



THE UNIVERSITY
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Evaluation of the potential to expand horticultural industries in Northern Australia

CRCNA Project International Market Report – South Korea

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CRCNA Project International Market Report – South Korea Chapter

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Background and purpose of the desktop research

South Korea's fruit imports have increased steadily after the implementation of numerous free trade agreements (FTAs) since 2003 (Euro Fresh Distribution, 2016). South Korea is a rapidly developing market for Australian fresh fruit, with exports almost doubling from 1,752 tonnes in 2015/16 to 3,493 tonnes in 2017/18 (AHIA, 2018). With a growing demand for dietary diversity driving consumer preferences for more fresh fruit, South Korea's fruit imports continue to increase, reaching record levels in 2017, with respective volume and value at 834,000 tonnes and \$1.24 billion (Fresh Plaza, 2018b). Oranges and table grapes are currently the dominant export horticultural crops, while bananas and pineapples are the main tropical fruit imported into South Korea. Other tropical and sub-tropical fruit, including mangoes and avocados are also being imported in increasing volumes as tastes diversify and demand increases (Lim and Kwak, 2017). As of 2017, the popularity of avocados had risen sharply in South Korea, with imports reaching US\$30 million; mango imports were US\$50 million (Fresh Plaza, 2018b).

Australian mangoes have been approved for export to South Korea since 2009. The Australian Mango Industry has identified South Korea as a key market for its product, with the aim that 20% of Australia's annual production, currently 58,000 tonnes. This places the target at approximately 12,000 tonnes per annum to be exported to South Korea by 2021. (Fresh Plaza, 2019). In contrast, Australian avocados and lychees have not gained market access. In this context, it is important to investigate market insights, which can potentially assist in informing the Australian mango industry in expanding market share and identifying the potential for Australian avocados and lychees in the South Korean market.

This Korean market desktop study has three purposes:

- (i) Examine data, practices and trends in locally produced mangoes, avocados and lychees as well as exports into the South Korean market, which could provide valuable insights into supplying innovative products valued by Korean customers;
- (ii) Investigate distribution and supply chains of fresh fruit in the South Korean markets, which could assist Australian suppliers understand value-adding opportunities and build strong relationships with chain partners to improve supply chain productivity;
- (iii) Benchmark the performance of major supplying countries in the South Korean markets, thus indicating where to position Australian mangoes, avocados and lychees in these markets.

1. Local production in South Korea

1.1 Mango production

Mango production is a relatively new activity in South Korea. According to the state-run Rural Development Administration, South Korea's average temperature has risen rapidly, opening the door to an increasing number of fruit and grains that have never previously been harvested (Lim, 2017). In response, Haenam has accelerated the development and commercialization of cultivation techniques for subtropical and tropical plants (Lim, 2017).

The first mango cultivation was introduced with seedlings from Taiwan and planted in Namwon-eup, Seogwipo-si, Jeju Special Self-Governing Province in 1993 (Source: <http://nongsaro.go.kr>). Subsequently mangoes have been successfully grown in several regions, covering both tropical and subtropical environments, including Gyeongbuk, Jeonnam, and Jeonbuk (Yonhap News, 2016). The number of mango farms is gradually increasing as shown in Table 1. In 2011, a total of 59 farm households were cultivating a total of 25.5 hectares of mangoes. By 2015, this number had increased to 79 with a cultivation area of 32.5 hectares.

Table 1 Local production of mango in South Korea

Province	2014			2015		
	Number of farmhouses	Cultivation area (Hectare)	Production (tonnes)	Number of farmhouses	Cultivation area (hectare)	Production (Tonnes)
Gyeonggi	1	0.2	0.0	1	0.2	0.4
Gyeongnam	3	0.9	7.0	5	1.9	9.5
Gyeongbuk	-	-	-	1	0.3	0.0
Jeonnam	5	0.6	8.9	9	1.3	11.7
Jeonbuk	-	-	-	1	0.1	0.0
Jeju	50	23.8	326.6	60	27.9	375.4
Chungbuk	-	-	-	2	0.8	1.0
Total	59	25.5	342.5	79	32.5	398.0

Sourced from Korea Rural Economic Institute.

Available at: <http://library.krei.re.kr/pyxis-api/1/digital-files/605ba745-b3ca-2a94-e054-b09928988b3c>.

All Korean mangoes are cultivated in greenhouses, given the need for consistent growing conditions, even in warm regions of Korea (Lim and Kwak, 2017). Mangoes are harvested and distributed from April to October. Korean mangoes are exclusively the variety *Irwin*, the same as those produced and exported from Taiwan (Lim and Kwak, 2017). Due to its reddish colour, the *Irwin* variety is better known as “apple mango” in South Korea (Koreaherald, 2010). Thanks to its higher sugar level compared to imported mangoes, the price of one Jeju mango generally stands at more than 10,000 won (A\$12.30 at the exchange rate of A\$1=807.10 Won) (Koreaherald, 2010). Domestic prices vary widely, however indicative wholesale prices at the Brisbane Markets for December 2019 were: \$5.15/kg for Honey Gold; \$3/kg for Kensington Pride and \$2/kg for R2E2. In December 2017 each of the three varieties sold for under \$2kg. .

1.2 Avocado production

Avocados have not yet been cultivated in Korea. However, test cultivation at the Agricultural Technology Centre has been carried out in Goheung since 2011 (Lim and Kwak, 2017).

1.3 Lychee production

The Jeju Special Self-Governing Province Agricultural Research and Extension Service began research into lychees in 2010. They planted a two-year-old lychee seedling in greenhouse facilities in 2010, and the tropical fruit lychee bore fruit for the first time in Korea at Jeju (yna.co.kr, 2015). Lychees produced in Jeju are red and their sugar content (19.7 Brix) is four times higher than imports, and they often have dark brown shells (yna.co.kr, 2015). However, there is currently no commercial production of lychees in South Korea (Source: Korea Research Institute of Climate Change and Agriculture).

2. Import regulation

The Korean government maintains strict regulations on food imports and requires specific product information before approving importation of a new-to-market product (Suh, 2011). Therefore, mango, avocado and lychee exporters must work closely with Korean importers to provide the necessary documentation to meet the government regulations. The supplying countries approved for shipping mangoes and avocados into South Korea are shown in Table 2.

Table 2 Import conditions and countries approved for exporting mangoes and avocados into South Korea

Product	country	Main import condition
Mango	Taiwan	Mango (<i>Irwin, Haden</i>) is produced in designated orchards, vines in registered facilities, vapour heat treatment (VHT) (30 minutes at 46.5°C)
	Philippines	VHT at the production site and registered facility (10-20 minutes at 46-47°C)
	Thailand	VHT at the production site and registered facility (20 minutes at 47°C or higher)
	Australia	Produced in registered orchards, steaming treatment for 15 mins at 47°C or higher
	Pakistan	Produced in a registered orchard, hot water immersion treatment (more than 60 minutes at 48°C), the bakery at a registered facility
	Vietnam (Mekong Delta)	Produced in the orchards registered for export to Korea, the bakery in a registered facility, heat treatment (more than 47°C for 20 minutes)
	Peru	Produced in registered orchards, hot water treatment in registered facilities (at least 47 minutes at 47°C after fruit core temperature reaches 46°C)
	Brazil	Approved in 2017, VHT
	India	Approved in 2017, VHT
	Cambodia	Approved in 2019, VHT
Avocado	United States*	Avocados can be imported by attaching a phytosanitary certificate issued by the plant quarantine authority of the exporting country
	New Zealand	
	Mexico	<i>Hass</i> avocado, produced in the designated Korean export complex of the state of Michoacan, fruit flies inspection at the registered packing house,
	Peru	Approved <i>Hass</i> Avocado in 2019

Note: Both hot water treatment (HWT) and vapour heat treatment (VHT) are methods accepted by Korea for mango treatment before shipment.

Source: the plant and animal quarantine agency; available at https://www.qia.go.kr/plant/imQua/plant_fruit_cond.jsp

Note: * Hawaii, Texas and Florida excluded as data from those States not available for national aggregate.

Currently ten mango exporting countries have gained market access into South Korea, including India, Brazil and Cambodia which have been approved since 2017. Postharvest heat disinfestation treatments have emerged over the past thirty years as non-chemical control methods for fruit flies and diseases of the fruit such as anthracnose and stem end rot. Both hot water treatment (HWT) and vapour heat treatment (VHT) are methods accepted by Korea for mango treatment before shipment. However, VHT is approved for most countries, with only Pakistan and Peru conducting HWT. The US, New Zealand, Mexico and Peru are the four countries that have gained approval to export avocados into Korea (Peru was approved in 2019). Avocados can be imported either by attaching a phytosanitary certificate issued by the plant quarantine authority of the exporting country, such as the US and New Zealand or under certain conditions from other countries, such as Mexico.

3. Import evolution

3.1 Mango imports

South Korea's total mango imports globally and from the top eight supplying countries from 2015 to 2019 (August) are shown in Figure 1. Given that South Korea produces very small volumes of mangoes, the market is dominated by imports to meet increasing market demands. Fresh mango imports into South Korea have risen from 2015 to 2018, increasing by 24.9% from 13,917.4 tonnes to 17,383.3 tonnes. The increase continued in 2019 reaching 15,734.4 tonnes in August 2019. Later data is not yet available.

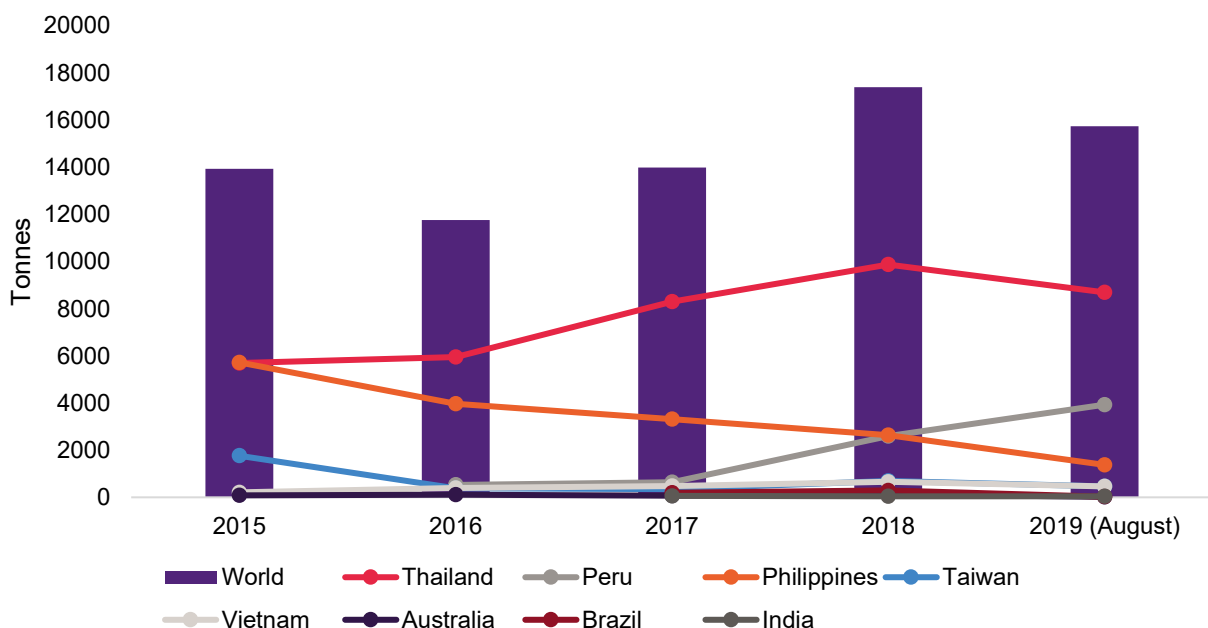


Figure 1 Import volume of mangoes into South Korea from 2015 to 2019 (August)

Sourced from trade statistics (HS code: 0804502000)

Note: 2019 data is constrained to August only as full year data is not yet available

Imports from Thailand continued to increase from 2015 to 2018, whereas imports from the Philippines dropped to 1,374.5 tonnes over the same period of time. Taiwan (1,760.5 tonnes), Vietnam (210.8 tonnes) and Australia (84.7 tonnes) were the next three largest mango suppliers in 2015. Taiwan's exports into South Korea dropped from 2015 to 2018, while Vietnam and Australia's exports increased over the same period, peaking at 657.8 tonnes and 135 tonnes. Peru was a smaller mango supplier in 2016 (524.9 tonnes), yet by August 2019 its imports had reached 3,927.4 tonnes, placing Peru as the second-largest mango supplier in the South Korean market. Brazil and India are smaller players in this market as they only commenced exporting to South Korea in 2017. However, their imports into South Korea in 2019 (August) have reached 25.7 tonnes and 45.1 tonnes, which overtook Australia's exports (18.8 tonnes). Brazil is a slightly larger global exporter than Australia, but India, despite being one of the largest producers of mangoes in the world is a very low volume exporter. The uplift in sales came from a substantial increase in consumption in South Korea. Also in 2017 South Korea opened its market to Brazilian mango imports after 13 years of negotiation (<https://www.gov.br/agricultura/noticias/coreia-do-sul-abre-mercado-para-brasil-exportar-manga>). India has been investing in export infrastructure for mangoes across a number of states, increasing capacity, which has also been helped by strong recent seasons.

3.2 Avocado imports

South Korea's imports of avocados have increased dramatically in recent years due to the rising popularity of the fruit for its versatility in cuisine and its health benefits (Fresh Plaza, 2017). The changes in South Korea's avocado imports are shown in Figure 2. As of 2018, the total imports stood at 1,1559.8 tonnes, an almost eightfold increase compared to 1,515.4 tonnes in 2015. By August 2019 import volumes had reached 5,827.4 tonnes.

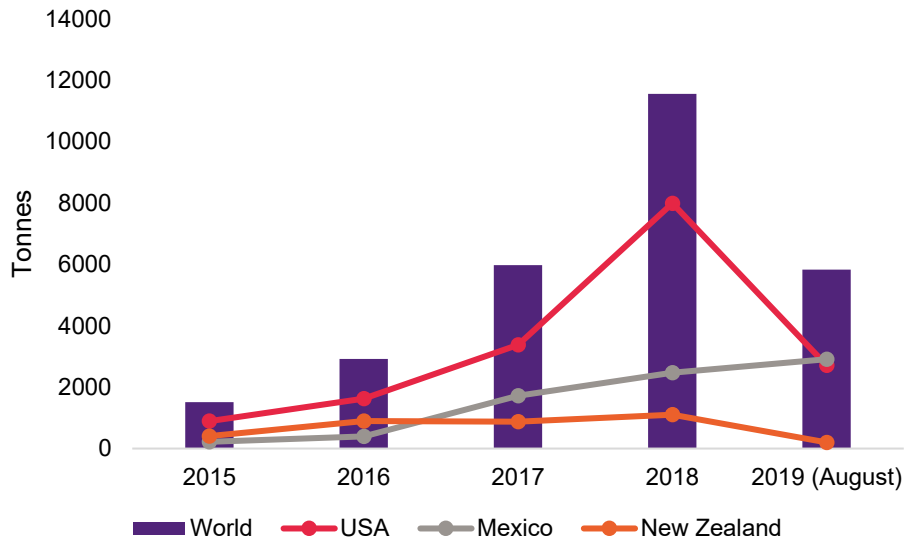


Figure 2 Import volume of avocados in South Korea from 2015 to 2019 (August)

Sourced from trade statistics of Korea (HS code: 0804400000)

Note: 2019 data is constrained to August only as year data is not yet available

The South Korean avocado market is currently dominated by the US, Mexico and New Zealand. The US is the largest avocado supplier to the Korean market and its exports continue to rapidly increase. In 2018, the US's avocado exports into South Korea peaked at 7,990.6 tonnes, which is a ninefold increase over the 2015 figure. Mexico also saw a significant increase in their exports into South Korea, peaking at 7,990.6 tonnes in 2018. New Zealand also saw increases in exports, although less extensive than the US and Mexico. Peru is a new player, which has gained market access in 2019. Since a growing number of South Koreans are discovering the value of avocados (Korea Herald, 2018), there could be an increasing demand for avocados.

3.3 Lychee imports

With no commercial production of lychee in South Korea, lychees are available only through imports (yna.co.kr, 2015). Given that lychees are kind of fruit with a small import volume, no official trade statistics data is available for lychee imports into South Korea. However, online news information (pulsenews.co.kr, 2019) shows that Luc Ngan lychees from Bac Giang are available in the South Korean market.

4. Market preference

4.1 Appearance

Appearance and flavour are key factors in South Koreans' assessment of fruit quality (New Zealand Embassy Seoul, 2016). Mangoes and avocados are often seen as a premium quality fruit, which is available only at high-end grocery stores, including those located inside department stores (Suh, 2011). The R2E2 variety of mangoes exported to South Korea from Australia, generally have a minimum blush ratio. The visual appeal of

fruit is a key factor for consumer purchases. Typically the higher blush ratios, more redness in the fruit, is appealing to consumers and have been a breeding goal for mango producers and institutional breeding programmes.

4.2 Variety

Variety preference for mangoes depends on the supplying countries. For example, *Irwin* mangoes are the most popular fruit from Taiwan and Korea (Koreaherald, 2010). *R2E2* is the only variety imported from Australia. For avocados, Hass is the only variety available in South Korea (Source: <http://gmarket.co.kr/>).

4.3 Fruit size

Generally, the South Korean market prefers larger sized mangoes. For example, *Irwin* mangoes imported from Taiwan weigh around 430 grams (Lim and Kwak, 2017). Australian *R2E2* mangoes are about 570-800 grams, which increases their appeal and their value.

5. Consumer insight

5.1 Preference for fruit

Taste is the number one criterion for fruit selection, indicated by 48% of South Korean consumers. Most South Korean consumers prefer sweet (36%), sweet and sour flavour (23%) as well as juicy and fresh (19%) fruit. Mangoes, therefore, should be sweet, juicy, have a yellow-orange colour and a smooth texture (Fresh Plaza, 2019).



Figure 3 South Korean consumer preferences of fruit (Rhee, 2015)

Health benefits, as indicated by 23% of South Korean consumers surveyed, has become the second most important factor for purchase. South Korean consumers prefer fruit which contains a high nutrient value (Rhee, 2015). Avocados provide a good example of how health benefits can create increased demand. Avocados were not initially accepted due to the soft texture of the flesh, green hue and rough exterior; however, it is now being widely accepted for its nutritional value. Demand has been increasing substantially in recent years.

South Korean consumers tend to pay more attention to quality over price (Euromonitor, 2019). Good quality mango, with desirable blush, sugar content, and synchronization in the packaging process, preferably with effective unbroken cold chains, are key requirements to gain highest export returns Fresh Plaza, 2018a).

Ease of handling of fruit is referred to by 14% of surveyed consumers and is highly valued by younger adults and youths, who place importance on quality and convenience (Rhee, 2015).

5.2 Preference for domestic fruit

Many South Korean consumers prefer domestic fruit over imported fruit. Figure 4 shows 80 % of South Korean consumers prefer to purchase locally produced fruit, even though domestic fruit is known to be more expensive than imported fruit. This is because domestic tropical fruit typically requires poly-tunnels or greenhouses to grow (Lim and Kwak, 2017). For instance, South Korea, like Japan is growing mangoes in greenhouses. The high costs, due to high CapEx and OpEx, drive high purchase prices. For example, a 3kg boxset of Jeju mangoes is priced at 180,000 won (around US\$ 157) on lottemart.com. In addition local growers claim their local mangoes are fresher and are better quality than those from other countries (Jejuweekly, 2017).

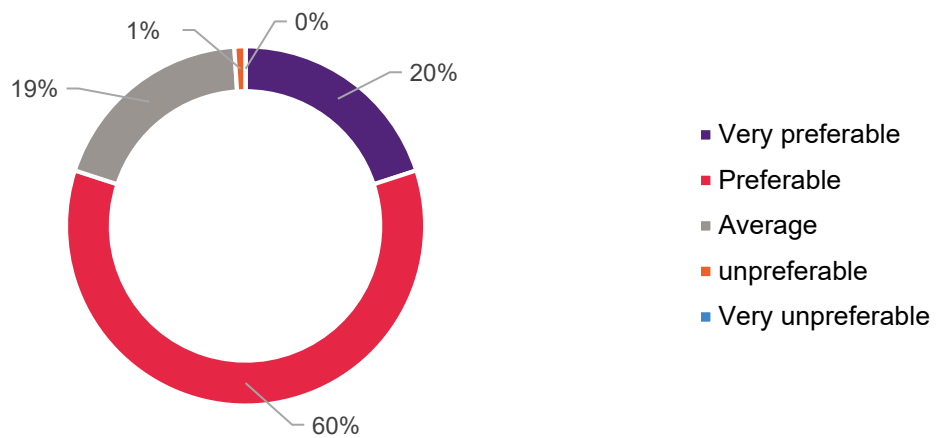


Figure 4 South Korea's consumer preference for domestic fruit in 2016

Sourced from: http://konkuk.dcollection.net/public_resource/pdf/000002208375_20190925163039.pdf.

6. Distribution channel

6.1 Supply chain structure

The distribution channel for imported fresh fruit in South Korea involves sales through a network of trading agents, importers and distributors (Deloitte Australia, 2017) as shown in Figure 5.

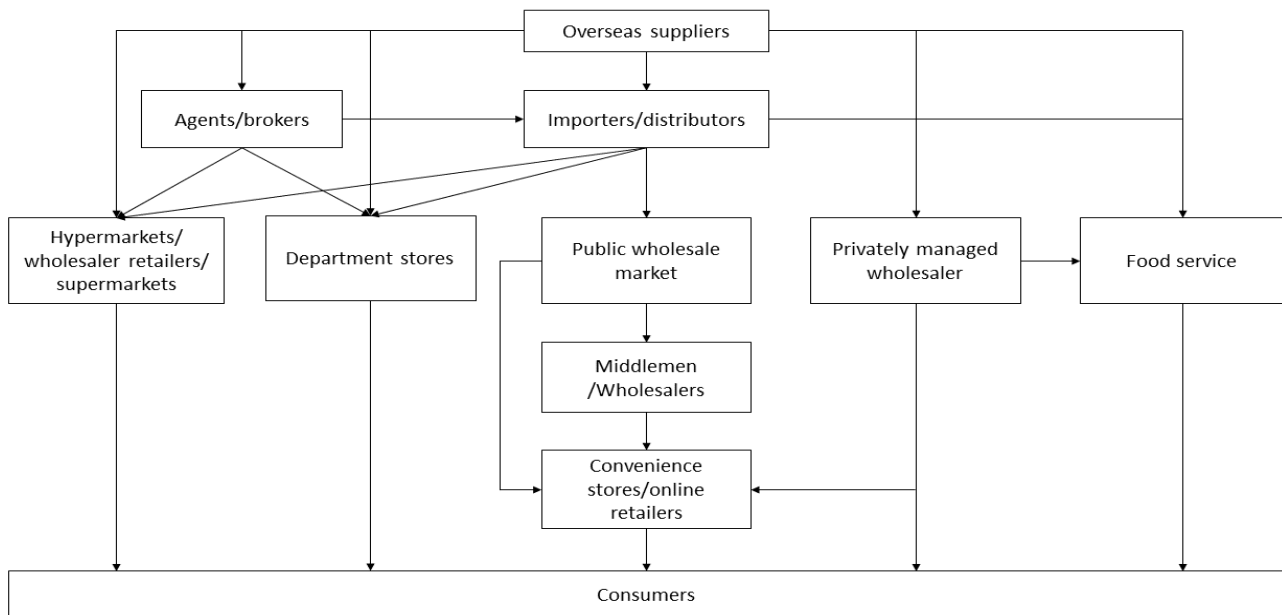


Figure 5 Supply chain structure for imported fresh fruit

The Garak-dong Agricultural Market is the oldest and largest public wholesale market in South Korea for marine and agricultural products, where Seoul Fruit and Vegetables, Hankook Fruit and Vegetables, Nonghyup, Seoul Gunhae, Seobu Fruit and Gangseo Fruit are top distributors (Fresh Plaza, 2012). Jin won is a wholesale distributor of fresh fruit and vegetables and was responsible for Australia’s first shipment of mangoes in 2010 (Deloitte Australia, 2017). The majority of fresh produce is sold through the retail sector including traditional markets (Suh, 2011). South Korean importers of mangoes supply mainly to hypermarkets, supermarkets, department stores and foodservice companies (Deloitte Australia, 2017). While there is an increasing trend for these large retailers to source direct from foreign suppliers, Korean retailers still rely on specialised importers and distributors for imported fresh fruit (Best Food Importers, 2016).

6.2 Retail channels

Retail channels to consumers traditionally go through hypermarkets, supermarkets, department stores and wholesale retailers. However, due to social and demographic changes, other small channels such as convenience stores and e-commerce are becoming increasingly popular. Mangoes and avocados, which were previously regarded as premium fruit, were only available at high-end grocery stores, including those located inside department stores (Suh, 2011). However, with increased imports of mangoes from Taiwan, Thailand and the Philippines, mangoes have become much cheaper, and can now be seen in large-scale retail stores or small supermarkets (Seoul Taiwan Trade Center, 2014).

6.2.1 Hypermarkets and supermarkets

Hypermarkets and grocery supermarket chains are considered as discounted stores and an important retail sales channel for food products in Korea (Mamou, and Lee, 2017). Hypermarkets hold close to 45% of the market share and are the main channel for imported food products (Best Food Importers, 2018). E-Mart,

Homeplus and Lotte Mart are the largest chains with an aggregate number of 420 stores nationwide (Mamou, and Lee, 2017).

6.2.2 Wholesale retailers

Costco, E-mart Traders and Vic Market are the three largest warehouse-style bulk retailers in South Korea. E-mart Traders is Shinsegae's response to Costco and sells more local products at lower prices compared to imported products (Location Korea, 2018a). Wholesaler/retailers carry a wide range of products, including imported fruit, which is cheaper in bulk purchases.

6.2.3 Department stores

Department stores, which occupy a high-end segment of the South Korean market (Deloitte Australia, 2017), offer a wide range of high-end, premium quality imported food products which are usually hard to find in regular food retail shops, such as supermarkets (Mamou, and Lee, 2017). In South Korea, all the largest and most luxurious shopping centres are owned by large conglomerates (Chaebol) such as Hyundai and Lotte (Location Korea, 2018a). The department stores are located nationwide with a focus on big cities like Seoul, Busan, Incheon and Daegu (Mamou, and Lee, 2017). Unlike other kinds of shopping centres or markets, department stores are considered more expensive (Location Korea, 2018a). The average price of food products in department stores is 10% to 25% higher than supermarkets (Mamou, and Lee, 2017).

6.2.4 Convenience stores

With the rising number of single-person households and an ageing population, the convenience store market is growing rapidly and becoming a dominant retail sales channel (Mamou, and Lee, 2017). Convenience stores, like small supermarkets, carry a wide range of products, including fruit and vegetables (Mamou, and Lee, 2017). Storyway, 7-Eleven, Ministop, Emart24, GS25 and CU (formerly known as Family Mart) are the most popular and common convenience stores. As of August 2017, there were 37,539 convenience stores throughout the country compared with 21,221 stores in 2011 (Mamou, and Lee, 2017).

6.2.5 E-commerce retailing

Online shopping is significantly more developed than in other Asian countries and many retailers have a strong online presence (Best Food Importers, 2016). The South Korean Retailer Auction was the first to sell fresh food online in 2014 and since then several e-retailers, including WeMakePrice, Ticket Monster and Gmarket have been established to supply local and imported fruit and vegetables to consumers (Fruitnet, 2017). With the online grocery market expanding in South Korea, the demand for delivery services is particularly rising among young people living alone and childless couples (Fruitnet, 2017).

6.3 Food services

The market for fresh fruit is also being fuelled by the domestic restaurant industry increasingly using tropical fruits (Lim and Kwak, 2017). Due to Korea's late venture into avocados, some restaurants have been more inclined to emulate popular Western culinary creations including avocado quinoa salads, avocado banana

smoothies and avocado chicken wraps. Koreans are also responsive to using avocados in traditional cuisines, such as bibimbap (Korea Herald, 2018). Starbucks released an avocado blended frappe seasonal beverage in 2015, which is only available in Korean locations (Korea Herald, 2018). This illustrates that throughout much of Asia avocados are seen as a sweet treat, often blended with chocolate in shakes and frappes. Due to the wide use of tropical fruit, including mangoes and avocados in restaurants and cafes, the foodservice industry has become an important channel for mangoes and avocados, enhancing their popularity among South Korean consumers.

7. Benchmarking analysis

7.1 Supply seasonality

7.1.1 Mango supply seasonality

South Korea imports mangoes throughout the year. However, imports occur mostly between January and June, with Thailand and Peru being the two largest suppliers (Figure 6). Thailand, the Philippines and Vietnam provide year-round supplies to the South Korean market. Thailand has the most stable supply throughout the year and has the highest yearly average market share throughout the year (52.65%), whereas the Philippines (17.63%) and Vietnam (5.15%) have more seasonal supply. Peru, Brazil and Mexico also have wide supply windows which are greater than 6 months. Mexico has a scattered supply throughout the year, while Brazil and Peru have a consistent supply from July to December and from November to June respectively. Compared with Brazil and Mexico, Peru has the highest yearly average market share (20.68%). Taiwan and India have short overlapping supply windows. However, in July, Taiwan's market share rises to 45.28%, while Thailand is at its lowest supply point. Australia mainly supplies the Korean market in November and December, when there is already fierce competition from Thailand, the Philippines, Vietnam and Brazil.

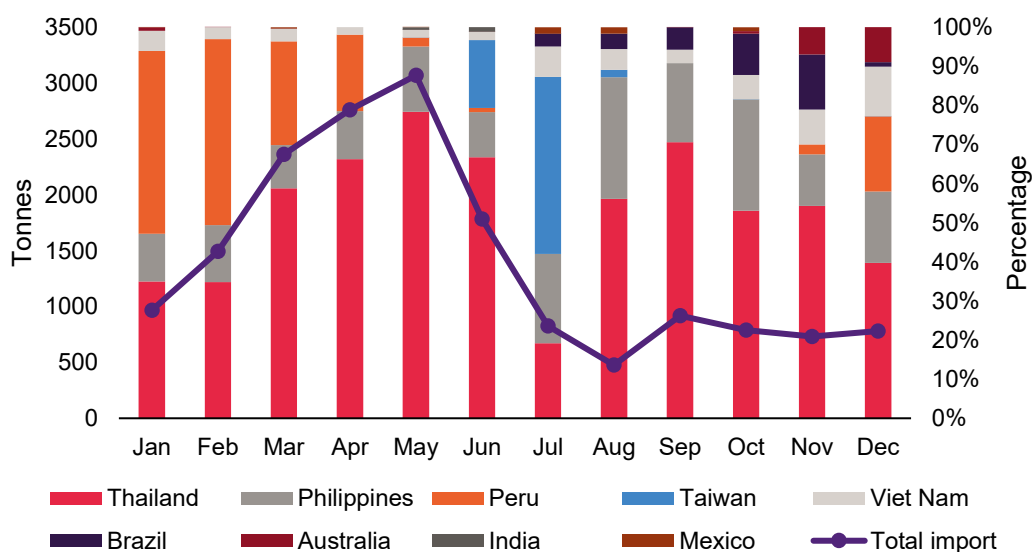


Figure 6 Monthly mango import volume and supply seasonality in 2018

Source: Korea Association of Trade and Industry (HS code: 0804502000)

7.1.2 Avocado supply seasonality

Avocado's supply in the South Korean market is year-round thanks to imports from several countries, of which Mexico, the US and New Zealand dominate - See Figure 7.

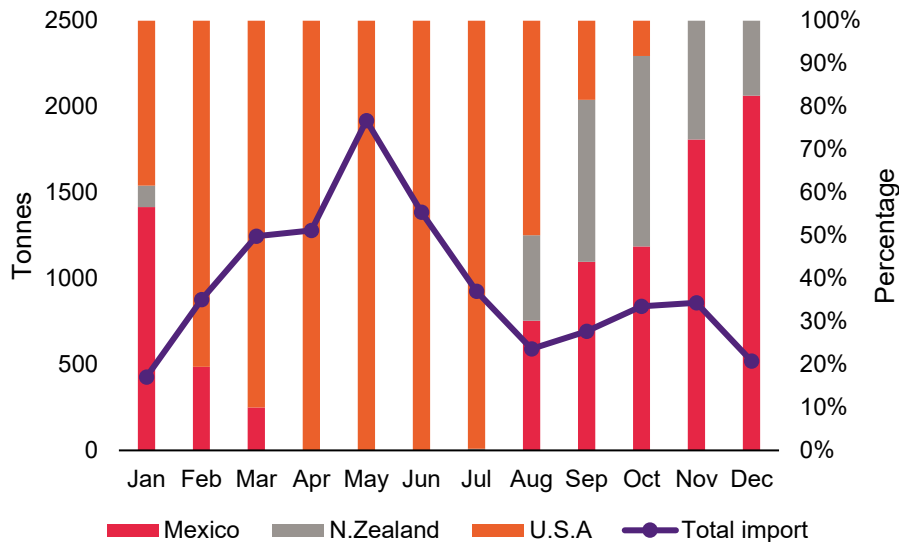


Figure 7 Monthly avocado import volume and supply seasonality in 2018
Source: Korea Association of Trade and Industry (HS code: 0804400000)

While South Korea imports avocados throughout the year, the imports occur mainly between February and July, when the US is the dominant supplier with more than 80% of the market share. Mexico mainly supplies avocados from August to March and is the largest supplier (43%) from September to January. Compared with the US and Mexico, New Zealand is a much smaller supplier from July through to January but has a much higher market share between September and November when US supplies are low.

7.1.3 Lychee supply seasonality

Currently there is no data available for lychee supply seasonality into South Korea.

7.2 Market competitiveness

7.2.1 Mango market competitiveness

The supply volume and freight, cost and insurance (CIF)-based import price of mangoes from the top 15 supplying countries to South Korea between 2015 and 2018 are compared in Figure 8. Vietnam and the Philippines are the only two suppliers who supply relatively large volumes and have lower landed prices in South Korea than the average landed price (3.9 US\$/KG), at 3.3 US\$/KG and 2.7US\$/KG each. Thailand is the largest mango supplier into the South Korean market, with a slightly higher average landed price at 4.2 US\$/KG. Peru and Brazil have much higher supply volumes compared with Australia, potentially because their mangoes are cheaper than Australia's, though Koreans tend to buy on quality rather than price. Taiwan also

has higher supply volumes than Australia, even though its mangoes are more expensive. India and Pakistan's mangoes are cheaper than Australia's, however, their supply volumes are lower than Australia's. Also, there are also several other smaller suppliers, including Mexico, Cambodia, the US, China, Canada and the United Kingdom (who don't necessarily grow the fruit), whose landed price in Korea is higher than Australia's.

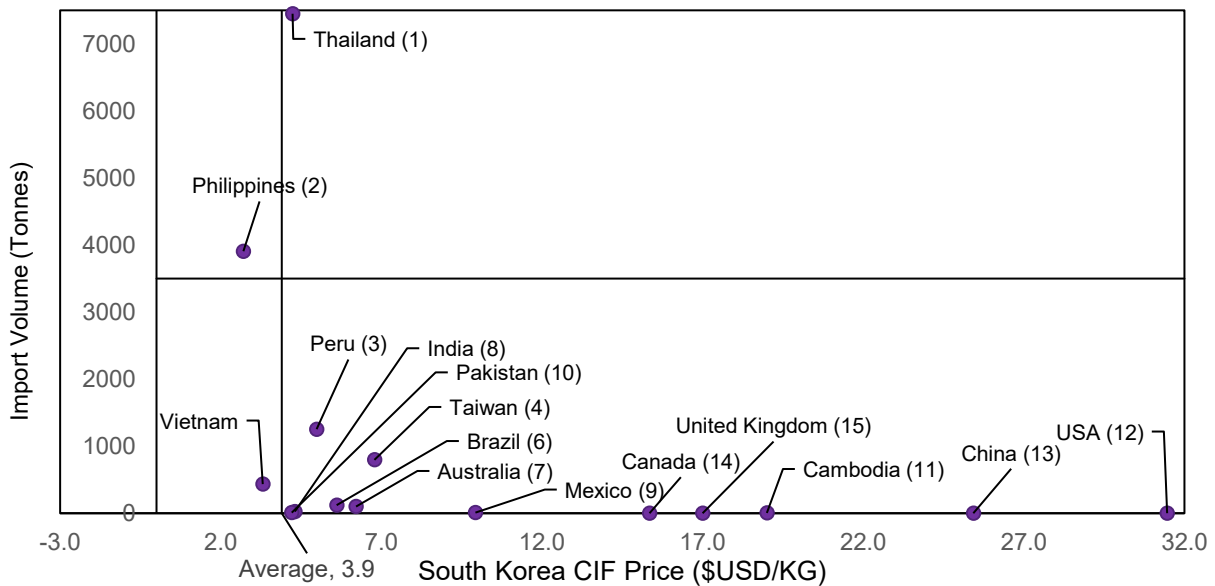


Figure 8 South Korea's mango import volume and price from the top15 suppliers in 2015-18

Source: Korea Association of Trade and Industry

7.2.2 Avocado market competitiveness

The supply volume and freight, cost and insurance (CIF)-based import price of avocados from six supplying countries to South Korea between 2015 and 2018 are compared in Figure 9. Mexico is the second-largest avocado supplier after the US in terms of volume, but with the lowest landed price, at 3.6 US\$/KG. Although the US and New Zealand have the same landed price in Korea, at 4.7 US\$/KG, US's supply volume is more than four times than that of New Zealand. Peru, Colombia and Myanmar also export to South Korea, but their volumes are relatively small, though their respective landed prices are higher, at 8.5 US\$/KG, 16.5 US\$/KG and 5.0 US\$/KG.

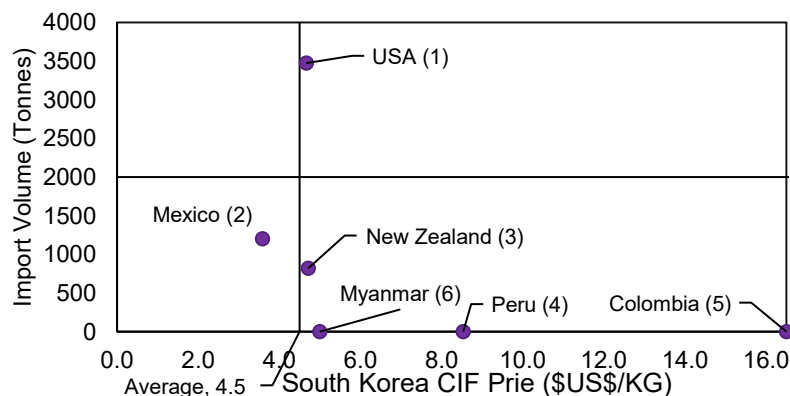


Figure 9 South Korea's avocado import volume and price from six suppliers in 2015-2018

Source: Korea Association of Trade and Industry

7.2.3 Lychee market competitiveness

Currently there is no data available for lychee supply into South Korea.

7.3 Quality comparisons

Lim and Kwak (2017) compared the domestically grown *Irwin* mangoes, that were purchased at the department stores and retail stores in Seoul, with imported *Irwin* mangoes from Taiwan. The comparison of domestic mangoes and imported mangoes are shown in Table 3.

Table 3 Comparison of Quality between Domestic Mangoes and Imported Mangoes

	Length (mm)	Diameter (mm)	Weight (g)	Firmness (N)	Soluble solids (°Brix)	Acidity (%)	Note
Domestic Mango ('Irwin')	115.3±1.6	80.4±2.1	425.1±5.8	4.01±1.6	13.9±2.4	0.27±0.02	Low acidity, better palatability
Imported Mango ('Irwin')	114.8±1.7	81.3±1.4	429.6±3.9	2.51±0.9	14.6±1.7	0.47±0.04	High acidity, mediocre palatability

Source: Lim and Kwak (2017).

The size of the fruit was similar between domestic and imported mangoes, while the imported *Irwin* mangoes are much heavier than local mangoes. In terms of the taste, the imported mangoes tasted sweeter, but their acidity was also higher. In terms of palatability, most imported mangoes deteriorated due to long-term storage, affecting texture and fragrance. Additionally, the hot water steaming treatment in the producer countries had an adverse impact on the texture and palatability (Lim and Kwak, 2017).

7.4 Sales performance

Price of fruit at the retail level is a key determinant of the value of the market in South Korea. Retail prices for mangoes, avocados and lychees were retrieved from shopping.naver.com. NAVER Co., Ltd., founded in 1999, is South Korea's largest web search engine with over 200 million users, as well as a global ICT brand that provides services including LINE messenger.

(source: <https://www.navercorp.com/en/naver/company>).

7.4.1 Mango retail sales

Imported mangoes are typically sold for consumption as whole fresh fruit in retail channels (Deloitte Australia, 2017). Korean people consume mango by neatly cutting its fresh into dice shapes, so mangoes are often advertised online in diced cutting.

At the time when the search was conducted in October 2019, locally grown mangoes from Jeju and mangoes imported from Thailand, the Philippines and Brazil were all available at shopping.naver.com. A snapshot of some imported mangoes posted for sale at shopping.naver.com is shown in Figure 10.

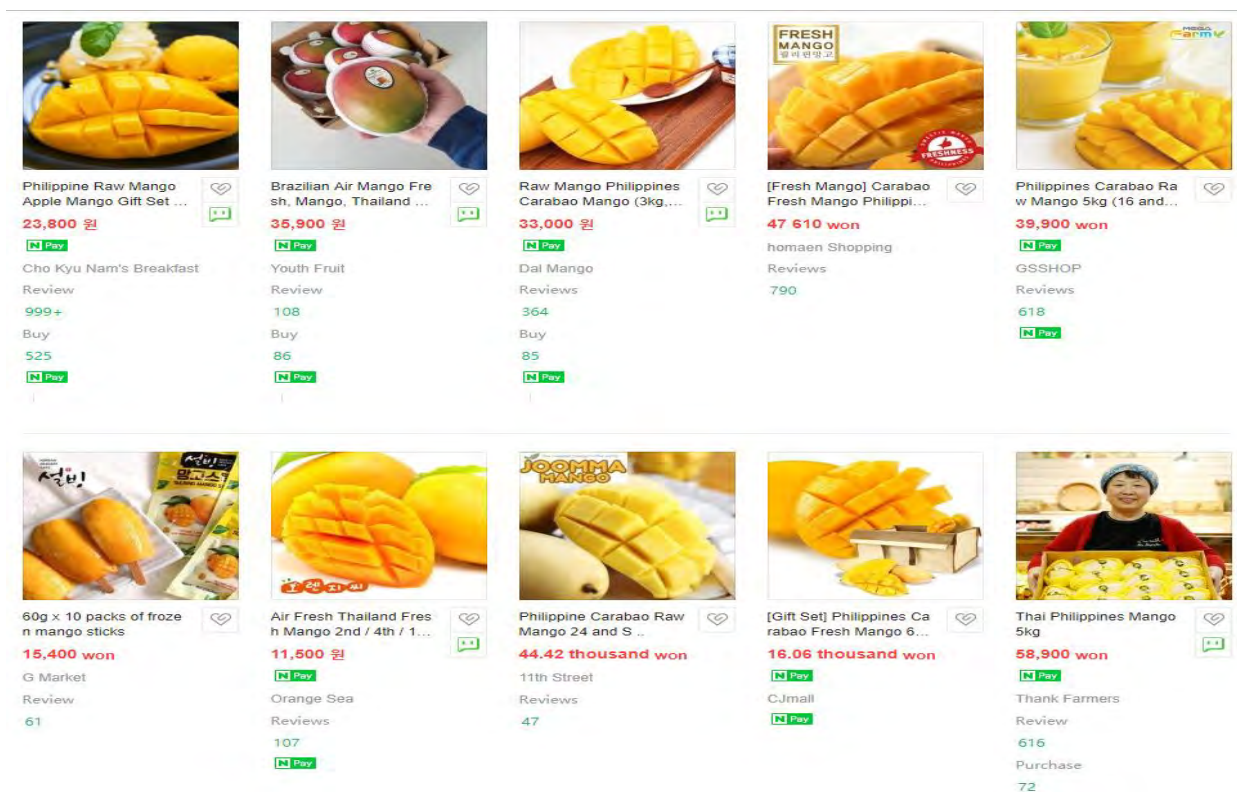


Figure 10 Imported mangoes posted in *shopping.naver.com* (10 October 2019)

Imported fresh mangoes are sold either by weight or by piece on Korea's *shopping.naver.com* (Table 4). Many sellers indicate the name of the mango traders, and some sellers indicate the supplier of the mango as shown in Table 4. When the imported mangoes are sold by weight, sellers normally indicate the number of mangoes, as larger size mangoes are much more expensive. For example, 5 kg of Thailand mangoes at size 20 is marked at AUD\$70, while mangoes with the same weight at size 12-14 are marked at AUD\$74. This indicates a preference for larger fruit. Mangoes are also sold in gift packs at a price premium compared with common packaging.

Table 4 Some retail prices for imported mangoes in *shopping.naver.com*

Origin of country	Variety	Brand	Supplier	Name of trader	Weight	Number of fruit	Pack type	Sales price
Philippines	Carabao			Doori Golden Trading	1.25kg			\$20
					2.5kg			\$40
					5kg			\$60
Thailand				Le Bon International	5kg	18		\$61
					5kg	14		\$67
				Sooil Commerce	5kg	20		\$70
					5kg	12~14		\$74
Brazil	Apple mango		Pieske International		≥500g	1		\$7
						4kg	6-7	
					4kg	<7	gift pack	\$69
					2kg		pack	\$37

Note: Retail prices were retrieved between 10 and 24 October 2019; Exchange rate at A\$1=807.10 Won

7.4.2 Avocado retail sales

As at October 2019, avocados imported from Mexico and New Zealand were available at shopping.naver.com. A snapshot of some posted avocados for sale at shopping.naver.com is shown in Figure 10. To demonstrate the good quality of fruit, avocados are often advertised online cut in half.

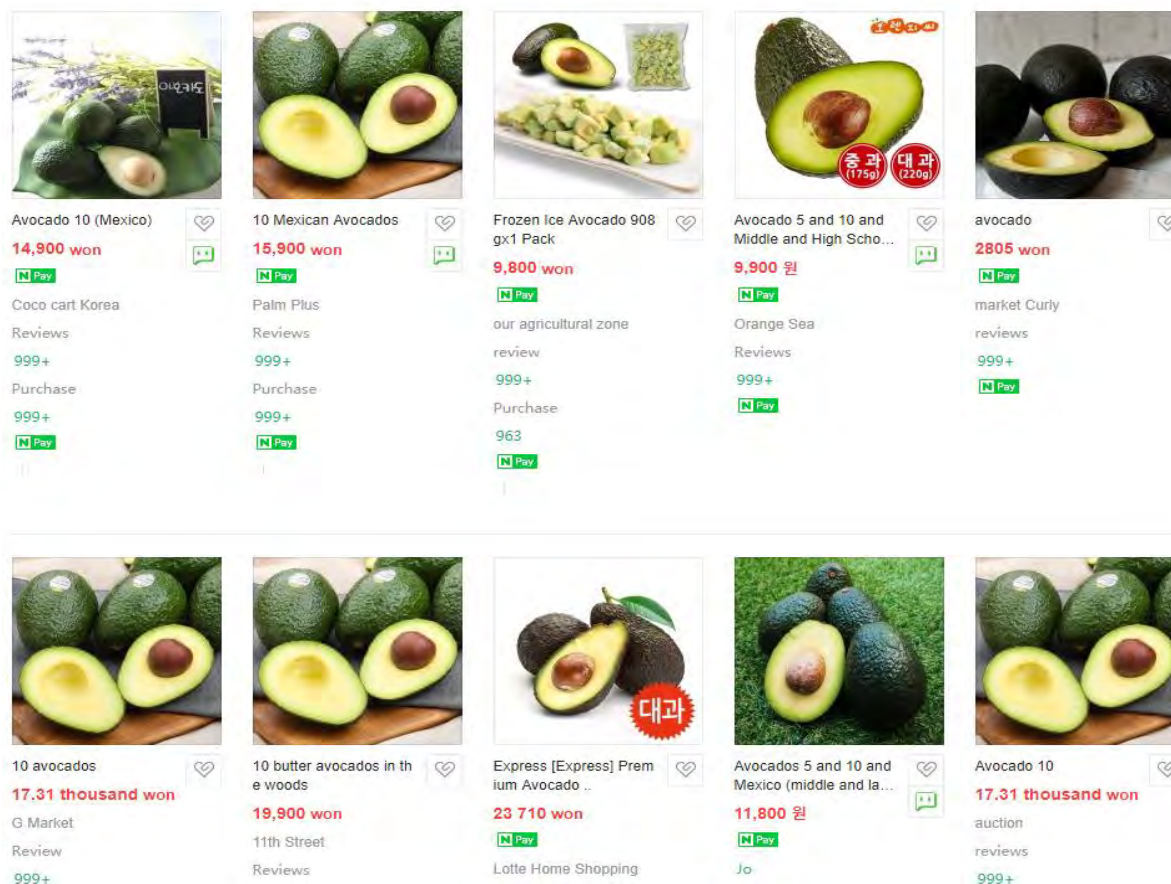


Figure 11 Imported avocados posted on shopping.naver.com (10 October 2019)

Only Hass avocados are sold on the Korean market. A piece of fruit weighs between 170 to 220g. Avocados posted on shopping.naver.com are sold either by piece or by the box as shown in Table 5. The retail price for a 170g piece of avocado is marked at AUD\$2.50-\$3.00. Large fruit is more expensive. For example, a piece of avocado weighing 220g is marked at AUD\$2.90-\$3.50. It should also be noted that New Zealand’s avocados are slightly cheaper when compared with Mexican avocados. Some sellers indicate the name of fruit traders as shown in Table 5. Although some sellers indicate the country of origin, it seems that it may not be an important factor in attracting consumers, given that some sellers broadly specify origins.

Table 5 Retail prices for imported avocados in shopping.naver.com

Origin of country	Variety	Name of trader	Weight	Number of fruit	Sales price	
Mexico	Hass	Mission Produce	170g	10	\$30	
			220g	10	\$35	
New Zealand		Jinwon Trading	170g	15	\$38	
			220g	12	\$43	
Mixed US/Mexico/NZ		-		170g	1	\$3
				220g	1	\$3.5

Note: Retail prices were retrieved between 10 and 24 October 2019; Exchange rate at A\$1=807.10 Won

7.4.3 Lychee retail sales

Fresh lychees were not available at the time when we searched shopping.naver.com. However, frozen lychees are imported from China and Vietnam. A snapshot of frozen lychees sold on shopping.naver.com is shown in Figure 12. When selling imported lychees, some online retailers indicate the country of origin, such as picture 2 in Figure 12 which shows they are imported from Vietnam, while others just give a rough indication - picture 1 shows frozen lychees from China or Vietnam. The sale price varies among different online sales. Picture 1 shows that 1 kg of frozen lychees imported from China/Vietnam is marked at AUD\$4.71. Whereas, picture 2 shows that 1 kg of frozen lychees from Vietnam are marked at AUD\$11.03.



Figure 12 Online retailing price for imported lychee on shopping.naver.com (Dated on 10 October 2019) (exchange rate of A\$1=807.10 Won)

8. A reference model for Northern Australia's mango and avocado industries

8.1 Cambodian mangoes into the Korean market

Hyundai Corporation and Cambodian company Mao Legacy, which has a 400-hectare orchard in Kampong Speu province in southern Cambodia, have established a joint venture (Fresh Plaza, 2019). The company built a Vapor Heat Treatment (VHT) facility to meet South Korea's Animal and Plant Quarantine Agency's requirements for mangoes to be imported into South Korea (Fresh Plaza, 2019).

8.2 Philippines' premium mangoes into Korea

South Korean-based agricultural company, *Mega Farm*, has expressed strong interest in promoting Philippine mangoes into the South Korean market via contract farming (Manila Times, 2018; Fresh Plaza, 2018c). *Mega*

Farm will contract Philippine farmers to produce mangoes for them and will provide VHT, technology, marketing etc. (Fresh Plaza, 2018c). *Mega Farm* will conduct pre-harvest testing (PHT) to ensure there are no banned antibiotic residues in the premium mangoes for export. Moreover, *Mega Farm* undertakes the packaging through a “special paper” for wrapping the mangoes to maintain the fruit’s freshness and quality (Manila Times, 2018).

8.3 New Zealand’s efforts in the Korean avocado market

AVANZA, a partnership between New Zealand’s largest avocado producer - AVOCO and New Zealand’s two biggest avocado exporters, Southern Produce and Primor Produce, has been working to educate South Korean consumers on the health benefits of New Zealand avocados and promote the AVANZA brand.

AVANZA-led promotional activities include not only educating consumers on the health benefits of avocados but also teaching importers and distributors how to correctly handle and store the fruit. As of 2017, the promotional activity included an ongoing association with Maeil Dairies, one of the largest beverage companies in South Korea. The partnership enabled AVANZA to participate in Maeil’s soy milk and avocado smoothie promotions, including social media campaigns. AVANZA’s market investment also included recipe ideas and supermarket demonstrations, which are seen by marketers as an effective way to reach first-time consumers.

Between 2014 and 2018, AVANZA held 1500 sampling sessions, reaching 600,000 consumers. These joint efforts, including centrepiece displays in selected stores providing consumers with the option to select a ready-to-eat piece of fruit, have also increased sales. New Zealand avocados are purported to have twice as much vitamin B6 and 20 per cent more folate than those grown in other countries. Due to their promotion and marketing, AVANZA has expanded the avocado category in South Korea and been rewarded with increased sales, as people are prepared to pay a premium for the large-sized New Zealand-grown fruit. The margins are maintained by the higher price achieved at point of sale, and the volume of sales that comes with the enhanced reputation. The 2017/18 season saw returns per tray increasing 20% over the previous season (<http://www.fruitnet.com/asiafruit/article/175073/nz-sees-avocado-awakening-in-south-korea>).

9. Implications for Northern Australia’s export development

The Korean mango market is currently dominated by two year-round suppliers - Thailand and the Philippines, whose market shares stands at 52.65% and 17.63% respectively between 2015 and 2018. While Australia ranks seventh in the South Korean mango market in terms of average volume from 2015 to 2018, Australian mangoes accounted for less than 1% of total mango imports into South Korea. Compared with major suppliers, Australian mangoes have a very short supply window, mainly supplying in November and December when there is fierce competition from Thailand, the Philippines, Vietnam and Brazil. Mangoes are regarded as high-grade fruit in the South Korean markets, where there is an increasing demand for premium mangoes. However, it should be noted that mangoes could become commoditised with a large supply volume (Seoul Taiwan Trade Centre, 2014). An example is bananas, which were high-grade imported fruit in the past but have now become

a cheaper and popular fruit in South Korea (Seoul Taiwan Trade Centre, 2014). It is expected that mangoes will follow the trend of bananas if the demand for mangoes continues to increase (Seoul Taiwan Trade Centre, 2014).

The Korean avocado market continues to grow, with ample market opportunity for Australian avocados if market access is approved. Currently, the South Korean avocado market is dominated by Mexico, the US and New Zealand, which together supply this market throughout the year. Mexican avocados are cheaper than US and New Zealand avocados which have similar landed prices in Korea (4.7 USD/KG). The potential entry of Australian avocados would mean that Australia has to compete with established suppliers, and other new entrants, such as Peru. Although Australia would directly compete with New Zealand in the Korean avocado market, Australia can learn from the successful case of AVANZA, which made substantial investments in marketing.

Lychees are a rare fruit in South Korea. However, South Korea does import lychees from China and Vietnam, and frozen lychees are available in online markets. Once Australian lychees gain market access into the South Korean markets, increasing market awareness for Australian lychees would fill the market demand, when lychees from China and Vietnam are out of season. Since quality is highly valued and due to the short shelf life of fresh lychees, Australia would need to establish a distribution system to deliver fresh lychees on time. Since frozen lychees are available in the Korean markets, there could be an opportunity to supply frozen lychees.

Australian mangoes have gained market access into South Korea. To further increase the market share of Australian mangoes in this market, Australian suppliers need to work with South Korean importers to extend supply windows and educate customers to recognise and accept Australian mangoes as a premium fruit. More importantly, Australia needs to identify an area where they can promote desirable attributes to customers, thereby differentiating Australia's produce from other competitors. Apple mango is the most popular mango in South Korea and local apple mangoes are more expensive compared with imported mangoes. It could be valuable for Australia to benchmark Australian mangoes against the apple mango in terms of taste and weight. This could indicate one direction for developing quality mangoes to cater for discerning South Korean consumers.

Additionally, food service outlets could be a prosperous market for Australian mangoes, avocados and lychees due to the wide use of tropical fruit, including mangoes and avocados in restaurants and cafes.

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