



Freightline 6 – Australian rice freight transport

The *Freightline* series is intended to provide information about where freight moves in Australia. This issue focusses on the transport of rice in Australia. It provides a picture of rice movements in 2015–16.

At a glance

- Australian rice production totalled 274 kilotonnes in 2015–16, which is approximately 40 per cent of total production in 2014–15, and about half of average annual production over the last eight years. Just over 80 per cent of total domestic rice production is exported in a typical non-drought year.
- Nearly all Australian rice production is located in the Murrumbidgee and Murray River areas in New South Wales and Victoria. Over 95 per cent of Australia's total rice output is produced in New South Wales.
- The total area of rice planted decreased to 26.6 hectares in 2015–16, which was approximately 40 per cent of the total area planted in 2014–15.
- Melbourne is the main export port for rice, accounting for approximately 95 per cent of exports, by weight.
- The rice industry generates revenues of around \$800 million per annum, with around \$500 million of this derived from value-added exports.

BITRE estimates that the domestic rice transport task was approximately 94 million tonne kilometres¹ in 2015–16, with approximately 76 per cent of this task handled by road transport. This includes movement of paddy rice from farms to mills and milled rice moved to export ports, but excludes movements of packaged rice destined for domestic consumption.

Introduction

Increased policy focus on freight, and the adequacy of infrastructure to support Australia's growing freight task, is increasing the demand for more detailed information on where and how freight moves. Detailed data on freight movements, however, is either expensive to collect, owing to the breadth and diversity of the task, or, where it involves a small number of companies (e.g. rail), availability is restricted by confidentiality concerns. As a consequence, there is generally little current data available.

Information on the size and scope of rural and agricultural commodity transport tasks is particularly lacking. This limits the information base for infrastructure planning, both in terms of understanding current transport flows and in assessing infrastructure bottlenecks (RIRDC 2011), and inhibits governments' ability to develop appropriate policy responses and assess competing infrastructure needs. The lack of adequate information and

1. One tonne kilometre is equivalent to one tonne moved one kilometre.

timely investment can ultimately affect costs faced by agricultural producers who face increasing input costs, as well as seasonal and climatic challenges.

This issue of *Freightline* focuses on where and how Australia's raw rice harvest is transported from farms to export ports, including key elements of the rice supply chain—storage, milling and export.² Estimates of rice freight movements for 2015–16 are presented, based on modelling of regional supply and use. Movements of rice by-products, including rice husks and bran—by-products after milling—and the rice straw produced during harvesting, are not considered in this issue, nor are movements of packaged rice destined for domestic consumption.

Australian rice industry

Rice production

The Australian rice industry has the capacity to produce just over one million tonnes of rice each season, under favourable growing conditions. In 2012–13, total rice production reached a recent high of approximately 1161 kilotonnes, however, production has dropped significantly since then, to a six-year low of 274 kilotonnes in 2015–16. Although Australian rice producers use 50 per cent less water than the global average, Australian rice production is highly dependent on the amount of water available to irrigators (RGA 2017).³ In particular, during the height of the 'Millennial drought', in mid-to-late 2000s, rice production fell to less than 20 kilotonnes in 2007–08 and around 60 kilotonnes in 2008–09 (ABARES 2017).

The total area of rice planted varies with water availability, and directly impacts production levels—the total area planted was also at a six-year low in 2015–16.

Table 1, below, shows rice production, planting, yields and export volumes by crop year between 2008–09 and 2015–16.

Table 1 Australian rice production and export volumes, 2008–09 to 2015–16

Measure	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16
Total area planted ('000 ha)	7.2	18.9	75.8	103	113	74.9	69.7	26.6
Rice production (kt) ^a	60.9	197	723	919	1161	819	690	274
Yield (t/ha)	8.5	10.4	9.5	8.9	10.3	10.9	9.9	10.3
Export volume (kt) ^b	44.9	20.8	91.4	501	577	561	481	366

a. Paddy rice

b. Milled rice.

Note: Export volumes are related to the previous year crop harvest.

Sources: ABARES (2017) and BITRE estimates.

Figure 1 shows the rice growing regions of Australia. Nearly all domestic rice production is located in the Murrumbidgee Irrigation Area of New South Wales and the Murray Valley in New South Wales and Victoria. Over 95 per cent of Australia's rice output is produced in New South Wales (approximately 262.4 kilotonnes in 2015–16). According to ABS (2017), there are also small amounts of rice grown in northern New South Wales, around Lismore, and northern Queensland, around Ayr and Brandon (south of Townsville) and around Tully (between Townsville and Cairns).⁴

Rice crops in Australia are mostly planted in October and harvested from March to May (RGA 2017a). Consequently, the majority of rice exports tend to occur in the financial year following the crop harvest.

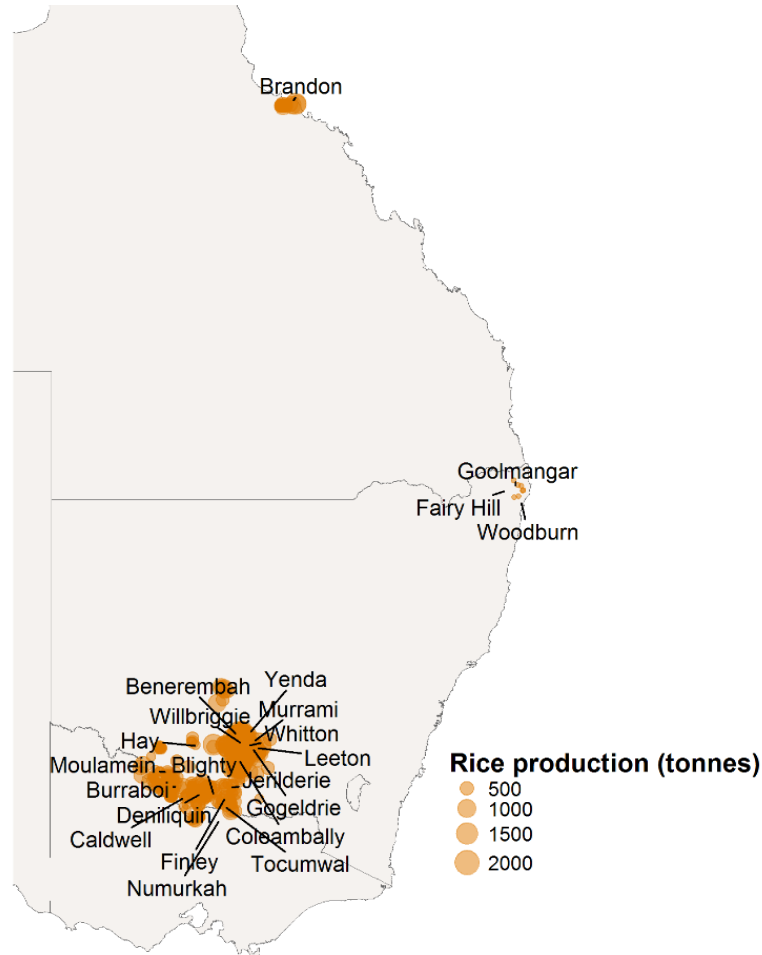
2. CSIRO's TraNSIT tool also uses a computer-based approach to model commodity transport volumes across the road and rail network in great detail, providing estimates of freight-related road and rail vehicle movements across the network (Higgins et al. 2017). The BITRE's modelling approach is similar to TraNSIT, but relies only on publicly-available information and hence, while not as detailed, can provide estimates of interregional freight volumes.

3. In order to produce rice, rice growers need approval from their irrigation infrastructure operator who must comply with the water license issued by the State Government and follow the rice water use policies of the various irrigation corporations.

4. ABS (2017) also reports very small volumes grown outside Darwin in 2015–16, but these are not included in the analysis and estimates presented herein.

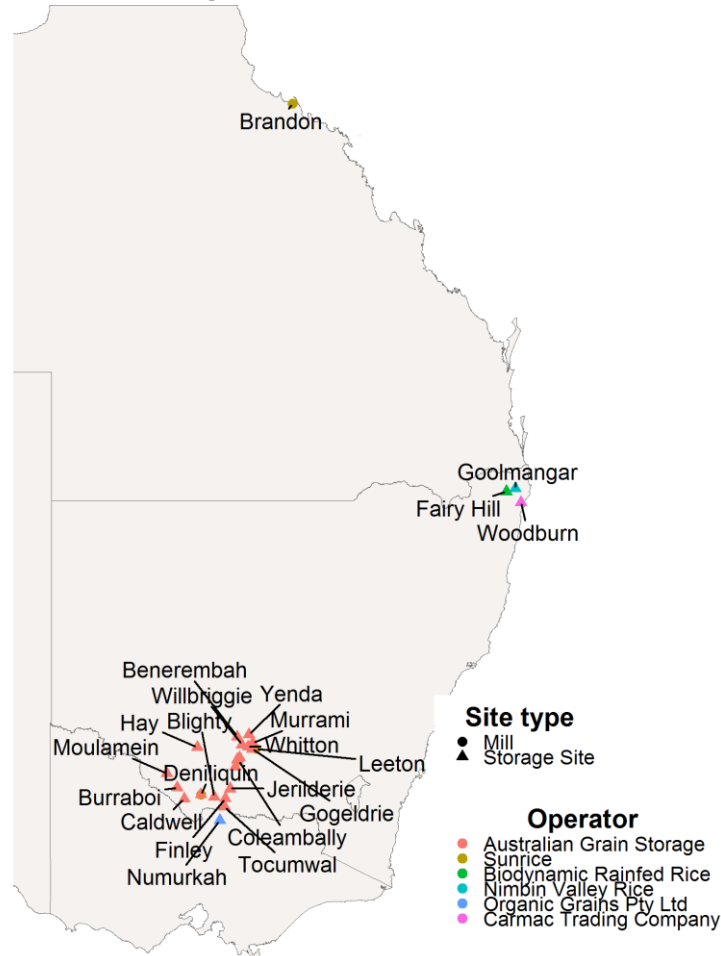
Once harvested, the unmilled rice—known as paddy rice—is transported to a paddy storage facility where the rice is sorted according to variety. It is then transported to industry mills for processing. The milling process involves the removal of the hard protective husk, and the germ and brown layers. These can be used to produce animal feed. The polished, white hard centre of the grain is what is known as white rice. The location of paddy storage facilities and industry mills are shown in Figure 2.

Figure 1 Rice growing areas, Australia, 2015-16



Sources: ABS (2017a) and BITRE estimates.

Figure 2 Location of rice storage facilities and mills in Australia



Source: Rice storage/milling companies.

Marketing arrangements

According to the Rice Growers Association of Australia (RGA), rice is Australia's third largest cereal grain export, and the ninth largest agricultural export (RGA 2017b)—however, this varies from year-to-year with prevailing growing conditions. In 2015–16, Australian rice exports totalled approximately 366 kilotonnes—which predominantly relates to the crop harvested in 2014–15. Export volume in 2016–17 are estimated to have been 177 kilotonnes (ABARES 2017). The rice industry generates around \$800 million per annum, with around \$500 million of this coming from value-added exports (RGA 2017b).

The *Rice Marketing Act 1983 (NSW)* provides the Rice Marketing Board for the state of NSW (RMB) with the legal right to control the marketing of all rice produced in New South Wales. The Board also issues a sole and exclusive license for exports, which is currently held by Ricegrowers Limited, trading as SunRice (RMB 2017a). In a non-drought year, SunRice exports up to 80 per cent of Australian rice production to more than 60 overseas destinations (RGA 2017a). The remaining 20 per cent of domestic production supplies the domestic market. Australian exports represent about 2 per cent of total world rice trade.

The domestic rice market operates under an 'authorised buyer scheme'. Since 2006, RMB is in charge of issuing licenses to authorised buyers to trade domestically. RMB (2017b) notes currently authorised buyers include:

- Ricegrowers Limited (trading as SunRice);
- Graincorp Limited;
- Slater Farms;
- GJ & BJ Woolley;
- Frank Boyle;

- Organic Grains Pty Ltd;
- Carmac Trading Pty Ltd (trading as OzRice);
- PS & JM Randall;
- Australian Food and Agriculture Company Limited;
- Natural Rice Co Pty Ltd; and
- RG and WL Heffer.

Rice-related freight movements

Transport and storage

Where and how rice is moved depends on a number of factors, including prices, market volumes, transport costs and transport capacity. Transport of Australia’s rice harvest is currently handled by a mix of road and rail transport modes. Movement of paddy rice from the farm to the paddy storage facility for sorting is handled almost exclusively by road transport. Road transport is also used to transport unmilled rice to the industry mills for processing. Finally, a mix of rail and road transport is used to transport the milled, white rice to authorised domestic buyers and to ports for export to overseas markets. Figure 3 provides a simple schematic diagram showing the key elements of the Australian rice supply chain.

Figure 3 Stylised rice supply chain



Rice transport patterns and freight volumes

The purpose of the *Freightline* series is to illustrate where and how freight moves. Figure 4 provides an illustration of the size and scope of rice freight movements across Australia in 2015–16. It has been derived by modelling rice movements between areas of production to export ports. The modelled results illustrate the flow of paddy rice from farm to storage and storage to mills, and milled rice from mills to ports for export, by transport mode. The difference between total production volumes and total exports is in part due to the milling process and in part due to domestic usage.

Transportation by road currently dominates the rice supply chain in Australia. Figure 4 shows significant road volumes for transportation from areas of production to ports. Figure 5 reproduces the results shown in Figure 4, but depicts the road and rail rice transport volumes separately for clarity, and Figure 6 shows the same, but focusses on the main growing regions in southern New South Wales and Victoria.

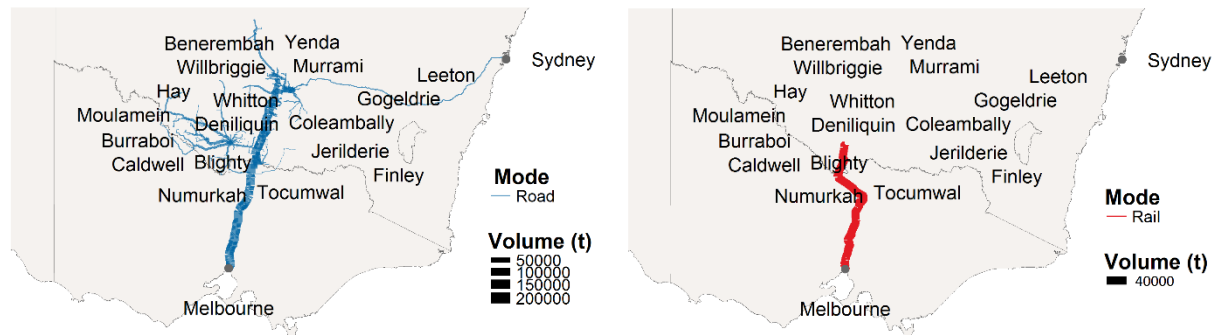
Unfortunately, rice exports are confidentialised in ABS export statistics so it is difficult to be definitive about export volumes through each port, however, based on information available for prior years, BITRE infers that most rice is exported through the Port of Melbourne (see Table 2).

Table 2 Estimated Australian rice exports, by delivery mode, for 2015–16 production

Port	Mode			Mode		
	Road	Rail	Total	Road	Rail	Total
	<i>(kilotonnes)</i>			<i>(per cent)</i>		
Brisbane	6.9	0	6.9	100.0	0.0	3.9
Sydney	1.5	0	1.5	100.0	0.0	1.0
Melbourne	126.2	42.7	168.9	74.7	25.3	95.2
Total	134.7	42.7	177.4	75.5	24.5	100.0

Source: BITRE estimates.

Figure 6 Road and rail rice transport movements, southern New South Wales and Victoria, 2015–16



Source: BITRE estimates.

Overall, BITRE estimates total rail movements of rice were approximately 13 million tonne kilometres in 2015–16 with total road freight movements estimated to have been 81 million tonne kilometres (see Table 3).

Table 3 Estimated rice production and rice transport movement volumes, by mode and jurisdiction, 2015–16

Jurisdiction	Road	Rail	Total	Production
	<i>(million tonne kilometres)</i>			<i>(kilotonnes)</i>
New South Wales	33.5	2.9	36.4	262
Queensland	14.6	0.0	14.6	10
Victoria	32.7	10.1	42.8	0
Total	80.8	13.0	93.8	272

a. Total tonnage presented on uplift/discharge basis, based on uplift state of origin.

Note: Figures may not add to total due to rounding.

Source: BITRE estimates.

Other issues

The estimates of rice supply chain movements presented here are based on rice production data in 2015–16 and total exports in 2016–17, which are assumed to be related primarily to the previous year's harvest. The estimates also do not take into consideration the variation in rice movements across different years nor consider seasonal variations in rice movements.

Concluding remarks

This *Freightline* issue attempts to provide information about rice freight movements in Australia. The estimates presented in the paper are based on modelled rice flows—from farms to export ports—based on assumptions about the proximity of sites, transport costs and transport service availability. Consequently, the flows are indicative estimates of likely freight movements and may not reflect the actual modal pattern and volume of rice movements. Nonetheless, these estimates are, as far as BITRE is aware, the most up-to-date publicly-available estimates of Australian rice supply chain transport volumes.

References

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