



# SUPPLY CHAIN PERSPECTIVE

SUGAR



**QTLC**

QUEENSLAND TRANSPORT  
AND LOGISTICS COUNCIL

## Overview

Sugar is one of Australia's most important agricultural industries, worth \$1.5b to \$2b annually to the Australian economy. The value of sugar produced in Queensland in 2013 is estimated at \$1.7b, with more than \$1.3b coming from export sales.

According to Canegrowers<sup>1</sup>, the peak group for sugar cane growers, the seasonal industry produces 30-35 megatonnes of cane and 4.5-5.0 megatonnes of raw sugar across approximately 4,300 cane farming businesses in Queensland and northern New South Wales. New South Wales sugar growing and milling operations produce up to 270,000 tonnes of raw sugar annually<sup>2</sup>.

There are 24 sugar mills from Grafton in the south to Mossman in the north, and sugar is exported from seven bulk storage ports. In 2013, more than 30.5 megatonnes of cane was crushed, which produced in excess of 4 megatonnes of sugar. The dry conditions in season 2013 contributed to good sugar content for the Queensland crop, which had an average recovery of commercial cane sugar (CCS) of more than 14<sup>3</sup>. (CCS is a measure of recoverable sugar in the cane.)

## Dimensions

The majority of Australian sugar cane production occurs in Queensland, with the balance in northern New South Wales.

Key facts:

- Australia is the third largest global raw sugar supplier, and the sugar industry is the seventh largest agricultural exporter in Australia.
- 80% of sugar produced is exported.
- 30-35 megatonnes of sugar cane is harvested annually, with 4.5-5 megatonnes of raw sugar, 10 megatonnes of bagasse, 1 megatonne of molasses and 60 megalitres of ethanol<sup>4</sup> produced, with a value of \$1.7b-\$2b<sup>5</sup>.
- The industry consists of 4,300 cane farm businesses, 24 sugar mills owned by seven milling companies, four sugar refineries and seven bulk storage ports<sup>6</sup>.

<sup>1</sup> [www.canegrowers.com.au](http://www.canegrowers.com.au)

<sup>2</sup> CaneGrowers, About the Industry, [www.canegrowers.com.au/page/Industry\\_Centre/About\\_Us/About\\_the\\_Industry/](http://www.canegrowers.com.au/page/Industry_Centre/About_Us/About_the_Industry/)

<sup>3</sup> Sugarcane Statistics, <http://asmc.com.au/industry-overview/statistics/>

<sup>4</sup> [www.biofuelsassociation.com.au/ethanol-production-facilities-in-australia](http://www.biofuelsassociation.com.au/ethanol-production-facilities-in-australia)

<sup>5</sup> CaneGrowers, About the Industry, [www.canegrowers.com.au/page/Industry\\_Centre/About\\_Us/About\\_the\\_Industry/](http://www.canegrowers.com.au/page/Industry_Centre/About_Us/About_the_Industry/)

<sup>6</sup> Sugarcane Statistics, <http://asmc.com.au/industry-overview/statistics/>

The Ports of Townsville and Mackay handle the majority of bulk sugar exports – 53.8% of the 2013 crop – with the balance handled by the Ports of Mourilyan, Lucinda, Cairns, Bundaberg and Brisbane.

**Table 1: Sugar exports by port**

Port	Export tonnes	
	2012/13	%
Raw sugar		
Brisbane	30,680	0.9%
Bundaberg	204,800	6.0%
Cairns	187,023	5.4%
Lucinda	424,103	12.3%
Mackay	754,647	22.0%
Mourilyan	423,325	12.3%
Townsville	1,091,626	31.8%
Refined sugar		
Mackay	318,493	9.3%
Total	3,434,697	

Source: Trade port statistics for the five years ending June 2013, Queensland Department of Transport and Main Roads

## ➤ Number of people working and businesses involved

Table 2 shows operations and outputs for 2012/13.

**Table 2: Employment and companies involved**

Industry snapshot 2012/13	Size and employment
Mills	24
Milling companies	7
Growers	4,300
Total employment	16,000
Hectares harvested	371,000
	<b>Production</b>
Cane crushed	30,500 megatonnes
Sugar produced	4,360 megatonnes
Sugar exports	3,450 megatonnes
	<b>Revenue</b>
Industry revenue	\$2b
Value sugar exports	\$1,4b

Source: Sugarcane statistics, <http://asmc.com.au/industry-overview/statistics/>

Table 3 and Figure 1 show sugar cane production and processing areas in Queensland.

**Table 3: Sugar cane production and processing areas**

<b>Northern region (5)</b>	<b>Herbert-Burdekin Region (6)</b>	<b>Mackay-Proserpine Region (5)</b>	<b>Southern region (5)</b>
Mossman (Mackay)	Victoria (Wilmar)	Proserpine (Wilmar)	Maryborough (MSF)
Tableland (MSF)	Macknade (Wilmar)	Marian (Mackay)	Millaquin (BS)
Mulgrave (MSF)	Pioneer (Wilmar)	Farleigh (Mackay)	Bingera (BS)
South Johnstone (MSF)	Inkerman (Wilmar)	Racecourse (Mackay)	Isis (Isis)
Tully (COFCO)	Invicta (Wilmar)	Plane Creek (Wilmar)	Rocky Point (HECK)
	Kalamia (Wilmar)		

Source: Canegrowers, [www.canegrowers.com.au/page/Industry\\_Centre/About\\_Us/Statistics\\_facts\\_figures/](http://www.canegrowers.com.au/page/Industry_Centre/About_Us/Statistics_facts_figures/)

## Points of value add, transformation and consumption

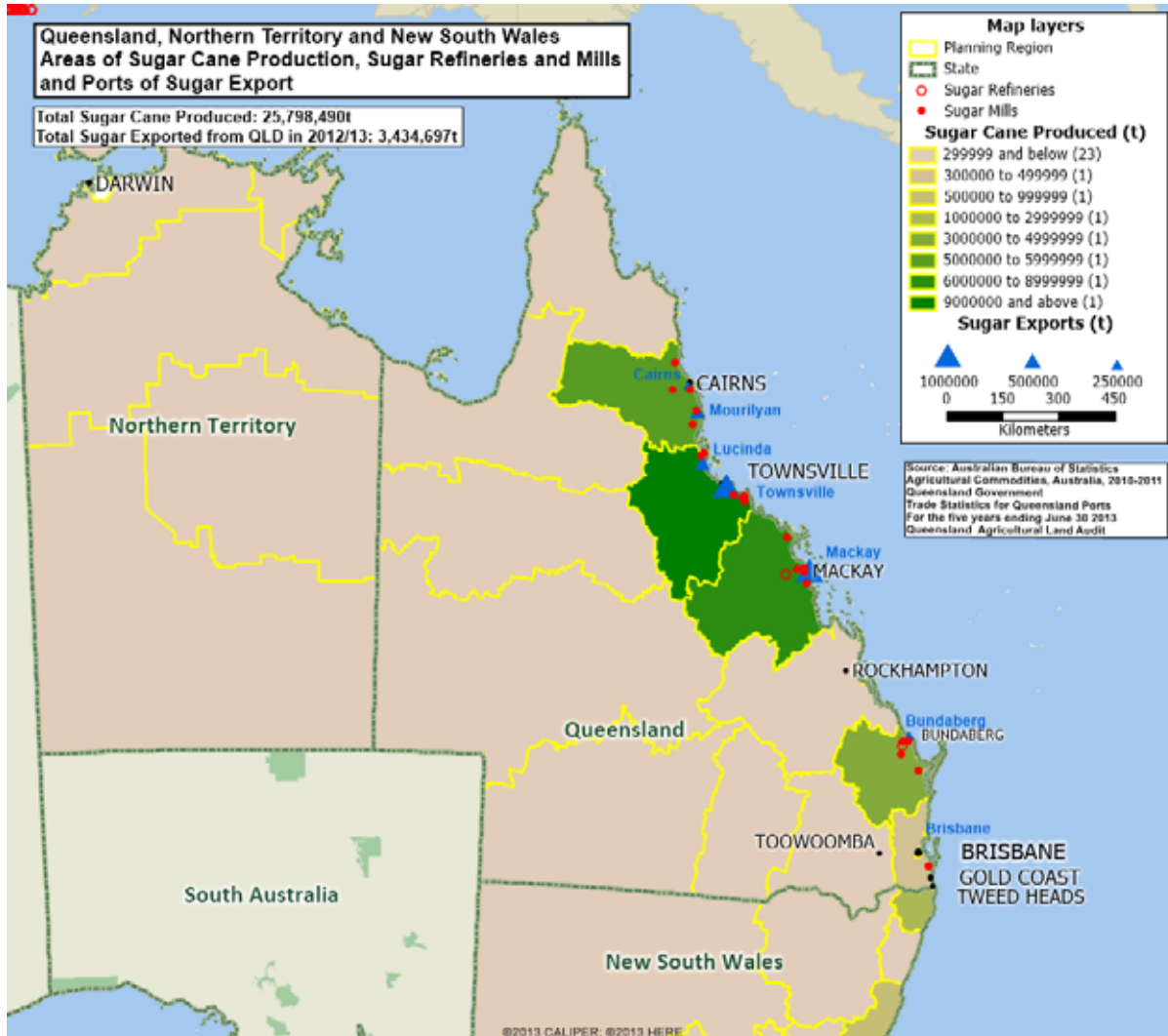
Raw and refined sugar is used in both export and domestic markets. Approximately 80% of sugar is exported, with the remaining 20% used domestically<sup>7</sup>. Australia's refineries are located at:

- Bundaberg
- Mackay
- Harwood at Yamba, New South Wales
- Ingham, Victoria.

<sup>7</sup> CaneGrowers, About the Industry, [www.canegrowers.com.au/page/Industry\\_Centre/About\\_Us/About\\_the\\_Industry/](http://www.canegrowers.com.au/page/Industry_Centre/About_Us/About_the_Industry/)

Figure 1 shows the areas of sugar cane production in Queensland and northern New South Wales, as well as the ports for sugar export in Queensland.

**Figure 1: Sugar cane production and exports, Queensland**



Raw sugar for domestic use is refined into white and specialty sugar products. This accounts for 22% of the total domestic consumption, which goes into retail packs for home use. The remaining domestic production, or 15.6% of total annual production, is used in a number of products including<sup>8</sup>:

- beverages
- retail
- confectionary
- bakery products
- preserved food
- alcoholic beverages
- dairy products.

These domestic products form part of the fast-moving consumer goods (FMCG) to-market channel. This channel, via distribution centres, is for final distribution to retail outlets or to food manufacturing production facilities. From production facilities, the finished goods then use the same and/or similar retail distribution channels to market.

<sup>8</sup> CaneGrowers, About the Industry, [http://www.canegrowers.com.au/page/Industry\\_Centre/About\\_Us/About\\_the\\_Industry/](http://www.canegrowers.com.au/page/Industry_Centre/About_Us/About_the_Industry/)

## Transport movements

Transport movements in the sugar industry occur in three forms:

- an unprocessed state as billets of harvested whole stick cane from farm to mill
- a raw sugar state from mill to refinery then to port
- a refined sugar state from refinery to port or domestic value adding and local consumption.

### ➤ Cane transport<sup>9</sup>

Australian sugar mills own and operate a network of 4,200 km of narrow gauge (610 mm) railway used by 220 locomotives and 50,000 rail bins, transporting approximately 90% of the harvested cane. Only seven mills are dependent on road transport, representing the 10% balance of the haulage task.

Computerised transport scheduling systems help reduce delivery delays. Point of delivery is either on-farm, or at a rail siding or transfer point. Farmers in new areas of production are required to contribute to cane transport costs.

During the 2013 season, an estimated 10%, or 3.05 megatonnes, of cane was transported by road. The unit of movement for road transport is a mix of standard articulated vehicles and B-Double configurations.

The load carrying capacity of these different configurations is between 20 tonnes and 30 tonnes per vehicle. The estimate for road related movements of cane is 120,000 a year.

<sup>9</sup> Australian Sugar Milling Council, 'Cane railways in the sugar industry', <http://asmc.com.au/wp-content/uploads/2013/08/Cane-railway-fact-sheet.pdf>

### ➤ Raw and/or refined sugar transport

Queensland raw sugar is transported by road, government railway or mill-owned railway to the seven bulk terminals. All New South Wales raw sugar is transported by road to the Harwood refinery.

Around 1.2 million tonnes of raw sugar is moved on rail from Burdekin to the Port of Townsville each year. A further 140,000 tonnes is moved by rail to the Port of Mackay. These freight contracts are likely to transition from rail to road freight within the next two years, given the flexible capacity road transport offers to agricultural producers.

In 2011/12, an estimated 62,000 heavy vehicle movements (124,000 return movements) were required to transport sugar product from mills to port and first points of distribution in domestic markets. This number is expected to increase with the forecast growth in production over the next five years<sup>10</sup>.

### ➤ Bulk storage

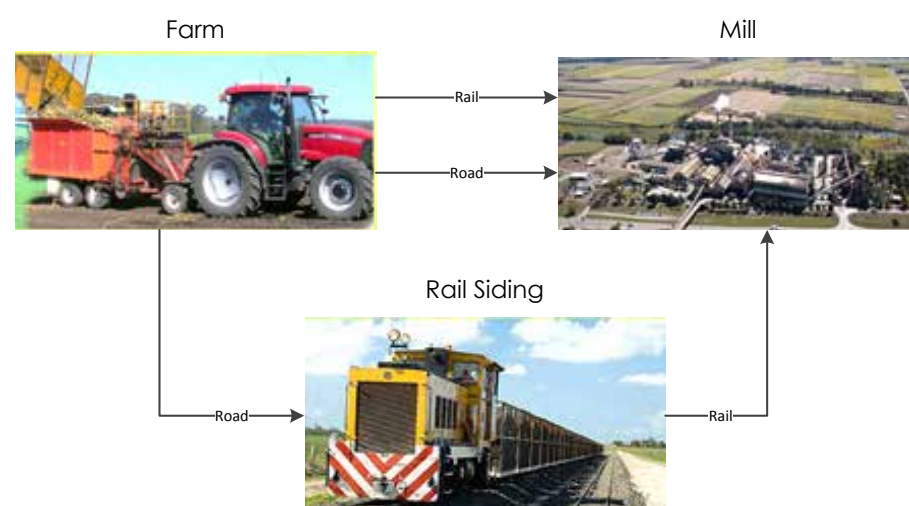
Queensland's raw sugar storage and handling system is one of the largest in the world<sup>11</sup>. More than two million tonnes of raw sugar storage capacity is available across the state's seven bulk handling ports, allowing for buffer stocks to supply domestic and international refineries on a consistent basis.

The equipment and technology used at bulk sugar terminals allows for 25,000 tonnes of raw sugar to be loaded onto vessels in less than a day. When required from storage, the raw sugar is fed through hoppers in the terminal shed floor to underground conveyors, which then feed the ship loaders that fill the vessels hold.

<sup>10</sup> Heavy Vehicle Action Plan Stage 2, Route Identification, Queensland Department of Transport and Main Roads, June 2013

<sup>11</sup> [www.bundysugar.com.au/education/process/storage](http://www.bundysugar.com.au/education/process/storage)

**Figure 2: Farm to mill transport**



The typical unit of transport movement is in two parts, as follows.

### ➔ Cane transport mode

Cane is moved from farm to mill via a private rail network by the millers themselves, or via road in heavy vehicle articulated combinations. The private rail network uses narrow 610 mm gauge line, and the locomotives haul six-tonne cane bins. The only interaction with the general population is at road level crossings.

The road haulage involves standard prime movers, hauling single articulated trailers and in some instances B-Double trailers. The rail bins can be carried on these trailers, or purpose-built bins are fitted to these trailers for transfer to the mill.

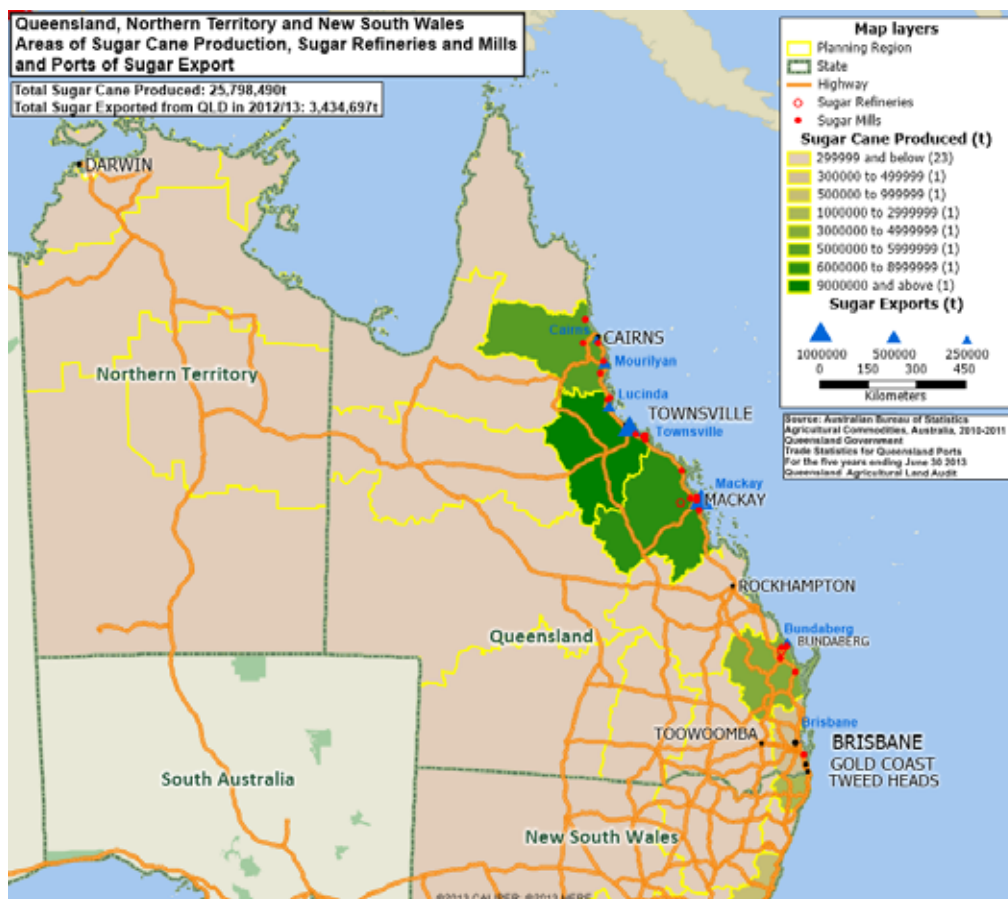
### ➔ Raw and/or refined sugar transport mode

Purpose-built bulk haulage trailers are used on this freight task. As the raw sugar is now a food product, care is required in handling and movement to ensure product integrity. The trailing unit is designed to suit the end-to-end handling requirements. Raw sugar can be carried using tippers, or unitised onto pallets, and the refined sugar – a high food grade product – is transported in sealed and pressure-vacuumed purpose-built trailers, or as bagged product on pallets

## Main routes

Much of the cane transport occurs on country roads that connect the cane farms to the initial transfer points, for collection by cane railway or road. Mills are typically located close to regional towns, and in close proximity to the growing areas. Once cane is harvested, it has a very short life, which dictates a quick transport response to the mills for processing. The movement of sugar is then via road networks to the ports, where storage and export activity occurs. With close to 80% of cane grown in Queensland being produced in regions from Mackay to the north, most of the transport activity occurs in this region.

**Figure 3: Main routes**



## Key nodal infrastructure

The key nodal points in the cane and sugar supply chain are:

- farms
- cane load and transfer points: farm to rail, farm to road
- mills
- refineries
- ports, harbours, berths and bulk sugar handling equipment
- food manufacturing facilities
- fast-moving consumer goods (FMCG) distribution facilities.

## Change in the supply chain

Over the last 20 years, the sugar industry has undergone reform due to:

- a significant period of growth and consolidation in milling – currently 24 mills are owned by seven companies, down from 33 mills owned by 19 companies in 1980
- an increase in off-shore investment, with all mills and refineries foreign-owned, excluding the New South Wales cooperative; this has led to opportunity for investment and increasing production as Australian raw sugar is in high demand and global consumption is increasing at 2% a year
- an increase in cane yield per hectare, through advances in research and development<sup>12</sup>.

Any expansion in the sugar industry would require significant investment, as the distance between growing and milling must be kept short to protect the harvested crop. The time between harvesting cane and arrival at mill is around 12 hours. This factor may limit any significant expansion of the industry in the future<sup>13</sup>.

<sup>12</sup> [www.qsl.com.au/sites/default/files/QSL%20FO%20Licht%20presentation%20China%20Sept%202011.pdf](http://www.qsl.com.au/sites/default/files/QSL%20FO%20Licht%20presentation%20China%20Sept%202011.pdf)

<sup>13</sup> Queensland Agricultural Land Audit, Statewide Overview Chapter 3, Queensland Department of Agriculture, Fisheries and Forestry, 2012