

# North Queensland Agricultural Market and Supply Chain Study



May 2019





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Principal partners: Townsville Enterprise Limited (TEL), Cooperative Research Centre for Developing Northern Australia (CRCNA) and North Queensland Regional Organisation of Councils (NQROC)

Local Government partners: Burdekin Shire Council, Charters Towers Regional Council, Hinchinbrook Shire Council, Townsville City Council, Palm Island Shire Council

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# The opportunity



The increase in the volume and value of global food consumption is a major megatrend that is set to confront this generation. Global, national and regional policy makers should consider these trends as part of their forward planning. Growing international market concern associated with food security and supply has contributed to mounting interest in North Queensland products across key markets including South East Asia, China and the Middle East.

Townsville Enterprise Limited (TEL), the North Queensland Regional Organisation of Councils (NQROC), Cooperative Research Centre for Developing Northern Australia (CRCNA) and industry stakeholders have come together to fund the North Queensland Agricultural Market and Supply Chain Study (NQAMSCS) and establish evidence-based recommendations that will assist in harnessing export opportunities and support the long-term agricultural development objectives of the region. The study has adopted a 'demand led' approach to the qualification of priority markets and products, existing supply chain opportunities and constraints, industry capacity to supply, sector collaboration and future investment considerations.

The NQAMSCS has been undertaken so that North Queensland's primary producers, industry peak bodies, stakeholders, investors and the government are in a better position to further consider the appropriate allocation of finite resources and the formulation of supportive policy settings that take into consideration the sectors long-term growth and sustainability.

The study found that there is \$3 billion in unmet global market demand across ten of Australia's leading agricultural export destinations and identified five priority Australian products: beef, avocado, macadamia, on-shore aquaculture and soybean. In addition to this, the study also identified unmet demand in many other categories that are relevant to the study region.

Transitioning land use and strategic efforts to embrace the five priority products was estimated to result in a positive NPV of up to \$271.1 million and generating approximately 2,000+ new jobs within the region. Noting that intensification of food and fibre production in the region must be undertaken in a manner that improves soil and water health and reduces the risk of nutrient loss. And that secondly, proposed growth strategies include the adoption of digital and new technologies.



Adoption and implementation of the study's recommendations still require further development. Some of the priority product's supply chain infrastructure was observed to be underdeveloped or inefficient. Building value in these constrained supply chains will be critical to ensuring the region can meet anticipated global food demand. These specifically include:

- Transitioning the beef industry to a higher value-add sector, such as targeting boxed beef markets, requires additional infrastructure investment and planning to facilitate processing and export capability.
- Utilising existing sugarcane land and fallow cropping systems to improve soil health and improve total farm output, through the rotation of soybean and other crops.
- Developing a new farm systems group to drive collaborative effort in research and development.
- Intensifying the production of fresh food supported by improved cold chain logistics and better use of shared services for biosecurity, customs and quarantine.
- Leveraging the Port of Townsville and Townsville Airport as key hubs for driving new export growth based on the study's identified priority markets and products.

Additionally, targeted investment attraction, matching customers to producers, and linking customers needs to suitable land, water and supply chain assets is key.

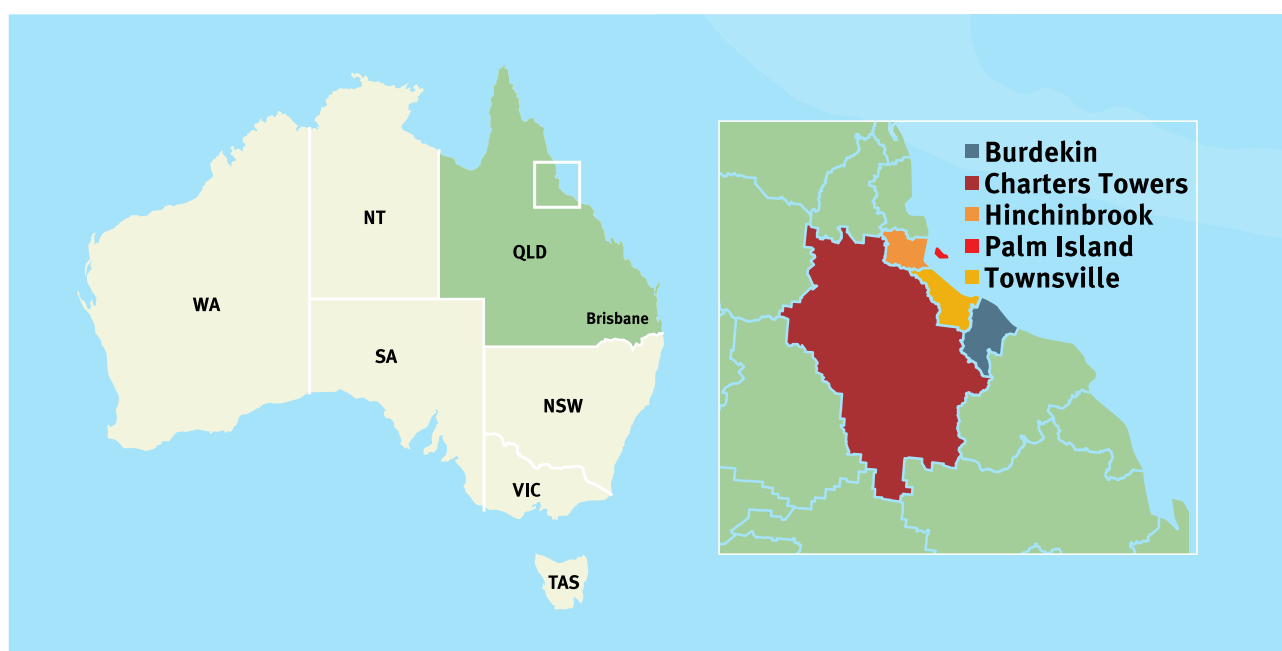
The NQAMSCS has produced a holistic 'developmental road map' that seeks to define the key products, target markets

and critical enablers that will support the region's response to growing export market demand. More work is required to contemplate the development of value-added food processing in the region and several case studies of successful value-adding have been considered. Continued momentum and effective implementation of the strategies identified will be key, with further consideration given to how we build cross-supply chain cooperation and identify the geographical location of specific key enabling infrastructure that supports industry's capacity to ensure continuity of supply across the priority products.

KPMG, AEC and Premise were pleased to support TEL, NQROC, the CRCNA and project participants in delivering this forward-thinking study and applaud the region for its proactive stance of securing the future of the industry and capturing new growth and value for the region. KPMG is looking forward to future opportunities to work with North Queensland stakeholders and TEL to drive the implementation of the recommendations here-in and realise future export opportunities for the region.

## The North Queensland agricultural region

North Queensland is a major agricultural producing region of Australia. In 2016-17 the region's agriculture, forestry and fishing sectors contributed over \$1 billion to total gross regional product of \$15.5 billion, however this study has identified the opportunity to increase this contribution significantly. The study region incorporates the five Local Government Areas of Townsville, Hinchinbrook, Burdekin, Charters Towers and Palm Island.



Key statistic indicators for North Queensland are outlined below.

**Table 1.1. North Queensland's key economic indicators**

| Indicator                             | Date    | North Queensland |
|---------------------------------------|---------|------------------|
| Population                            | 2016    | 234,310          |
| Gross regional product (GRP)          | 2016-17 | \$15.5 billion   |
| Agriculture, forestry and fishing GRP | 2016-17 | \$1 billion      |
| Agricultural workforce by PoW         | 2016    | 3,351            |

Source: AEC (unpublished), QGSO (2019).

A significant mix of viable agricultural land, ease of export access to major global markets via the Port of Townsville and Townsville Airport, available and affordable irrigation, and the potential to produce a broad range of in-demand agricultural products positions North Queensland to be a major agricultural hub of the future. The potential of North Queensland to use agriculture for future economic growth and diversification is matched by few other regions around Australia.

Traditional livestock and cropping systems such as beef and sugarcane currently represent the majority of industry production and employment, supported by small areas of high value annual horticulture. However, changing food demand preferences and extensive soil and climate potential provide the region with the capacity to diversify into a range of high value agricultural industries.

# Market demand

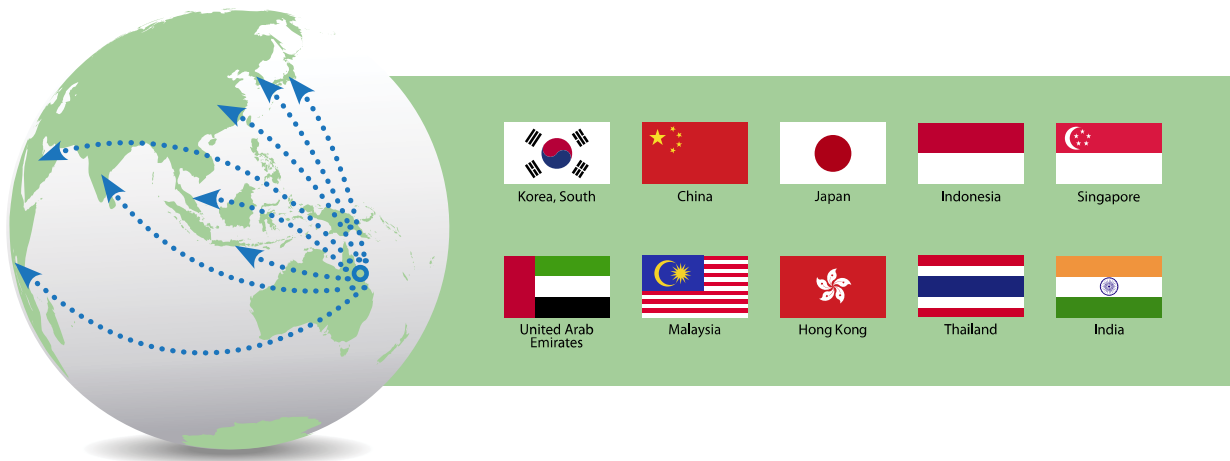


North Queensland's agricultural sector is a significant contributor to the region's economy. As a result, the study highlights the opportunities to supply international markets with high demand food and fibre products that have the strongest potential for future growth.

Focusing on key emerging and established markets, a market-assessment matrix was developed to evaluate the demand for North Queensland products. The matrix is based on a multitude of factors, including:

- Population
- Reliance on imported food and fibre
- Proximity to North Queensland
- Logistics maturity
- Market potential and accessibility requirements
- Risk factors
- Trading partner status (including FTAs)
- Import and export volumes
- Domestic production capabilities
- GDP
- Income per capita
- Inflation

When the matrix was applied, a list of ten priority markets were identified which had high and/or unmet demand for new and expanded agricultural production potential.



An examination of unmet demand in the ten priority markets was considered for over 30 potential products, with a refined list of five key products chosen based on the prevailing agronomic conditions in North Queensland. An analysis of the current supply chain for each product was conducted to assess the export potential. A future state assessment was then performed to identify supply chain gaps and opportunities for investment, informed by stakeholder engagement and market research.

**5**  
KEY PRODUCTS  
REPRESENTATIVE  
OF NUMEROUS  
BROADER  
OPPORTUNITIES



**Beef**



**On-shore  
Aquaculture**



**Macadamia**



**Avocado**



**Soybean**

# 1. Future industry opportunities

## Beef

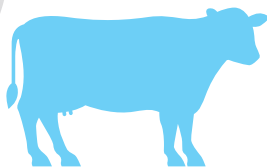
### Rationale for the opportunity

The major flooding event across Northern Queensland in February 2019 has had a significant impact on the beef industry with livestock losses and supply chain infrastructure. As such, the opportunity for the beef industry should be viewed in the context of the recovery effort, assisted by the Federal Government that has committed more than \$3 billion in aid.

The future market demand outlook for Australian beef is still very strong, driven by favourable trade agreements (China - Australia FTA signed in 2015 will see tariffs on Australian beef eliminated by 12-25% by 2024), increasing preferences for red meat in Asia, and strong market positioning for safe and high quality produce (Australia is one of the few beef exporters free of Foot and Mouth Disease). The live export market is also well established in North Queensland. That said, there is significant unmet demand for value-added beef in a number of key export markets in close proximity to the study region. The growth and diversification of the beef sector into more intensified production and value-added processing provides the region with an opportunity to capture greater supply chain value while simultaneously diversifying its customer base.

**Table 3.1. Key markets and competitors**

| Products   | Market demand  | Key international competitors   |
|--|--|---|
| Beef: <ul style="list-style-type: none"> <li>Expanded regional processing</li> <li>Live export</li> <li>High value market niches (Wagyu, Organic)</li> </ul> | <ul style="list-style-type: none"> <li>Korea</li> <li>Singapore</li> <li>China</li> <li>United Arab Emirates</li> <li>Japan</li> <li>Malaysia</li> <li>Hong Kong</li> <li>Thailand</li> <li>Indonesia</li> </ul> | <ul style="list-style-type: none"> <li>United States</li> <li>Canada</li> <li>New Zealand</li> <li>India</li> <li>Uruguay</li> <li>Argentina</li> <li>Mexico</li> <li>Brazil</li> <li>Europe</li> </ul> |



### Infrastructure requirements

The study analysed the required supply chain infrastructure to further produce and export value-added beef. Identified infrastructure required to develop a future state supply chain included:

- Irrigation and water availability
- Feedlot development
- Road and rail transport upgrades
- Additional processing facilities
- Cold storage facilities
- Access to feed

The implementation of key upgrades and additions will support the increased production of higher value beef.





**Key outcomes of the intensification of beef scenario:  
Establishing a 190,000 head/annum feedlotting industry.**

**\$228m  
production value**

**Additional \$200m  
of export value**

**Additional 50  
direct FTE jobs**



**Trade & market access**

Highest demand potential in Japan, China, Indonesia and Korea. These markets are all FTA enabled markets, however some non-tariff barriers to trade do exist. Targeted relationships must be established throughout the supply chain and with customers to inform the development of production and supply chain capabilities.



**Production**

Producers will require consistent access to water for supplementary grazing and grain for feedlots. Upskilling of producers on intensified beef operations will be necessary. Engagement with regional research, development and extension capabilities and industry bodies is crucial to achieve this and ensure the region has increased capability to produce and finish cattle to meet new market demands.



**Supply chain**

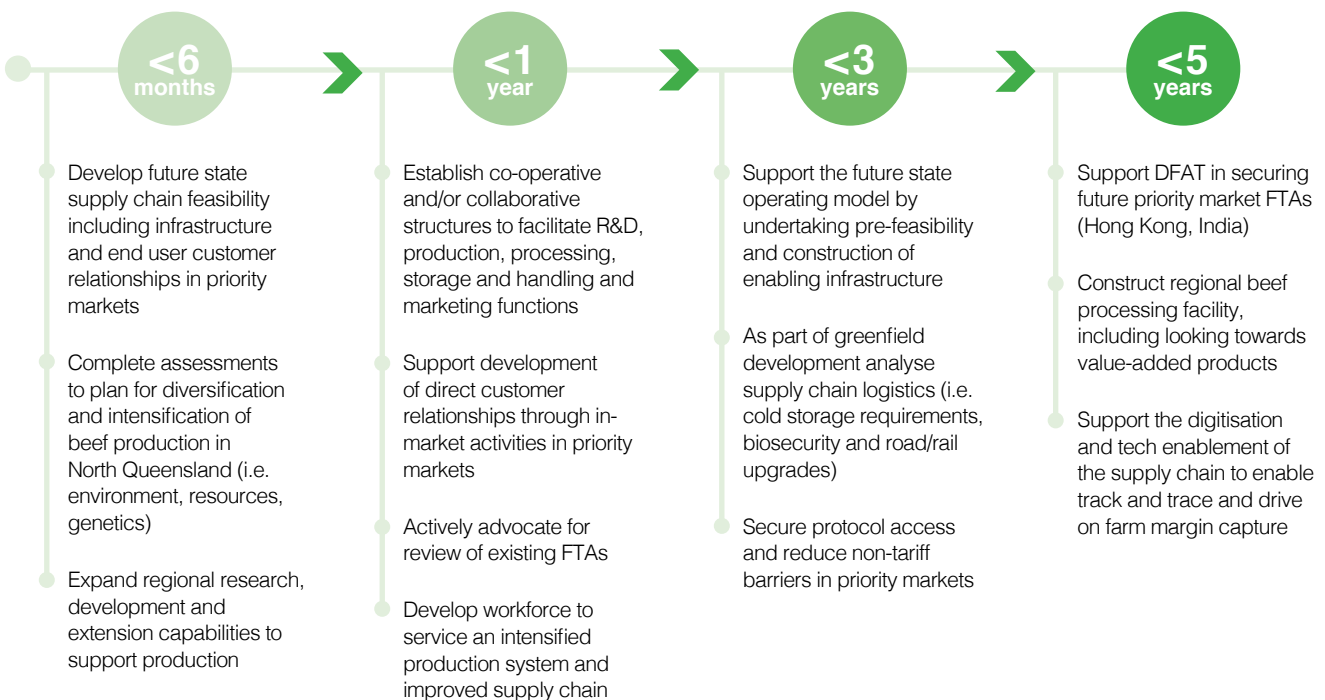
The development of an intensive beef production industry is limited by insufficient grain storage, water access, feedlots and processing facilities. The development of adequate access routes (road, rail and port), cold chain infrastructure, and air/sea freight services to priority export markets are crucial to the success of an intensified production strategy.



**Collaboration & innovation**

The industry must establish cooperative structures to share knowledge (data), develop skills, infrastructure and secure market access. The implementation of digital solutions will improve the efficiency of production, supply chain and marketing activities by enabling greater communication between all members of the value chain.

**Recommendations timeline:**



## 2. Future industry opportunities

### Avocado

#### Rationale for the opportunity

Current avocado production in North Queensland is limited however future market demand outlook for this product is particularly strong in Asian markets such as Malaysia, Singapore and Hong Kong. The global demand for the fruit which was once highly niche is growing consistently year-on-year, with a 33 per cent increase in Australian exports from 2015-2016 to 2016-2017. There is growing demand for avocado in a number of South East Asian markets, also serving as a proxy for the production of other high value tree crops.

The production of alternative tree crops such as avocado, or other high value tree crops, provides an opportunity for the region to diversify production. Land suited to production has been identified as part of the study and the production capacity of the region will only be enhanced further by increased irrigation availability.

Key constraints include the perishability of avocado once harvested, long timeframes to reach commercial production and susceptibility to cyclone damage in coastal areas.

**Table 4.1. Key markets and competitors**

| Products   | Market demand  | Key international competitors  |
|--|--|--|
| Avocado: <ul style="list-style-type: none"><li>• Powdered/processed</li><li>• Fresh export</li></ul> | <ul style="list-style-type: none"><li>• Malaysia</li><li>• Singapore</li><li>• Hong Kong</li></ul> | <ul style="list-style-type: none"><li>• Mexico</li><li>• South Africa</li><li>• New Zealand</li><li>• Chile</li><li>• Peru</li></ul> |



#### Infrastructure requirements

The study analysed the required supply chain infrastructure to produce and export avocado. Identified infrastructure required to develop a future state supply chain included:

- Production equipment
- Storage capacity (on-farm or regional)
- Processing facilities
- Temperature controlled logistics capabilities

A number of other key perennial horticulture crops have similar infrastructure requirements to avocado.




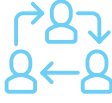


**Key outcomes of the avocado production scenario:  
Transition of 40,000 ha from existing land use to a mix of perennial horticulture and rotational grains and pulses.**

**\$213m**  
production value

**\$124m of export**  
value

**Additional 800**  
direct FTE jobs

|   |   |   |  |
|---|---|---|--|
|  <p><b>Trade &amp; market access</b></p> <p>Demand is currently highest in Malaysia, Singapore and Hong Kong, however other markets such as China and Japan prove favourable markets with the reduction of non-tariff barriers (e.g. improved protocols). Avocado producers will also need to be wary of the impact of biosecurity risks on market access.</p> |  <p><b>Production</b></p> <p>Current production in the Study region is limited with suitable areas of land being identified in the study region. Facilitation of training for producers should be implemented to grow regional capabilities. Engagement with research institutions should be promoted to ensure best practice methods and development initiatives are implemented. Investment in production and harvesting equipment is required in due course given the lead time to establish fruit bearing trees.</p> |  <p><b>Supply chain</b></p> <p>There is a limited existing supply chain with minimal opportunity for value-added production. Establishment of storage facilities, cold chain infrastructure and air and sea freight access to priority markets is crucial to the development of the industry. A regional processing facility will ensure production can meet both domestic and export market demand for value-added products.</p> |  <p><b>Collaboration &amp; innovation</b></p> <p>The industry must establish cooperative structures to share knowledge (data), develop skills, infrastructure and market access initiatives. A cooperative structure will provide economies of scale for the purchase of inputs and marketing of outputs. The implementation of digital solutions will improve the efficiency of production, the supply chain, and enhance communication.</p> |
|---|---|---|--|

**Recommendations timeline:**



### 3. Future industry opportunities

#### Macadamia

#### Rationale for the opportunity

The macadamia industry in North Queensland is relatively new yet has significant potential. The global market value of macadamias has been steadily increasing with consistent, year-round demand.

As with avocado, the production of macadamia provides an opportunity for the study region to diversify production. There is established demand for macadamia in the priority export markets of Korea and China, with an appetite for both raw and value-added macadamia products. Land suited to the production of macadamia has been identified as part of the study and the production capacity of the region will only be enhanced by increased irrigation availability.

Notable constraints to industry development include high costs of production, significant upfront capital requirements, long timeframes to reach commercial production, and establishing a regional grower skill base.

**Table 5.1. Keys markets and competitors**

| Products  | Market demand  | Key international competitors   |
|---|--|---|
| Macadamia: <ul style="list-style-type: none"><li>• Dried/processed</li><li>• Fresh export</li></ul> | <ul style="list-style-type: none"><li>• Korea</li><li>• China</li><li>• Japan</li><li>• Malaysia</li><li>• Australia</li></ul> | <ul style="list-style-type: none"><li>• United States</li><li>• Iran</li><li>• South Africa</li><li>• Kenya</li></ul> |



#### Infrastructure requirements

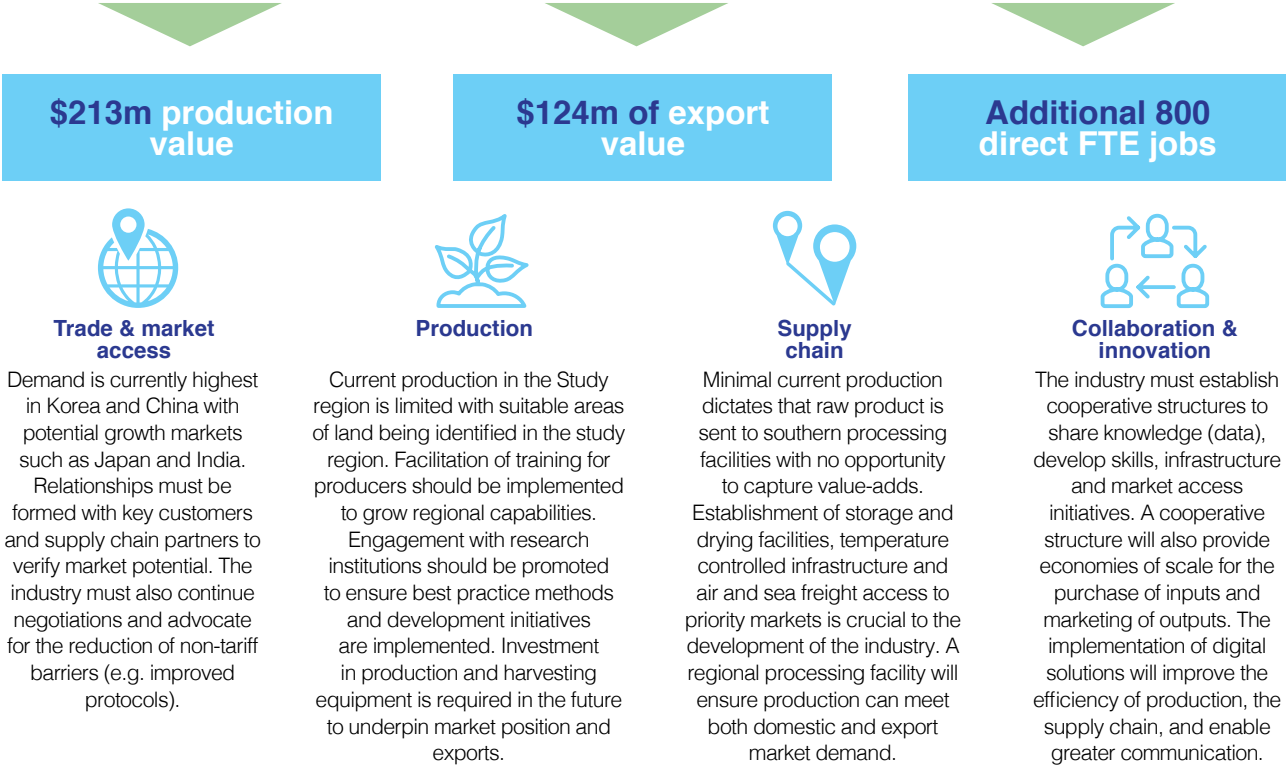
The study analysed the required supply chain infrastructure to produce and export macadamias. Identified infrastructure required to develop a future state supply chain included:

- Production equipment
- Storage capacity (on-farm or regional)
- Processing facilities
- Temperature controlled logistics capabilities

Macadamia and avocado are both perennial horticulture and consequently have similar infrastructure requirements.



**Key outcomes of the macadamia production scenario:  
Transition of 40,000 ha from existing land use to a mix of perennial horticulture and rotational grains and pulses.**



**Recommendations timeline:**



## 4. Future industry opportunities

### On-shore aquaculture (tropical rock lobster)

#### Rationale for the opportunity

There is currently some on-shore aquaculture in the study region and the fundamental requirements of a successful sector are present. There are established entities producing products such as cobia, barramundi and tiger prawns. There is suitable land in close proximity to port and airport infrastructure, high unmet demand in priority markets, available labour and an opportunity to further diversify the agricultural production of the region. Tropical rock lobster was selected on the basis of its demand in priority South East Asian markets and this example serves as a proxy for other on-shore aquaculture species.

Table 6.1. Key markets and competitors

| Products  | Market demand  | Key international competitors   |
|---|--|---|
| On-shore aquaculture: <ul style="list-style-type: none"><li>• Tropical rock lobster</li><li>• Tiger prawns</li><li>• Barramundi/cobia</li></ul> | <ul style="list-style-type: none"><li>• China</li><li>• Korea</li><li>• Malaysia</li></ul> | <ul style="list-style-type: none"><li>• United States</li><li>• Canada</li><li>• India</li><li>• Vietnam</li><li>• Thailand</li><li>• Brazil</li><li>• New Zealand</li><li>• South Africa</li></ul> |



#### Infrastructure requirements

The study analysed the required supply chain infrastructure to further produce and export on-shore aquaculture such as tropical rock lobster. Identified infrastructure required to develop a future state supply chain included:

- Production facilities, including ponds and hatcheries
- Centralised processing facilities and packaging
- Cold chain logistics
- Water treatment

Over recent years, there has been a significant rise in the value and demand for tropical rock lobster and other on-shore aquaculture produce.



## Key outcomes of the intensification of aquaculture scenario: Developing a 500 ha on-shore aquaculture industry.

**\$150m  
production value**

**Opportunities for  
domestic & export  
market**

**Additional 300  
direct FTE jobs**



### Trade & market access

Demand for tropical rock lobster is highest in Korea, Thailand and China, these three markets have FTAs in place and there are no tariffs on the goods, however some non-tariff barriers exist. Other priority markets include Japan and Hong Kong. Continued advocacy by industry bodies is required to raise awareness of production in the study region and reduce non-tariff barriers.



### Production

Current production in the Study region is limited. Facilitation of training for producers should be implemented to grow regional capabilities. Engagement with research institutions should be promoted to ensure best practice methods and development initiatives are implemented. Commercial operators must be engaged to develop production hatcheries, ponds and related infrastructure to underpin market position.



### Supply chain

The existing supply chain is currently limited with aquaculture farms growing, processing and storing on single sites before distributing to domestic markets. Investment in cold chain facilities encompassing processing and packaging capabilities is vital. Access to refrigerated container freight, together with live air/sea freight market access to key export markets will provide a diverse range of pathways to market for production.



### Collaboration & innovation

The aquaculture industry has shown that cooperative structures can benefit the industry through the collation of knowledge (data), skills, infrastructure, and market access initiatives. The implementation of digital solutions will improve the efficiency of production, the supply chain and enable greater communication between consumer and producer (e.g. certifying product quality and provenance).

## Recommendations timeline:



## 5. Future industry opportunities

### Soybean

#### Rationale for the opportunity

Australia is positioned to deliver safe and high quality produce, with potential to capture a niche market in the production of non-GMO soybean for high value Asian markets. As a result, the future market demand outlook for soybean has significant potential especially for value-added opportunities such as tofu, soy meals and noodles.

The development of a soybean industry in the study region can be beneficial on a number of levels. The demand for soybean in key export markets is high and growing, supplemented by strong domestic demand. Soybean can be used as a rotational crop with sugarcane, as a broadacre crop in its own right, and as a by-product for use in the intensive livestock and aquaculture industries as a source of feed.

Table 7.1. Key markets and competitors

| Products   | Market demand  | Key international competitors   |
|--|--|---|
| Soybean: <ul style="list-style-type: none"><li>• Tofu</li><li>• Soy meal</li><li>• Noodles</li></ul> | <ul style="list-style-type: none"><li>• China</li><li>• Japan</li><li>• Indonesia</li><li>• India</li><li>• Korea</li><li>• Singapore</li><li>• Malaysia</li></ul> | <ul style="list-style-type: none"><li>• United States</li><li>• Argentina</li><li>• Brazil</li><li>• Canada</li></ul> |



#### Infrastructure requirements

The study analysed the required supply chain infrastructure to further produce and export soybean. Identified infrastructure required to develop a future state supply chain included:

- Production equipment
- On-farm or regional storage
- Processing capabilities
- Biosecurity facilities
- Temperature controlled logistics including food grade containers

Establishing export markets in international countries where demand for soy-based products is high is crucial to the success of the supply chain.





## Key outcomes of the intensification of soybean scenario: Developing a 36,000 ha rotational soybean industry.

**\$46m**  
production value



### Trade & market access

Demand for soybean is highest in China, Japan, Indonesia and India, with growing demand in Korea. China and Japan are FTA markets, however India and Indonesia are not. All markets have tariff and non-tariff barriers. Targeted supply chain and customer relationships must be established in conjunction with ongoing advocacy from producers and industry bodies to raise the awareness of North Queensland production and to help minimise barriers to trade.

**Additional \$18m of**  
export value



### Production

Current production in the study region is limited. Facilitation of training for existing farm labour should be implemented to grow regional capabilities. Engagement with research institutions should be promoted to ensure best practice methods and development initiatives are implemented. Investment in equipment will be required to enable efficient production. The consistent production of soybean is required to underpin market position and supporting infrastructure.

**Utilising existing**  
sugarcane labour



### Supply chain

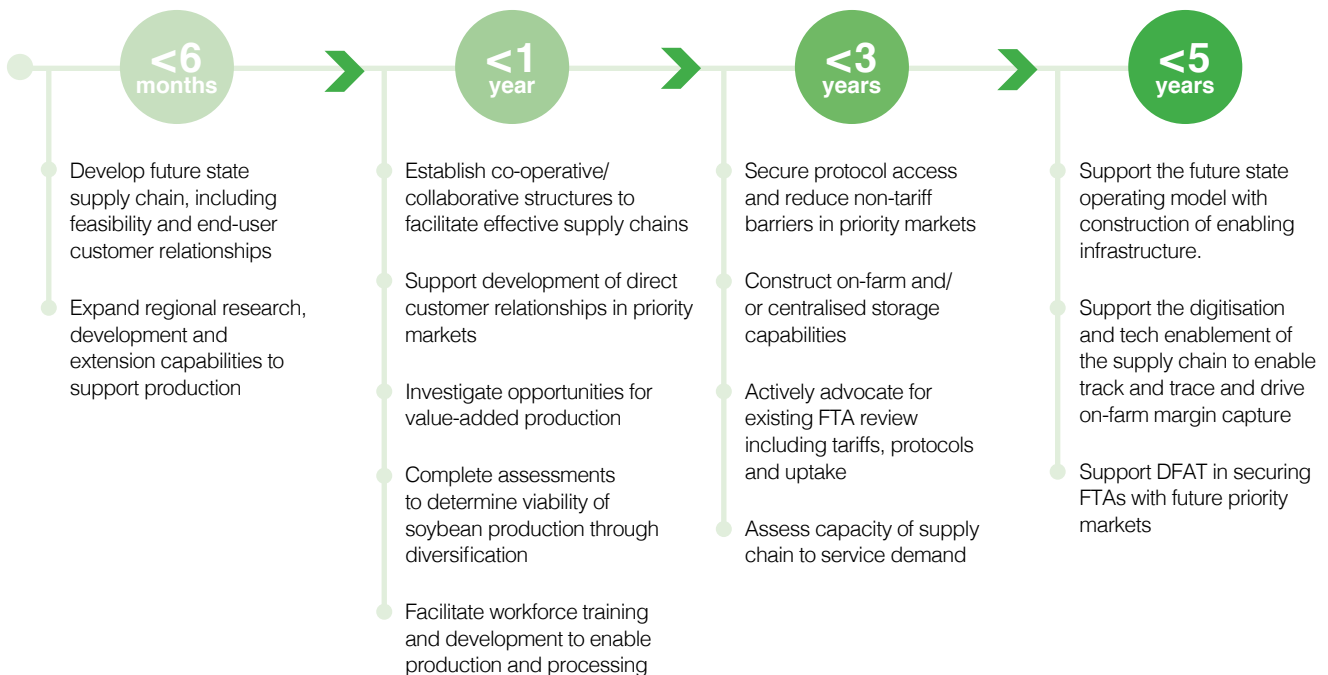
The provision of on-farm and/or centralised storage and processing facilities will provide producers with greater flexibility (risk mitigation) and access to multiple markets. Rail, port and airport infrastructure will provide producers with a diverse range of channels to established markets. The supply chain must also contemplate potential production from the broader North Queensland region to ensure its capacity to handle a sustainable, increased volume of soybean.



### Collaboration & innovation

The industry must establish cooperative structures to share knowledge (data), skills, infrastructure and market access initiatives. A cooperative structure will also provide economies of scale for the purchase of inputs and marketing of outputs. The implementation of digital solutions will improve the efficiency of production and the supply chain, and enable greater communication between consumer and producer.

## Recommendations timeline:



## Next steps

The NQAMSCS was an extensive body of work that provides a roadmap for the region's agricultural production, infrastructure and export sectors to meet existing and future international market demands. As the North Queensland region looks to intensify and improve its agricultural production to capture better high-value premiums in export markets there are two key future scenarios that should be operationalised:

1. Intensify and introduce the growth of specific products and their industries, to increase the volume of raw commodity available for export. Improving the capacity and capability of all supply chain operators, creating a better accumulation and processing hub/node at Townsville, increasing exports from the Port of Townsville and re-opening international services from the airport will be critical to achieving this.
2. Intensify and introduce the growth of the specific products to increase the volume of raw commodity produced for value-adding and additional processing stages to capture better premiums in export markets. This future state would also critically depend upon the whole supply chain being improved, centralised and amalgamated.

There are a number of considerations and next steps that need to be undertaken to achieve the desired future scenario, including further research, full commercial feasibility studies and further stakeholder engagement. In order to initiate this process the following short-term actions should be completed to progress the opportunities identified in the study:

1. Launch the NQAMSCS study with key stakeholders including producers, government and industry.
2. Utilise the study as a base, socialise recommendations and actions to prioritise opportunities and supply chain investments with key stakeholders. Determine stakeholder ownership of prioritised actions.
3. Undertake full commercial feasibility and detailed economic modelling of each priority product value chain to inform producers and commercial operators, and drive the required investment both on-farm and across the supply chain.
4. Identify new investors or participants to invest and/or operate in each product's future scenario supply chain.
5. Model the required air freight volumes to validate regular cargo air freighters ex-Townsville Airport to key priority markets based on intensification and increasing production of priority products.
6. Continue dialogue with producers, commercial operators, industry bodies and State and Federal Government to drive the study recommendations and agricultural strategy for the region.

The region and individual sectors cannot move forward in isolation and require a holistic approach to long-term infrastructure planning. Industry interests should be prioritised over regionalised approaches to supply chain investment. Therefore there is the need for an industry led statewide supply chain developmental mapping process. Working with key government agencies, a statewide approach would ensure targeted investment prioritising each sector's development in line with primary producer interests, intensification of production, improving supply chain and industry efficiencies and finally ensuring access to target markets.

The study partners TEL, NQROC and the CRCNA have an ongoing leadership role in driving the next steps and implementing the recommendations of this study.







For further information regarding investment opportunities in the North Queensland agricultural sector please contact:

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