Containerised Grain Industry Profile

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Department of Economic Development, Jobs, Transport & Resources

State Government Victoria

Victoria's Containerised Grain Industry

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Key points

- The Containerised Grain Trade Industry profile provides an overview of the location, structure and performance of Victoria's containerised grains trade industry.
- Victorian exports of grain in containers have grown significantly from 215,528 tonnes in 2001, to 2,232,000 tonnes in 2011.
- The most common grains exported in containers are wheat, malt and feed barley, pulses (mainly lentils and beans), corn, sorghum and canola.
- In 2013-14, the main export destinations for Victoria's containerised grains were China, Indonesia, Vietnam, Myanmar, Taiwan for wheat; Egypt, Bangladesh, India, Sri Lanka for pulses (incl. lentils, chickpeas, beans) and South Korea, Malaysia and Taiwan for soybeans.
- During the past 12 months, China has significantly increased its imports of Victorian containerised wheat from 55,000 tonnes to more than 230,000 tonnes (2013-14 period).

Structure of Victoria's containerised grain industry

There are two broad categories of movements of grain both domestically and abroad: bulk and non-bulk (bags and containers)[1]. Bulk transporting of grains was introduced to Victoria in the early 1940s following the introduction of bulk elevators in others countries, most importantly the United Kingdom. The bulk handling system moved industry away from predominantly transporting grain in bags on cargo ships (break-bulk) and encouraged the building of infrastructure to support a new system of bulk handling of grain in Victoria. The new infrastructure decreased vessel loading time from seven days for break-bulk shipping to one day for bulk loading (64,000 bushels/hour)[2].

Even with the invention of intermodal containerisation in the 1950s and containerised shipping in the 1960s, bulk handling of grain remains the predominant method of transporting Victorian grain. However, containers have revolutionised the shipping industry and transformed ports globally, including the Port of Melbourne which upgraded its dock in the early 1960s to facilitate the container shipping trade. The more efficient container shipping system has led to the reduction in break-bulk vessels, which continue to take bagged grains like pulses. Victorian grain growers have added containers to their choices of how to ship grain both domestically (for example from Victoria to Tasmania) and abroad.

Grains for containers are sourced from farms in the grain growing areas of Victoria that supply the bulk system, as well as nearby regions in South Australia and New South Wales (e.g. the Riverina). Grains most commonly packed into containers are high value grains but any grain can be packed into a container depending on destination market demands and market structures. Grain most commonly packed in containers are wheat, barley, canola, sorghum, pulses and oats[3].

Location of Victoria's containerised grain production

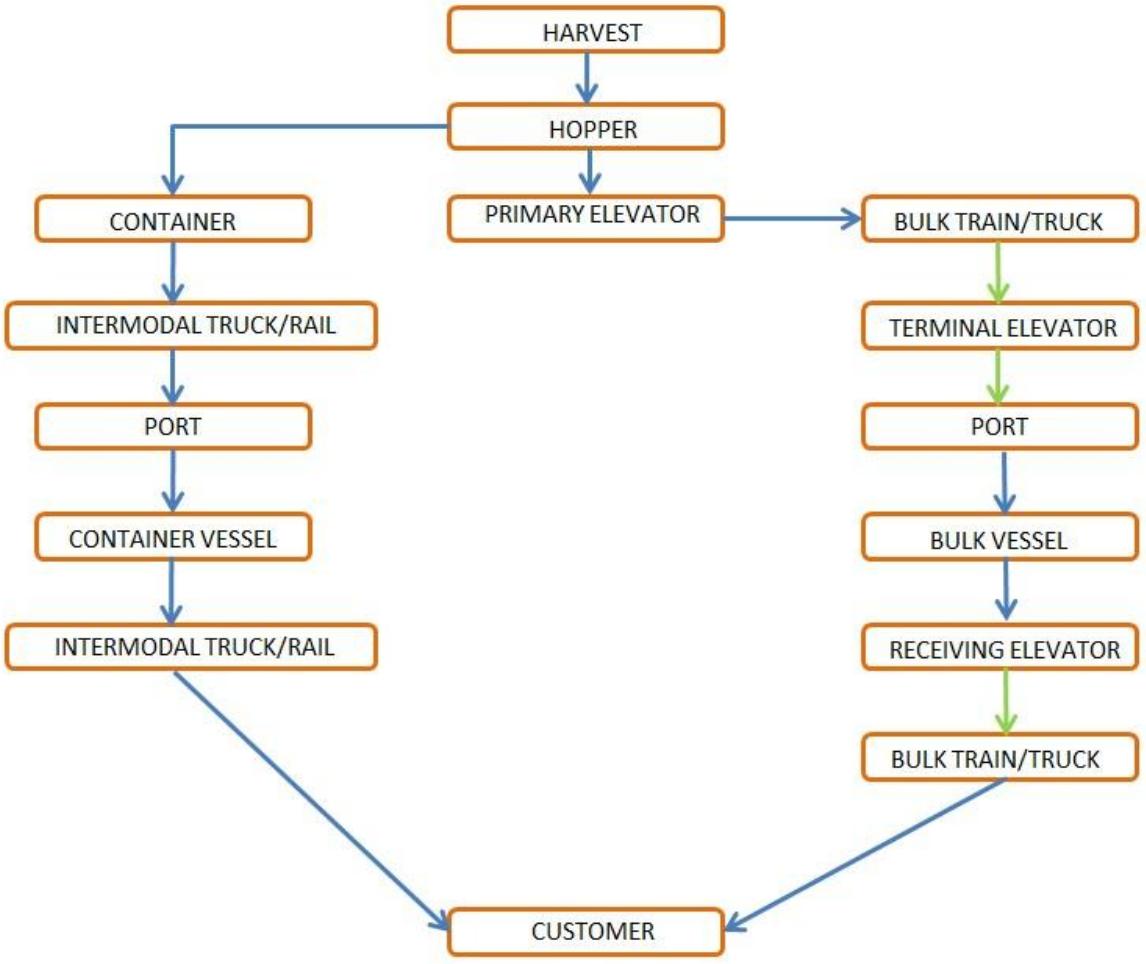
Victoria has three grain export port terminals - Port of Melbourne, Port of Portland and Port of Geelong. All three ports have bulk grain facilities, but the Port of Melbourne is currently Victoria's only container port. The Port of Melbourne is also Australia's largest container shipping port, handling 36% of Australia's container trade[4].

Grain is containerised for packing and processing in facilities located across Victoria in Horsham, Merbein, Dooen, Lara, Laverton, Sunshine, Geelong and Melbourne. There is also a facility in Tocumwal, NSW that packs Victorian grain. Some of these sites are located close to the rail lines that service Melbourne, Adelaide and Sydney. The majority of Victoria's containerised grain is transported by road to the Port of Melbourne[5]. GrainCorp has facilities at Geelong for packing and processing grain sourced from its bulk storage into containers for transport by truck to container shipping port or for the domestic market[6].

Victorian containerised grain industry production

Containers can be packed with grain anywhere along the supply chain from the farm to the Port, however, containers are more commonly packed with grain at container packing and processing facilities located in regional Victoria close to the grain supply or nearer to the ports closer to the container supply. The processing of grains from farm to delivery is summarised in Figure 1.

Figure 1 – How grain is processed and delivered from harvest to customer



*Blue arrows indicate steps where grain is manually handled

At the container packing and processing facilities, containers are sourced from one of the many container parks. The containers are checked to ensure they are clean, free of residues or insects that may contaminant the grain and generally export ready. Containers must be inspected by the Department of Agriculture's Biosecurity officers before the container and its cargo can approved for export. Packers may choose to add container liners for containers to improve the quality of the container but the container still needs to pass inspection by the Department of Agriculture Biosecurity before the liner is added[7,8].

The container may be packed with grain in bags either directly onto the container floor or on pallets. This is common for grains like pulses that are better suited to bagging in 25kg and 50kg lots. In the case of wheat and barley, the container is more likely to be filled directly with grain rather than with the use of grain bags. To directly fill the container, packers may alter the container by creating a bulkhead to hold the grain. Packers often also prepare the export documentation to enable the container and cargo to pass quarantine, take grain samples for government testing for residues and fumigate the grain in accordance with Australia requirements under the Export Control Act 1982 and subordinate legislation, as well as applying any importing country's requirements[9].

The predominant container size used for grains is the 20 foot container with usual load weights varying between 20 and 25 tonnes of grain. While 40 foot containers can be used, their weight limit is very similar to the 20 foot container and filling them with grains can easily result in exceeded capacity. A full 40 foot container of grain is simply too heavy for truck transport and generally has maximal pay load of 25-26 tonnes, only one or two tonnes more than a 20 foot container (See Table 1). The 40 foot container obviously utilises greater space on the ship for a similar net cargo weight, translating to a higher freight rate per tonne. The abundant supply of 40 foot containers has however encouraged exporters to use them.

Table 1 - Comparison of standard container size, volume and weight limit[10]

Container Type	Capacity, m^3	Maximum Payload, kg	Tare Weight, kg	Maximum Gross, kg
20 foot (20')	33.2	28,260	2,220	30,480
40 foot (40')	67.7	28,860	3,640	32,500

Packers are required to ensure that the weight of the container loaded with grain does not exceed the specified weight limit for the container nor Australia's road or rail weight limits. Grains vary significantly in their density with wheat considered a heavy grain with average weight being 80kg/100L, barley lighter at 70kg/100L and oats and malt both lighter than barley. Pulses are generally between 70 to 80kg/100L with the exception of lentils which are heavier. This means the fill height for containers containing wheat and pulses will be lower than those filled with malt and barley[11].

Once packed/filled, containers are transported by rail or road to their domestic destination or to a sea port for export. Approximately 22 per cent of containerised grain is transported by rail to the Port of Melbourne each year[12]. Once the grain arrives at port, it will be stored for a short period while awaiting loading onto a ship.

While the majority of grain packed in containers in Victoria is exported from the Port Melbourne, Victorian containerised grains are also regularly exported from Adelaide and Sydney. The Port of Adelaide has a direct rail link from Dooen in Victoria where Viterra has a container packing facility. While existing infrastructure play an important role in determining the port of departure, other factors including port costs, transport costs, shipping costs, and departure dates of freight vessels also influence the decision.

Victoria's exports and domestic consumption of containerised grain

On average only 45% of grain grown in Victoria will be exported with most of it being consumed by the domestic market. In the domestic market, containers are becoming a more common method of transporting grain for food products or feed for stock. Tasmania imported over 80,000 tonnes of containerised wheat in 2011-12, with most of this coming from regional Victoria flour milling[13].

Australia's containerised grain exports have increased significantly over the past 10 years, with the most common grains exported being pulses (mainly lentils and beans), wheat, malt and feed barley, corn, sorghum and canola. This has been driven by strong demand from China, Indonesia, Vietnam, Malaysia, South Korea, Thailand, Taiwan and other South-East Asian markets[14,15]. By volume, Victoria's containerised grain exports have increased from 215,528 tonnes in 2001, to 2,232,000 tonnes in 2011[16].

Over the last five years, containerised grain exports have increased over 200%, and now represent 30% of all grain exports from the Port of Melbourne. Agricultural goods and meat sourced mostly from regional Victoria make up 43% of all containerised exports from the Port of Melbourne[17].

Despite the higher associated costs, containerised grain exports have rapidly expanded alongside bulk grain transport. Nationally, non-bulk grain exports (bags and containers) have increased from 4% of total grain exports in 2000-01 to 17% of grain exports in 2009-10[18].

In Australia, much of the increase is attributed to deregulation allowing better access to more markets as well as a general increase in the value of commodities have made many commodities more prone to be containerized from a value proposition standpoint[19].

In Asia, the increase predates deregulation and has been suggested to be in response to better long term storage in a humid environment, lack of space for holding large amounts of grain, regulating the food supply and back haul freight prices associated with container movements. Australia is a net importer of packed containers from Asia and net exporter of unpacked containers making exporting grains in containers to Asia more attractive[20].

Other reasons have included the increased availability of infrastructure at the destination port, location or availability of containers, cost of shipping, frequency of departure dates, and availability of port space. Although usually more costly in terms of logistics, containers are suited to transporting smaller shipments of grains; are an easier entry into the market for smaller growers; provide risk mitigation through diversification of product and market; are suited to grains with high market value, or have particular requirements such as GM-free or specific blends; and require less infrastructure to ports that have relatively few bulk handling facilities such as Southeast Asia[21], [22].

Wheat and Barley

More than 2 million tonnes of wheat and barley are exported from Australia in containers each year. The majority of this being high quality wheat for food and malting barley destined for Asia[23].

Asia is considered an area for increasing market share for containerised wheat and barley as it well suited to destinations that have limited infrastructure to deal with bulk grain. It also allows better management of inventory, smaller financial outlay and regulated supply. Demand there is increasing due to a more westernised diet, rapidly increasing population and higher incomes.

In 2013-14, the main export destinations for Victoria's containerised wheat were China, Indonesia, Vietnam, Myanmar, and Taiwan[24].

China's imports increased significantly over the past year and are expected to continue if China continues to limit import permits for bulk vessels. Limiting import permits for bulk vessels provides more opportunities for container shipping. China imported over 230 000 tonnes of Victorian containerised wheat in 2014[25].

China was also the biggest importer of Australian barley in containers in 2013-14 to be used in malt houses and stockfeed. In 2008, shortly after deregulation of the non-bulk market, there was a shortage in shipping containers, driven by increased used by the wheat sector and a shortage of containers to ship grain stalled barley sales to China.20

Taiwan is a dedicated purchaser of containerised grain especially wheat. Victorian container exports of wheat to Taiwan have increased from 93,000 tonnes in 2013 to 156,000 tonnes in 2014.10 Taiwan has also increased it imports of barley which its uses mostly for stockfeed[26].

Table 2 - Containerised wheat and barley exported from Victoria[27]

	TEU			Mass tonnes		
	Wheat	Barley	Total	Wheat	Barley	Total
2006-07	10,517	7,023	17,540	245,353	151,680	397,033
2007-08	18,817	18,150	37,021	457,483	397,069	854,552
2008-09	20,389	4,379	24,768	484,007	95,383	579,390
2009-10	35,128	8,760	43,888	840,570	183,022	1,023,592
2010-11	40,785	11,783	52,568	958,973	246,236	1,205,209

Canola

Nationally, 100,000 tonnes was exported in containers in 2014. This is considered significant as canola is traditionally a bulk commodity. Vietnam accounts for 50% of canola container exports where the load will be distributed to smaller buyers. Demand in other markets has also increased[28].

Sorghum

China is considered a strong market for sorghum where it is used in a traditional drink called Baijiu. In 2011/12, Australia exported 750,000 tonnes of sorghum mainly in containers to China at an average $365 per tonne. The previous year it was $280 a tonne. In comparison, bulk shipments of sorghum to Japan are closer to $235 per tonne which can make selling grain in containers a much more attractive proposition[29],[30].

Pulses

Traditionally the vast majority of Australian pulse exports have been via containers. Pulse markets vary by type and variety. Generally, the countries that are significant producers of pulses are also the countries that have the highest demand for Australia container loads.

The main destinations are Egypt, Bangladesh, India, Sri Lanka for containerised pulses (incl. lentils, chickpeas, beans) and South Korea, Malaysia and Taiwan for containerised soybeans. Containers are in demand when local supply is lacking and allow for spot market and delivery at specified times[31].

Challenges and opportunities

Opportunities in the containerised grain industry

Bulk export of grain still accounts for the majority of grain exports as it has a lower cost for handling and transport per tonne than non-bulk exports. However, non-bulk exports have allowed speciality or niche grains to be marketed in smaller quantities, allowing access to ports that have limited infrastructure or little room for bulk grain and are more convenient for end-users to store and transport their grain[32].

As the cost of using shipping containers continues to decrease and the size of containers ships and facilities continue to increase, more opportunities will present themselves for exporting grain in containers. Containerised grains can provide an excellent opportunity to maintain the identity of the grain for multiple purposes including overseas assurances to do with origin, biosecurity, quality, and genetic identity.

Other opportunities include:

- While most of the Victoria's grain exported in containers are regular customers, containerised grain is also well suited to one off consignments that take advantage of the spot market.
- Price stability (freight charges, grain price) compared to bulk shipping which occurs over a longer term and is therefore more subject to risks.
- Bulk vessels can be used for any type of dry bulk product. At peak times of the year or when there is a steep increase in the profitability of a different bulk commodity, bulk shipping freight rates can be less than competitive.
- The cost of containers and containerised freight is decreasing as ship size increases and shipping companies compete with each other for market share.
- Currently, the number of containers imported to Melbourne far exceeds the number exported and this can provide an opportunity for exporters[33].

Challenges in the containerised grain industry

Despite this predicted growth in containerised shipping, there are some concerns in the industry.

- Ship size is increasing and the canals they use to decrease shipping transit time are not accessible to them and an increased vessel size means that these larger ships have a limited access to countries/ports. At the same time the number of ships is decreasing in number leading to an oligopolistic market. It is expected that freight rates may actually increase with rising debt in the industry, increasing demand for a limited number of suitable ships and limited supply of suitable ships[34].
- A study published in 2011 of selected countries in South East Asia showed despite the benefits there were issues particular to using containers such as pesticide residues, inconsistent supply and quality, and lack of technical information[35].
- With container grain exports, one grower having unacceptable residues may cause market access issues for the whole industry. This is in contrast to bulk grain, where blending and diluting of grain between growers occurs.
- New entrants into the growing containerised grain market may be less financially secure, increasing insolvency risks.

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