

Horticulture Brief - International Supply Chain Benchmarking Sectoral Assessment

Report for the Department of Infrastructure, Transport, Regional Development and Communications

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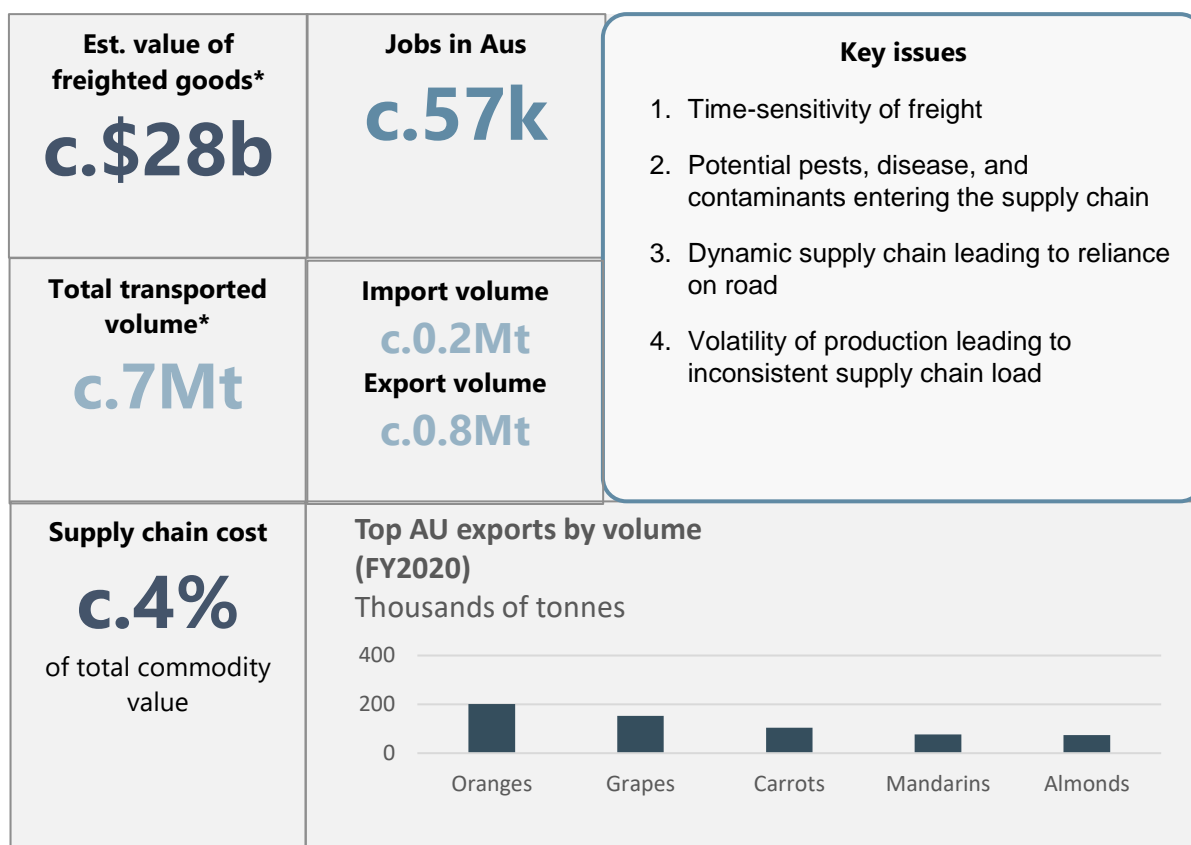
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Executive Summary



*Volume and value include fruit (many), vegetables (many), nuts (macadamias and almonds) and wine grapes.

Australia's horticulture industry was estimated to be worth \$28bn in FY2020. Australia's most demanding horticulture freight, in terms of overall freight task, are bananas (c.0.4Mt), tomatoes (c.0.5Mt) and potatoes (1.5Mt) due to their weight and volume moved. Freight costs are only a small percentage of total commodity value, at c.4% overall.

Australia is relatively self-sufficient in terms of production, with only c.2% of produce imported and c.7% exported. A variety of different growing climates throughout Australia drive a geographically diverse industry that offers a wide variety of products, including tropical fruits like mangos and table staples like broccoli.

The key issues in the Australian horticulture supply chain are the time sensitivity of freight, potential pests and contaminants within the supply chain, the dynamic nature of the supply chain leading to reliance on road from farm to distribution centre and the volatility of production. Furthermore, the time sensitivity of freight and Australia's relative distance to export markets is problematic for exports. In some cases, a 'faster', more efficient, supply chain could open export markets that are not currently accessed.

Horticulture Supply Chains in Australia

Australia produces an extremely wide variety of fruits and vegetables, with 7Mt moved annually. Australia's import and export trade volume in fresh fruit and vegetables is low, with exports equating to c.7% of the local production volume and imports reaching less than 2%.ⁱ While Australia's macadamia and almond nut exports are significant in value terms (c.\$1bn), they are very light (c.0.1Mt total), so do not contribute significantly to the overall freight task costs.ⁱⁱ Much of Australia's produce is seasonal, with a few exceptions such as potatoes, carrots, cauliflower and broccoli.

Depending on their inherent properties, horticultural products require a range of packaging and transport conditions. Fruits, vegetables and nuts are produced on individual farms and must be aggregated at

distribution centres. Many products packed into cartons or trays (such as oranges, mandarins, apples, pears and mangos). Others have more specific requirements – for example, carrots are packed in plastic bags inside cartons to increase humidity and then shipped at low temperatures to prevent hair root growth. Produce is moved predominantly by road (b-double) and rail, with some produce packed into 40-foot refrigerated containers.

Bananas, pineapples, mandarins, avocados, mangos, fresh tomatoes and capsicums are mainly produced in Queensland, which has a warmer climate that is suitable to more tropical produce. Stone fruit, oranges and grapes are grown in New South Wales, Victoria and South Australia. Fresh pears, canning fruit and processing tomatoes are grown in Victoria. Apples and fresh vegetables are grown in all states.ⁱⁱⁱ

Australia's horticulture supply chains face the following key issues:

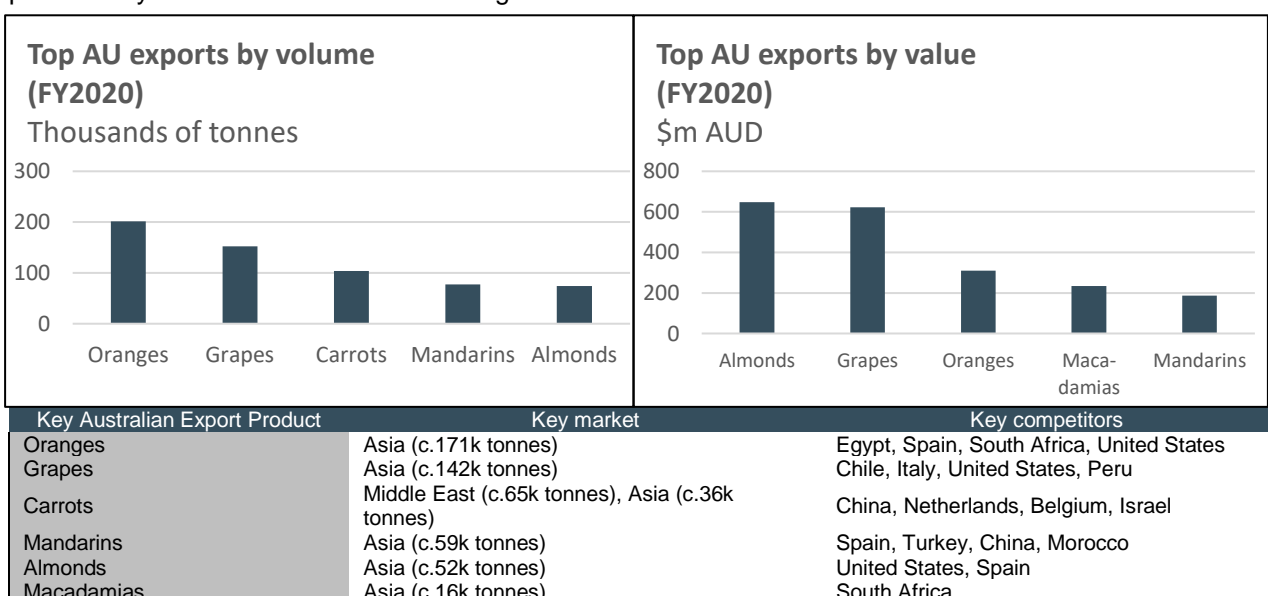
1. Horticultural products are generally perishable, meaning freight is time-sensitive and long delays, such as roadblocks, can make the product unsalable
2. Pests, diseases and contaminants, potentially from overseas, can enter the supply chain and damage the produce
3. The supply chain is dynamic, as particular farms can change the produce they grow or the use of the land. While this adds flexibility, it increases the reliance on flexible road-freight, which is often less efficient than rail
4. A high reliance on climate makes fruit and vegetable production volatile. Heatwaves can affect the production, harvest timing and quality (including size and weight) of the produce. Variation in volumes can make decisions around infrastructure investment difficult.

International Supply Chain Comparison

Horticultural production is highly dependent on climate and available land. Countries such as the United States, China, India and Brazil produce significant fruit, vegetables and nuts due to their suitable climates (not too cold or arid) and considerable geographic size.

Some climates are suited to growing specific crops. For example, bananas and mangos thrive in warm climates such as the Philippines and Brazil.






For most produce, delivery must be timely to ensure that it is fresh and does not perish. More efficient supply chains move produce at low cost with minimal wastage through the use of appropriate storage (e.g. cold chain) for the product and distance. While cold chain is more expensive than standard freight, the reduced perishability tends to offset the added freight cost.



Horticulture products by country

	Australia	New Zealand	U.S.	Philippines	Brazil
Estimated total quantity produced	c.7Mt	c.5.2Mt (c.1.4Mt fruit c. 3.8Mt vegetables)	c.55-65MT	c.30-40Mt	c.50-60Mt
Estimated direct export %	c.7%	c.66%	c.10-20%	c.34%	<c.5% (excl. fruit juices)
Potential produce groups to compare	Potatoes, tomatoes, bananas, melons, oranges, mangos	"table staples" e.g. potatoes, tomatoes, carrots, onions	"table staples", citrus and berries	Tropical fruits (e.g. bananas, mangos, pineapples)	Citrus, tropical fruits (e.g. bananas, mangos, pineapples)
Mode of transport	Mainly road and rail	Mainly road	Mainly road and rail	Road	Mainly road and rail
Data availability / feasibility for deep dive	Industry data available	High proportion of exports, could compare staples	Good data availability from U.S. department of agriculture, should focus on particular state (e.g. Florida)	Mixed data availability	Mixed data availability

Benchmarking Outlook

Intl benchmarking considerations	Importance	Horticulture supply chain
Size and growth		Horticulture supply chains are important as the industry employs c.57k Australians, and moves 7Mt of produce per year
Freight importance		Freight appears to be a small relative cost, suggesting that a study into all components of horticulture may not be worthwhile, though there may be specific products of importance that warrant further study. Food produce by horticulture is an input into other key areas of the economy (e.g. hospitality) and increasing efficiency may have knock-on effects
Export importance		Exports are not significant for the horticulture industry in volume terms. Overall, the time sensitivity of freight and Australia's relative distance to export markets is problematic for exports. In some cases, a 'faster', more efficient, supply chain could open export markets that are not currently accessed. Furthermore, there may be opportunities to increase the efficiency of existing key export products (e.g. citrus, grapes and nuts)
Geographic scope		Well distributed throughout Australia
Known efficiency / public interest		The horticulture supply chain is generally well regarded as important in Australia. Due to the importance of fruit and vegetable consumption in a healthy diet, lower prices through increased supply chain efficiencies would be of significant benefit to the public

International benchmarking could be achieved by 'bundling' products together. There are several grouping approaches that would be sensible for further benchmarking.

One option is to group "table staple" vegetables such as potatoes, onions, broccoli/cauliflower, carrots, lettuce and tomatoes. Table staples make up the bulk of the vegetable freight task costs based on the CSIRO modelling. This would allow benchmarking efficiencies to be targeted at reducing standard household food costs. Horticulture New Zealand has done a similar exercise already, though further information would be required on actual supply chain flows.^{iv} New Zealand would serve as a good comparator for table staples, as it largely produces them domestically like Australia.

Produce could also be grouped based on seasonal or climate-based categories for benchmarking, such as tropical fruits (bananas, pineapples, mangos and melons), citrus (oranges, mandarins, lemons and limes) or even summer fruits (strawberries, blueberries and stone fruit). Grouping fruits this way would allow benchmarking based particular places (e.g. Queensland) or on the freight task at certain times of year. This method could identify issues that are obscured in the data, such as potential infrastructure bottlenecks in winter.

Benchmarking more tropical fruits, such as bananas, pineapples, mangos and melons requires very warm comparator countries such as Brazil or the Philippines. These countries are generally less developed and may have different supply chain issues to Australia (more limited infrastructure such as roads and cold chain facilities). Regardless, there are a number of universal issues that have an impact on supply chains e.g. the volatility of harvests, affecting infrastructure investment and return and price. The Philippines has a reasonable amount of data on fruit supply chains, namely mangos and bananas, available in English.

Citrus fruit could be benchmarked against individual states in the U.S., due to the varying climates and harvests across the country. Florida or California would make good comparators and are the largest citrus producers in the U.S.^v While these two states are relatively geographically small, they could be compared against a smaller area of Australia such as Queensland and New South Wales, where citrus is produced. The United States Department of Agriculture (USDA) provides good information on citrus production which would need to be supplemented with additional expert interviews.

References

ⁱDepartment of Agriculture, Fisheries and Forestry, Foodmap An analysis of the Australian food supply chain, updated July 2012

ⁱⁱAlmond Board of Australia, 2019/20 Almond Insights, 2020

ⁱⁱⁱDepartment of Agriculture, Water and the Environment (webpage), Horticulture fact sheet, 2020

^{iv}Horticulture New Zealand

^vUnited States of Agriculture, Citrus Fruits 2020, August 2020