value at farm level by improving breeding (including polled cattle to improve handling)	5 years+	Operators; MLA	◑	○
1.1.10	Disseminate latest research on increasing cattle fertility levels	6 months	DAF; MLA	●	●
1.1.11	Support drought relief to regional farmers	As required	State	●	●

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 1: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
1.2	ENHANCE SUPPLY CHAIN EFFICIENCY				
1.2.1	Improve information flow from final consumer of live cattle in Indonesia (and elsewhere) back to producer	1-2 years	MLA	○	◑
1.2.2	Explore options to increase availability of specific, detailed data on results by channel across the total supply chain, to increase transparency and better inform stakeholder understanding of their own specific, realised market returns	6 months	Industry; MLA; DAF	◑	◑
1.2.3	Increase and expand contractual supply arrangements between producers and processors	2-3 years	Industry	○	◑
1.2.4	Focus on assisting the production of the market required specifications and production systems, to maximise returns to the farmer and the processing industry	2-3 years	MLA	◑	◑
1.2.5	Align and sharpen industry incentives and build strong supply chain relationships with North West Queensland producers	1-2 years	DAF; MLA	◑	●
1.2.6	Develop innovative customer-focused sectoral supply chain solutions, covering all links within the chain	2-3 years	DAF	○	◑
1.2.7	Review regional infrastucture audit and support additional supply chain infrastructure upgrades	6 months	DAF	●	◑
1.2.8	Continue to lobby for funding for roading and rail upgrades	Ongoing	Local Government	●	◑
1.2.9	Prioritise upgrading port infrastructure at Karumba and Townsville (in progress)	2-4 years	State	◑	◑
1.2.10	Identify potential public-private partnerships to invest into supply chain improvements based on industry growth	Ongoing	DAF; DSDMIP; TIQ	●	◑

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; ABS: Australian Bureau of Statistics; ABARES: Australian Bureau of Agricultural and Resource Economics and Sciences. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 1: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
1.3	DEVELOP FEED GRAINS AND FODDER CROPS				
1.3.1	Research on best performing fodder genetics in fodder crop (by region)	1-2 years	DAF; MLA	●	◑
1.3.2	Conduct research into best practice in fodder crop production in region	1-2 years	DAF; MLA	●	●
1.3.3	Commission research into measurable best practice systems for sustainable intensification on-farm (agronomy, management etc.)	6 months	DAF	●	◑
1.3.4	Encourage greater use of on-farm production of supplementary feed under dryland production systems (currently under ~8ha/farm on average)	5 years+	DAF	●	●
1.3.5	Develop partnerships with pastoralists to develop "Best Practice Farm Models" to share learning across the region	1 year	DAF; MLA	●	●
1.4	SUPPORT REGIONAL PROCESSING				
1.4.1	Support the development of strategically located cattle processing facility	2-3 years	DAF	●	●
1.4.2	Support on-going viability studies of regional cattle processing	2-3 years	DAF; MLA; Industry	◑	◑
1.4.3	Review existing proposals; prioritise and assist	1 year	DAF	●	●
1.4.4	Review existing blockages to regional processing	1 year	DAF	●	●
1.4.5	Share learnings on best practice processing to enable low cost, high efficiency, high technology based processing	2 years	DAF	◑	●

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; ABS: Australian Bureau of Statistics; ABARES: Australian Bureau of Agricultural and Resource Economics and Sciences. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 1: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
1.5	IMPROVE REGIONAL REPUTATION FOR QUALITY BEEF				
1.5.1	Implement a strategy to position North West Queensland beef as a premium, sustainable and grass fed product leading to a growth of sales into high end retail and foodservice outlets; develop a "Face of the North West" to personalise the industry	2-3 years	Industry; DAF	●	◑
1.5.2	Build a strong brand image for North West Queensland beef capable of securing a significant price premium at retail and food service market outlets	5 years+	Industry; DAF	◑	◑
1.5.3	Investigate opportunities for including animal welfare standards and human health benefits of grass fed beef in the marketing messages for North West Queensland beef	6 months	DAF; MLA	◑	◑
1.5.4	Develop strong reputation for quality and environmental sustainability of North West Queensland beef with customers	5 years+	Industry; DAF	◑	◑
1.5.5	Identify and promote North West Queensland's unique selling points, including grassland based rearing, improved animal health, welfare and biosecurity etc	6 months	DAF	◑	◑
1.5.6	Engage with retailers and foodservice operators to develop a partnership approach for the production of a unique North West Queensland beef, ensuring a harmonised and collaborative approach to market specifications, genetics, price points and farm management practices	2-3 years	DAF	◑	●
1.5.7	Identify global partners for investment into a vertically integrated beef supply	1 year	DAF; TIQ	●	●
1.5.8	Explore opportunities to collaborate with TIQ in promoting regional beef industry as a tourist attraction	6 months	DAF; TEQ	●	◑
1.5.9	Identify, develop, reinforce and secure new markets, as well as supporting the trade in live exports	5 years+	DAF; MLA; State	◑	●
1.5.10	Increased level of communication and engagement with and between processors and producers in terms of marketplace developments	6 months	DAF; MLA	○	◑
1.5.11	Defend interests of the North West Queensland beef sector in international trade agreements pursued by Australia	5 years+	DAF	◑	●

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; DSDMIP: Department of State Development, Manufacturing, Infrastructure and Planning; TIQ: Trade and Investment Queensland; TEQ: Tourism and Events Queensland. Source: Coriolis analysis

○ Low ◑ Med ● High

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
1.6	ADD VALUE THROUGH CATTLE R&D				
1.6.1	Review intervention strategies for the rapid recognition, prevention and control of emerging livestock issues	6 months	DAF	◑	○
1.6.2	Explore options for alternative funding models for research in the sector	6 months	DAF	◑	◑
1.6.3	Explore research projects on the advantages of North West Queensland grass fed beef systems in comparison with other production systems (e.g. feedlot) with regards to animal welfare, health and taste along with any other relevant areas	6 months	DAF; MLA	◑	◑
1.6.4	Seek to ensure country of origin labelling requirements for beef in all markets; consider extending these to region of production	5 years+	DAF; State	◑	◑

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; DSDMIP: Department of State Development, Manufacturing, Infrastructure and Planning; TIQ: Trade and Investment Queensland; TEQ: Tourism and Events Queensland. Source: Coriolis analysis

There are ongoing requirements to continue to support emerging projects and products in the region (Horizon 2)

PRELIMINARY/PROPOSED

VISION	NORTH WEST QUEENSLAND DEVELOPS A VIBRANT AND ROBUST DIVERSIFIED AGRICULTURE SECTOR, LEADING TO INCREASED PRODUCTION, EMPLOYMENT AND POPULATION IN THE REGION			
DRIVERS	MODERN	AFRICAN CLIMATE	CLOSE TO MARKETS	SAFE &TRUSTED
HORIZONS	*HORIZON 1* *Grow & build cattle*	HORIZON 2 Support emerging projects & products	*HORIZON 3* *Discover & develop new options*	
ACTIONS	*SUPPORT CATTLE INDUSTRY GROWTH* *1. Drive on-farm competitiveness* *2. Enhance supply chain efficiency* *3. Develop feed grains & fodder crops* *4. Support regional processing* *5. Improve regional reputation* *6. Add value through cattle R&D*	SUPPORT INVESTMENT IN WATER PROJECTS 1. Leverage existing allocations 2. Support project proponents 3. Enable landholder development 4. Support major infrastructure projects 5. Improve processes and systems 6. Invest in growth	*SUPPORT DIVERSIFICATION INTO NEW CROPS* *1. Coordinate development* *2. Develop identified opportunities* *3. Promote opportunities to attract investment*	

Source: Coriolis analysis

HORIZON 2: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
HORIZON 2 - SUPPORT INVESTMENT IN WATER PROJECTS					
2.1	LEVERAGE EXISTING ALLOCATIONS				
2.1.1	Assist in investment attraction to the region and accessing potential partners	2 years	DAF; TIQ	●	◑
2.1.2	Develop strategies to support the success of new irrigated crops in the region through public-private partnerships	6 months	DAF	◑	●
2.1.3	Support trials of irrigated crops across the region	1-5 years	DAF	●	●
2.2	SUPPORT PROJECT PROPONENTS				
2.2.1	Guide high potential irrigation projects through existing processes and systems	Ongoing	DAF; DSDMIP; DNRME	●	●
2.2.2	Document potential sources of funding for irrigation projects	6 months	DSDMIP	●	○
2.2.3	Create a favourable environment through which the private sector can be involved	1-2 years	State; Federal Government	●	●
2.2.4	Develop model business case model for development, provide case studies	1-2 years	DAF	●	●
2.2.5	Fund development of feasibility reports and business plans for new irrigation projects	Ongoing	State; Federal Government	●	●
2.2.6	Continued collaboration by state departments to deliver best economic outcomes while managing environmental outcomes	Ongoing	DNRME; DES; DSDMIP; DAF	●	◑
2.2.7	Promote regional potential to all levels of government and population outside of region	1-2 years	DAF; Local Gvnt; NWQROC; MTEZ	●	◑
2.2.8	Fund ongoing research into water availability in region	Ongoing	DSDMIP; DNRME	●	●
2.2.9	Fund additional water flow monitoring stations, where appropriate (to improve data, and effectiveness of existing water rights conditions)	2 years	DNRME	◑	◑

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; ABS: Australian Bureau of Statistics; ABARES: Australian Bureau of Agricultural and Resource Economics and Sciences. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 2: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
2.2.10	Document all available suitable land for agricultural development	Ongoing	DAF	●	●
2.3	ENABLE LANDHOLDER DEVELOPMENT				
2.3.1	Support existing landholders in developing property	1 years	DAF	◑	●
2.3.2	Provide extension support to existing irrigation in the region to improve performance and implement best practice	2-3 years	DAF	●	●
2.3.3	Promote more efficient use of existing irrigation water (e.g. low pressure drop-tube pivot systems)	6 months	DAF	◑	●
2.3.4	Explore potential research and demonstration programs to test new and emerging sprinkler and water management technologies	2-3 years	DAF; service providers	◑	◑
2.3.5	Reduce regulatory burden to enable North West Queensland to get ahead of its competition in pursuing new opportunities; Government must work to convert this belief into a reality	2-3 years	State; Federal Government	◑	●
2.4	SUPPORT MAJOR INFRASTRUCTURE PROJECTS				
2.4.1	Examine the processes surrounding access to funding, and bring forward proposals to simplify the process	Ongoing	DNRME; DES; DSDMIP; DAF	●	◑
2.4.2	Ensure North West Queensland receives a fair share of national investment in infrastructure	Ongoing	State; DSDMIP	○	●
2.4.3	Review funding options to support private enterprise conducting prefeasibility and scoping work	Ongoing	State; DSDMIP	●	●
2.4.4	Provide additional financial support to viable local government initiatives to transform regional economies	Ongoing	State; DSDMIP	○	●
2.4.5	Review mechanisms for public private partnership arrangements	3 months	State; DSDMIP	●	●
2.4.6	Continue to fund electricity grid expansion and upgrades	Ongoing	Grid operators	○	◑

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; ABS: Australian Bureau of Statistics; ABARES: Australian Bureau of Agricultural and Resource Economics and Sciences. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 2: ON-GOING SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
2.5	IMPROVE PROCESSES AND SYSTEMS				
2.5.1	Benchmark the application of irrigation and dam building legislation and standards internationally to identify best practice in cost effective regulation	2-3 years	State; Federal Government	◑	◑
2.5.2	Disseminate information about government processes required for irrigation and land development (clear steps, stages, timeframes, costs)	6 months	DAF; DNRME	●	◑
2.5.3	Review effectiveness of existing one-stop-shop system (timeframes, outcomes, costs)	1 year	DSDMIP; DNRME	◑	◑
2.5.4	Review progress of existing red tape reduction programs; ensure program covers issues relevant to agricultural diversification in the NW (track progress)	1 year	DAF	●	◑
2.5.5	Investigate processes for more efficient facilitation of water trading between rights holders in region	1 year	DNRME; DAF	◑	◑
2.5.6	Develop and promote regional irrigation forums (opportunities for learnings/networking)	6 months	DAF	●	●
2.6	INVEST IN GROWTH				
2.6.1	Assess Government readiness for agricultural diversification in the region	3 months	DAF; DSDMIP	◑	◑
2.6.2	Ensure that agricultural diversification is a high priority of government leadership	3 months	State Gvnt.	◑	●
2.6.3	Ensure policy on agricultural development in region is evidence based	3 months	DAF; DSDMIP; State	◑	◑
2.6.4	Assess if agricultural sector's budget aligns with proposed transformation aspirations	3 months	DAF; DSDMIP; State	●	●
2.6.5	Assess and explicitly state the different government objectives for economic diversification in region and reconcile	3 months	DAF; DSDMIP; State	◑	◑
2.6.6	Ensure alignment exists among all levels of stakeholders (Federal, State, Local, landowners)	3 months	DAF; DSDMIP; State	◑	●
2.6.12	Present a clear, unequivocal, united Government position on development in region	Ongoing	State Gvnt.	●	●

DAF: Department of Agriculture and Fisheries; MLA: Meat and Livestock Australia; ABS: Australian Bureau of Statistics; ABARES: Australian Bureau of Agricultural and Resource Economics and Sciences. Source: Coriolis analysis

○ Low ◑ Med ● High

Regional diversification into new crops needs support (Horizon 3)

PRELIMINARY/PROPOSED

VISION	NORTH WEST QUEENSLAND DEVELOPS A VIBRANT AND ROBUST DIVERSIFIED AGRICULTURE SECTOR, LEADING TO INCREASED PRODUCTION, EMPLOYMENT AND POPULATION IN THE REGION			
DRIVERS	MODERN	AFRICAN CLIMATE	CLOSE TO MARKETS	SAFE &TRUSTED
HORIZONS	*HORIZON 1* *Grow & build cattle*	*HORIZON 2* *Support emerging projects & products*	HORIZON 3 Discover & develop new options	
ACTIONS	*SUPPORT CATTLE INDUSTRY GROWTH* *1. Drive on-farm competitiveness* *2. Enhance supply chain efficiency* *3. Develop feed grains & fodder crops* *4. Support regional processing* *5. Improve regional reputation* *6. Add value through cattle R&D*	*SUPPORT INVESTMENT IN WATER PROJECTS* *1. Leverage existing allocations* *2. Support project proponents* *3. Enable landholder development* *4. Support major infrastructure projects* *5. Improve processes and systems* *6. Invest in growth*	SUPPORT DIVERSIFICATION INTO NEW CROPS 1. Coordinate development 2. Develop identified opportunities 3. Promote opportunities to attract investment	

Source: Coriolis analysis

HORIZON 3: DIVERSIFICATION SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
3	HORIZON 3 - SUPPORT DIVERSIFICATION INTO NEW CROPS				
3.1	DEVELOPMENT COORDINATION				
3.1.1	Prioritise selected regions, crops, value chains for initial focus of diversification efforts	3 months	DAF	●	●
3.1.2	Identify different areas and value chains within region for differentiated approach	3 months	DAF	●	●
3.1.3	Develop a collaborative RD&E program with industry, government and university partners	6 months	DAF, ONA	◑	●
3.1.4	Develop strategies to support the success of new crops in the region through public-private partnerships	6 months	DAF	◑	●
3.1.5	Ensure best global genetics is available in Queensland; support the movement of these genetics through Australian biosecurity	6 months	DAF	○	●
3.1.6	Conduct audit of regional support services focusing on needs of new crops	6 months	DAF	●	◑
3.1.7	Investigate new supply chain models that lead to value chain integration with key buyers in high value markets	6 months	DAF	◑	●
3.1.8	Develop optimum business models for each product and form commercial scale pilot programmes in order to prove the model before roll out across the individual operators	2-3 years	DAF	◑	●
3.1.9	Develop supportive policies for skills, research and effective regulation of new products	6 months	DAF	◑	◑
3.1.10	Investigate potential lifecycle of high value waste streams emerging from new products	6 months	DAF	◑	●
3.1.11	Support localised weather and climate forecasting services	Ongoing	DAF	◑	●
3.1.12	Establish grants program for farm level soil testing and monitoring program	Ongoing	DAF	◑	◑
3.1.13	Continue to support biosecurity controls in the region	Ongoing	DAF	●	◑
3.1.14	Continue to support pest management programs in the region, focussing on those pests creating barriers to diversification	Ongoing	DAF	●	◑

DAF: Department of Agriculture and Fisheries. ONA: Office of Northern Australia. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 3: DIVERSIFICATION SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
3.2	OPPORTUNITY DEVELOPMENT				
3.2.1	Identify and equip regional "change agents" who are the frontline people helping producers to diversify (combining agronomy, farm management); create strong linkages into existing capacity-building DSD are working on in region	1-3 years	DAF; DSD	◑	◑
3.2.2	Invest in specific leadership training for project managers and agricultural diversification team	3 months	DAF; DSDMIP	◑	●
3.2.3	Identify and host world class producers of identified Horizon 3 products operating at scale in climatic peer regions	6 months	DAF; TIQ	●	●
3.2.4	Host regional field days offering hands on experience with new crops suited to the region	Ongoing	DAF	●	●
3.2.5	Establish demonstration farms across region to provide best practice example and training opportunities	5+ years	DAF	◑	●
3.2.6	Conduct audit to identify skills and capabilities gaps in the region; create strong linkages into existing capacity-building DSD are working on in region	6 months	DAF; DESBT; DSD	●	◑
3.2.7	Develop and promote regional provision that is specifically targeted at meeting the skills needs of employers in the cropping sector	Ongoing	DESBT; DAF	◑	◑
3.2.8	Encourage existing cropping operator collaboration to improve skills	6 months	DAF	◑	●
3.2.9	Develop funding programme to access industry Agronomists	1 year	DAF	◑	●
3.2.10	Deliver targeted skills development support for the growing cropping sector	6 months	DESBT; DAF; Industry bodies	◑	●
3.2.11	Promote the sector and create opportunities for underrepresented groups	1-2 years	DAF; State	◑	◑
3.2.12	Encourage training in risk assessment and management for producers moving into new cropping industry	Ongoing	DESBT; DAF	●	●

DAF: Department of Agriculture and Fisheries; DSDMIP: Department of State Development, Manufacturing, Infrastructure and Planning; DESBT: Department of Employment, Small Business and Training. TIQ: Trade and Investment Queensland. Source: Coriolis analysis

○ Low ◑ Med ● High

HORIZON 3: DIVERSIFICATION SUPPORT REQUIREMENTS

PRELIMINARY/INDICATIVE

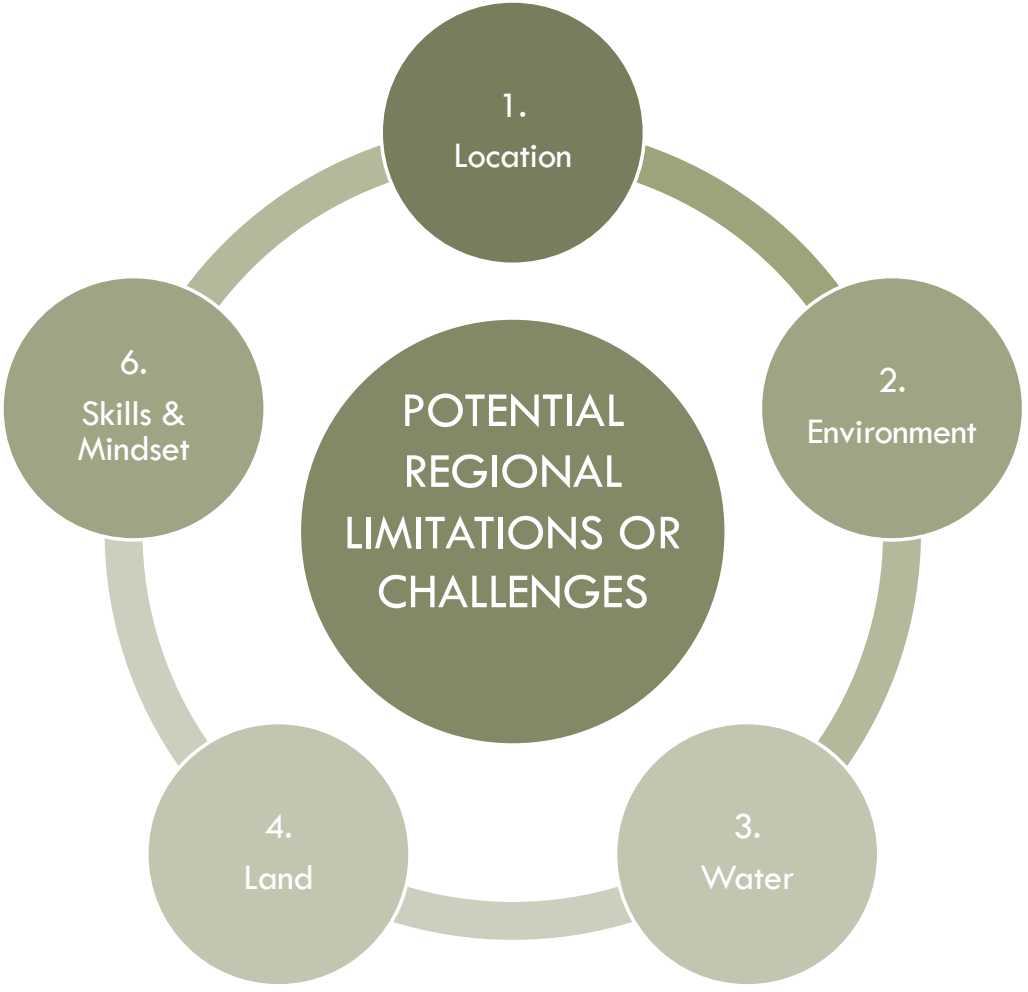
#	GOALS/TASKS/ACTIONS	TIMEFRAME	RESPONSIBILITY	EASE OF IMPLEMENTATION	IMPACT
3.3	OPPORTUNITY PROMOTION				
3.3.1	Investigate and develop new funding models	6 months	DAF	◑	●
3.3.2	Explore opportunities to develop and pursue collaboration with industry and government partners	6 months	DAF	●	●
3.3.3	Identify and investigate world class, well-resourced global agribusiness firms that are investing in large scale tropical savannah/sahel production projects targeting exports	6 months	DAF; TIQ	◑	●
3.3.4	Develop promotional materials for region and specific opportunities as they arise to be distributed throughout government network and other agencies	Ongoing	DAF; DSDMIP; TIQ	●	●
3.3.5	Promote diversification opportunities in the region to relevant state, national and international organisations	2-3 years	DAF; TIQ	●	●
3.3.6	Organise tours, field days, showcases of the region to identified potential investors	2-3 years	DAF; DSDMIP; TIQ	●	●
3.3.7	Investigate potential of regional investment attraction team/office to feed investor pipeline and co-ordinate investment attraction	6 months	DAF; DSDMIP; MITEZ; NWQROC	●	●

DAF: Department of Agriculture and Fisheries; DSDMIP: Department of State Development, Manufacturing, Infrastructure and Planning; TIQ: Trade and Investment Queensland; MITEZ: Mount Isa to Townsville Economic Development Zone; NWQROC: North West Queensland Region of Councils. *Source: Coriolis analysis*

○ Low ◑ Med ● High

APPENDIX 2: DETAILS OF IMPROVEMENT OPPORTUNITIES

Increasing agricultural production in North West Queensland faces a range of key limitations or challenges



Source: Coriolis analysis

1. Opportunities exist to improve regional cost competitiveness through better logistics and infrastructure

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Opportunities exist to improve regional logistics efficiency	- Many activities currently require more time and cost than they should - Road transport times to ports and regional centres can be excessive - Freight and transport costs can be high - Receiving timely services can be challenging	- Implement products that are non-perishable, hardy and transport friendly - Develop efficient logistics systems - Create close relationships with suppliers and contractors
Opportunities exist to further invest in regional infrastructure - **Road** - **Rail** - **Electricity** - **Port**	- Some key roads remain unsealed and narrow (e.g. East of Georgetown) - Rail incompatible gauge NT to QLD - Unreliable electricity at some locations Townsville port currently unable to support large container ships (channel widening project underway, to allow larger ships) - Karumba port limited capacity beyond live cattle, mining and fishing	- Ensure high efficiency of all operations - Consider local electricity production (e.g. solar)
Opportunities exist to improve regional supporting products and services	- Potentially higher costs of sourcing inputs - Access to some products or services can take too long - Regional support in some areas is limited	- Plan for more inventory on hand of key parts - Implement better planning and scheduling - Coordinate with other operators to share costs, equipment and service calls

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

2. Opportunities exist to better manage and respond to environmental conditions

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Opportunities exist to improve response to environmental outcomes	- Rainfall volumes and timing both extremely variable (e.g. early rain) - Potential for flooding in rainy season - Cyclone zone in the Gulf - Temperatures can be very high for extended periods - Region historically prone to drought - Water inundation and water logging - Risk of burn/wilt to crops	- Grow climatically suitable products - Implement ongoing risk assessment - Access accurate weather forecasting - Manage timing precisely
Opportunities exist to better utilise the wide variety of soil types in the region	- Crops and development highly dependent on regional soil type - Two key soil types: (1) vertisols (black cracking soil with high fertility, good water holding capacity) and (2) red soils (low fertility, low water holding capacity and poor structure) - Unable to access land on vertisols (black cracking) after rainfall	- Clearly assess local soils before development - Plan and schedule for access on black soils - Utilise all available regional soil type resources (e.g. CSIRO reports)
Opportunities exist to improve pest management systems and strategies	- Presence of various pests: locust swarms, brolga (Australian crane), fruit bats, kangaroos, wild dogs, and various insects - Potentially for crop loss from insects and birds - Potential for animal losses from wild dogs	- Risk mitigation for new development required - Identify chemical and physical crop protection system before production - Research into best varieties

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

3. Opportunities exist to enable more regional water

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Opportunities exist to improve availability of surface water in some locations	- Use of natural rainfall is (obviously) free - Timing of rainfall can be inconsistent and variable, particularly in some areas - Diversion of surface water requires a water "allocation" from government - Allocations do not guarantee water as take is limited at certain times - Development costs to divert and hold surface water are possible	- Produce high value and climatically suitable products - Access accurate weather forecasting - Manage timing - Invest in irrigation - Explore JV with existing surface water allocation holders - Investment in establishing water infrastructure for existing allocations
Massive regional growth will be unlocked by dams	- Existing dam water (e.g. Lake Julius) expensive and currently unavailable - Dams require substantial investment - Major infrastructure projects can have long timeframes	- Government must build more dams to enable transformative regional growth - In parallel, implement short/medium term projects using products and locations that do not require large scale government infrastructure

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

4. Opportunities exist to better enable land development…

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
More land could be converted into freehold land **More land could be leased by the government to operators** **Traditional owners of the land (Aboriginal groups) are not currently fully realising the potential of their land** **Foreign investment restrictions on land ownership could be relaxed**	- 28% of land in QLD is freehold, 64% is leasehold - Freehold land can be developed - Leasehold land is government owned land under (term leases, perpetual leases and freehold leases); Pastoral leases are term leases and can only be used for the purpose identified in the lease - Some leaseholders may not be making large scale, long term investments in their property - Crown Aboriginal Land is freehold (held in Trust) and can be developed - Development on land with Native title must include the rights of, and engage with, the Traditional Owners; activities may be impacted by 'future acts' - Changes to use of leasehold land could be made less time consuming and lower cost - Foreign investment restrictions are currently in place in Australia	- Ensure rules and conditions for crop production are understood and that clear property rights exist - Focus high investment development in high potential lands - Work with traditional owners in development process from planning stages forward - Potential to form JV with existing pastoral lease holders

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

… continued

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Processes required to achieve approval to clear vegetation for high value agriculture can be improved	- Under the Vegetation Management Act 1999[1] -*Vegetation is a native tree or plant other than the following - grass or non-woody herbage; a plant within a grassland regional ecosystem; a mangrove* - Limitations are placed on what vegetation is able to be cleared for high value agriculture - Sites previously identified which had a clearing permit or which have a PMAV can be cleared and can be developed - Projects with "Coordinated" status have less restrictive rules on land clearing	- Clearing regulated vegetation possible: under an exemption, if the activity fits within the scope of an "Accepted Development Vegetation Clearing Code", Area Plans or under a permit[1] - Development possible on Downs country where no clearing is required - Develop in previously cleared areas - Smaller organisations and family businesses will struggle to participate in significant land development - Check regulations prior to development - Focus on large projects; unfortunately this will increase project risk - Budget for time delays and cost overruns in approvals process - Projects must be large enough to afford minimum required paperwork - Attempt to be declared a "Coordinated Project" by the Queensland Coordinator-General allowing for a coordinated planning and assessment process
Land development regulation and processes can be improved	- Land development in Australia is regulated - Extensive "Impact assessments" are required - Significant time can be required to progress through the required stages - Development must consider impacts on nationally important flora and fauna, ecology, wetlands, heritage places, etc. - Any activity causing serious environmental harm requires approval (e.g. relevant activities are aquaculture, feedlots, food processing production etc.)	

1. https://www.legislation.qld.gov.au/view/pdf/2017-07-03/act-1999-090. Source: various published articles and reports; Coriolis interviews; Coriolis analysis

5. Opportunities exist to develop regional skills and change regional mindsets

OPPORTUNITY	DETAILS	PRIVATE INVESTMENT REQUIRED
Opportunities exist to attract new labour to the region and develop local skills	- Low resident population - Low availability of labour across all job types or specialisations - Some specific or specialised skills do not exist locally - Difficult to access reliable labour - High cost of labour in the outback	- Develop employee sourcing and retention plan - Implement products that can be mechanically harvested - Build accommodation for labour (e.g. seasonal)
Opportunities exist to develop local skills with climatically suited products	- Limited crop production in the region - Many high potential products have had limited or no trials in the area - Developing new products in new regions is risky and requires significant time - Trials across multiple locations to test conditions	- Focus efforts on species with proven results in the region - Focus efforts on products with high returns that are climatically suited to the region - Partner with external parties with new capital and new expertise to reduce risk - Partner with land-owners to lease or sublease land for new developments
Opportunities exist to engage and enhance regional mindsets regarding development opportunities	- Primary producers are typically risk adverse with a limited appetite for high risk projects - Need to support and celebrate first movers and pioneers in the region - Existing operators may currently view themselves are "pastoralists" not "farmers" - Some existing operators may not currently interested in diversified agriculture	

Source: various published articles and reports; Coriolis interviews; Coriolis analysis

APPENDIX 3: DETAILS OF CURRENT CROP TRIALS

KNOWN OR RUMOURED REGIONAL CROP PRODUCTION

As of mid-2018

PRELIMINARY
Known incomplete
Treat as directional

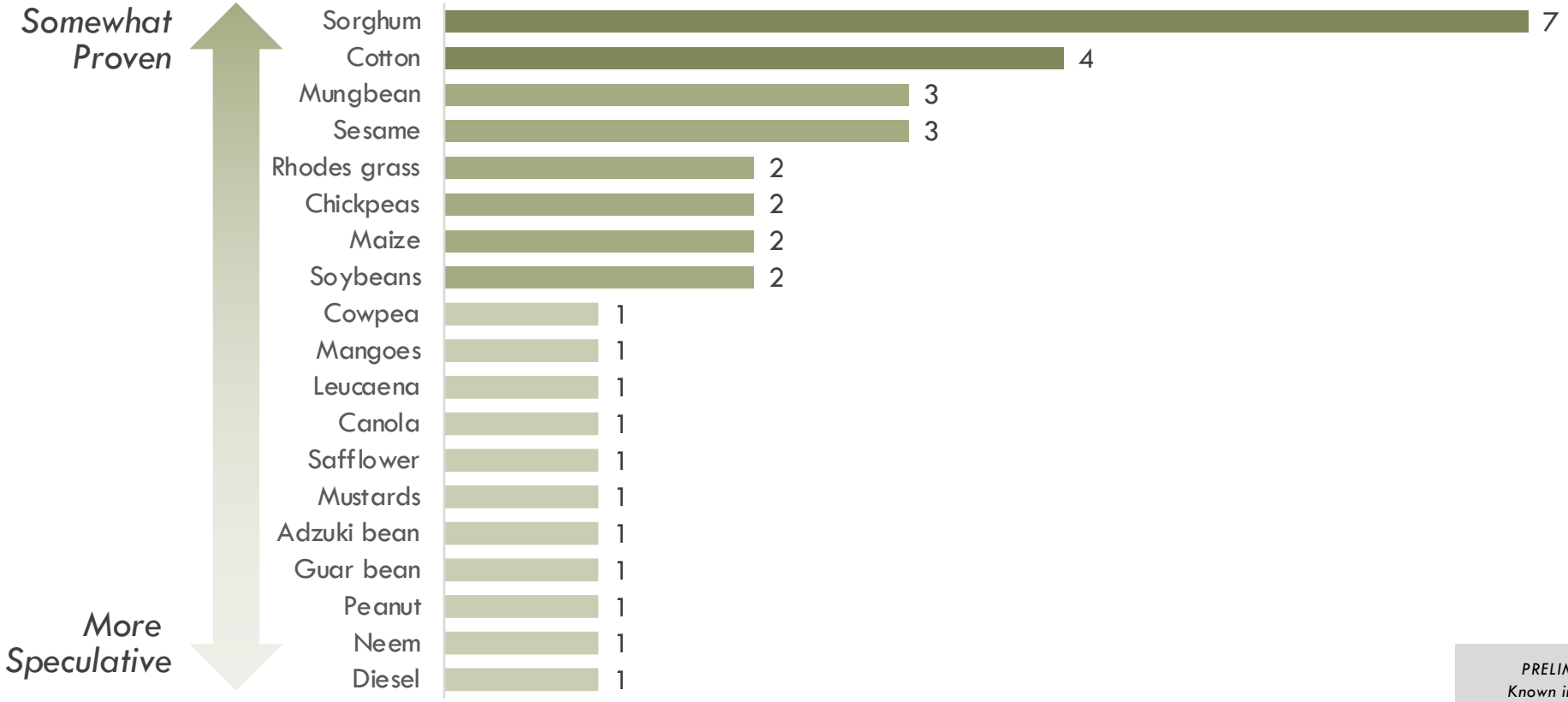
	STATION	CROPS	COMMENTS/NOTES
Etheridge	Strathmore Station	Cotton (6,000 acres) Sorghum, cowpea, mungbean, sesame (past trials)	Tried sesame but too early in trial, didn't manage it well and it also flooded
	Pappalardo Family/ Marathon Man Co	Mangoes (22,000 R2E2; 16,000 Kensington Pride)	-
	Forest Home Station	Cotton (130ha), corn, sorghum, hay Grain sorghum, mungbean, sesame trial, soybean trial	Using pivot irrigator; currently looking for share farmers Contains a DAF research site that is trialing Cotton varieties, mung beans, sesame and soybeans in partnership with Forest Home
	N/A	N/A	"Rumours" of peanuts, neem trees, diesel trees in the region in past
Burke	Gregory Farm (part of Gregory Downs Station, 226,425ha)	Irrigated forage crops and native grasses baled (338ha)	Owned by Paraway (Macquarie)
	Escott Station	Sorghum silage, Rhodes grass into hay	-
Cloncurry	Stanbroke (Three Rivers Project)	Cotton, chickpeas	Unclear if anything in ground yet; 15,000ha proposed; 28,800 ML allocation already; wants 122,000ML more
	Cloncurry Biofuels Trial (in township)	Sorghum, leucaena, sesame, canola, safflower, mustards, guar bean, pigeon pea, sunn hemp, sunflower, soybean, agave	Day to day work done by untrained council workers; very unsophisticated irrigation system
Carpentaria	Lorraine Station	Maize silage (150 ha of maize in 2017; 45t/ha; 6,500tonnes; 11,500t in 2016) Rhodes Grass hay, maize silage for own feedlot, grain sorghum	(240,000ha; 17,000 breeder cattle; 7,500 head feedlot (only 1,600 in it recently); 900ha irrigated cropping) "Rumoured" to have tried soybeans 4 ringtanks; most recent was $5m investment
Richmond	Silver Hills (500ha irrigated cropping)	Sorghum silage for feedlot (grain & feed), mungbeans with irrigation, maize silage and grain for flour, cotton, adzuki bean, chickpea, guar bean (past trials), etc.	Guar beans didn't work (wrong variety)
	Sutherland Station	Sorghum, forage/pasture	-
	AJM Pastoral	Sorghum, forage	Successfully grew sorghum 2018

Source: various published articles; interviews, Coriolis analysis

Sorghum and cotton stand out as crops that are somewhat proven in the region, followed by mungbean and sesame

NUMBER OF KNOWN, RUMOURED OR TRIALED PRODUCTION SITES

Separate farming operations; 2018 or recently



PRELIMINARY
Known incomplete
Treat as directional

Source: see page prior (various published articles; interviews)

APPENDIX 4: STAKEHOLDER ENGAGEMENT

Thankyou to the stakeholders and teams who kindly gave their time and energy to the project

STAKEHOLDERS

- Warren Devin (Mayor), Etheridge Council
- Norm Garsden (CEO), Etheridge Council
- Gary Pickering (Operations), Croydon Council
- Jane McNamara (Mayor), Flinders Council
- Graham Sealy (Councillor), Flinders Council
- Ernie Camp (Mayor), Carpentaria Council
- Jack Bowen (Mayor), Burke Council
- Mike Hayward (CEO), Burke Council
- Mark Crawley (Deputy CEO), Mount Isa City Council
- Greg Campbell (Mayor), Cloncurry Council
- Belinda Murphy (Mayor), McKinlay Council
- John Kelly (CEO), McKinlay Council
- Peter Bennett (CEO), Richmond Council
- Kevin Bawden, (Councillor), Richmond Council
- Corbett Tritton, Silver Hills
- James Lord, May Downs
- Nikko Lord, Sutherland Station
- Jim Lindsay, KLR Marketing
- Peter Anderson, Strathmore
- Alister McClymont, AJM Pastoral
- Alison Collier, Port of Townsville
- Helaina Bannister, Port of Townsville
- Andrew Maclean, Southern Gulf NRM
- Glen Graham, MITEZ
- Jed Matz, CRCNA
- Tim McGrath, QDAF
- Peter Leach, QDAF
- Peter Siemen, QDNRME
- Cameron Venables, QDNRME
- Paul MacIntosh, Pulse Australia
- Mark Schmidt, Australia Mungbean Assoc.
- Brett Williams, QUT
- Surya Bhattarai, CQU
- Oron Gar, Equinom
- Chris Lambridge, University of Queensland
- Murry Smith, GHD
- Tony Matchett, Savannah Agriculture Consulting
- Angus Macdonald, Marsden Jacobs Associates
- Joe Moro, Mareeba F&V Growers Assoc.
- Steve Scurr, Pinata
- Paul Fagg, Skybury Coffee
- Denis and James Howe, Howe Farming
- Colin and Ursula Verde, Red Claw Aquaverde

PROJECT SPONSORS

- Adam West (Regional Director - North Region), Queensland Department of Agriculture & Fisheries
- Gareth Jones (Manager, Regional Agribusiness Development, Trade & Investment), Queensland Department of Agriculture & Fisheries
- Greg Mason (Senior Industry Development Officer (Agribusiness)), Queensland Department of Agriculture & Fisheries

NWMP STRATEGIC BLUEPRINT – PROJECT LINKAGES

- John Hoare (Director - Economic and Industry Development) Department of State Development, Manufacturing, Infrastructure and Planning
- Kate McClean (Project Manager, NWMP), Department of State Development, Manufacturing, Infrastructure and Planning

INTERVIEWS AND ANALYSIS

- Tim Morris (Director), Coriolis Australia
- Virginia Wilkinson (Director), Coriolis Australia
- Nicki Hall (Consultant), Coriolis Australia
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APPENDIX 5: GLOSSARY OF TERMS

A$/AUD	Australian dollar
ABS	Absolute change
ANZSIC	AU/NZ Standard Industry Classification
AU	Australia
Australasia	Australia and New Zealand
b	Billion
CAGR	Compound Annual Growth Rate
CIF	Cost plus Insurance and Freight
CN	China
CSIRO	Crown Scientific Institute Research Organisation
EBITDA	Earnings before interest, tax, depreciation and amortization
FAO	Food and Agriculture Organisation of the United Nations
FOB	Free on Board
FTA	Free Trade Agreement
FY	Financial year (of firm in question)
HS Code	Harmonized Commodity Description and Coding System
JV	Joint venture
m	Million
n/a	Not available/not applicable
Nec/nes	Not elsewhere classified/not elsewhere specified
N/C	Not calculable
N.H	Northern Hemisphere
R&D	Research and Development
S.H	Southern Hemisphere
T	Tonne
US/USA	United States of America
US$/USD	United States dollar


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