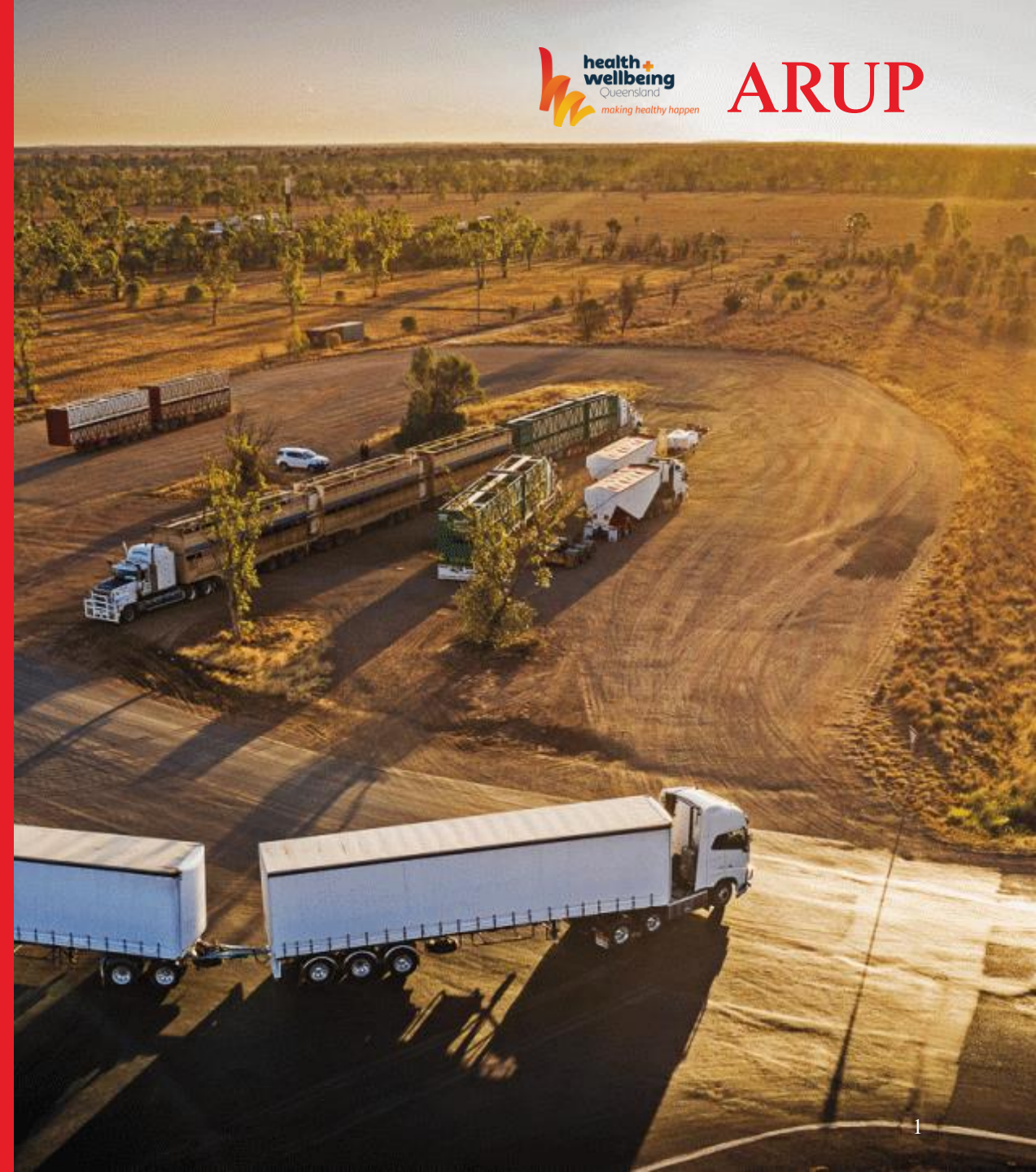


HEALTH & WELLBEING QUEENSLAND

# Remote Community Healthy Food Supply Chain Study

V1.6

November 2022



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01

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# Introduction

# The challenge

## The complex logistics involved in supplying healthy, fresh food to remote communities threatens food security

- Around 150,000 Aboriginal and Torres Strait Islander people, in more than 1,200 remote and very remote communities across Australia, live with tenuous food security. Access to healthy, fresh food relies on community stores and is subject to insecure supply routes and seasonal disruption.
- The National Indigenous Australians Agency (NIAA) estimates that residents of remote communities pay 39 per cent more for supermarket supplies than consumers in capital cities, and the gap could be widening.
- The geographical isolation of remote communities means bringing food in from warehouses in large population centres is an enormous logistical task.
- The cost of transport, lack of bulk purchasing power and high operating costs means residents of remote communities pay a premium for everyday items.
- Research suggests that food insecurity is associated with poorer nutrition and dietary patterns, which can contribute to chronic disease, including type 2 diabetes, kidney disease, heart disease, cancer and mental health problems.

Key regional stakeholders have identified that the operation of supply chains to serve regional communities is a key challenge in meeting the **four pillars of food security** in remote communities:

- **Availability:** Having enough food of appropriate quality available in communities, supplied through domestic production or imports
- **Access:** Individuals have access to affordable food, including proximity to food sources and transport to reach those food sources
- **Utilisation:** The selection and preparation of food, through use of knowledge, skills and access to cooking and food storage facilities.
- **Resilience and stability:** Individuals have access to healthy food options at all times and have the skills and resources to choose, prepare, cook and store those foods.

Health and Wellbeing Queensland's (HWQld) Gather + Grow Framework (shown below) identifies key priority areas to deliver food security to remote Aboriginal and Torres Strait Islander communities in Queensland. These priorities are aligned to the four pillars of food security.



# Role of the supply chain

Supply chains have an important role to play in addressing health outcomes in remote communities

## Effective supply chains support health outcomes

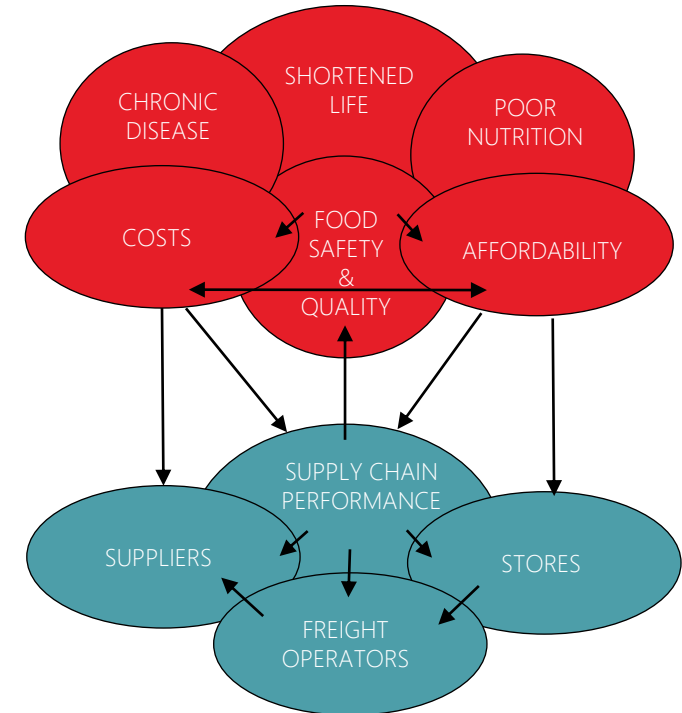
- Food security is essential for the social, emotional and physical health of communities, families and individuals.
- The food supply chain - including the cost of the food, freight transport and handling, storage and retailing - impacts heavily on the pricing, quality and quantity of food that is available, purchased and consumed in remote communities.
- High cost and poor-quality fresh food can result in lower levels of consumption and can negatively impact the nutritional status of community members.
- As noted by Lovell (2008), the role of the food supply chain in the health and well-being of remote Aboriginal and Torres Strait Islander communities can be overlooked.
- The figure opposite shows key interfaces between the supply chain and health outcomes.

## Supply volumes

- The availability and cost of fresh food in remote Aboriginal and Torres Strait Islander communities are affected by supply volume. Small populations buy small volumes, and if goods are expensive, people buy less.
- Supplier discounts are volume-based, so the less you buy the more expensive a product becomes. Associated transport costs also become higher where these costs are applied across a smaller volume of product.

## Freight operators

- Remote communities face greater freight challenges than those in highly populated areas because of accessibility, small freight volumes, limited choice of freight companies, higher costs and low buying power.
- For complex supply chains, it can be difficult to pinpoint the cause of freight problems when something goes wrong, impacting the ability to identify appropriate actions to be taken.



*Supply chain performance is related to food safety and quality and ultimately to health outcomes (Lovell, 2008)*



# Key papers

The link between supply chains and food security has been analysed in a range of studies over the past 20 years



A broad range of studies analysing the problems associated with food supply chains to remote communities have been conducted by local, state and federal government bodies over the past 20 years. These reports have highlighted a large number of issues and provided detailed root cause analysis of the issues facing regional and remote communities throughout Australia, including reports directly analysing Far North Queensland communities.

This Remote Community Supply Chain Study adds to this body of knowledge and aims to provide additional underlying information upon which policy-makers and industry participants can make informed decisions on measures to improve the performance of supply chains and achieve positive outcomes for remote communities.

# Supply chain mapping

Supply chain mapping defines the networks, facilities, materials and participants for a given supply chain



Functional supply chain map



Geographic supply chain map

## What is supply chain mapping?

- Supply chain mapping is the process of gathering and presenting data about the production and movement of a good or service to provide visibility and identify areas for improvement.
- Supply chains are represented both geographically (similar to a route map, showing supply chain routes and facilities) and functionally (focusing on the process flow of materials through a supply chain).
- The length and configuration of supply chains to remote communities, costs and timing challenges are critical factors in the freshness of produce and retail prices.

## Why map supply chains?

- The study aims to answer fundamental questions about supply chains to remote communities, including:
  - Where does produce originate?
  - How does it get to consumers?
  - How far does it travel?
  - How long does it take?
  - Who is involved?
- With multiple handoffs along a supply chain, often no single entity has a clear and complete picture of the journey of produce from paddock to plate.
- A supply chain map provides a basis for further analysis and data-based decision making in order to address the issue of food insecurity in remote communities.

# Study overview

## This study investigates food supply chains for Bamaga and Mornington Island

### Purpose and aims of the study

- HWQld is seeking to better understand the supply chains of remote communities by mapping the supply chains of fresh food to two remote towns.
- The key objective of the study was to build a picture of food-based supply chains to remote communities, including the stakeholders, infrastructure, facilities, transportation modes, distances and transport routes involved. The information will help identify supply chain efficiency and resilience mechanisms to improve food security in remote Aboriginal and Torres Strait Islander communities.

### Study scope

- The scope was limited to the following five food groups which are fundamental to a healthy diet:



MILK



RED MEAT



VEGETABLES



FRUIT



CHICKEN

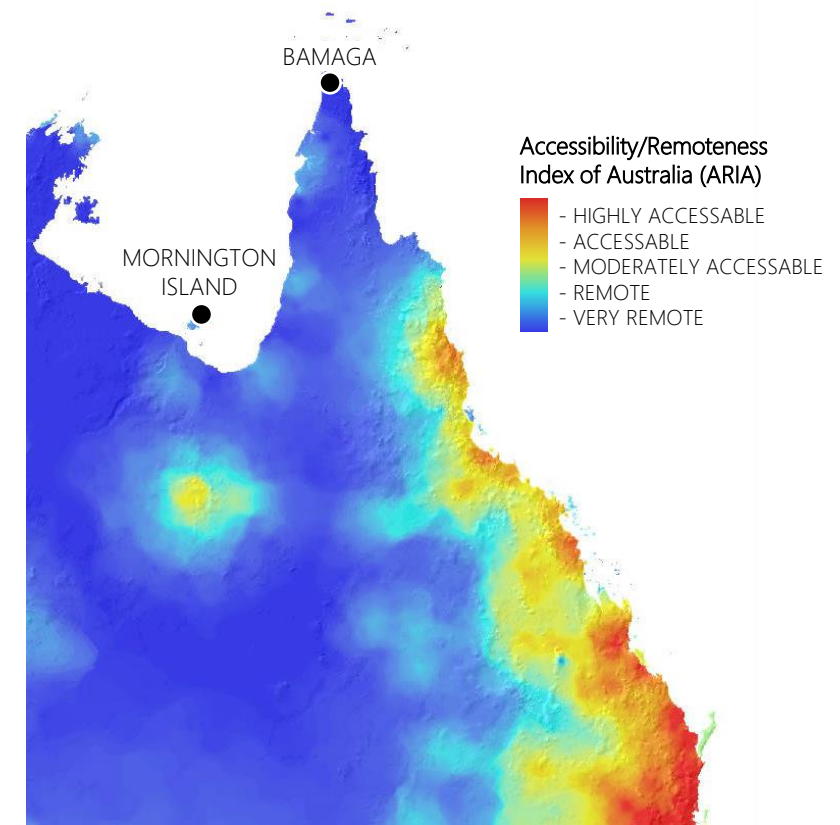
- These critical food groups were selected in conjunction with community representatives and via a survey with Torres and Cape Indigenous Council Alliance (TCICA) local community leaders.
- Through discussion with TCICA, two remote towns were selected: Bamaga at the tip of Cape York and Mornington Island in the Gulf of Carpentaria. The supply chains for these towns are considered to provide a broad representation of the key characteristics of food supply to FNQ.

### Methodology

- Data was collected through structured interviews with supply chain stakeholders.
- From this, geographic and functional supply chain maps were developed to present the supply chain networks for the towns studied.
- Observations on the mapped supply chains were then compiled and presented.

### Governance

- This report was prepared by Arup, under the management and guidance of HWQld and TCICA.



Location of remote communities selected for the study  
(Queensland Government Statistician's Office)



# Stakeholder engagement

Supply chains were mapped through engagement with key supply chain participants

- Engagement was undertaken with key participants in the supply chains to Bamaga and Mornington Island as part of this study.
- The purpose of the engagement was to:
  - Obtain input into the current state of the supply chain network
  - Understand high-level issues and enablers that influence the security/availability of fresh food in the community
  - Identify high-level opportunities in the current supply chain network.

Supply chain role	Organisation	Name	Role
Bamaga			
Distributor	Simon George and Sons	Francis Wakeham	General Manager
Distributor	Warwick Meats	Shane Leehy	Sales Manager
Freight Operator	SeaSwift	Lino Bruno	Former General Manager
Retailer	Community Enterprise Queensland (CEQ)	Tony Flint	General Manager
Mornington Island			
Freight Operator	Carpentaria Freight	Greg Campbell	COO
Local Government	Mornington Shire Council	Graham King	A/Chief Executive Officer
Local Government	Mornington Shire Council	Kyle Yanner	Mayor
State government	Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP)	Dr Ian Mackie	Deputy Director General
Store Operator	Dragons Den Butcher Shop	David Myers	Store Owner
Store Operator	Gununamanda Limited	Glenn	Store Manager
Distributor	Total Food Network	Kristian DeClerk	FNQ DC Manager
Distributor	D.R. Johnston		Sales Manager
Distributor	Sheridan Meats		Operations
Distributor	Davis Milk	Peter Winfield	Manager

# 02

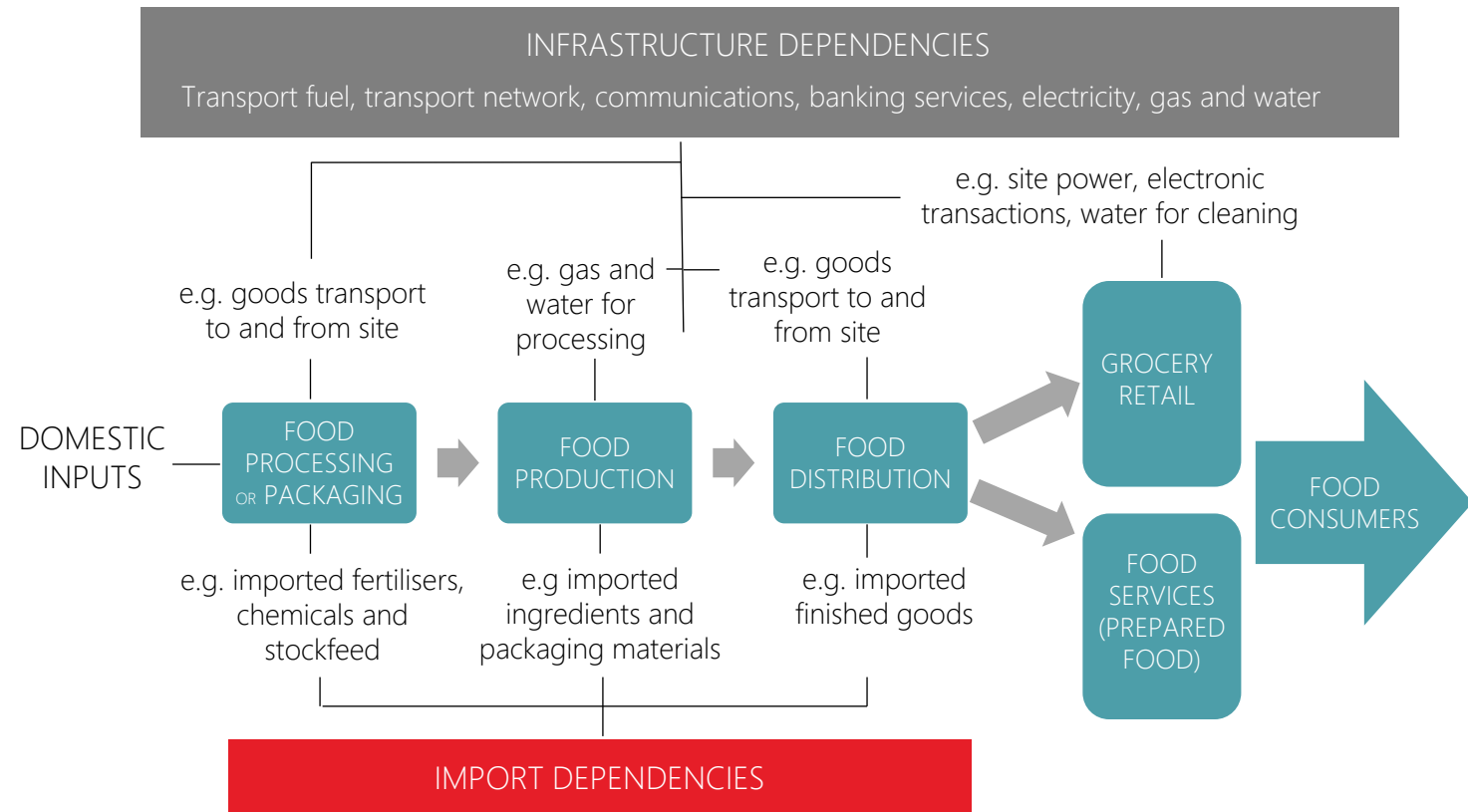
## Food supply chain overview

# Food supply chain overview

Supply chains move food from point of production to point of consumption, involving people, equipment and infrastructure

## What does the food supply chain involve?

- The food supply chain involves all points of production, value add (including processing, packaging and logistics), movement and retail between the food producer and the consumer.
- Each node and movement in the supply chain contributes in some way toward the food reaching its ultimate consumer in appropriate condition, but add both cost and risk expressed through operating expenses, which impact the final price of goods.
- The food supply chain is heavily dependent on:
  - Infrastructure** for continuity of production, processing, distribution and retail such as power, water, financial services, communications and transport services.
  - Labour** for both physical movement of goods and management of the processes. Processes are particularly labour-intensive at the point of sale to consumers.



Overview of food supply chain and its dependencies (Resilience in the Australian food supply chain (2012))

# Food supply chain objectives

## Food supply chains must balance competing objectives

### What is the supply chain being asked to do?

- It is important to identify what the supply chains servicing remote communities should achieve in order to identify and achieve good performance.
- As part of the broader goal to deliver food security, the supply chain must work towards many underlying objectives.
- A range of interacting, and at times competing objectives apply to the supply chain. In some instances, an objective cannot be achieved without compromising another objective. For example, airfreight would improve delivery speed for food but would increase costs to unacceptable levels.
- Of the six objectives shown in the model (opposite), the two which are often most challenging to meet for remote communities are quality (in particular poor shelf life) and cost.

Q Quality	D Delivery	I Inventory	C Cost	C Customer	+ Safety
<b>Received fresh</b> Produce is received fresh at the retailer from the supplier.	<b>Quick delivery</b> Produce is delivered as quickly as possible to maximise shelf life	<b>Optimum inventory</b> Inventories are maintained at levels to meet customer demand though minimise waste	<b>Minimum retail price</b> Retail prices are not a barrier to consumers in obtaining fresh produce	<b>Retailers satisfied</b> Retailers are satisfied with level of service.	<b>High level of safety</b> Safety procedures are stringent and maintained throughout the supply chain.
<b>Maximise shelf life</b> Produce has retail shelf life that is maximised	<b>High availability</b> Fresh produce is available to consumers year round		<b>Lowest cost freight</b> Supply chain uses lowest cost methods to minimise retail input costs.	<b>Consumers satisfied</b> Retail consumers are satisfied with level of service.	
<b>Wide range</b> There is a wide range of fresh produce to allow consumer choice	<b>High reliability</b> Produce is delivered in on-time and in full.				
<b>Minimise waste</b> Damage/waste of produce within the supply chain is minimised	<b>Cold chain maintained</b> Cold chain is maintained and breakages minimised				



# Brisbane's supply chain (benchmark)

The food supply chain for Brisbane is generally short, efficient and with few touchpoints



The supply chain for Brisbane has been used as a benchmark throughout this report. The benchmark has been used to compare and quantify the difference between supply chains and food prices for remote communities to that of a capital city with close proximity to a central market.

It is acknowledged that remote supply chains are fundamentally different to Brisbane, due to the intractable challenges of distance, small populations and geographical isolation. Brisbane is used in this report to demonstrate the marked difference in how food travels across Queensland and highlight unique challenges in remote supply chains.

## Overview of Brisbane's supply chain

- Produce for the Brisbane market is sourced from across Australia from growing regions in South East Queensland (SEQ) and throughout New South Wales, Victoria and South Australia.

- Produce is grown throughout Australia on the basis of growing conditions for specific produce (soil, weather, etc) and is dependent on seasonality. Where there are multiple options for producers of a particular item, proximity may be a determining factor for the distributor in selecting a supplier.
- There is direct transport from producers/processors to the retailer's Distribution Centre (DC), bypassing the central market. This is facilitated by direct contracts with producers.
- Distribution centres are located strategically to reduce distance and time to serve stores, typically within two hours of transport by road. This proximity means that replenishment can occur regularly, reducing dwell time of goods in the DC.
- Supply into and distribution from DCs are considered as independent events – typically there is no bypassing of this process to drive shorter cycle times or distances.
- The supply chain can deliver produce to consumers extremely fast, facilitating increased shelf life at retail stores.
- For example, apples can be picked, graded, washed and packed on one day, transported to a DC, distributed to a retail store the next, put on shelves and bought and consumed the next day - *a total of only 3 days from harvest to consumption.*

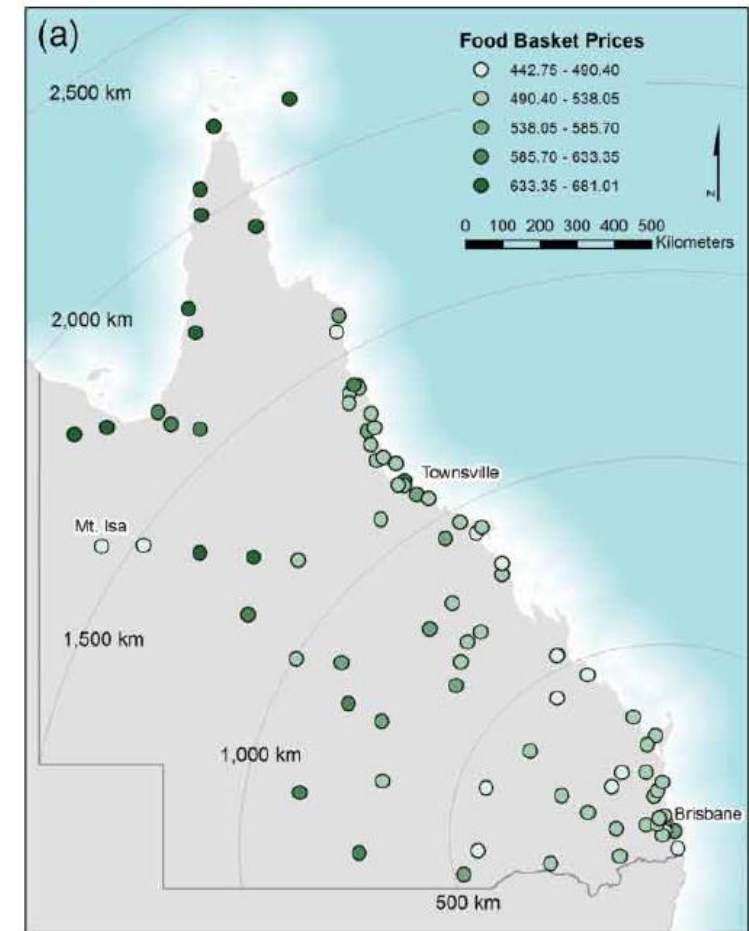
# 03

## Key issues for remote communities

# Food retail prices

Retail prices for towns increase proportionally the further they are away from Brisbane

- Food retail prices disproportionately impact food access in remote communities, where incomes may be lower and food costs may form a larger component of household spending.
- Singh-Peterson, Lieske, Underhill & Keys (2015) undertook a study into food basket prices in Queensland. The study analysed prices as a function of distance to Brisbane.
- The study found that:
  - The direct distance to Brisbane is positively and significantly correlated with food basket prices (i.e. prices increased as distance from Brisbane increased).
  - Store type is significant and negatively correlated with store prices, indicating that food purchased in supermarkets is less expensive than food purchased in specialty and independent stores.
  - Distance to the east coast of Queensland and distance to the rail network are also positively correlated with food basket prices.
- ABS remoteness data was not as robust a determinant of food basket pricing as direct or road network distance.
- Increasing transport costs will continue to result in escalating food prices even through supermarket-driven supply chains.
- There is a very clear relationship between food prices and the distance that food travels between the retail store and distribution centres, or between large urban centres and the retail store.
- The study recommended that policies targeting food security in remote locations should consider:
  - the relative positioning of food distribution centres
  - Impacts of rising fuel prices, and
  - the ongoing impact of supermarket centralisation policies (clustering suppliers and distribution centres as close to points of high demand as possible).



Food basket prices and direct distance from Brisbane (Singh-Peterson, Lieske, Underhill & Keys (2015))

# Retail price comparison

To test the conclusions drawn by the literature and feedback from the communities, an informal sample of prices at each community was taken on a single day during the development of the study and compared to Brisbane and Cairns

- This data shows the prices at the stores on a single day, and does not constitute a representative sample of prices at the stores. It is included for information only. Prices are subject to fluctuations at all stores for a variety of reasons. This data was collected in October 2022.
- Following Singh-Peterson, Lieske, Underhill & Keys (2015), it was expected that the remote communities, being a significantly distant from Brisbane, would have commensurately higher retail prices.
- As shown, the total basket of goods was more expensive at community stores than in Brisbane. In particular, fruit and vegetable items tended to have a broader spread between the stores, with fruit and vegetables on Mornington Island being significantly (67%) more expensive at the time of sample.
- It is noted that there are a wide array of price differences, including products that are currently cheaper in the community stores than in Brisbane, and products that are two and three times as expensive in the community stores.

Category	Item	Unit	Brisbane	Bamaga		Mornington Island	
			Price	Price	Δ	Price	Δ
RED MEAT	Steak (t-bone)	kg	\$30.00	\$27.49	▼-8%	\$28.00	▼-7%
CHICKEN	Chicken breast	kg	\$13.00	\$18.99 (Frozen)	▲46%	\$16.00 (Frozen)	▲23%
MILK	Full cream milk	2L	\$3.10	\$4.04	▲30%	\$5.79	▲87%
FRUIT	Apples (royal gala, loose)	kg	\$4.90	\$3.99	▼-19%	\$6.99 (Green)	▲43%
	Pears (Packham, loose)	kg	\$3.00	\$3.99	▲33%	\$6.99	▲133%
	Bananas (cavendish, loose)	kg	\$3.50	\$3.99	▲14%	\$4.99	▲43%
	Oranges (navel, loose)	kg	\$2.90	\$2.99	▲3%	\$4.99	▲72%
VEGETABLES	Carrots	kg	\$2.50	\$1.49	▼-40%	\$3.79	▲52%
	Lettuce iceberg	Each	\$1.90	\$4.29	▲126%	\$5.99	▲215%
	Onions (brown loose)	kg	\$3.00	\$2.99	0%	\$4.89	▲63%
	Potatoes (white, washed)	kg	\$4.50	\$5.99	▲33%	\$3.79	▼-16%
	Pumpkin (kent)	kg	\$2.50	\$2.99	▲20%	\$3.99 (Pre-packaged quarter pumpkin)	▲60%
	Tomatoes	kg	\$6.90	\$7.99	▲16%	\$12.99	▲88%
SUBTOTAL (MEAT AND MILK)			\$46.10	\$50.52	▲10%	\$49.79	▲8%
SUBTOTAL (FRUIT AND VEGETABLES)			\$35.60	\$40.70	▲14%	\$59.40	▲67%
TOTAL			<b>\$81.70</b>	<b>\$91.22</b>	<b>▲12%</b>	<b>\$109.19</b>	<b>▲34%</b>

## Notes

- Brisbane retail price data based on online research at shop.coles.com.au with store set as West End 4101.
- Bamaga and Mornington Island data was self-reported by representatives of Community Enterprise Queensland (CEQ), Dragons Den Butcher Shop and Gununamanda Limited.
- For Mornington Island, red meat and chicken are sold at the Dragons Den Butcher Shop, with milk, fruit and vegetables retailed at Gununamanda Limited.



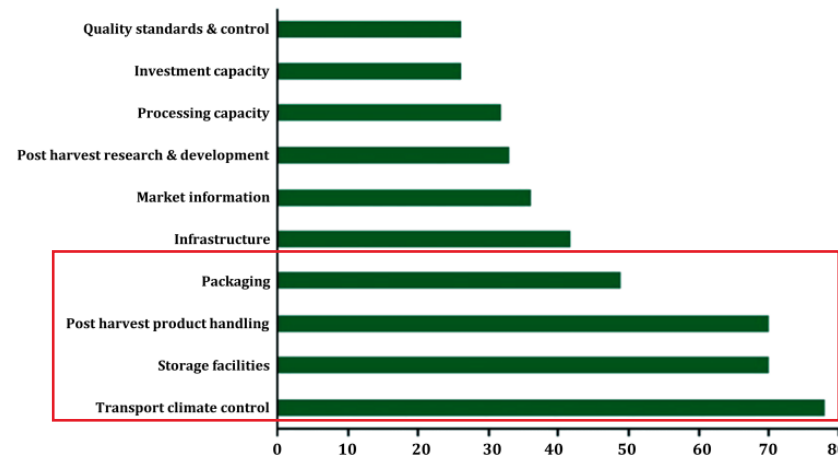
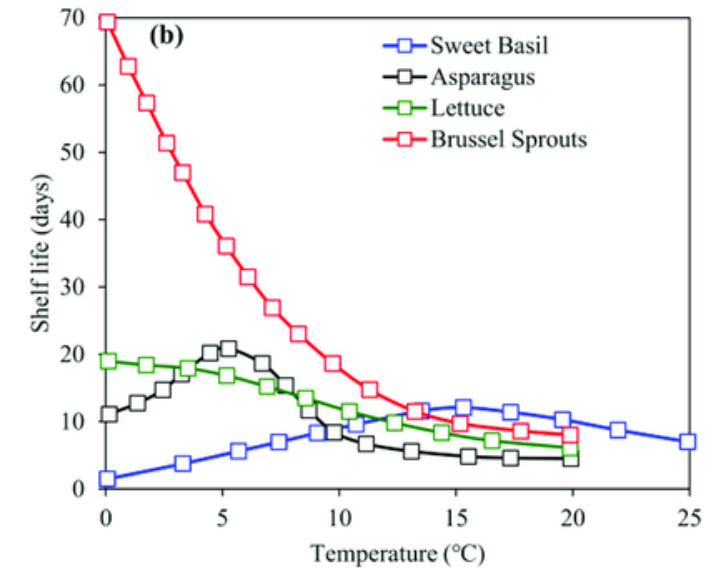
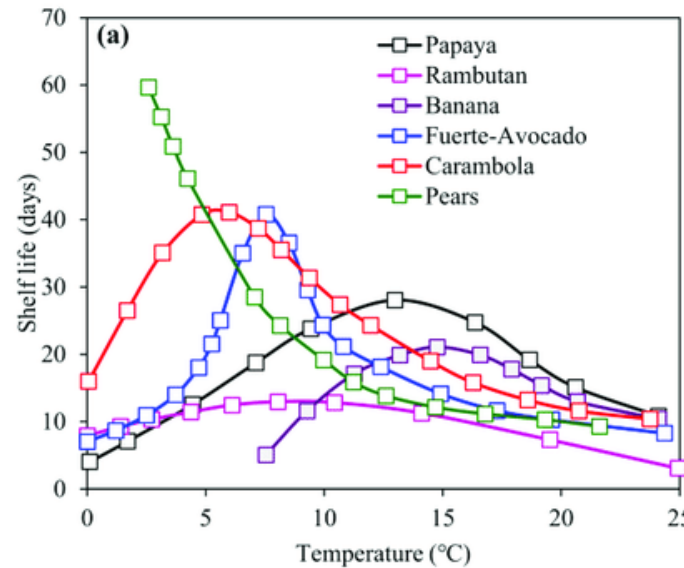
# Produce shelf life

Proper packaging, handling and temperature control is critical for extending shelf life

A key issue in ensuring food availability for remote communities is the shelf life of produce. Studies have found there are many factors involved in maximizing shelf life for fresh produce:

- McKerrow (2015) assigns causality to four key factors:
  - *Initial quality of the produce*
  - *Atmospheric conditions during transport (including temperature and relative humidity)*
  - *Correct packaging*
  - *Container/vehicle hygiene.*
- Hussain et al. (2022) also highlights packaging, handling, storage and transport climate control as critical factors.

The figure overleaf shows a cause-and-effect diagram that presents possible factors that can affect shelf life. As shown, there are many points of potential failure from harvest to retail. With long duration supply chains and many touchpoints along their journey, the challenge of extending shelf life is magnified for remote towns.

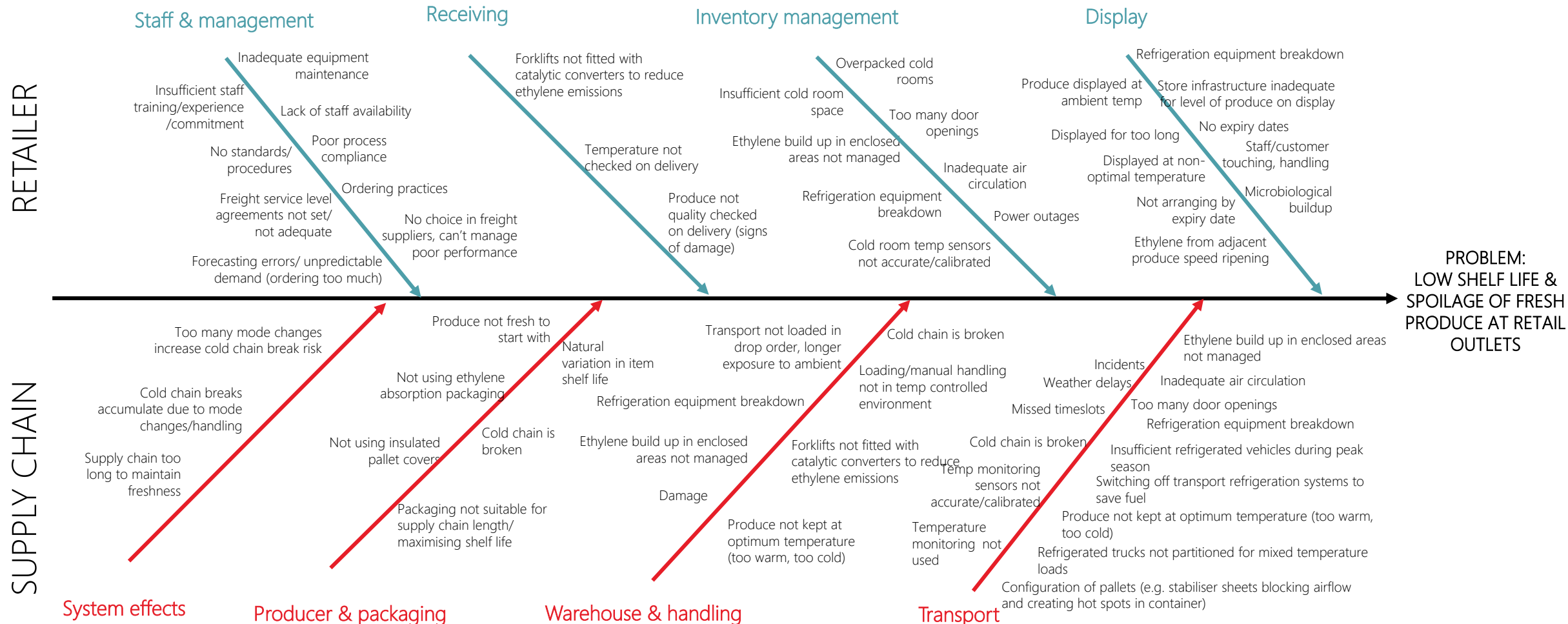


Top: Effect of storage temperature on shelf life of a) fruits and b) vegetables (Hussain, et al., 2022), showing varying optimal storage temperatures for different produce.

Left: Major categories for the cause of post-harvest losses (Hussain, et al., 2022)

# Factors affecting produce shelf life

Many factors can affect shelf life - the more touchpoints in the supply chain, the more opportunities there are for failure

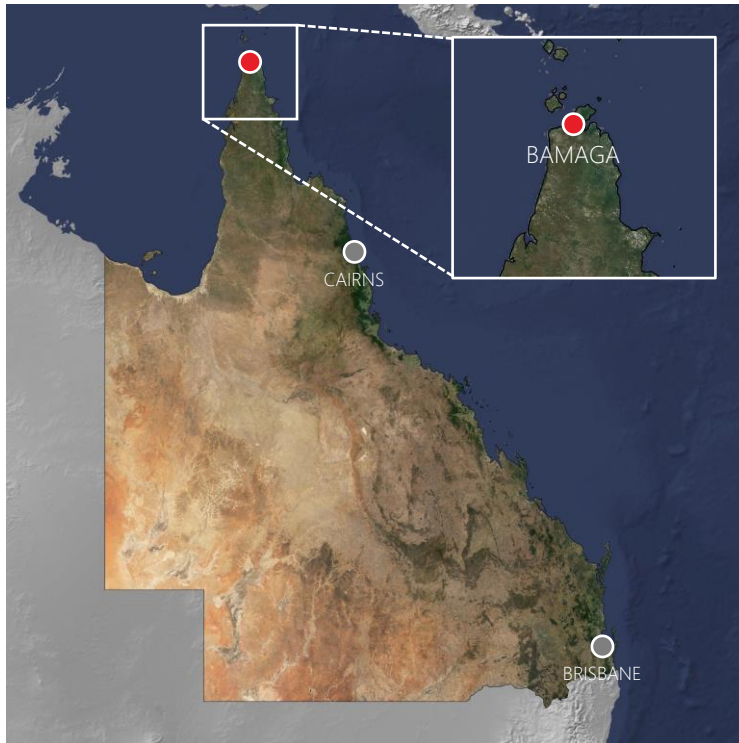


# 04

Site 1: Bamaga supply chain

# Community profile

Bamaga is a small town located in the Far North Queensland region



Location of the Bamaga community

- Bamaga is a small township located in the Far North Queensland region.
- The region comprises a single regional city, Cairns, in the south-east.
- Bamaga is one of five communities that collectively form the Northern Peninsula Area at the tip of Cape York together with Injinoo, Umagico (Alau), New Mapoon and Seisia.
- The Traditional Owners include the Anggamuthi, Atambaya, Wuthathi, Yadhaykenu and Gudang people.
- The population is 1,164 people, with 80% of the population identifying as Aboriginal and/or Torres Strait Islander.





# Grocery retail

Community Enterprise Queensland (CEQ) operates the grocery retail store in Bamaga

- Bamaga is serviced by one (1) supermarket located in the center of the town.
- It offers a range of grocery items including dry, chilled and frozen goods, along with a range of fresh fruit, vegetables and meat.
- It is open seven days per week, 8am to 6pm weekdays and reduced hours on weekends.
- The store is part of the 'IBIS' chain of supermarkets operated throughout the region by Community Enterprise Queensland (CEQ), a not-for-profit Queensland Government statutory body.
- CEQ is responsible for providing goods and essential services to the Torres Strait, Northern Peninsula Area, and mainland Aboriginal remote communities through 28 stores.



# Freight access

A maritime freight link to Cairns provides the main source of food supplies for the Bamaga CEQ store

Bamaga can be accessed from the land, air and sea for the provision of freight.

## Maritime Access

- Bamaga is located approximately 6km by road from Seisia, a nearby coastal town with a small port. In addition to a wharf, the port includes a general warehouse (400m<sup>2</sup>) and external hardstand (4,000m<sup>2</sup>).
- The port is served by SeaSwift linehaul vessels that make twice weekly trips from Cairns with general and frozen/chilled cargo. Due to the size of the wharf, goods are transferred to a smaller vessel at Horn Island.
- The voyage from Seisia to Cairns takes 2-3 days.
- Prevailing weather conditions can mean that the tide does not reach its forecast maximum. Tide conditions combined with levels of siltation in the approach channel, can mean vessels cannot deliver freight on time and must wait to reattempt to land or abandon a delivery of essential freight to remote communities.





# Freight access (cont'd)

## Surface Access

- The main freight access road for the town from the south is Airport Road. While this road is sealed, other key roads linking Bamaga with Cairns (most notably the Peninsula Development Road) are unsealed and there is a ferry crossing required at the Jardine River.
- The wet season (December to May) impacts road networks with flooding and road closures.
- Cyclones further impact already vulnerable areas, and climate change may exacerbate existing conditions.
- There is no rail connection, with the closest railhead being Cairns.



*An unsealed section of the Peninsula Development Road*

## Air Access

- Bamaga is located approximately 10km by road from the single runway Northern Peninsula Airport (formerly known as Bamaga Airport).
- The airport is accessible all year round, with flights by Regional Express (REX) and SkyTrans.
- During flooding, airfreight of perishable goods on a weekly basis into flood-locked communities is possible.
- Airfreight is approximately five (5) times the cost of road or rail freight and is generally considered unsuitable for the ongoing provision of food due to the cost.
- Air travel generates a much larger level of emissions per distance travelled than other modes of transportation.

# Freight task and key suppliers

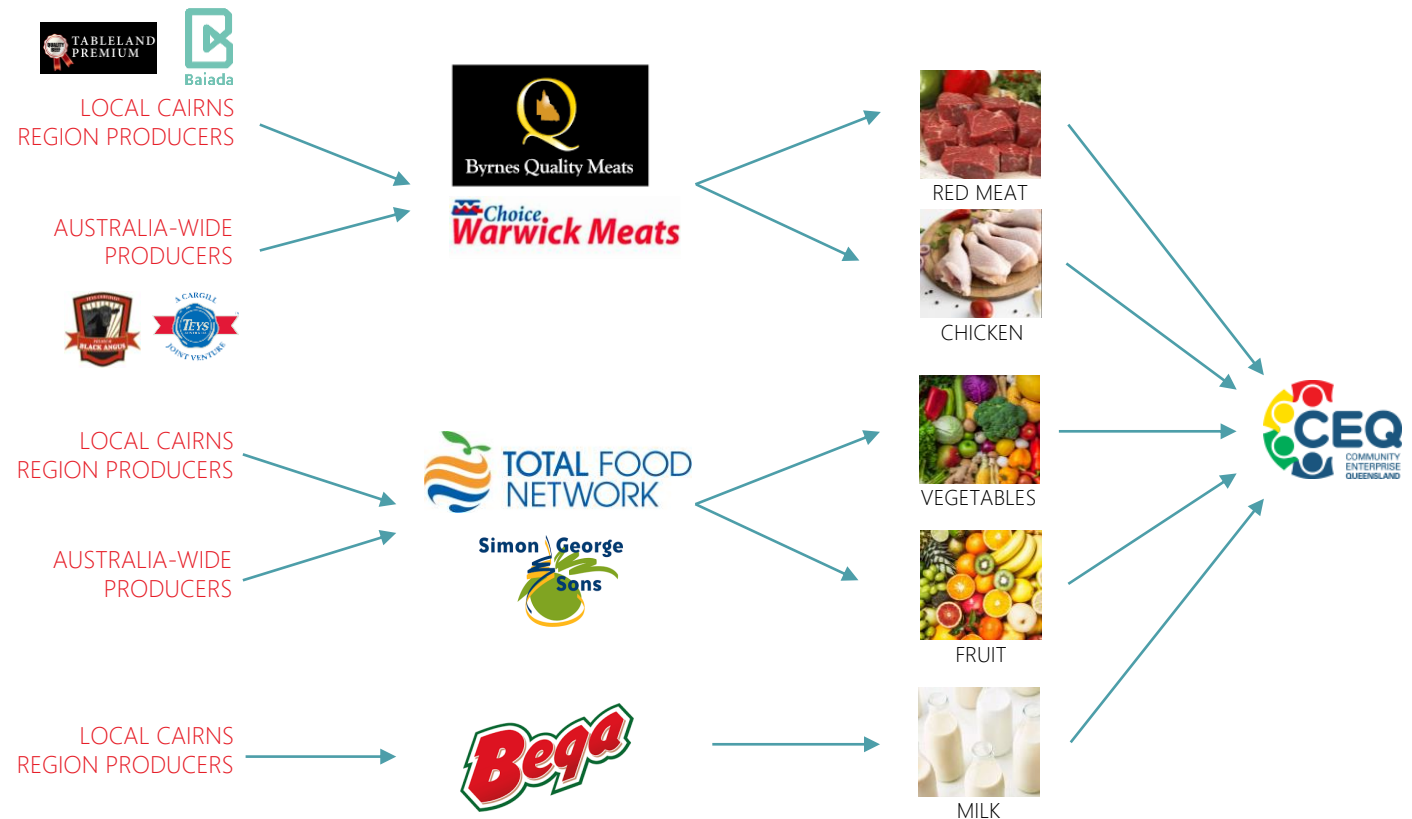
Fresh produce for Bamaga is through a number of key suppliers that are served by local and national producers

## Freight task

- The freight task for the CEQ Bamaga store is approximately 20 pallets per week of fresh produce.
- During tourist season this increases to approximately 30-35 pallets per week. The store adjusts their ordering behaviour proactively to cater to this demand.

## Key suppliers

- Red meat and chicken is supplied by Warwick Meats, who operate out of Molendinar on the Gold Coast, and source produce from the surrounding region before shipping to Bamaga via Cairns. Byrnes Quality Meats have also been used as suppliers.
- Total Food Network (TFN) and Simon George and Sons (SGS) provide fruit and vegetables, sourcing some produce locally to Cairns, some from the South East Queensland (SEQ) market and some from suppliers in South Australia and Victoria depending on seasonal availability.
- Bega supply milk and operate a large dairy in the Atherton Tablelands.



Key produce suppliers to the CEQ store in Bamaga



# Supply chain overview

## Supply chain overview - Bamaga

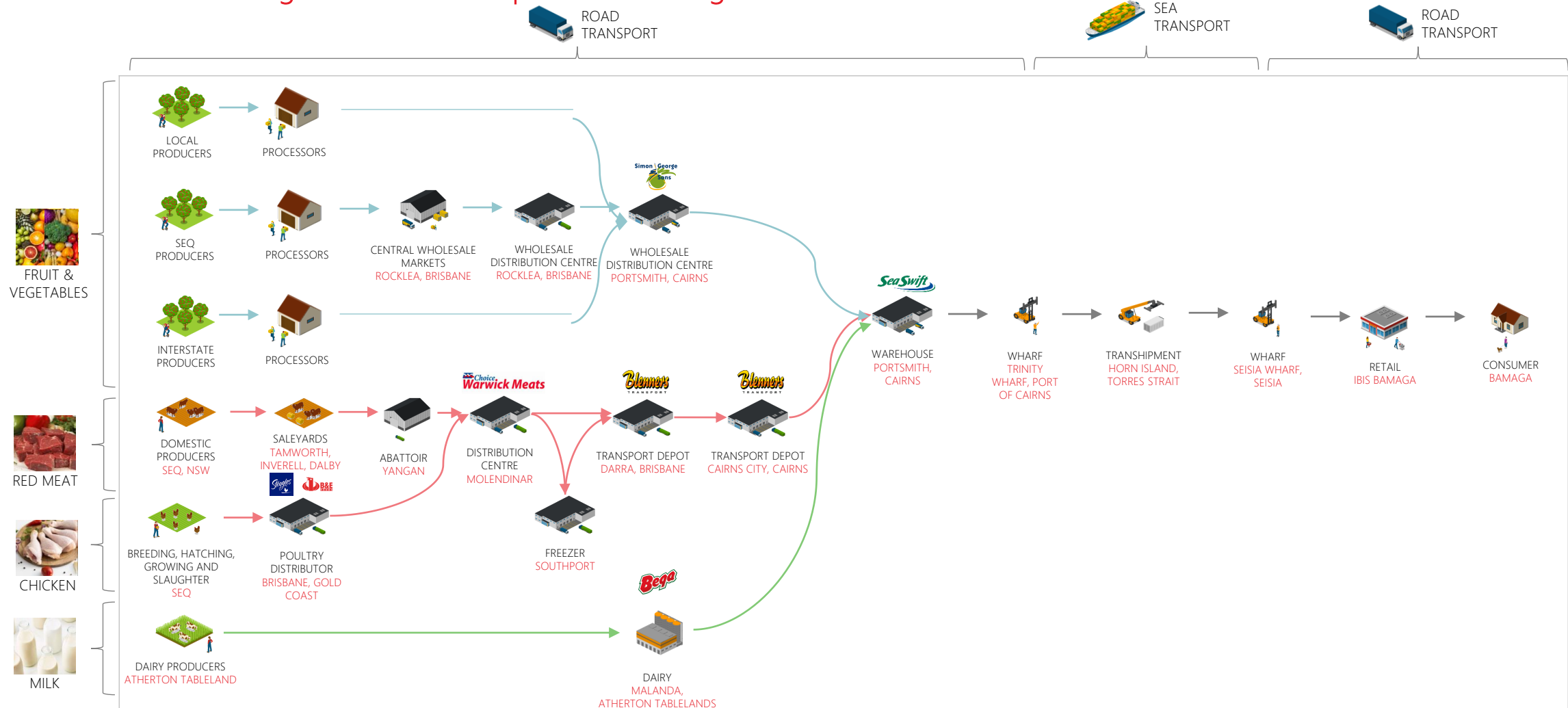
- The supply chain for fruit and vegetable produce (by Simon George and Sons), meat and chicken (by Warwick Meats) and milk (by Bega) was mapped (see overleaf). Other suppliers of each goods type have not been considered in this study.
- Non-perishable grocery items are supplied to the store by Australian Grocery Wholesalers (AGW). Their supply chain is outside the scope of this study.
- The longest supply chains (associated with fresh food and vegetables from South Australia), cover approximately 3,675km (2,730km by road, 930km by sea) and spans almost the entire depth of the country. Produce takes just under two weeks to make the journey from farm to store.
- The supply chains involve up to 20 touch points in the chain, with up to seven organisations involved in a single chain moving produce from producers to the store.



Left to right, top to bottom: Seaswift DC, Portsmouth, Bega Milk Processing Plant, Brisbane Markets, Cairns - Trinity Wharf, Horn Island Wharf, SeaSwift vessel MV Trinity Bay, and Seisia Wharf

# Supply chain map

Fresh food for Bamaga is sourced from producers throughout Australia for transit via Cairns



# Supply chain details

CEQ operate the IBIS store in Bamaga as part of their broader network of stores in the region, both on the mainland and islands

## Ordering process

- CEQ operates the Bamaga store in conjunction with its network of stores in the region, allowing them to aggregate orders and negotiate with suppliers due to scale.
- The store places the replenishment order 2 weeks in advance for groceries and 1 week in advance for Fresh Produce. Orders are aggregated by CEQ to suppliers.
- The average order quantity is 20 pallets a week, but during the peak tourist season the orders may increase to up to 30 pallets a week.

## Pricing and financials

- CEQ maintains two separate price structures – Region 1 and Region 2 (outer islands).
- Pricing is the same for all stores in each respective region regardless of size or turnover.
- In some cases, pricing of cigarettes and luxury items is used to subsidise fruit and vegetables.
- The store prioritises keeping shelves stocked with goods for availability and marketability, which results in recurrent food waste being disposed at the store. This is similar to practices in urban retail food stores.

## Supply chain inventories

- Currently, the Bamaga store has a relatively high sales volume compared to other stores of similar size operated by CEQ.
- CEQ operates a distribution facility in Cairns which handles a wide variety of goods for distribution. However, fresh produce is sent directly from the distributor to the Seaswift distribution centre, bypassing the CEQ facility, due to the cold room and freezer equipment present at the Seaswift facility. CEQ staff work in the Seaswift facility to check the quality of goods, check cold chain compliance and consolidate stock for shipment.
- CEQ is developing a larger distribution facility in Cairns, which will expand CEQs commercial opportunities, reduce the cost of providing other non-food items (electrical and furniture) and improve the stability of supply of items including sanitary products.

# Supply chain details

Fruit and vegetables for Bamaga are sourced across Australia, with seasonality a key factor in supplier selection

## Production, Processing and Transit to Cairns

### Fruit and vegetables (fresh produce)

#### National Producers

- A number of the products considered by the study are sourced directly from farms in Victoria and South Australia (including Parilla). These include:
  - Apples (seasonal)
  - Pears (seasonal)
  - Oranges (seasonal)
  - Carrots
  - Lettuce (seasonal)
  - Onions (seasonal, majority from SA)
  - Potatoes (washed)
  - Tomatoes (seasonal)
- Produce is transported directly from farm to the SGS distribution centre in Portsmith, Cairns via road transport (Lindsay Transport) in refrigerated containers.

- Goods are collected on Thursday and delivered on the following Monday.

- Duration: 4 days

#### South-East Queensland Producers

- Products sourced from South-East Queensland, including from the Lockyer Valley and Stanthorpe, include:
  - Apples (seasonal)
  - Pears (seasonal)
  - Oranges (seasonal)
  - Lettuce (seasonal)
  - Onions (seasonal)
  - Tomatoes (seasonal)
- Produce is transported by road to the SGS DC at Rocklea, before being consolidated and transported by road (Lindsay Transport) to the SGS DC in Portsmith, Cairns in refrigerated containers.

- Duration: 1 day (overnight)

#### Local Producers

- A number of the products considered by the study are sourced from local producers around Cairns. These include:
  - Bananas (Tully)
  - Oranges (seasonal, Koah, Atherton Tablelands (4 weeks per year))
  - Onions (seasonal, Mareeba)
  - Pumpkins (Atherton Tablelands, Burdekin)
  - Tomatoes (seasonal, Burdekin, Mareeba)
- Produce is transported directly from farm to the SGS distribution centre in Portsmith, Cairns via road transport (Lindsay Transport) in refrigerated containers.
- Duration: 1 day



# Supply chain details

Red meat and chicken for Bamaga are sourced from South-East Queensland and shipped to Cairns via road

## Red meat

- Red meat is produced domestically across Australia. CEQ has been supplied in the past by Byrnes Meats which operate in the surrounds of Cairns, and are currently supplied by Warwicks Meats, who operate out of the Gold Coast. Factors separate to the length of the supply chain factor are the deciding factors in the choice of supplier in this instance.
- Warwick Meats purchase cattle from saleyards in Dalby (QLD), Inverell and Tamworth (NSW). The cattle is raised and finished in the areas surrounding the saleyards.
- The live cattle are transferred by road to Yangan, QLD, where they are slaughtered at the Carey Bros Abattoir. Meat products are transported by road to the Warwicks Facility at Molendinar, Gold Coast.
- Warwicks Meat engage Blenners Transport to deliver to Cairns. Red meat is transported on Warwicks own truck (refrigerated semi-trailer set to chilled or frozen) 4 times per week – 3 pallets per delivery.

- Duration: 2 days

## Chicken

- Warwicks Meat sources chicken from Steggles (Brisbane) and B&E Poultry (Gold Coast). The poultry distributors manage the upstream supply chain, including the breeding, hatching, raising and slaughter of chickens.
- The chicken is supplied to CEQ frozen. Following packing at Warwick Meats Molendinar, they are transported to Southport, Gold Coast for freezing.
- Subsequently, the frozen chicken is transported to Blenners Transport for shipment to Cairns.
- Duration: 2 days

## Red meat and chicken transport to Seaswift DC

- Red Meat and Chicken are transported to Blenners Transport at their depot at Darra, Brisbane. The goods are shipped overnight to Blenners Depot in Cairns City, Cairns.

- Blenners Transport cross docks the delivery at its Cairns City depot and delivers the CEQ/Bamaga component of the shipment to the Seaswift DC.

- Duration: 1 day

## Milk

- Raw milk from dairy producers (on farm) is initially stored at farms in refrigerated vats before being transported in a refrigerated tanker.
- Raw milk is transported to the Bega (formerly Lion Dairy) facility in Malanda where the dairy manufacturing process is completed and transported directly to Seaswift Cairns DC.
- Duration: 1 day

# Supply chain details

Produce for Bamaga is consolidated in Cairns before transit to Seaswift to meet the weekly schedule

## Warehousing and Distribution in Cairns

- Fruit and vegetables for delivery to Bamaga and other IBIS stores throughout FNQ are aggregated and packed at the SGS DC at Portsmith, Cairns. Local, SEQ and national goods are consolidated, packed direct for shipment to each IBIS store at the warehouse and stored.
- Goods are transported by road (SGS own fleet) to the Seaswift Warehouse to meet weekly cut-off times for the Friday shipment.
- Red meat, chicken and milk is transported to the Seaswift Warehouse by road to meet the same timeframes.
- Cold goods are stored in refrigerated containers (reefers) or in other dedicated cold storage for single pallets. Reefers are plugged in to power at the facility to maintain temperature.
- Seaswift consolidate goods for shipment and transport to Trinity Wharf (Ports North) via road (Seaswift shuttle).

- Duration: Up to 4 days (national goods that arrive in SGS DC on Monday to shipment on Friday).

## Cairns to Bamaga Transport

- Seaswift transports the consolidated goods by road to Ports North Wharf twice per day. The shuttle service does not allow temperature-controlled containers to be plugged in for the duration of the movement (5-minute duration). Containers are loaded onto the line haul vessel for transit to Horn Island.
- Seaswift offer two departures per week:
  - Friday departure (arrival in Bamaga Monday morning), with cut-off time of Tuesday for dry goods and Thursday for cold goods.
  - Tuesday departure (arrival in Bamaga Friday morning), with cut-off time of Friday for dry goods and Monday for cold goods.

- The produce in the scope of the study is transshipped at Horn Island. Goods are moved from a larger vessel (which travels from Cairns to Horn Island) to a smaller vessel which is able to dock at the Seisia Wharf.
- Vessel arrives at Seisia Wharf in Bamaga on Monday. Cargo unloaded and de-consolidated.
- There are fees and charges paid by Seaswift to use the port infrastructure at each location.
- Full container load (FCL) Shipments are delivered directly to the store by road transport. Less than container load (LCL) shipments are collected by the store from Seisia Wharf.
- The Bamaga store does not have a dedicated loading dock, with vehicles unloaded in temporary exclusion zone (traffic cones) in the carpark.
- Duration: 3 days

Detailed maps of each supply chains, with breakdowns of distance and CO2 emissions generated on each leg, are included in Appendix 3.



# Geographic supply chain map

Bamaga's geographic supply chain map shows supply chains extending the entire length of Australia



- From the data obtained, an interactive, geographic supply chain map was also produced to show the extent of the supply chain for Bamaga
- It covers the end-to-end supply chain from 'paddock to plate' including the four key suppliers.
- The map shows retail outlets, production regions, transport modes, distribution routes, logistics infrastructure including intermodal terminals, warehousing and distribution facilities.
- All locations are precise where possible and routes reflective of transport modes.

Access Interactive Map

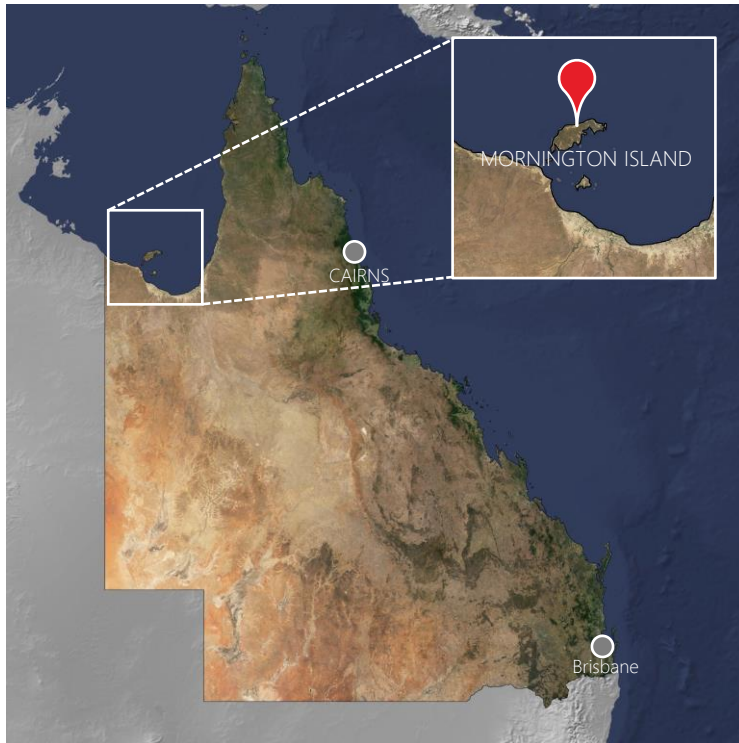
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05

Site 2: Mornington Island supply  
chain

# Community profile

Mornington Island is a small town located in the Far North Queensland region



*Location of Mornington Island*

- Mornington Island is a small town located within the southern Gulf of Carpentaria and is the largest island in the Wellesley Island group
- It is sometimes referred to as Gununa or Goonana by the Lardil people, the Traditional Owners of Mornington Island.
- Mornington Island is Aboriginal freehold land which is inalienable. The Gununa township is under township freehold held by Mornington Shire Council.
- The Shire comprises of the twenty-two islands that make up the Wellesley Island group, with Mornington Island, Bentinck Island, and Sweers Island the largest.
- The island hosts a population of 1,143 people, with 86% of the population identifying as Aboriginal and/or Torres Strait Islander.





# Grocery retail and butcher

Fresh food and meat is sold on Mornington Island at the supermarket and butcher

- Mornington Island is serviced by one supermarket (Gununamanda Limited) located in the center of the town.
- It offers a range of grocery items including dry, chilled and frozen goods, along with a range of fresh fruit, vegetables and meat.
- It is open six days per week from 9am to 4pm. It is closed on Sunday.
- Meat and chicken products are sold by the butcher shop, which is separately owned and operated. It is located next to the supermarket. The supermarket sells some frozen meat products, which are not considered in this study.



# Freight access

A maritime freight link to Cairns provides the main source of food supplies for Mornington Island

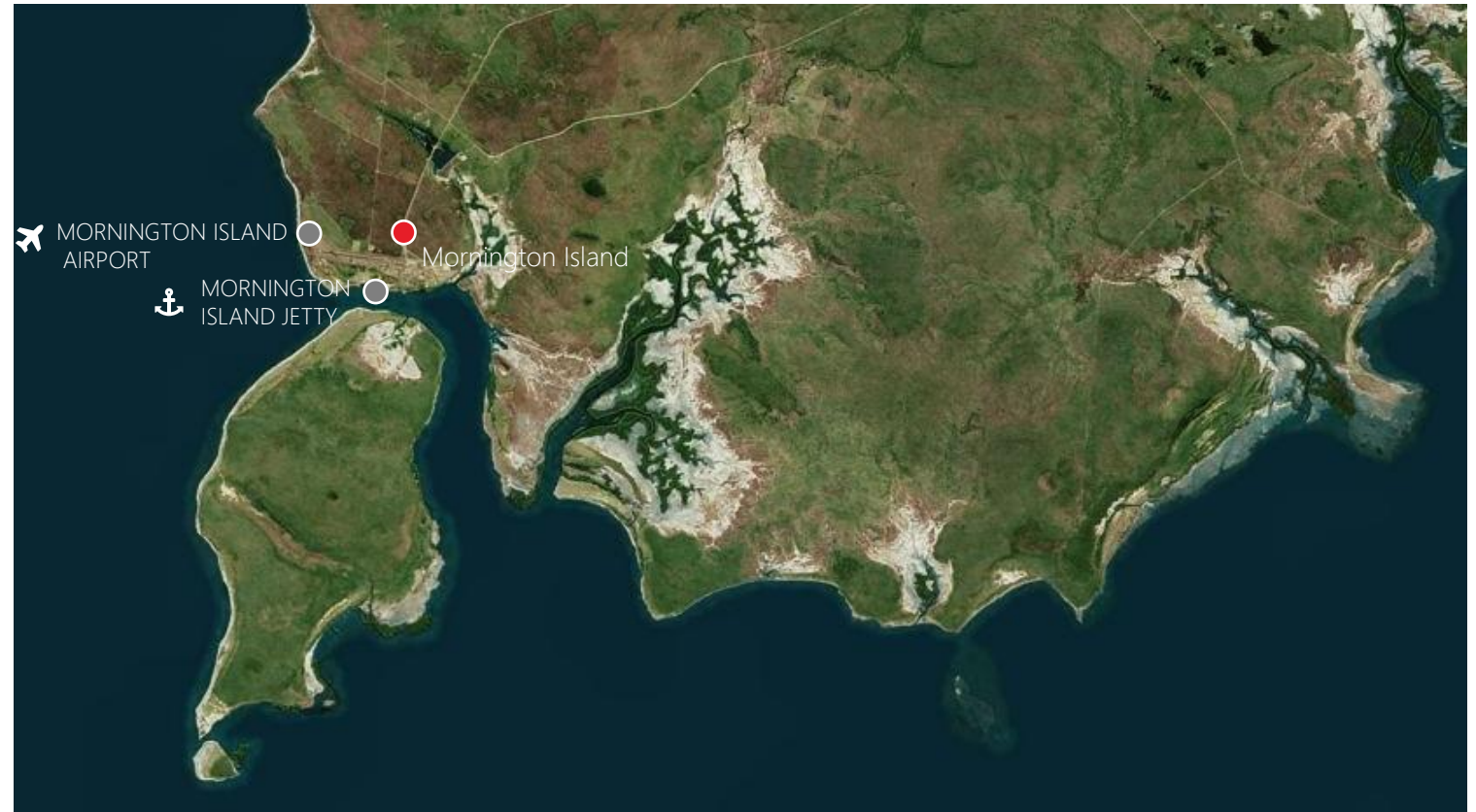
Mornington Island can be accessed from the air and sea for the provision of freight.

## Maritime Access

- Mornington is typically accessed by sea for the purpose of delivering freight.
- Vessels typically embark from Karumba and alight at the Mornington Island Jetty, a voyage that takes approximately one day.

## Air Access

- Mornington Island Airport may also be used to transport freight when sea access is constrained, with flights by Regional Express (REX).
- The airport sits adjacent to the town with good access to the store and butcher.
- Airfreight is approximately five (5) times the cost of road or rail freight and is generally considered unsuitable for the ongoing provision of food due to the cost. Air travel generates a much larger level of emissions per distance travelled than other modes of transportation.



# Freight task & key suppliers

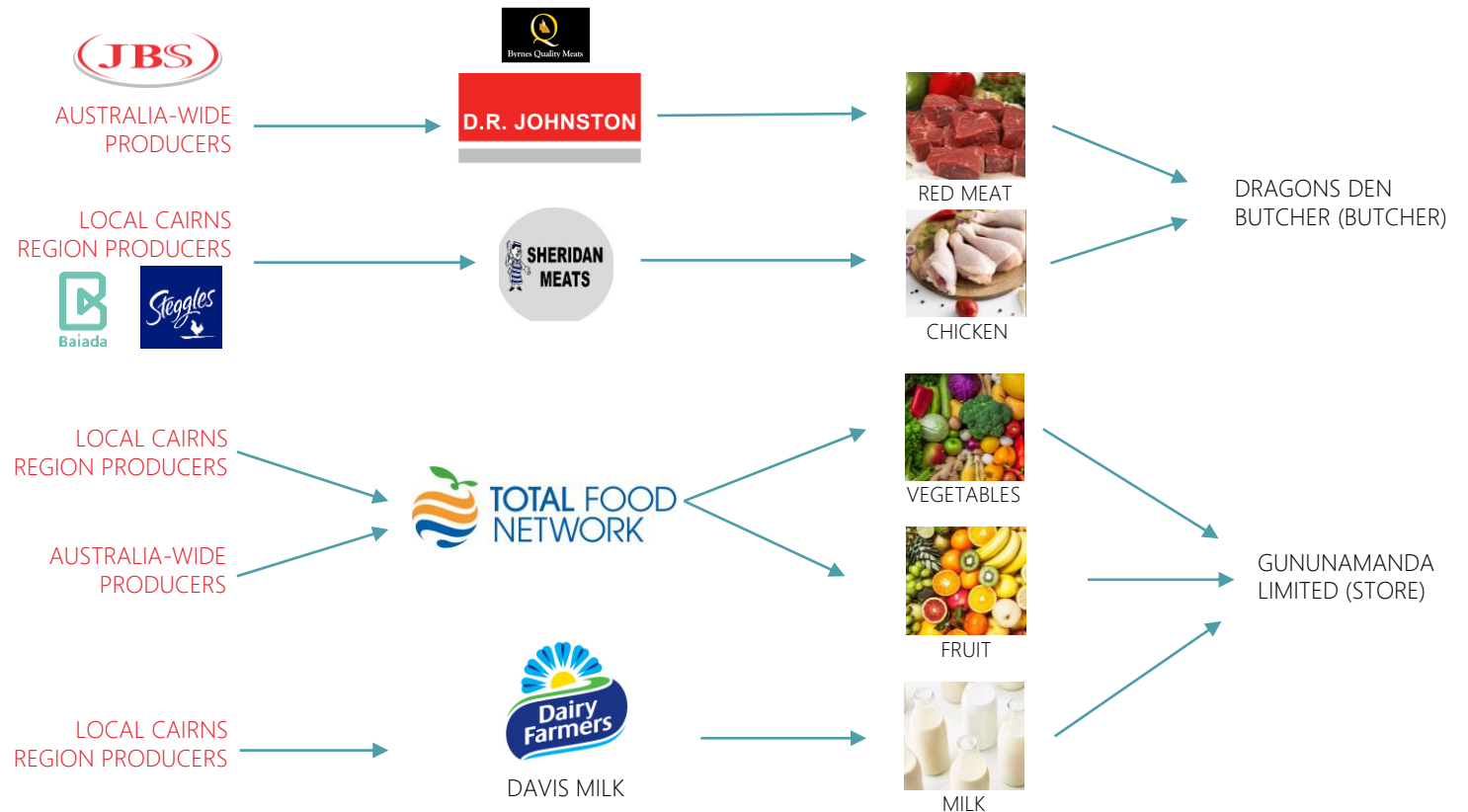
Fresh produce for Mornington Island comes from suppliers who source from local and national producers

## Freight task

- Fresh food for Mornington Island is delivered once weekly by barge. The size of delivery may vary throughout the year.

## Key suppliers

- Red meat is primarily supplied by D.R. Johnston, who operate out of Hemmant in Brisbane and distribute for large producer JBS. This supply is augmented by small orders from Byrnes Quality Meats, who operate an abattoir in the Atherton Tableland supplying local produce.
- Chicken is supplied by Sheridan Meats in Cairns, who source from the Baiada/Steggles producers in Mareeba.
- Total Food Network (TFN) supplies fruit and vegetables, sourcing some produce locally to Cairns with the remainder through the South East Queensland (SEQ) market.
- Davis Milk distribute milk for Dairy Farmers and currently supply the store.



Key produce suppliers to the CEQ store in Bamaga



# Supply chain overview

## Supply chain overview – Mornington Island

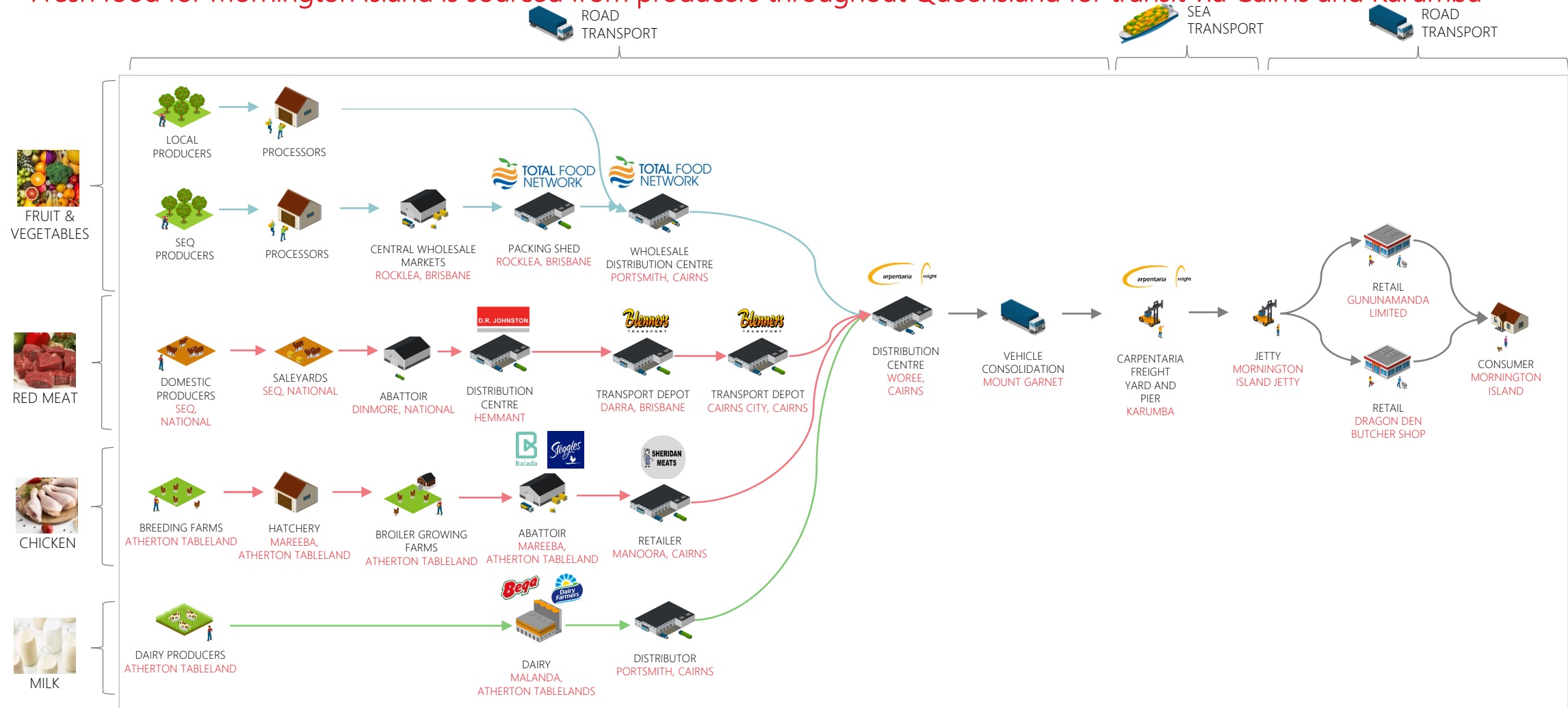
- The supply chain for fruit and vegetable produce (Total Food Network), meat and chicken (D.R. Johnston) and milk (Davis Milk) was mapped (see overleaf).
- Non-perishable grocery items are supplied to the store by MetCash – this supply chain outside the scope of this study.
- The supply network for fresh produce spans producers and distributors local to Cairns and in South East Queensland and Northern New South Wales.
- The supply chain covers the length of Queensland, with some goods covering up to 2,815km and being handled 20 times by 5 different organisations throughout the journey.



*Barge and road transport by Carpentaria Freight*

# Supply chain map

Fresh food for Mornington Island is sourced from producers throughout Queensland for transit via Cairns and Karumba



# Supply chain details

The Mornington Island store and butcher are operated independently with produce sourced directly from suppliers and distributors

## Ordering process

- The operators of the store place orders for weekly fulfilment through a single weekly barge delivery. There is no ability to consolidate orders to reduce costs – shipments are aggregated by distributors into Cairns to reduce their own costs.
- Orders for fresh produce are placed by Thursday for delivery on the barge the following Wednesday.
- The average order quantity varies between 0.5 to 2.5 pallets per week of fresh fruit and vegetables, 4 pallets of meat and half a pallet (40 cartons) of milk products.

## Pricing and financials

- The operation of the store has been subject to a number of challenges outside of the scope of this study, which contribute to pricing challenges and pressures alongside those posed by the costs accrued along the long supply chain.
- Stakeholders noted that some residents of Mornington Island choose to make delivery orders to Coles in Cairns via Coles Online, which are shipped on the weekly barge via Karumba. This may provide a source of price competition for the store and butcher to meet but reduce the viability of the operation of the stores through reduction in revenue.

## Supply chain inventories

- The store and butcher must hold sufficient inventory (in appropriate cold and frozen conditions where applicable) to operate within the constraint of the weekly delivery. Stable power and readily available replacement equipment (fridges) are required to reduce the risk of loss of quality of goods.
- During the wet and cyclone season, the stores look to hold a larger volume of inventory to account for the possibility of missed shipments. This must be balanced against the shelf life, particularly of the perishable goods which are the focus of this study.

# Supply chain details

Fresh produce on Mornington Island is sourced from growing regions surrounding Cairns where possible, with the remainder of goods sourced from South East Queensland through the fresh produce markets at Rocklea

## Production, processing and transit to Cairns

### Fresh produce (fruit and vegetables)

#### South-East Queensland producers

- Where produce cannot be obtained from the Cairns local market throughout the year, TFN procure goods from the Rocklea Markets in Brisbane, sourced from the surrounding growing regions. Products include:
  - Apples
  - Pears
  - Oranges (seasonal)
  - Carrots
  - Lettuce
  - Onions (seasonal)
  - Potatoes (seasonal)
  - Pumpkins (seasonal)
  - Tomatoes (seasonal)
- TFN consolidates and packs orders for shipment to Cairns at their Rocklea facility.

- Goods for Mornington Island are purchased and dispatched on Friday and are received at the TFN distribution facility at Portsmith over the weekend.

- Duration: 1 day (overnight)

#### Cairns Local producers

- Where possible, a number of the products considered by the study are sourced from local producers around Cairns. These include:
  - Bananas (Tully)
  - Oranges (seasonal, Koah, Atherton Tablelands (4 weeks per year))
  - Onions (seasonal, Mareeba)
  - Potatoes (seasonal)
  - Pumpkins (Atherton Tablelands, Burdekin)
  - Tomatoes (seasonal, Burdekin, Mareeba)
- Produce is transported directly from farm to the TFN distribution facility in Portsmith, Cairns via road transport in refrigerated containers.

- Goods from SEQ and local suppliers are consolidated at the TFN distribution facility. Goods for shipment to Mornington Island are packed on Monday and transported to the Carpentaria Freight Warehouse at Woree.

# Supply chain details

The butcher sources red meat and chicken from distributors in Brisbane and Cairns respectively

## Red Meat

- The majority of red meat is sourced by the butcher from D.R. Johnston, which is a national distributor for multinational food and meat producer JBS. A smaller quantity of meat is sourced from Byrnes Quality Meats, which operates cattle infrastructure in the region surrounding Cairns.
- JBS operates cattle growing and meat processing assets throughout Australia, with the most local abattoir (which processes a large component of the beef meat sent to Mornington Island) being located at Dinmore.
- The D.R. Johnston facility in Hemmant, Brisbane is the consolidation point for meat bound for the butcher. Currently, an average of 4 pallets per week (2 pallets chilled, 2 pallets frozen) are sent to the butcher each week.
- The meat is shipped from Brisbane to Cairns weekly via Blenners Transport, who pick up the shipment from the Hemmant DC and transit to Carpentaria Freight via depots at Darra, Brisbane and Cairns City.

- Duration: 1 - 2 days (overnight, distributor to Carpentaria Freight).

## Chicken

- Most of the chicken supplied in Northern Queensland comes from Steggles/Baiada, which operate local breeding farms, a hatchery facility, broiler growing farm and an abattoir facility in Mareeba.
- The meat is delivered to Sheridan Meats, which is an independent supplier and distributor of meat products. The chicken is frozen for delivery to Mornington Island.
- Sheridan Meats freezes and packs the chicken (between 150-200kg per week) for delivery to Mornington Island and delivers to Carpentaria Freight on Monday.
- Duration: 1 day

## Milk

- Raw milk from dairy producers (on farm) is initially stored at farms in refrigerated vats before being transported in a refrigerated tanker.
- Raw milk is transported to the Bega/Dairy Farmers (formerly Lion Dairy) facility in Malanda where the dairy manufacturing process is completed.
- The distributor, Davis Milk, orders milk for its served customers on Friday, receives the milk Saturday and repacks for distribution. Milk for regional communities is ordered 'better date' to help preserve shelf life.
- The milk is delivered to Carpentaria Freight on Monday morning to meet cut-off times.
- Duration: 4 days

# Supply chain details

Produce is transported to Karumba by road via Mount Garnet before barge to Mornington Island once per week

## Transport from Cairns to Mornington Island

- Goods for delivery to Mornington Island are consolidated into refrigerated containers at the Carpentaria Freight Warehouse at Woree. The shipments are made up of fresh produce alongside general grocery items (primarily supplied by Metcash).
- Containers are transported by B-Double from Cairns to Mount Garnet, where they are made up into road trains for the journey to Karumba – this involves multiple road movements to compile containers for road train assembly.
- The road trains are transported to Karumba twice weekly – Friday and Monday.
- Containers are unloaded from the vehicle at the Carpentaria Freight Yard in Karumba for transhipment to barge.
- Carpentaria Freight operate two barges (the Torres Venture (110t capacity) and the Carpentaria Venture (180t capacity).
- When the roads between Cairns and Karumba are inaccessible (occasionally during the wet and cyclone season), other measures including barging goods across roads or barging goods directly from Cairns to Mornington Island, must be taken, at great cost.
- Refrigerated goods are loaded onto the barge in Karumba and shipped to Mornington Island – the barge departs on Tuesday and arrives on Mornington Island on Wednesday morning each week.
- Goods are collected by the receiver (store, butcher or other) at the Mornington Island Jetty following unload from the barge, and are taken to the point of retail by vehicle.
- There are fees and charges associated with the use of the Mornington Island Jetty that are paid by the retailer at the collection of goods.
- Duration: 2-3 days transit

Detailed maps of each supply chains, with breakdowns of distance and CO2 emissions generated on each leg, are included in Appendix 4.



# Geographic supply chain map

Mornington Island's fresh food supply chain covers the length of Queensland and passes through many areas at risk of disruption throughout critical seasons



- From the data obtained, an interactive, geographic supply chain map was also produced to show the extent of the supply chain for Mornington Island.
- It covers the end-to-end supply chain from 'paddock to plate' including the four key suppliers.
- The map shows retail outlets, production regions, transport modes, distribution routes, logistics infrastructure including intermodal terminals, warehousing and distribution facilities.
- All locations are precise where possible and routes reflective of transport modes.

Access Interactive Map

CLICK (will open browser)

# 06

## Key Findings

# Assessing the impact

## *The role of the supply chain in the framework to address food security*

As noted in section 01, supply chains have an important role in delivering the four pillars of food security as defined in the HWQld framework: availability, access, utilisation, resilience and stability. To attempt to isolate the impact of the supply chains, the following process was undertaken:

1. Key characteristics of regional supply chains (compared to benchmark urban supply chains) were identified.
2. Where possible, the scale of difference of these characteristics to the benchmark supply chains was quantified.
3. The holistic impact of each characteristic against the elements of the framework were considered.

The outcome of this assessment is shown on the following pages.



# Key regional supply chain characteristics

Key differences in supply chains for Bamaga and Mornington Island compared to the benchmark (Brisbane)

## 1. Distance

The supply chains that serve Bamaga and Mornington Island are significantly longer than those that serve urban centres, due both to the distance between growing regions and the hub of Cairns, and the distance between Cairns and the communities.

## 3. Touch Points

The supply chains for Bamaga and Mornington Island involve more organizations and touch-points (handling and transport) than the benchmark supply chain.

## 2. Duration

Food bound for Bamaga and Mornington Island spends a much greater amount of time in the supply chain than food bound for urban centres.

## 4. Disruption

The supply chains are heavily reliant on a large number of geographically spread pieces of transport and logistics infrastructure – including roads, ports and wharves – that are subject to disruption due to weather or maintenance issues.

# 1. Distance

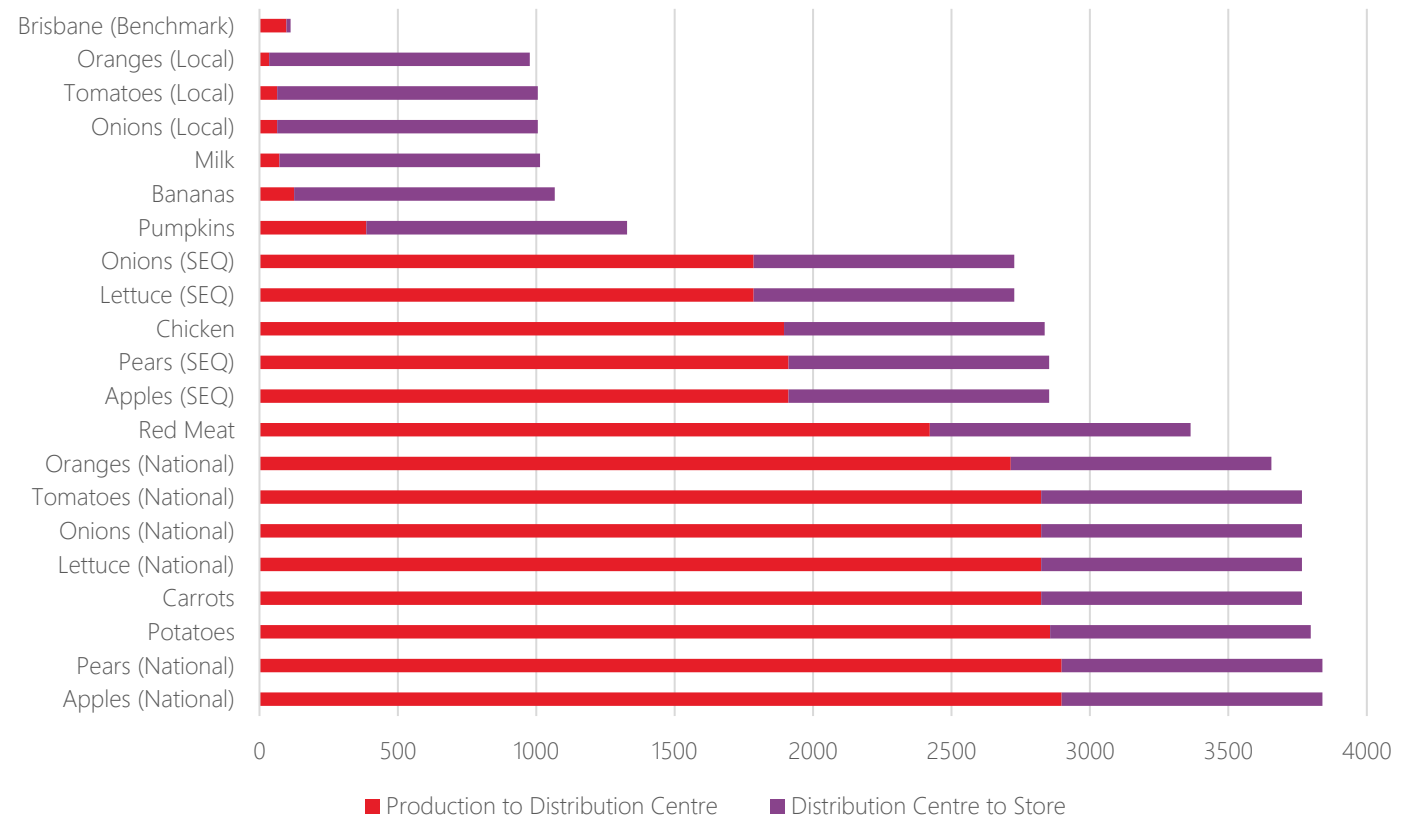
The difference in distance travelled and associated emissions between supply chains is significant

Costs and risk throughout the supply chain are driven by the level of handling of goods and the distance travelled by the goods. Whilst an obvious outcome, it is notable the reduction in distance travelled (along with associated reductions in costs of service and risks) associated with the supply of food from local producers compared to foods sourced nationally. This finding is most notable in the Bamaga supply chain (shown right), which sources produce from local and national suppliers for fresh food.

The 'longest' supply chain to Bamaga (apples and pears from the Adelaide Hills) covers a distance four (4) times as great as the 'shortest' supply chain (oranges from Koah). Compared to the benchmark (urban Brisbane Woolworths supplied with produce from the Lockyer Valley via the Heathwood DC), this supply chain covers 35x the distance from producer to consumer.

Commensurately, the carbon emissions associated with the supply of food ("food miles") are reduced when locally supplied food is used (noting that the food, regardless of source, shares the final leg of the journey to Bamaga and Mornington Island). While transport only contributes a portion of the emissions associated with food production (in addition to emissions associated with food growing and production, most particularly in the case of red meat), reducing transport emissions associated with long supply chains will be critical as the economy moves to meet the government's climate goals.

Distance Travelled to Bamaga by Food Type and Source of Production  
(compared with Brisbane benchmark)

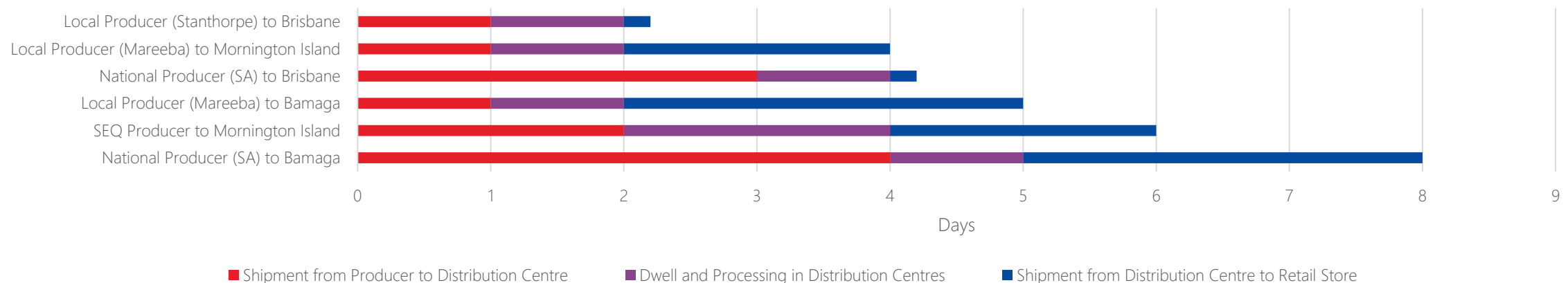




## 2. Duration

Food spends significantly longer in the supply chain when supplying Bamaga and Mornington Island compared to urban supply chains

Supply Chain Duration for Local and National Producers



The key differences in time spent in supply chain between the supply chains that serve Bamaga and Mornington Island and that which services the benchmark (Brisbane) are associated with:

- The duration of travel from growing and producing regions of many fresh goods to Cairns distribution hub.
- The weekly delivery cycle from DC to community (once per week at Mornington Island, twice per week at Bamaga), meaning that food may dwell in DCs while waiting for delivery.

- The significant duration of travel between DC and retail store including via sea freight.

The aggregate impact of these challenges are shown in the graph above, showing duration from producer to store from local and national producers to Brisbane, Mornington Island and Bamaga.

The difference is most stark when receiving goods from non-local suppliers, which increases the time in the supply chain associated with the duration of travel and increased dwell time in DC due to delivery cycle.

Most notable are the supply chains connecting national suppliers to Bamaga (collected from producers Thursday, in store the following Friday) and SEQ suppliers to Mornington Island (shipped from producer Thursday, in store the following Wednesday).

The difference is less but still significant when local suppliers are considered, which may time deliveries to avoid dwell in the DC. The key driver for the difference in this scenario is the distance between DC and store, which is nominal in the case of Brisbane.

# 3. Touch Points

Regional supply chains involve significant additional handling and transition of goods to reach their destinations

Supply chain nodes (points at which goods are handled) are necessary throughout the supply chain to add value towards the final product – including processing, packaging, aggregating and breaking down of stock – for the consumer. However, each point of handling adds cost associated with:

- The facilities in which the goods are handled
- The equipment used to handle the goods
- Consumables used during handling
- Human labour associated with goods handling

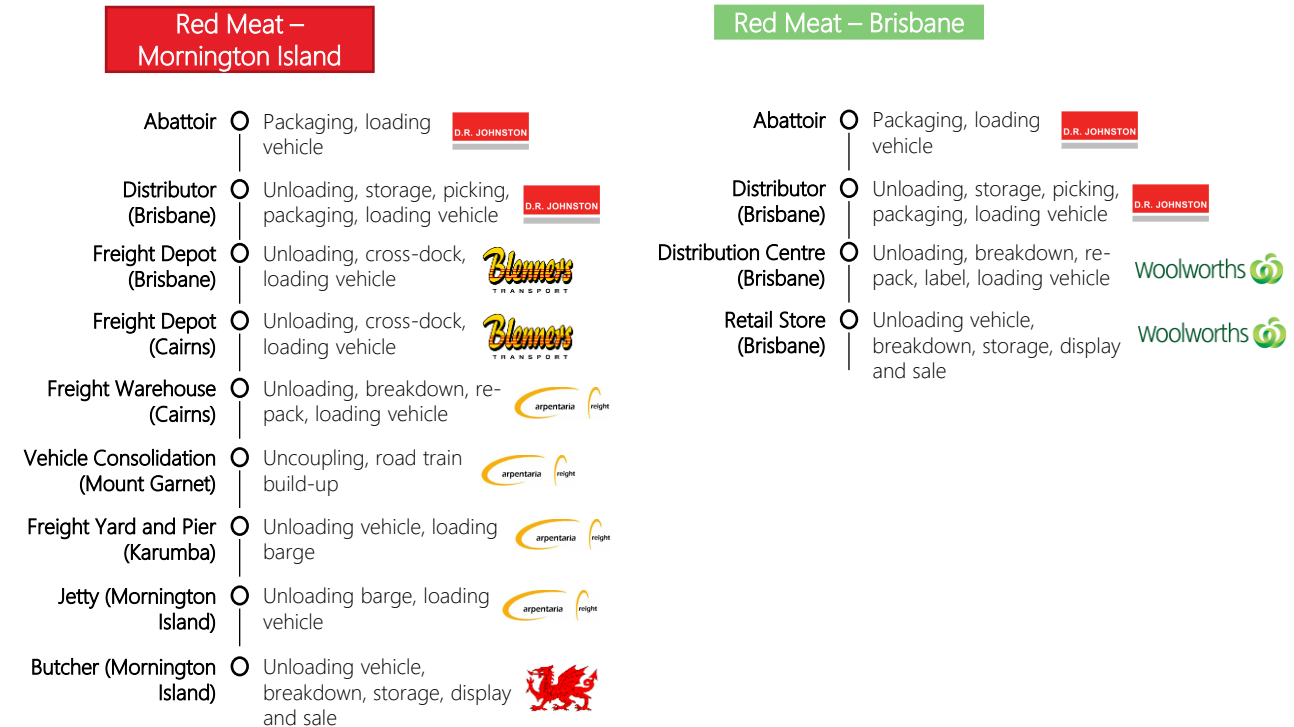
Each point of handling also introduces risk of product mishandling, particularly when dealing with refrigerated and frozen products.

Due to the nature of the supply chain to Bamaga and Mornington Island, there is a high level of handling required to allow the goods to be delivered, associated with:

- Aggregation and disaggregation of goods to be delivered to Cairns and onwards.
- Mode changes between road and sea freight and transhipment.

While this handling is required and performed by professional operators throughout, additional associated costs and risks will be incurred by supply chain organisations.

A summary of handling requirements for an example supply chain (red meat to Mornington Island) is shown compared to the benchmark supply chain.



## 4. Disruption

The distribution leg of the supply chain between Cairns and Bamaga and Mornington Island is subject to many challenges, including disruptions due to weather and access to vital transport infrastructure.

The distribution of goods from hubs in Cairns to the towns (by Seaswift to Bamaga and by Carpentaria Freight to Mornington Island) is subject to a number of critical challenges, including but not limited to:

- The impact of weather, particularly during the wet and cyclone seasons, to both road and shipping routes.
- Insufficient or inaccessible infrastructure, such as ports and wharves, due to weather or maintenance issues.

The disruption of service due to these challenges leads to the following impacts:

- Due to the limited number of deliveries per week to each town, a missed shipment can lead to an immediate lack of fresh food, groceries and other critical items in towns, which is a risk to public health.

- Costly work-arounds, including using air freight to ship goods to towns (as noted by CEQ) or the use of alternative and less efficient barge processes (including barging directly from Cairns to Mornington Island as noted by Carpentaria Freight) must be undertaken.
- Store operators must order and hold additional stock during the wet seasons to account for this possibility, which puts further pressure on shelf lives of the fresh goods in store.

It is noted by stakeholders throughout the consultation process that all parties, including store operators, freight operators and suppliers work collaboratively and efficiently to meet these challenges as they arise.



*Photo of usual distribution route from Cairns to the Cape in the wet season – Carpentaria Freight*

# Impacts on food security

The characteristics of the supply chains create a number of risks to food security within the supply chain

## *Impact on Availability*

- Through engagement with local, regional and national producers and distributors, CEQ and the Mornington Island stores offer the community a diverse range of produce and goods enabled by the supply chains.
- The stores act as the single point of food availability in each town, meaning that any issues with operation, related to supply chain operation, commercial performance, solvency, supplier relationship and equipment or infrastructure creates a risk for reliable food availability in each town.
- The long supply chain reduces the shelf life of perishable goods in store compared to the benchmark in some cases by up to a week, reducing food quality and potentially increasing the opportunity for food waste. Some suppliers have noted a focus on packaging and providing 'best-dated' stock to help issue.
- The large number of touch and handover points compared to the base case increase the risk of product spoilage and mishandling, including through breaks in cold chain compliance.
- The selection of suppliers and products based on packaging and of food condition (chilled or frozen) has been reported by store operators. These tools are useful to maximise shelf life given the characteristics of the supply chain.
- Due to the scheduled cycle of deliveries from distribution centre to store (once per week to Mornington Island, twice per week to Bamaga), a missed shipment due to supply chain delay, supplier error or weather condition is not able to be easily or quickly rectified, and can lead to empty shelves and fresh food shortages for as long as the situation can take to rectify.
- As noted by stakeholders, reliability of supply is a key criteria for store operators when selecting suppliers for fresh food due to the significant impact of missed or incorrect shipments. This may lead to missed opportunities to promote local suppliers or reduce the ability of the stores to select suppliers that may use shorter supply chains or provide cheaper goods.

# Impacts on food security

The characteristics of the supply chains create a number of risks to food security within the supply chain

## *Impact on Access*

- The price of food at the stores is consistently higher than in the comparable food basket in Brisbane for a variety of reasons – supply chain costs likely contribute to part of this increase.
- Costs associated with the supply chains to supply the stores put pressure on prices in store primarily due to the impact on operating expenses for operators, freight organisations and suppliers. Factors impacting these costs are shown in the diagram overleaf.
- Due to the large distances covered throughout the supply chain, changes in fuel price (in particular in the 2022 context) have a significant impact on operating costs.
- Operators throughout the supply chain reported that they do not always pass on increased cost of service (price rises, fuel, etc.) through pricing, which provides some comfort to customers but may cause pressure on producers and businesses throughout the value chain. The ongoing viability of these businesses is critical to ensure ongoing supply to the communities.
- Any wastage of food is of particularly high cost in remote areas due to significant cost and activity to resupply. Food waste may be caused by store practices, breakdowns in equipment or loss of power or issues with shipment or transport.
- Stakeholders noted the high comparative cost of wharf usage at Horn Island, Thursday Island, Seisia and Mornington Island, including unloading charges for operators.
- The return journey of the barge is mostly (80%) empty, which reduces the viability of the barge and increases the cost that must be recovered from the freight being moved to the community. Opportunities to generate activity in the community or other barge uses that result in goods or equipment being shipped on the return leg may assist to lower the costs to consumers.

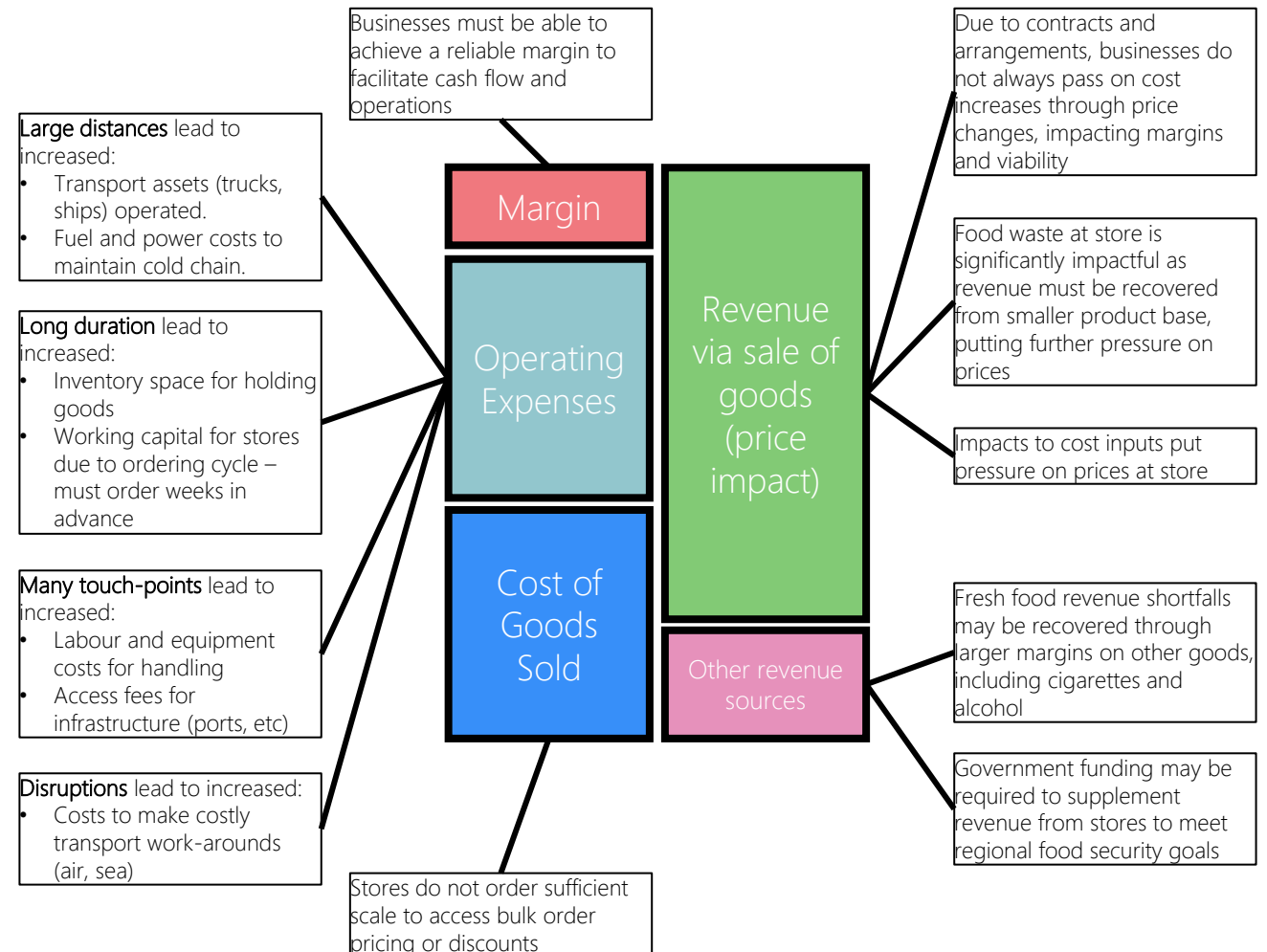


# Impacts on food security

The characteristics of the supply chains create a number of risks to food security within the supply chain

## Impacts on Access (continued)

- Put simply, for ongoing viable operation of a business, the revenue generated through the business must cover:
  - The cost of goods sold
  - Operating expenses to bring the goods to market
  - A margin to facilitate business outcomes.
- This balance between revenue and costs must be maintained for all operators in the supply chain, including the retail stores, distributors, freight operators and producers.
- The diagram on the right summarises some of the impacts of the supply chain on each category of costs.



# Impacts on food security

The characteristics of the supply chains create a number of risks to food security within the supply chain

## *Impact on Utilisation*

- The issues caused by long supply chains associated with food delivery also apply to other critical provisions, including health supplies and pharmaceuticals, which has an impact on the general health and wellbeing of the community. This also impacts the availability of equipment required for the safe storage and preparation of food, including fridges and kitchen equipment.
- Infrequent delivery results in a larger than base case requirement for refrigeration equipment due to the larger shipment. Additionally, more redundancy in equipment may be sought as there is no ability to restock quickly if a shipment is lost.

## *Impact on Stability and Resilience*

- The supply chain has a number of critical points of vulnerability, including:
  - Key arterial freight routes to Cairns may be vulnerable to flooding at various points throughout the year.
  - Portsmith, Cairns, hosts the majority of the distribution centres that service Bamaga and Mornington Island.
  - The Port of Cairns may be subject to closure due to cyclone or other significant weather event.
  - The road freight route between Cairns and Karumba is often cut during the wet season necessitating alternative loading arrangements at Mornington.
  - The sea freight route to Horn Island, Seisia and Mornington Island may be impacted by cyclone or other significant weather event.
- Wharf infrastructure at all vessel and barge stops may have periods out of service during maintenance or repairs.
- Food is only able to be delivered once or twice weekly due to the shipping schedule, meaning that the system is particularly vulnerable to missed shipments, leading to shortages at the store.
- The PDR, if upgraded to allow heavy vehicle access, could provide additional resilience to the freight arrangements in the region, particularly to Bamaga.
- Ordinary seasonal weather impacts to the supply routes and maintenance issues associated with the regional infrastructure lead to high-cost work-arounds (including shipments by air for extended periods). Stakeholders noted that this is a regular occurrence in the region.
- Weather events, including cyclones and significant rain events, pose significant threat of disruption to freight movements in the region. This disruption may worsen due to the impacts of climate change.

# 07

## Next Steps

# Opportunities and Next Steps

Supply chain issues are complex, and collaboration between all stakeholders is required to develop solutions that will meet the challenges of food security in remote communities in Queensland.

## Stakeholder Opportunities

Whilst a number of the characteristics of the supply chain are inherent based on the geography and population distribution of Queensland, there is an opportunity for key stakeholders in the supply chain to work collaboratively to identify opportunities to improve supply chain operation and subsequently improve food security outcomes in remote communities in Queensland. Potential areas for consideration by stakeholders as part of the coordinated effort are shown right.

## Government Engagement through HWQld

HWQld is working to garner support and coordination at all three levels to government to support communities to become food secure. At the local government level, HWQld has partnered with the Torres Cape Indigenous Council Alliance to ensure communities priorities are heard and responded to. At the state level, HWQld is engaging closely with cross-government colleagues to ensure a coordinated and collaborative approach is taken to obtain the maximin benefits. HWQld are also liaising at the National level with the National Indigenous Australian's Agency in the development of the National Remote Food Security Strategy. This study will be considered by government stakeholders as part of that process.

### Local, State and Federal Government

- Consider application of subsidies.
- Assist with maintenance of critical infrastructure to minimise unavailability.
- Consider infrastructure to provide redundancy and resilience for communities.

### Suppliers and Distributors

- Consider local supply and production options.
- Focus on reliable supply to avoid missed shipments.
- Consider packaging and 'better-dated' stock offerings to communities.

### Freight Operators

- Work with government to consider arrangements for more frequent deliveries to store if required.
- Coordinate with suppliers and other freight organisations to streamline logistics and reduce handling

### Retailers

- Work with suppliers and government to provide information to help improvement efforts.
- Continue to collect community feedback and pass down the supply chain as required.
- Work to continuously improve practices in asset management, pricing, governance, financial management and group buying

# A1

## Glossary



# Glossary

Terms	Definitions
Dwell time	The time cargo/freight spends at facilities waiting for collection and distribution.
Cycle time	The time elapsed between the placement of order by a customer and the delivery of products to the customer.
Distribution centre	The facility/warehouse that stores a manufacturer's goods temporarily, before they are transported to stores or customers for sale.
Transportation modes	It refers to the different ways by which goods are transported from one place to the other through land, air or sea.
Cold chain	It refers to a low temperature-controlled supply chain network.
Direct transport	The movement of shipment from one point to another without a change in the means of transport.
Transshipment	The shipment of goods or containers to an intermediate destination, then to another destination.
Cut-off times	The latest time cargo may be delivered to a terminal for loading to a scheduled train or ship.
Consolidation	The loading of two or more suppliers 'deliveries to a distribution center on a single vehicle.

A2

Sources

# Sources

The documents presented in the below table were reviewed as part of this engagement.

## Township Strategic Planning

Mornington Shire Council (MSC). Strategic 5 Year Implementation Plan for Major Projects (2021)

MSC. Strategic 5 Year Implementation Plan for Major Projects - Market Garden Ministerial Briefing Note (2021)

MSC. Strategic 5 Year Implementation Plan for Major Projects – Beef Production Ministerial Briefing Note (2021)

MSC. Strategic 5 Year Implementation Plan for Major Projects Minutes of Meeting (2022)

Aurecon. Mornington Island Master Plan (2020)

Townsville Enterprise. Strategic 5 Year Implementation Plan for Major Projects (2019)

TCICA. Cape, Torres and Gulf Opportunities Plan (2019)

## Food Sourcing

TCICA. Food Production Study (2021)

Metcash Limited. Public Submission to ACCC Grocery Inquiry (2018)

Metcash. Metcash Supply Standards (2021)

L.E.K Consulting Australia. Milk - Supply Chain Benchmarking Report (2021)

## Food Transportation

National Rural Health Alliance. Freight Improvement Toolkit (2007)

Carpentaria Freight Services. Service Letter (2022)

Issues Magazine. Freight and Health in Remote Indigenous Communities (2008)

Australian Fresh Produce Alliance. The role of packaging for Australian fresh produce (2019)

Queensland Government. Queensland Freight Action Plan 2020-2020

Department of Transport and Main Roads. Far North Queensland Regional Transport Plan (2019)

Expert Group. A study of Waste in the Cold Food Chain and opportunities for improvement (2020)

Issues Magazine. Freight and Health in Remote Indigenous Communities (2008)

## Food Pricing & Security

CEQ. Inquiry into Food Pricing and Food Security in Remote Indigenous Communities (2020)

Sea Swift. Parliamentary Inquiry into Food Pricing and Food Security in Remote Indigenous Communities (2020)

# Sources (cont'd)

Woolworths Group. Inquiry into Food Pricing and Food Security in Remote Indigenous Communities (2020)

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Gidgee Healing. Gather + Grow Food Security in the Lower Gulf Queensland (2022)

CFCA. Understanding food insecurity in Australia (2020)

Queensland Government Statistician's Office. Index of Retail Prices in Queensland Regional Centres (2015)

Charles Darwin University. Submission to the Inquiry into Food Pricing and Food Security in Remote Indigenous Communities - Parliament of Australia.(2020)

Queensland Government Statistician's Office. Index of Retail Prices in Queensland Regional Centres (2015)

Charles Darwin University. Submission to the Inquiry into Food Pricing and Food Security in Remote Indigenous Communities - Parliament of Australia.(2020)

# A3

## Detailed Supply Chain Maps - Bamaga



# Supply chain map

## Fruit & vegetables functional supply chain map – Bamaga



# Transport of fruits and vegetables

## Fruit and vegetables travel distance and associated emissions - Bamaga

From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Southern Downs	Rocklea	Domestic producer - Wholesaler	Road	207km	18kg
Lockyer Valley	Rocklea	Domestic producer - Wholesaler	Road	81km	7kg
Toowoomba	Rocklea	Domestic producer - Wholesaler	Road	118km	10kg
Rocklea	Simon George DC (Cairns)	DC Transit to Cairns	Road	1704km	152kg
Goulburn Valley	Simon George DC (Cairns)	Interstate producers - Wholesaler DC	Road	2,635km	235kg
Adelaide Hills	Simon George DC (Cairns)	Interstate producers - Wholesaler DC	Road	2,898km	259kg
Adelaide Plains	Simon George DC (Cairns)		Road	2,824km	252kg
Parilla	Simon George DC (Cairns)	Interstate producers - Wholesaler DC	Road	2,856km	255kg
Riverland	Simon George DC (Cairns)		Road	2,714km	242kg
Tully	Simon George DC (Cairns)	Local Producers - Wholesaler	Road	125km	11kg

From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Burdekin	Simon George DC (Cairns)	Local Producers - Wholesaler	Road	386km	34kg
Mareeba	Simon George DC (Cairns)	Local Producers - Wholesaler	Road	64km	6kg
Koah	Simon George DC (Cairns)	Local Producers - Wholesaler	Road	35km	3kg
Atherton Tablelands	Simon George DC (Cairns)	Local Producers - Wholesaler	Road	62km	6kg
Simon George DC (Cairns)	SeaSwift Warehouse	Retailer DC - Freight Forwarder DC	Road	2km	<1kg
SeaSwift warehouse	Port of Cairns	Freight Forwarder DC - Wharf	Road	3km	<1kg
Cairns	Horn Island	Transshipment delivery	Sea	851km	15kg
Horn Island	Seisia	Sea freight - Wharf	Sea	44km	1kg
Seisia	Bamaga	Wharf - Retailer - Customer	Road	6km	1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

# Supply chain map

## Red meat functional supply chain map – Bamaga



# Transport of red meat

## Red meat travel distance and associated emissions - Bamaga

From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Tamworth	Yangan	Saleyard - Abattoir	Road	426km	38kg
Inverell	Yangan	Saleyard - Abattoir	Road	297km	27kg
Dalby	Yangan	Saleyard - Abattoir	Road	184km	16kg
Yangan	Molendinar	Abattoir - Distributor	Road	207km	18kg
Molendinar	Darra	Distributor – Freight Carrier	Road	77km	7kg
Darra	Cairns City	Depot to Depot	Road	1,708km	153kg
Cairns City	Portsmith	Depot to Seaswift DC	Road	3.7km	<1kg
Portsmith	Port of Cairns	Seaswift DC – Wharf	Road	3km	<1kg
Port of Cairns	Horn Island	Transshipment delivery	Sea	851km	15kg
Horn Island	Seisia	Sea freight – Wharf	Sea	44km	1kg
Seisia	Bamaga	Wharf - Retailer - Customer	Road	6km	1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

# Supply chain map



## Chicken functional supply chain map - Bamaga





# Transport of chicken

## Chicken travel distance and associated emissions – Bamaga

From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Wulkuraka	Molendinar	Poultry Distributor to Distributor	Road	99km	9kg
Ormeau	Molendinar	Poultry Distributor to Distributor	Road	32km	3kg
Molendinar	Southport	Distributor to Freezer	Road	6km	1kg
Southport	Darra	Freezer to Transit Depot	Road	78km	7kg
Darra	Cairns City	Depot to Depot	Road	1,708km	153kg
Cairns City	Portsmith	Depot to Seaswift DC	Road	3.7km	<1kg
Portsmith	Port of Cairns	Seaswift DC – Wharf	Road	3km	<1kg
Port of Cairns	Horn Island	Transshipment delivery	Sea	851km	15kg
Horn Island	Seisia	Sea freight – Wharf	Sea	44km	1kg
Seisia	Bamaga	Wharf - Retailer - Customer	Road	6km	1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

# Supply chain map

## Milk functional supply chain map – Bamaga



# Transport of milk

## Milk travel distance and associated emissions – Bamaga

From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Atherton Tablelands	Malanda	Diary producers – Dairy Factory	Road	5km (est)	<1kg
Malanda	Cairns	Dairy Factory – Retailer DC	Road	75km	7kg
Cairns	Cairns	Retailer DC – Freight Forwarder DC	Road	2km	<1kg
Cairns	Port of Cairns	Freight Forwarder DC – Wharf	Road	3km	<1kg
Cairns	Horn Island	Transshipment delivery	Sea	851km	15kg
Horn Island	Seisia	Sea freight – Wharf	Sea	44km	1kg
Seisia	Bamaga	Wharf - Retailer - Customer	Road	6km	1kg

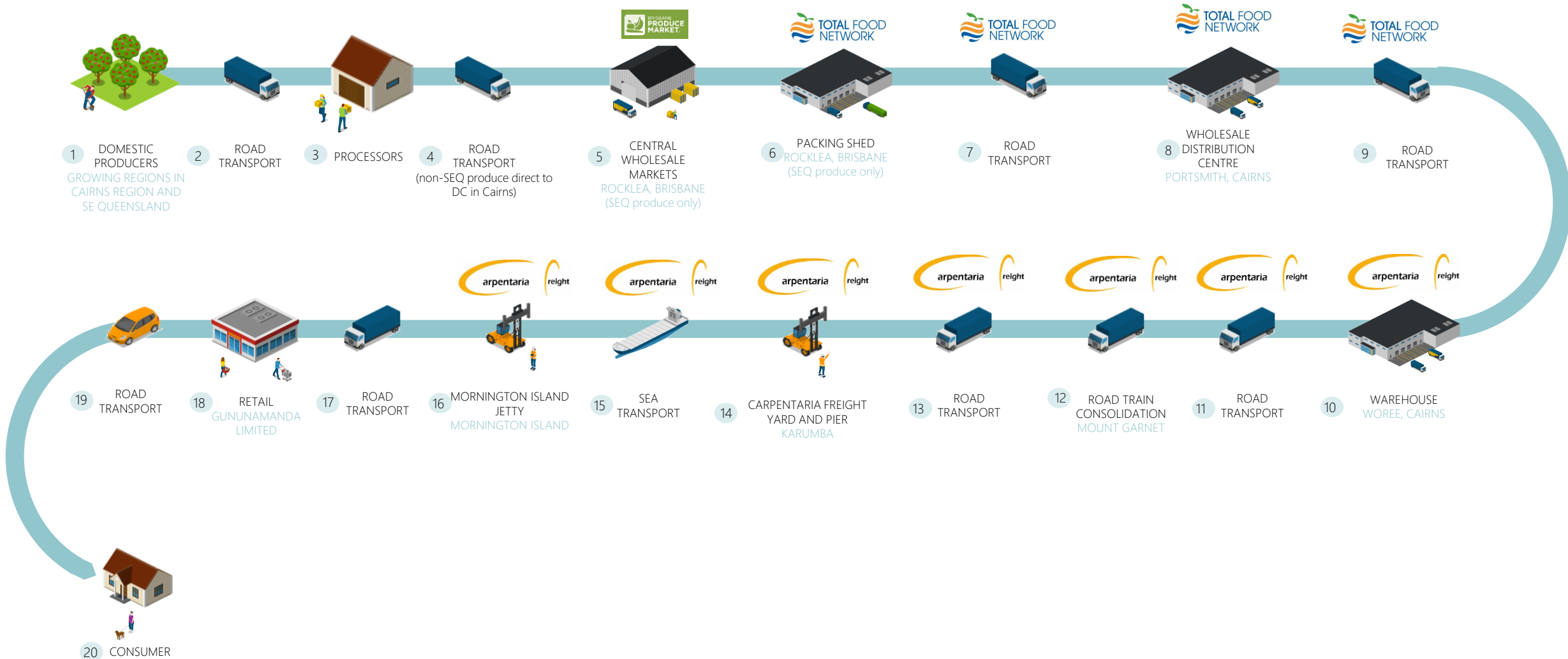
*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

# A4

## Detailed Supply Chain Maps – Mornington Island

# Supply chain map

## Fruit & vegetables functional supply chain map – Mornington Island





# Transport of fruits and vegetables

## Fruit and vegetables travel distance and associated emissions- Mornington Island

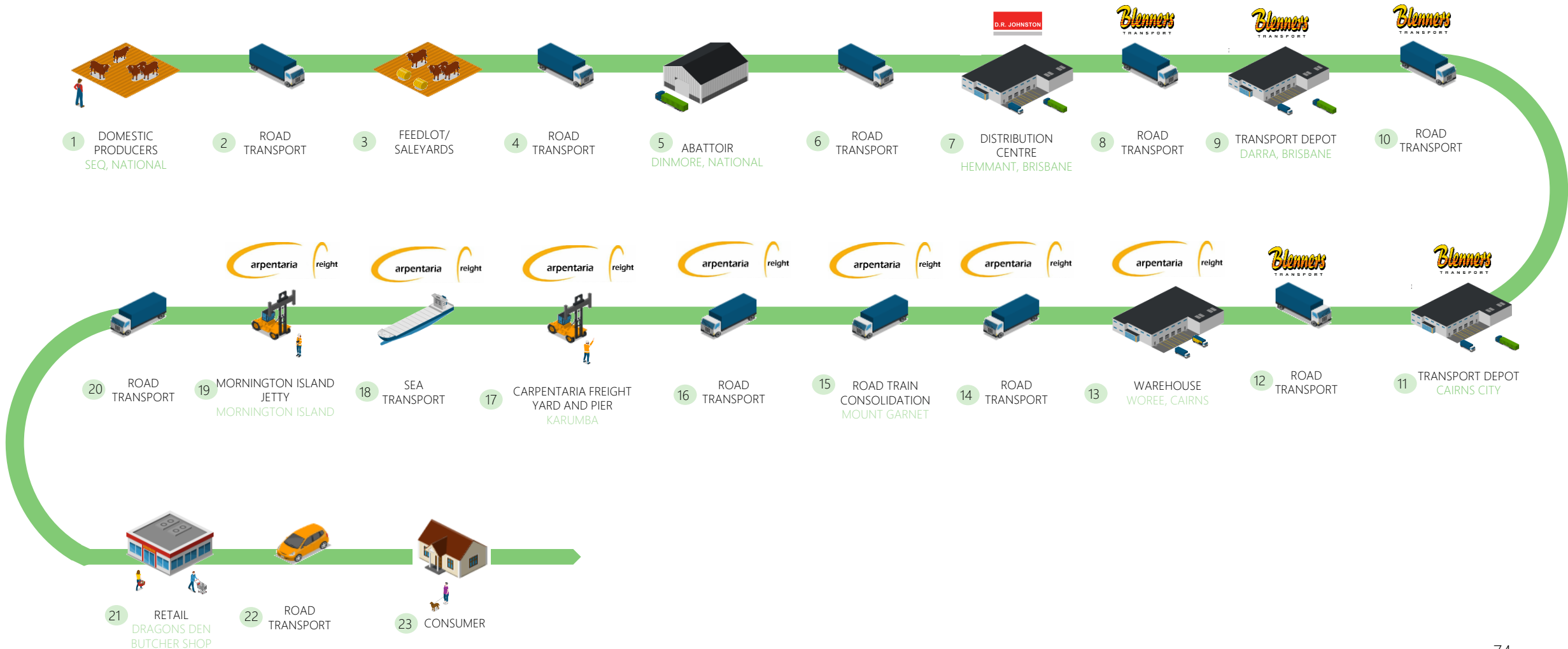
From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Southern Downs	Rocklea	Domestic producer - Wholesaler	Road	160km	14kg
Lockyer Valley	Rocklea	Domestic producer – Wholesaler	Road	98km	9kg
Toowoomba	Rocklea	Domestic producer – Wholesaler	Road	117km	11kg
Rocklea	TFN DC Cairns	DC Transit to Cairns	Road	1,703km	152kg
Tully	TFN DC Cairns	Local Producers – Wholesaler	Road	139km	12kg
Burdekin	TFN DC Cairns	Local Producers – Wholesaler	Road	441km	39kg
Mareeba	TFN DC Cairns	Local Producers – Wholesaler	Road	70km	6kg
Koah	TFN DC Cairns	Local Producers – Wholesaler	Road	45km	4kg
Atherton Tablelands	TFN DC Cairns	Local Producers – Wholesaler	Road	240km	22kg
TFN DC Cairns	Carpentaria Freight warehouse	Retailer DC – Freight Forwarder DC	Road	3.7km	<1kg
Carpentaria Freight warehouse	Mount Garnet Vehicle Consolidation	B-Double Transit	Road	156km	14kg
Mount Garnet Vehicle Consolidation	Karumba	Transport to barge	Road	589km	53kg
Karumba	Mornington Island Jetty	Sea freight – Wharf	Sea	284km	5kg
Mornington Island Jetty	Mornington Island Store	Wharf - Retailer - Customer	Road	1.2km	<1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

# Supply chain map



## Red meat functional supply chain map - Mornington Island



# Transport of red meat

## Red meat travel distance and associated emissions - Mornington Island

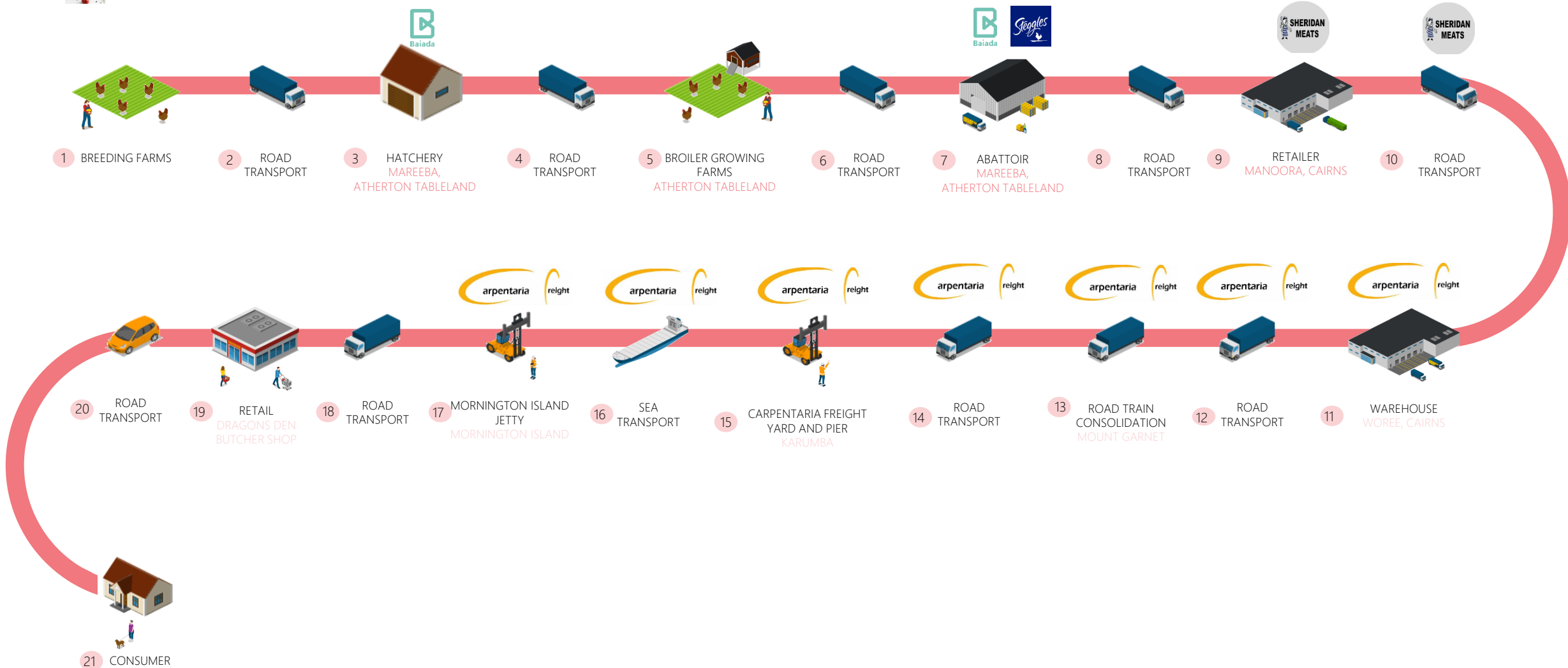
From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Dinmore	Hemmant	Abattoir – Distributor DC	Road	44km	4kg
Hemmant	Darra	Distributor DC – Freight Depot	Road	32km	3kg
Darra	Cairns City	Freight Depot – Freight Depot	Road	1,707km	152kg
Cairns City	Portsmith	Freight Depot – Freight Warehouse	Road	1.3km	<1kg
Carpentaria Freight warehouse	Mount Garnet Vehicle Consolidation	B-Double Transit	Road	156km	14kg
Mount Garnet Vehicle Consolidation	Karumba	Transport to barge	Road	589km	21kg
Karumba	Mornington Island Jetty	Sea freight – Wharf	Sea	284km	13kg
Mornington Island Jetty	Mornington Island Store	Wharf - Retailer - Customer	Road	1.2km	<1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

# Supply chain map



## Chicken functional supply chain map - Mornington Island



# Transport of chicken

## Chicken travel distance and associated emissions - Mornington Island

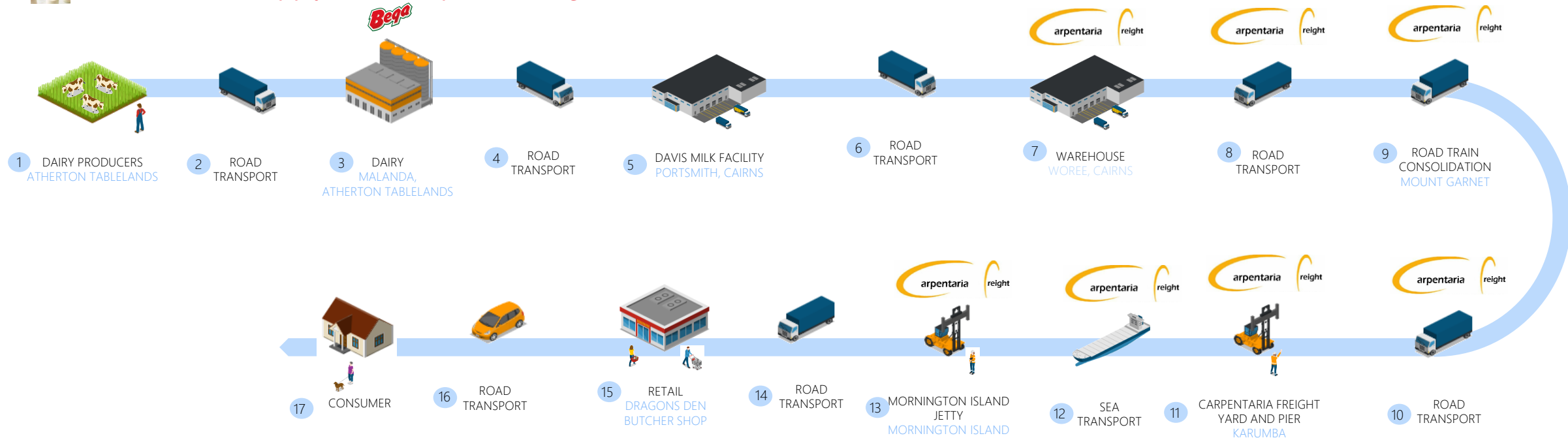
From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Mareeba	Manoora	Abattoir – Supplier	Road	66km	6kg
Manoora	Carpentaria Freight warehouse	Supplier – Freight Warehouse	Road	7km	1kg
Carpentaria Freight warehouse	Mount Garnet Vehicle Consolidation	B-Double Transit	Road	156km	14kg
Mount Garnet Vehicle Consolidation	Karumba	Transport to barge	Road	589km	53kg
Karumba	Mornington Island Jetty	Sea freight – Wharf	Sea	284km	5kg
Mornington Island Jetty	Mornington Island Store	Wharf - Retailer - Customer	Road	1.2km	<1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*



# Supply chain map

## Milk functional supply chain map - Mornington Island



# Transport of milk

## Milk travel distance and associated emissions - Mornington Island

From	To	Movement Type	Mode	Distance	CO <sub>2</sub> Emissions
Atherton Tablelands	Malanda	Diary producers – Diary Factory	Road	5km (est)	<1kg
Malanda	Cairns	Diary Factory – Retailer DC	Road	75km	7kg
Cairns	Cairns	Retailer DC – Freight Forwarder DC	Road	2km	<1kg
Carpentaria Freight warehouse	Mount Garnet Vehicle Consolidation	B-Double Transit	Road	156km	14kg
Mount Garnet Vehicle Consolidation	Karumba	Transport to barge	Road	589km	53kg
Karumba	Mornington Island Jetty	Sea freight – Wharf	Sea	284km	5kg
Mornington Island Jetty	Mornington Island Store	Wharf - Retailer - Customer	Road	1.2km	<1kg

*\*Note that emissions have been calculated on the basis of a single journey for a pallet of goods using vehicles and barges with an average cargo load of 10t and 25t, respectively, operating at 50% capacity across the supply chain.*

