



Capturing the ASEAN Agricultural Opportunity for Northern Australia

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The exchange rate used to convert value of trade data from US dollars (US\$) to Australian dollars (A\$) has been sourced from the International Monetary Fund (IMF), and is the average representative rate for 2018 [US\$1 = A\$1.3].

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Capturing the ASEAN agricultural opportunity for Northern Australia



TRENDS IN ASEAN SIGNAL DEMAND FOR CLEAN AND GREEN FOOD

<p>1. Urbanisation </p> <p>49 million more people to move to cities by 2025</p>	<p>2. Growth of consuming class </p> <p>Consuming class households set to double by 2030</p>	<p>3. Higher burden of obesity </p> <p>Obesity currently costs up to 19% of healthcare spending</p>
<p>4. Improved trade environment </p> <p>67% of Australian firms finding improved market access</p>	<p>5. Advancements in food technology </p> <p>Innovations in packaging and cold storage raising shelf life</p>	<p>6. Focus on sustainability </p> <p>Up to US\$1 trillion market in Asia in sustainable food by 2030</p>

LARGE UNTAPPED ASEAN EXPORT DEMAND FOR NORTHERN AUSTRALIA

15 agri-food products were identified as having significant growth opportunities for Northern Australia in ASEAN – wheat, live cattle, beef, milk and cream powder, malt, table grapes, sheep meat, cheese, milk and cream, oranges, infant food preparations, rock lobsters, macadamias, avocados, and soybeans

The products with highest untapped export potential and supply feasibility in Northern Australia are **live cattle** and **beef**, with a potential “upside” opportunity of **A\$13 billion**. **Avocados** and **macadamias** are “smaller bets” for the future



The major country opportunities for live cattle and beef in ASEAN are **Vietnam (71%)**, followed by **Indonesia (13%)** and **Malaysia (7%)**



ACTION PLAN FOR TOP OPPORTUNITIES

<p>Address regulatory barriers in ASEAN, including via trade negotiations, working groups, and business advocacy </p>	<p>Develop supply chain diagnostic tool from “farm-to fork” to identify impediments in live cattle and beef trade </p>	<p>Explore an export strategy for bovine genetic materials to diversify live cattle export products </p>	<p>Develop market research study for Australian macadamias in ASEAN to understand distribution networks and competitors </p>
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Executive Summary

Northern Australia and the Association of South East Asian Nations (ASEAN) are natural trade partners, given the geographical proximity between the two regions and the strong alignment between each other's needs and endowments.¹ ASEAN is already a key trading partner for Australia – between 2014 and 2016, Australia's agricultural exports to ASEAN countries exceeded an annual average of A\$10.7 billion, accounting for 21 percent of Australia's total exports in the sector.² Many ASEAN businesses have also invested in the Australian agri-food sector, integrating supply chains and product expertise into their value chains. Key export products, particularly in the livestock sector, originate from Northern Australia, and are exported out of major ports such as Darwin in the Northern Territory. The north – covering 53 percent of Australia's land mass – has the potential to become an “economic powerhouse”, and an export-oriented expansion of the agri-food sector which sits at the heart of policies envisioned to drive growth in the region.³

Due to a number of favourable trends, there is a large potential opportunity for accelerated export growth for Northern Australia in the agri-food sector in ASEAN. Rapid urbanisation in the region will add an additional 49 million people to ASEAN's bustling cities by 2025, both adding to food demand and constraining land available for agriculture.⁴ Complementing urbanisation is the continued rise of a consuming middle class, which is set to double from 2013 to 163 million households by 2030, further fuelling demand for higher quality agri-food products.⁵ The increasing burden of obesity, the economic cost of which represents up to 19 percent of annual healthcare costs in some ASEAN countries, could be eased through key dietary interventions and supporting regulations promoting consumption of clean and healthy food.⁶ The ASEAN-Australia-New Zealand FTA (AANZFTA; 2010) has improved the overall trade environment, with two-thirds of Australian firms in the region viewing market access as the key benefit of regional trade integration.⁷ The current review of this agreement, supported by a range of bilateral trade deals, could provide further market openings for Australian producers. Despite progress, key gaps in the trade environment remain, including a lack of supporting trade infrastructure (e.g. cold storage facilities), regulatory bottlenecks (e.g. non-tariff measures, FDI restrictions, lengthy red tape) and skills gaps, particularly outside the large urban centres in ASEAN. Advancements in technology in the food sector, however, are expected to ease burdens related to trade infrastructure in the future – for example, new forms of organic food packaging and innovative solutions such as solar-powered micro cold storages are

¹ The Association of South East Asian Nations (ASEAN) region consists of 10 countries: Brunei Darussalam, Cambodia, Lao PDR, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

² Australian Department of Foreign Affairs and Trade and Investment Statistics. The exchange rate used to convert value of trade data from US dollars (US\$) to Australian dollars (A\$) has been sourced from the International Monetary Fund (IMF) and is the average representative rate for 2018 – US\$1 = A\$1.3. Available at: <https://www.imf.org/external/np/fin/ert/GUI/Pages/CountryDataBase.aspx>

³ For boundary definitions of Northern Australia, please refer to the Appendix. Latest figures sourced from: Department of Industry, Innovation and Science (2017), *Economic Overview of Northern Australia*. Available at: <https://www.industry.gov.au/data-and-publications/economic-overview-of-northern-australia>;

References taken from Australian Government (2015), *Our North, Our Future: White Paper on Developing Northern Australia*. Available at: <https://www.industry.gov.au/sites/g/files/net3906/f/June%202018/document/pdf/nawp-fullreport.pdf>

⁴ Data sourced from United Nations Department of Economic and Social Affairs – Population Division (2018), *World Population Prospects*. Available at: <https://population.un.org/wup/>

⁵ McKinsey Global Institute (2014), *Southeast Asia at the crossroads: Three paths to prosperity*. Available at: <https://www.mckinsey.com/featured-insights/asia-pacific/three-paths-to-sustained-economic-growth-in-southeast-asia> ; data sourced from Brookings Institute (2017), *The unprecedented expansion of the global middle class*. Available at: https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf. The income range for middle-class families is defined by Brookings as ranging from US\$11 to US\$110 income per day in 2011 Purchasing Power Parity (PPP) terms.

⁶ The Economist Intelligence Unit (2017), *Tackling obesity in ASEAN*. Available at: http://www.eiu.com/public/thankyou_download.aspx?activity=download&campaignid=ObesityInASEAN

⁷ Australian firms in ASEAN were surveyed as a part of the Australian Business in ASEAN Survey, which is conducted annually by AustCham ASEAN among the members of its nine constituent business chambers. Agribusinesses form a significant portion of the firms surveyed. See AustCham ASEAN (2019), *Australian Business in ASEAN Survey 2019*. Available at: <http://austchamasean.com/wp-content/uploads/2019/03/Australian-Business-in-ASEAN-Survey-2019.pdf>

extending shelf life of fresh produce by up to four times.⁸ Australian agri-food businesses are also well placed to capture key business opportunities arising from sustainability-related concerns across the food value chain in Asia – with US\$1 trillion in annual revenue opportunities available across the continent by 2030.⁹

Given this background, the Cooperative Research Centre for Developing Northern Australia (CRCNA) commissioned this study to understand the key export opportunities for Northern Australian agri-food businesses in ASEAN markets. This study builds on the CRCNA's existing research by (a) identifying additional markets and agri-food products in ASEAN that could provide opportunities for Northern Australia (beyond those that past the CRCNA work has targeted at a global level), and (b) developing a detailed understanding of barriers and required actions to capture the opportunities identified.¹⁰

Considering all agri-food export products from Australia as a whole to the ASEAN region, 15 hold the highest future potential – these are wheat, live cattle, beef, milk and cream powder, malt, table grapes, sheep meat, cheese, milk and cream, oranges, infant food preparations, rock lobsters, macadamias, avocados, and soybeans. These products were identified based on a review of Australia's largest agri-food exports to ASEAN between 2012 and 2017, projected largest export opportunities for Australia over the following five years by the International Trade Centre (ITC), and complementary research including the North Queensland Agricultural Market and Supply Chain Study (NQAMSCS).

Two products from the top 15 are assessed to be most relevant for the Northern Australian agri-food sector – live cattle and beef. These were identified based on a detailed analysis of projected exports from Australia to ASEAN in 2025 for each of the 15 products, coupled with an analysis of supply feasibility for all products in Northern Australia (including production conditions, disease tolerance, existing production expertise, and existing supply chain). Together, these two products have an “upside opportunity” or unmet export demand of A\$13 billion per annum by 2025 (as compared to a “business-as-usual” scenario). This upside opportunity is not intended as a specific export revenue forecast or target, but is a thought experiment to highlight the potential growth opportunity available for these products in ASEAN. Capturing the opportunity would require addressing a range of major challenges in regulation, demand and supply conditions. Among the ten ASEAN Member States, over 90 percent of the untapped export opportunities for live cattle and beef are located in just three countries: Vietnam (71 percent), Indonesia (13 percent), and Malaysia (7 percent). Of the top 10 product opportunities, the top two are in Vietnam and two of the top five are in Indonesia.

Live cattle has the highest untapped annual export demand at A\$7.5 billion in 2025 (versus a “business-as-usual” scenario).¹¹ Historically, the live cattle trade has been driven by a lack of beef processing facilities in Northern Australia, cheaper costs of processing beef overseas, and shifting the burden of Halal compliance to local producers. Northern Australia is consequently the country's

⁸ REID (2013), “FreshPaper by Fenugreek”. Available at: <http://reid.wrap.org.uk/item.php?id=453>

⁹ AlphaBeta for the Business and Sustainable Development Commission [BSDC] (2017), *Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth*. Available at: <http://s3.amazonaws.com/aws-bsdc/Valuing-the-SDG-Prize.pdf>

¹⁰ Existing research includes The CRCNA and Townsville Enterprise (2019), *North Queensland Agricultural Market and Supply Chain Study*. Available at: <http://www.crcna.com.au/news/new-study-identifies-billions-in-unmet-market-demand-for-nq-agricultural-producers/>

¹¹ Multiple references from this section are drawn from expert engagement in Northern Australia and ASEAN and a range of sources including Meat and Livestock Australia (2018), *Market Snapshots – Beef (October 2018)*. Available at: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/oct-2018-snapshots/all-beef-markets-snapshots-oct2018.pdf>

production and export hub – the Darwin Port, for instance, manages 38 percent of the country's exports in live cattle.¹² Three focus markets have been identified for live cattle based on untapped demand – Indonesia and Vietnam are the primary markets, and Thailand is a smaller market as there is a strong domestic industry. Australia is the top supplier of live cattle to Indonesia and Vietnam. Meat supplied from Australian cattle slaughtered in Indonesia and Vietnam, typically retailed at butchers and wet markets, faces intense price competition from frozen Indian buffalo meat that can be imported at cheaper prices in comparison to importing and finishing Australian cattle locally. This competition is expected to increase further as the region diversifies its beef supply with increased imports from the US and South America. The live cattle trade faces a number of additional challenges in Indonesia related to the country's policy goal for self-sufficiency in beef – including import quotas and volume restrictions, and government-introduced price controls that constrain profitability. A pan-ASEAN issue that also restricts profitability and applies to all commodities and products is the uneven application of customs processes and standards; in particular, corruption has been cited as the most ubiquitous challenge to Australian businesses in ASEAN.¹³ Climate change-related extreme weather events are another major risk that have reduced the availability of cattle for export – persistent droughts across the north and widespread flooding in northern Queensland in 2019 have caused severe damage to northern cattle herds and communities.

Beef has the second largest untapped annual incremental opportunity (A\$5.5 billion) of the 15 products analysed.¹⁴ Historically, three factors have driven the beef trade between Australia and ASEAN – rapid population growth in ASEAN that accounted for a large share of the growth in regional protein consumption, rise of the middle class consumer that demanded more and better quality types of protein such as beef in high-end restaurants and hotels, and the well-developed trade and business relationship between the two neighbours. Beef products (particularly premium loin cuts) are expected to be the most valuable category of protein through 2025, driven by a growing consuming class, an urban consumer base, and westernisation of diets (even factoring in potential dietary shifts to plant- or fish-based protein). Australia is the top external supplier of beef to Indonesia, is second in Malaysia, Philippines, Singapore and Thailand, third in Cambodia, and fourth in Vietnam. Processed beef products that cater to the mass market (including manufacturing beef, offal, and mixed meats) comprise over half of beef exports from Australia to ASEAN. Northern Australian beef supplies this market segment but presently comprises a small proportion of these exports. It faces increased competition from frozen Indian buffalo meat, which has presently captured 50 percent of the Southeast Asian market (ex-Indonesia) at cheaper prices. Increased supply from South America, the US, and New Zealand, as well as local producers, will further increase competition to Australian beef – particularly reducing profitability in markets such as Indonesia (due to price controls and import quotas), and Thailand (due to tariffs and volume restrictions). A critical challenge to the expansion of beef exports from Northern Australia is the under-development of key elements in the beef value chain, particularly a lack of abattoirs. This gap exists due to a lack of investment in developing Northern Australian facilities, skilled labour in sparsely populated areas, and available opportunities for complementary agriculture (e.g. broadacre crops like soybean that can be grown in the same farming system and used in cattle feedlots or for biomass). Transfer of knowledge from the beef processing hub in southern Queensland, together

¹² Mercado (2018), "The importance of live cattle exports to regional Australia" Available at: <http://blog.mecardo.com.au/the-importance-of-live-cattle-exports-to-regional-australia-part-1>

¹³ Australian firms in ASEAN were surveyed as a part of the Australian Business in ASEAN Survey, which is conducted annually by AustCham ASEAN among the members of its nine constituent business chambers. Agribusinesses form a significant portion of the firms surveyed. See AustCham ASEAN (2019), *Australian Business in ASEAN Survey 2019*. Available at: <http://austchamasean.com/wp-content/uploads/2019/03/Australian-Business-in-ASEAN-Survey-2019.pdf>

¹⁴ Multiple references from this section are drawn from expert engagement in Northern Australia and ASEAN and a range of sources including Meat and Livestock Australia (2018), *Market Snapshots – Beef (October 2018)*. Available at: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/oct-2018-snapshots/all-beef-markets-snapshots-oct2018.pdf>

with planned development projects in logistics and transport infrastructure (e.g. A\$100 million Beef Roads Program, A\$10 million export hub development in northern Queensland, improvements to Townsville Port) could help mobilise requisite investment required to support expansion of production and exports. A key challenge in ASEAN that imposes significant costs on exporters is uneven technical market access – including a lack of standardised sanitary requirements, product testing procedures, and Halal specifications (particularly in Indonesia and Malaysia), as well as inconsistent acceptance of Australian certification. Additional challenges are similar to those for live cattle exports, including inefficient customs procedures and rampant corruption in ASEAN, and extreme weather events reducing available cattle herd for slaughter in Northern Australia.

In addition to live cattle and beef, avocados and macadamias could be considered as “smaller bets” as they have relatively high supply feasibility in Northern Australia but low forecasted export demand from ASEAN due to lack of market development and high product prices. However, both are expected to see significant growth in production scale in the long-term as they turn their attention to developing their ASEAN presence, creating valuable jobs in Northern Australia in the process. Output from Australia’s nascent avocados industry is expected to increase by over 50 percent by 2025, and this growth is expected to outpace local market demand, creating a surplus that could service increased demand from ASEAN.¹⁵ Ongoing efforts to obtain technical market access beyond Singapore and Malaysia, and suggested development of market-suited products incorporating avocados as an ingredient (e.g. guacamole) are key to stimulating demand from ASEAN. Australia has the world’s most well-developed macadamia production industry that invests A\$2.5 million into research and development each year and A\$2.2 million into marketing and consumer awareness. Productivity in macadamia orchards is targeted to increase to five tonnes per hectare by 2022 (up from three in 2017) and could even reach ten tonnes beyond 2030.¹⁶ Development of new breeds suitable to production in northern Queensland and investment in processing facilities to de-shell, dry, and roast macadamias in the Ord region in Western Australia are emerging priorities. Increased production will create additional supply which could service growth frontiers such as ASEAN in addition to major existing markets like China, Japan, and the US. Market demand could be stimulated by using macadamia nuts as an ingredient (e.g. in protein bars) as this would reduce product prices and appeal to a wider range of consumers.

Four strategic recommendations have been developed to reduce barriers to trade in ASEAN and increase production or supply of produce from Northern Australia to ASEAN, in conjunction with stakeholders and industry partners. The first is to engage regulators in ASEAN Member States (AMS) to address key regulatory impediments noted by Australian producers related to tariffs, quotas, technical market access, and non-tariff barriers (e.g. market access for avocados in Thailand and Vietnam, Halal standards in Indonesia and Malaysia). AustCham ASEAN, as the key action owner, could develop this recommendation as the industry voice in the negotiation of multilateral (e.g. AANZFTA, Comprehensive and Progressive Agreement for Trans-Pacific Partnership) and bilateral trade deals (e.g. Indonesia-Australia Comprehensive Economic Partnership Agreement), leader in engaging ASEAN working groups, and through advocacy at the ASEAN Business Advisory Council.

¹⁵ Avocados Australia (2018), *Facts at a glance 2017/18 for the Australian avocado industry*. Available at: https://www.avocado.org.au/wp-content/uploads/2018/10/2017-18_AAL-Facts-at-a-glance_FINAL.pdf

¹⁶ HortInnovation (2019), *Strategic Investment Plan full documents – Macadamias*. Available at: <https://www.horticulture.com.au/growers/funding-consulting-investing/investment-documents/strategic-investment-plans/>

The second is to develop a “farm-to-fork” supply chain diagnostic tool to analyse beef and cattle supply chains from Northern Australia into ASEAN markets to measure time and cost at each stage of the supply chain and identify key impediments to trade to address (e.g. missing infrastructure). This tool would build on existing studies in this area that have been done (e.g. by MLA) and could complement the study of time and costs along priority trade routes that is being driven by the ASEAN Secretariat under the Masterplan for ASEAN Connectivity 2025 (which is supported by DFAT), research initiatives commissioned by the CRCNA in Northern Australia to improve freight infrastructure, and could link with the Meat and Livestock Association’s (MLA) efforts to incentivise investment in ASEAN supply chains. This tool could be developed by AustCham ASEAN and trialled with select partners in Indonesia, Vietnam, and Thailand.

The third recommendation is to explore an export strategy for bovine genetic materials (e.g. semen, embryos, germplasm) that can be used to add desirable characteristics to herds in ASEAN. Australia is presently “underweight” in bovine genetics exports (in comparison to beef product exports) and the Australian Registered Cattle Breeders Association (ARCBA) believes that export value of genetics could rise ten-fold by 2023. Genetics could provide a useful alternative export product for Northern Australian cattle producers affected by extreme weather events, and potentially ease compliance burdens for breeder exports particularly in Indonesia. This strategy could be developed by the Commonwealth Science and Industrial Research Organisation (CSIRO).

The final recommendation is to develop a market research study for Australian macadamias in ASEAN to understand major importers, retail partners, distribution networks, and the competitor landscape in priority markets including Indonesia, Singapore, Malaysia, and the Philippines. This would build on the Australia Macadamia Society’s (AMS) current research efforts in South Korea and Taiwan. It could further involve regional councils and farmer’s associations in new growth regions that look to diversify their current agricultural output (e.g. sugarcane industry in northeast Queensland).

1. Key trends in ASEAN signal higher demand for Northern Australian agri-food exports

Key trends in food demand, production and consumption across the Association of Southeast Asian Nations (ASEAN) region reveal six key developments that could support higher demand for the clean and green food for which Australia is renowned. This chapter explores these trends in detail and their implications for Northern Australian agri-food businesses.

Northern Australia and ASEAN are natural trade partners, given the geographical proximity between the two regions. ASEAN is already a key trading partner for Australia – over 2014-16, Australia’s agricultural exports to ASEAN countries exceeded an annual average of A\$10.7 billion, accounting for 21 percent of Australia’s total exports in the sector.¹⁷ Many of these products, particularly in the livestock sector, originate from Northern Australia, and are exported out of major ports such as Darwin in the Northern Territory. A review of developments in the agri-food sector in ASEAN reveals six key trends that could accelerate demand for high quality agri-food products, and offer the potential to deepen the existing trade relationship between Northern Australia and ASEAN (Exhibit 1). These trends are: (i) urbanisation; (ii) growth of the consuming class; (iii) higher burden of obesity; (iv) improved trade environment; (v) advancements in food technology; and (vi) a growing focus on sustainability.

EXHIBIT 1

There are six key trends in the ASEAN food sector that will rapidly accelerate demand for high quality agri-food products



Trend	Factoid(s)	Implications for Northern Australia
1. Urbanisation	<ul style="list-style-type: none"> 49 million people will be added to ASEAN cities over 2018-25 Fastest growth in middleweight cities 	<ul style="list-style-type: none"> Loss of land through urbanisation Middleweight cities largely untapped
2. Growing consuming class	<ul style="list-style-type: none"> Consuming class is forecast to double between 2013 and 2030 to 163 million households 	<ul style="list-style-type: none"> Increased food demand – both in terms of quality sought and quantity purchased
3. Higher burden of obesity	<ul style="list-style-type: none"> Obesity costs ASEAN economies up to 19% of annual healthcare costs 	<ul style="list-style-type: none"> Increased demand for healthy foods e.g. fruits, vegetables, non-processed meats
4. Improved trade environment	<ul style="list-style-type: none"> 67% of surveyed firms believe improved market access is a key benefit of ASEAN regional integration 	<ul style="list-style-type: none"> Easier for agricultural products to reach consumers in key markets
5. Advancements in food technology	<ul style="list-style-type: none"> Investments in innovative food packaging and cold storage systems improving shelf-life of fresh produce 	<ul style="list-style-type: none"> Increased demand for fresh and frozen produce e.g. fresh fruits, frozen meat, dairy products
6. Focus on sustainability	<ul style="list-style-type: none"> Opportunities in Asia from sustainability focus in food worth US\$1 trillion through 2030 	<ul style="list-style-type: none"> Increased demand for sustainably grown, organic produce

SOURCE: Literature review; Team analysis

¹⁷ Australian Department of Foreign Affairs and Trade and Investment Statistics. The exchange rate used to convert value of trade data from US dollars (US\$) to Australian dollars (A\$) has been sourced from the International Monetary Fund (IMF) and is the average representative rate for 2018 – US\$1 = A\$1.3. Available at: <https://www.imf.org/external/np/fin/ert/GUI/Pages/CountryDataBase.aspx>

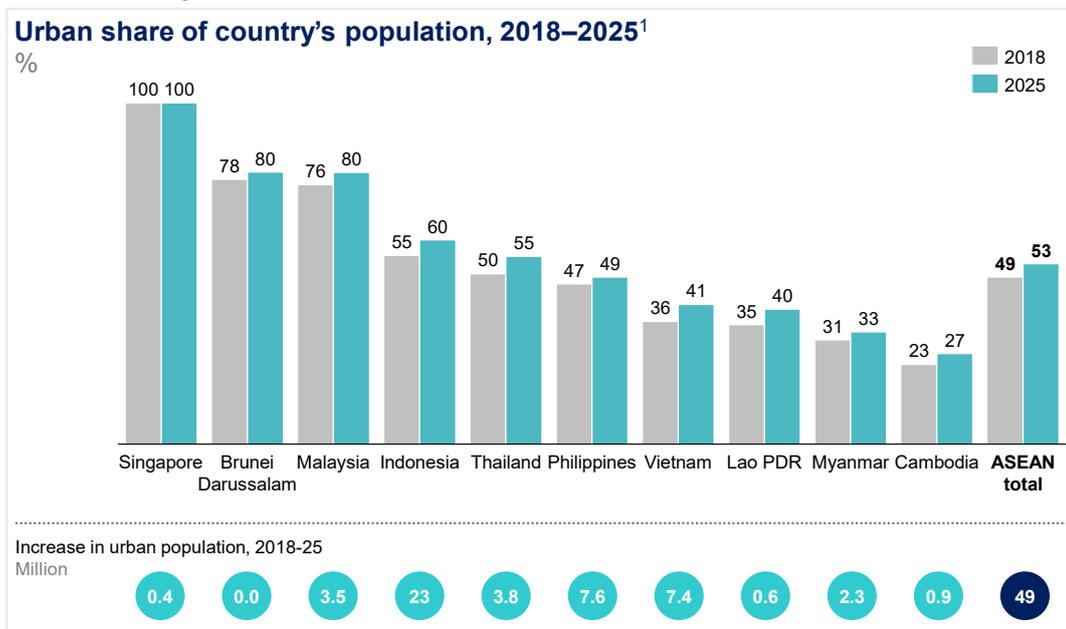
Rapid urbanisation will add pressure on land resources

By 2030, 60 percent of the world's population will live in cities, up from about 54 percent in 2016 – adding over 1 billion people to cities over 15 years.¹⁸ ASEAN is similarly experiencing an urbanisation wave, with over 49 million people expected to move to cities in the region between 2018 and 2025 alone (Exhibit 2).¹⁹

ASEAN's cities accounted for around 65 percent of GDP in 2014.²⁰ Urbanisation is a crucial driver of economic growth by providing more productive jobs for those leaving farms for employment in urban manufacturing and services, and also through offering the critical mass and density for economies of scale and network effects.²¹ In fact, no country has ever climbed from low-income to middle-income status without a significant population shift into cities.²²

EXHIBIT 2

An additional 49 million people are expected to live in urban areas in ASEAN by 2025



1. Urban population refers to people living in urban areas as defined by national statistical offices.

SOURCE: United Nations Department of Economic and Social Affairs: Population Division, *World Urbanization Prospects 2018*; Team analysis

The combination of urban sprawl and population growth is calling food security into concern, given that cities and agriculture compete for natural resources. The growth of cities could encroach on

¹⁸ United Nations (2016), *The World's Cities in 2016*. Available at:

http://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2016_data_booklet.pdf

¹⁹ Data sourced from United Nations Department of Economic and Social Affairs – Population Division (2018), *World Population Prospects*.

Available at: <https://population.un.org/wup/>

²⁰ McKinsey Global Institute (2014), *Southeast Asia at the crossroads: Three paths to prosperity*. Available at:

<https://www.mckinsey.com/featured-insights/asia-pacific/three-paths-to-sustained-economic-growth-in-southeast-asia>

²¹ Stuart S. Rosenthal and William C. Strange (2004), "Evidence on the nature and sources of agglomeration economies," in *Handbook of Urban and Regional Economics, 1st ed., volume 4*, J. V. Henderson and J. F. Thisse, eds., Elsevier. Available at:

<https://www.sciencedirect.com/science/article/pii/S1574008004800063>

²² World Bank (2009), *Urbanization and growth*. Available at: https://siteresources.worldbank.org/EXTPREMNET/Resources/489960-1338997241035/Growth_Commission_Vol1_Urbanization_Growth.pdf

arable land and lead to the loss of an estimated 2 million hectares per year globally, with about three-quarters of this being agricultural land.²³ Already, many Asian cities are utilising urban agriculture to make the most productive use of underutilised space in cities to ensure urban food security. 266 million households in developing countries (over 65 percent from Asia) are already engaged in urban farming and a quarter of those engaged earn an income from it.²⁴ However, cities will need to look to other sources of food to feed their burgeoning populations.

In addition to loss of agricultural land, there will be a loss of workers in the agricultural sector as people move to cities. In Indonesia, for example, urbanisation could result in about 8 million fewer farmers by 2030 as people migrate from rural areas to cities.²⁵ Urban residents also have a higher GDP per capita than their rural counterparts, and per capita food consumption tends to increase sharply with economic prosperity.²⁶

Economic growth is increasingly happening not only in mega-cities such as Jakarta, Manila, and Bangkok, but also in middleweight regions, with a population between 500,000 and 5 million (Exhibit 3). This implies that capital cities and major ports will not be the sole drivers of increasing urban food demand, and many other cities will require attention as ASEAN increasingly looks to agri-food imports to ensure food security.

EXHIBIT 3

Middleweights, not mega regions, are growing fastest in ASEAN

	Compound annual growth rate of real GDP		# of regions 2015	Share of real GDP 2015	Share of Pop. 2015
	2010-2015	2015-2020			
Mega Regions 5 million and above	5.0	5.5	8	33%	11%
Large Middleweights 1 million – 5 million	5.7	6.9	184	32%	48%
Small Middleweights 500,000 – 1 million	4.8	5.8	191	16%	22%
Small Regions 300,000 – 500,000	5.0	6.0	143	8%	9%
Rural Regions Below 300,000	4.2	5.5	448	11%	10%
Total	5.1	6.0	974		

SOURCE: AlphaBeta ASEAN economic database

23 World Bank (2015), *The dynamics of global urban expansion*. Available at: http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/dynamics_urban_expansion.pdf

24 Andrew J. Hamilton et al. (2014), "Give peas a chance? Urban agriculture in developing countries. A review", *Agronomy for Sustainable Development*. Available at: <https://link.springer.com/article/10.1007/s13593-013-0155-8>

25 McKinsey Global Institute (2012), *The archipelago economy: Unleashing Indonesia's potential*. Available at: <https://www.mckinsey.com/global-themes/asia-pacific/the-archipelago-economy>

26 Max Roser and Hannah Ritchie (2019), "Food per person". Available at: <https://ourworldindata.org/food-per-person#data-sources>

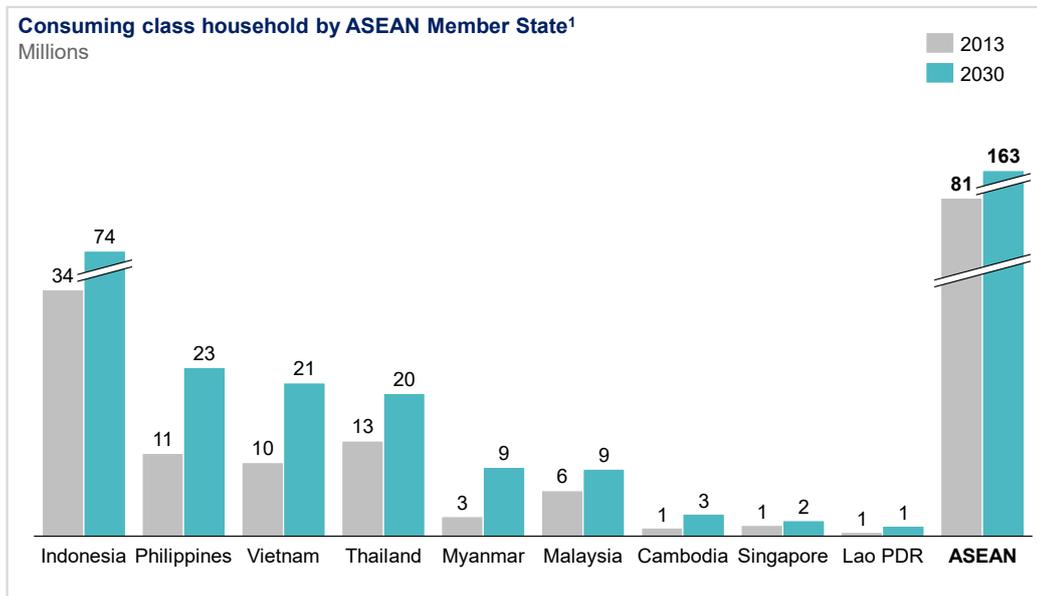
A growing consuming class will fuel demand for clean and green food

As millions move to cities searching for better livelihoods, the region is gaining a new wave of consumers with considerable spending power. The rate of increase of the middle class, in absolute numbers, is approaching its all-time peak. It took 150 years after the start of the Industrial Revolution in Europe for the middle class to reach 1 billion people globally. The next billion were added to the global middle class in 21 years. The third billion was added in just 9 years, and the next billion could arrive in just 7 years.

The Brookings Institute estimates that there were approximately 3 billion people in the consuming middle class globally at the end of 2015, with over 2.2 billion new entrants to the middle class coming from Asia through 2030.²⁷ Consuming class households, defined as those with incomes exceeding the level at which they can make discretionary purchases (e.g. higher quality food produce), will double in the ASEAN region from 81 million households in 2013 to 163 million households in 2030 (Exhibit 4).²⁸ This growth in the consuming middle class will fuel demand for more and new types of food. Already, urban households in Southeast Asia are displaying higher diversity in the food groups consumed – including substituting consumption of rice in favour of increasing consumption of wheat and consuming more wheat-based products, high protein and high energy foods, and “convenience” foods.²⁹

EXHIBIT 4

Around 163 million households are expected to be part of ASEAN’s consuming class by 2030 – twice as many as in 2013



1. Defined as households with more than \$7,500 in annual income (in 2005 purchasing power parity terms). This is the income level at which households begin to make significant discretionary purchases; Brunei not shown on chart as number of consuming class households in 2030 is only ~0.1 million.

SOURCE: McKinsey Global Institute

²⁷ Brookings Institute (2017), *The unprecedented expansion of the global middle class*. Available at: https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf. The income range for middle-class families is defined by Brookings as ranging from US\$11 to US\$110 income per day in 2011 Purchasing Power Parity (PPP) terms.

²⁸ McKinsey Global Institute (2014), *Southeast Asia at the crossroads: Three paths to prosperity*. Available at: <https://www.mckinsey.com/featured-insights/asia-pacific/three-paths-to-sustained-economic-growth-in-southeast-asia>

²⁹ Paul PS Teng (2017), *Role & challenges of new agricultural technologies in sustainable food systems and nutrition improvement in ASEAN*. Available at: <http://ilsisea-region.org/wp-content/uploads/sites/21/2017/12/01-Paul-Teng.pdf>

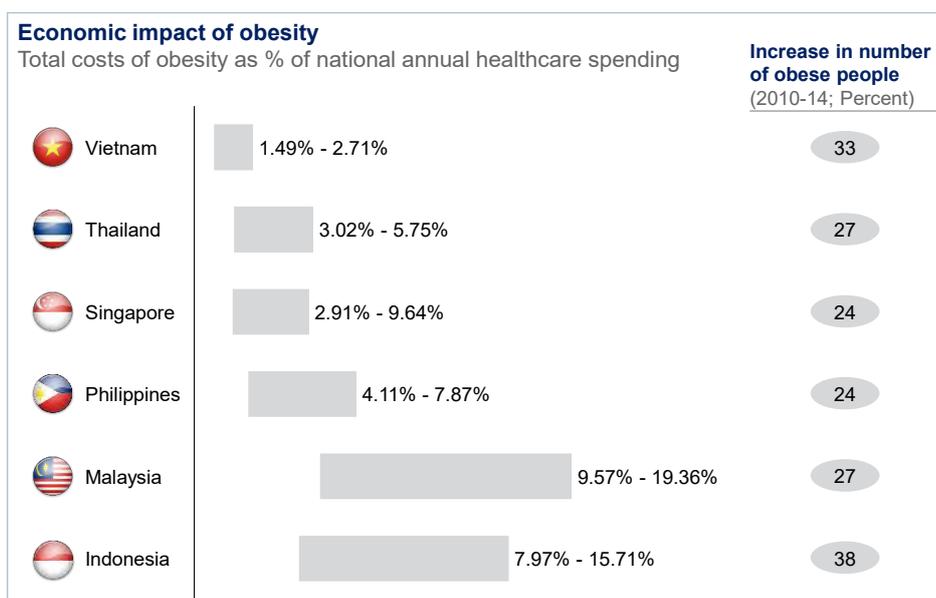
Obesity is a significant healthcare burden – food-based interventions are key

Noncommunicable diseases (NCDs) including cardiovascular diseases (such as heart attacks and strokes), diabetes, and musculoskeletal disorders represent a large share of the global burden on healthcare, and represent the leading cause of death globally.³⁰ Obesity is a leading cause of such NCDs, and its direct economic impact comprises 2.7 percent of global GDP.³¹ According to research by the Institute for Health Metrics and Evaluation at the University of Washington, obesity led to around four million deaths worldwide in 2015.³² Globally, the prevalence of obesity as of 2018 has tripled since 1975 with no recorded decrease in any region.³³

As a side effect of Asia's increased affluence, inactive lifestyles and excessive intake of energy are becoming more prevalent, leading to greater incidences of obesity. The Asian Development Bank (ADB) recently reported that nearly 41 percent of adults in Asia Pacific were overweight or obese.³⁴ ASEAN is no exception to this trend, with overall obesity rates increasing across the board and particularly in cities. For instance, Jakarta is reported to have higher obesity rates than eastern Indonesian provinces. The Economist Intelligence Unit estimates that the total economist cost of obesity, comprising direct healthcare costs and indirect costs in terms of productivity losses, represents roughly 19 percent of healthcare spending annually in ASEAN countries (Exhibit 5).³⁵

EXHIBIT 5

Obesity is a significant burden on healthcare in ASEAN



SOURCE: The Economist intelligence Unit; Team analysis

³⁰ WHO statistics as reported by MIMS Today (2017), "Infographic: WHO says Asia's healthcare costs will rise starkly over the next 10 years". Available at: <https://today.mims.com/infographic--who-says-asia-s-healthcare-costs-will-rise-starkly-over-next-10-years>

³¹ AlphaBeta (2018), *Prevention is the best medicine: Rethinking healthcare in Asia*. Available at:

<https://www.ecosperity.sg/content/dam/ecosperity/en/articles/Prevention-is-the-best-medicine-rethinking-healthcare-in-asia.pdf>

³² Diana Philips (2017), *Obesity-related deaths hit new high worldwide*. Available at: <https://www.medscape.com/viewarticle/881428>

³³ WHO (2018), *Factsheet: Obesity and overweight*. Available at: <http://www.who.int/mediacentre/factsheets/fs311/en/>

³⁴ As reported by Nikkei Asian Review (2017), "Indonesia and Malaysia follow Singapore's lead in tackling obesity". Available at:

<https://asia.nikkei.com/Politics-Economy/Policy-Politics/Indonesia-and-Malaysia-follow-Singapore-s-lead-in-tackling-obesity>

³⁵ The Economist Intelligence Unit (2017), *Tackling obesity in ASEAN*. Available at:

http://www.eiu.com/public/thankyou_download.aspx?activity=download&campaignid=ObesityInASEAN

Obesity may be a “blind spot” for nutrition policies in ASEAN, given that many countries still consider hunger and undernutrition as the key public health issue on the nutrition agenda. Compounding this problem is the lack of granular data from ASEAN on obesity prevalence and its long-term economic impact. However, global studies show that food-based interventions, including dietary changes at the individual consumer level and “nudges” at the regulatory level, hold the most considerable potential to reduce obesity. Low glycaemic index, low-calorie, low-fat and low-carbohydrate diets have all been found to be effective, and consumers can be “nudged” into making balanced and healthier food choices through reduction of portion sizes, “choice environment” measures including healthy snacks in school and at the workplace, and taxation on specific foods (e.g. sugar tax). Such dietary changes will require a shift to the clean and green food for which Australia is well-placed to supply.

Australian businesses in ASEAN believe regional integration will benefit trade

Agri-food trade between Australia and ASEAN has accelerated since the commencement of the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) in 2010 – which has set more consistent trade and investment rules across the region, lifted key trade tariffs, and improved market access.³⁶ The ASEAN Economic Community (AEC) further envisions ASEAN as an integrated market and production base, and has already largely removed trade tariffs and made progress on eliminating non-tariff barriers and improving single window trade in agriculture and aquaculture.³⁷ However, many regulatory, procedural and practical hurdles remain as key barriers to trade – as an illustration, to export meat products to Indonesia, a business must receive import approval, a letter of recommendation, establishment approval from relevant ministries, import permits, certificate of health, entry permits, import registration numbers, and be subject to quarantine.³⁸

However, despite ASEAN trade integration being “work-in-progress”, two-thirds of Australian businesses in the region view improved market access as a key benefit of regional integration (Exhibit 6). 45 percent of respondents further believe that ASEAN integration is important for doing business in the region, up from 41 percent in 2017.³⁹ An improving trade environment will be crucial to deepening the agri-food trade partnership between Australia and ASEAN.

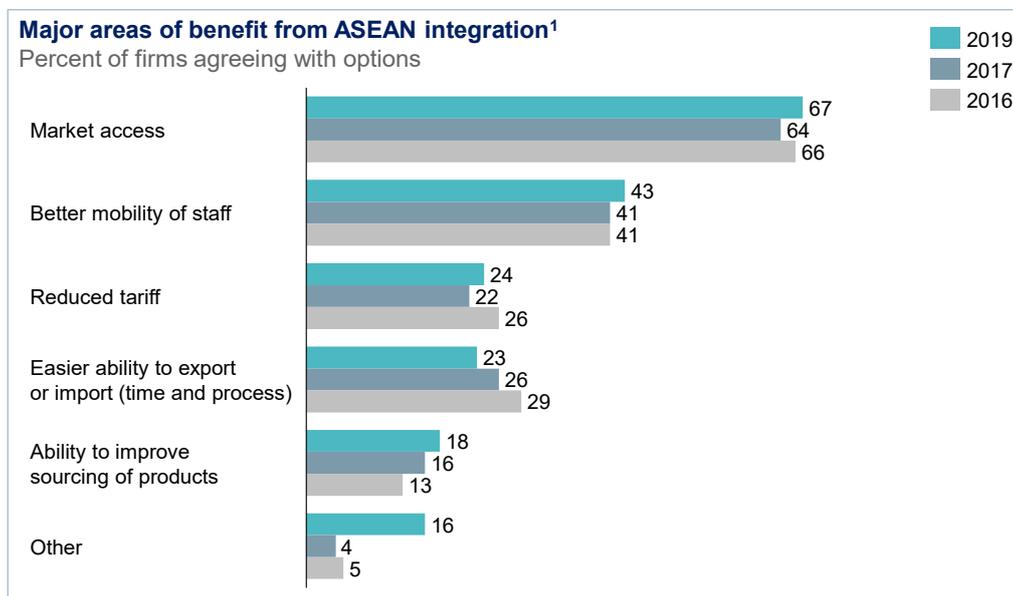
³⁶ ASEAN Secretariat (2016), “Benefits of AANZFTA to ASEAN” Available at: <https://aanzfta.asean.org/asean-australia-new-zealand-free-trade-arrangement/>

³⁷ AlphaBeta ASEAN regional integration database; Invest in ASEAN (2019), “ASEAN Economic Community – How viable is investing?” Available at: <http://investasean.asean.org/index.php/page/view/asean-economic-community/view/670/newsid/755/about-aec.html>

³⁸ Read Box 4 on “The Barriers to Beef”. McKinsey Global Institute (2014), *Southeast Asia at the crossroads: Three paths to prosperity*. Available at: <https://www.mckinsey.com/featured-insights/asia-pacific/three-paths-to-sustained-economic-growth-in-southeast-asia>

³⁹ Australian firms in ASEAN were surveyed as a part of the Australian Business in ASEAN Survey, which is conducted annually by AustCham ASEAN among the members of its nine constituent business chambers. Agribusinesses form a significant portion of the firms surveyed. See AustCham ASEAN (2019), *Australian Business in ASEAN Survey 2019*. Available at: <http://austchamasean.com/wp-content/uploads/2019/03/Australian-Business-in-ASEAN-Survey-2019.pdf>

Australian firms in ASEAN view improved market access and reduced trade tariffs as key benefits of regional integration



1. The income range for consuming middle-class households is defined by Brookings as ranging from \$11 to \$110 income per day in 2011 Purchasing Power Parity (PPP) terms.

SOURCE: AustCham ASEAN Business Survey 2019; Team analysis

New technologies in food are increasing shelf life

A key constraint to increased agri-food trade between Australia and ASEAN is the lack of trade infrastructure to support the import of perishable produce. There is often large-scale wastage of produce that is unable to reach the consumer while fresh, or transported without proper care or storage. The Food and Agriculture Organization of the United Nations (FAO) estimates that 40 percent of food losses occur during post-harvest, processing and distribution of the fruits and vegetables value chain in South and Southeast Asia.⁴⁰ Proper storage and distribution of fresh and frozen produce alike, including seafood and meat, will be critical as demand rises in the region.⁴¹

New technologies in packaging and cold storage adapted to the ASEAN context are circumventing the lack of traditional infrastructure such as large, human-operated cold stores, helping extend the shelf life of horticultural, livestock and dairy products that are both fresh and frozen.⁴² Australian agri-food businesses specialising in these sectors can leverage these developments to increase exports.

In food packaging, new innovations beyond Ziplock bags and traditional refrigeration, such as biodegradable alternatives and ethylene removal technologies, have been found to extend the shelf-life of fresh produce:

⁴⁰ FAO (n.d.), *Extent of food losses and waste*. Available at: <http://www.fao.org/3/mb060e/mb060e02.pdf>

⁴¹ JLL (2017), "Booming cold chain logistics lures investors" Available at: <http://www.jllapsites.com/research/booming-cold-chain-logistics-lures-investors/>

⁴² AlphaBeta (2018), *Feeding urban Asia: New approaches for providing safe, nutritious and affordable food*. Available at: <https://www.ecosperity.sg/content/dam/ecosperity/en/articles/Feeding-urban-asia-new-approaches-for-providing-safe-nutritious-and-affo....pdf>

- **Biodegradable alternatives.** Food packaging made using biodegradable materials that extends shelf life are cost-effective solutions – for instance, FreshPaper in US is food safe paper infused with low-cost organic spices that extends shelf life of fresh produce by four times versus standard storage techniques at supermarkets.⁴³ Researchers at the National University of Singapore (NUS) have developed similar biodegradable packaging film using grapefruit seed extract that doubles shelf life of common produce such as bread.⁴⁴
- **Ethylene removal.** Ethylene is a plant hormone produced naturally by fruit and other plant tissues that is responsible for ripening. Ethylene gas removal from both cold storage and transport containers is a widespread traditional practice that reduces volumes of food wastage. In the absence of such infrastructure, new solutions such as sachets and films which remove ethylene from produce to reduce loss of freshness from over-ripening, oxidation, and dehydration can be key to extending the shelf of fresh fruit and vegetables.⁴⁵ Packaging specialists such as Stream Peak in Singapore and Indonesia have introduced a range of ethylene absorbers including sachets, pellets and rods for the transport of fresh produce.⁴⁶

There are a range of developments related to cold storage systems adapted to both developed and developing country contexts that help reduce wastage due to human error and poor infrastructure, including automated storage and retrieval systems (ASRS) and micro-systems.

- **ASRS.** ASRS use artificial intelligence and robotic equipment to stack and retrieve food products efficiently within cold storages and climate-controlled warehouses, reducing food waste through less exposure to ambient temperature by human error or delays. ASRS are among the top three imported products in Thailand's A\$11 billion automation products.⁴⁷ Singapore's Mandai Link Logistics, which developed Singapore's first fully automated food storage facility capable of storing 25,000 tonnes of food, is looking to expand its automated cold logistics footprint into markets like Thailand and China.⁴⁸
- **Micro-systems.** Traditional, ammonia-based cold storage facilities require large investment and benefit from economies of scale when serving large centres of demand. Such facilities are difficult to deploy in off-grid environments as are common across the ASEAN archipelago. Recently, affordable, solar-based micro cold storages for farmers and small communities have begun replacing traditional facilities. Indonesia has emerged as a leader in micro cold storage technology, with successful solar powered deployments in Kota Wakatobi in South Sulawesi and Pacitan in East Java among 10 other locations in 2014.⁴⁹ These systems have been developed to help fisherman in Indonesia's 800 small fishing villages, and are capable of keeping around 500kg of fish fit for consumption – increasing yield of sellable catch by up to 50 percent.⁵⁰ Indonesia has recently opened the cold storage

⁴³ REID (2013), "FreshPaper by Fenugreek". Available at: <http://reid.wrap.org.uk/item.php?id=453>

⁴⁴ The Straits Times (2016), "Packaging film could prolong shelf life of perishables" Available at:

<https://www.straitstimes.com/singapore/packaging-film-could-prolong-shelf-life-of-perishables>

⁴⁵ BioConservacion (2016), "Ethylene removal in domestic refrigerators" Available at: <https://www.bioconservacion.com/en/news/ethylene-removal-domestic-refrigerators>

⁴⁶ Stream Peak International (2019), "Ethylene Absorbers" Available at: <https://streampeak.com.sg/e-catalogue/product/industries/food/ethylene-absorber>

⁴⁷ Netherlands Ministry of Foreign Affairs (2018), *Automation and robotics in Thailand*. Available at:

http://www.ntccthailand.org/images/articles_reports/20180712-Factsheet-Automation-and-Robotics-in-Thailand.pdf

⁴⁸ Enterprise Singapore (n.d.), "Mandai Link – Delivering cold chain logistics to Asia" Available at: <https://ie.enterprisesg.gov.sg/Venture-Overseas/Browse-By-Market/Asia-Pacific/Thailand/Success-Stories/cs/Success-Stories/Delivering-cold-chain-logistics-to-Asia>

⁴⁹ Contained Energy (2014), "Cold Storages in Wakatobi and Pacitan" Available at: <http://www.containedenergy.com/case-studies/cold-storage-wakatobi-pacitan/>

⁵⁰ Renewable Energy and Energy Efficiency Partnership (n.d.), *Financing solar-powered cold-storage for Indonesian fishing communities*.

Available at: <https://www.reeep.org/sites/default/files/Profile%20109010164%20Solar-powered%20cold-storage%20Indonesia%20fishing.pdf>

industry up to 100 percent foreign investment without geographic restrictions – providing an opportunity for overseas agri-food investors to secure their supply chains.⁵¹

Sustainability-related concerns in food represent a large business opportunity

The sustainability challenges posed by UN Sustainable Development Goals (SDGs) are shifting approaches across the entire value chain of food supply. An SDG-compatible food system will generate major incremental business opportunities in three key areas – production, supply chain and retail – these are worth an annual revenue opportunity in Asia of US\$1 trillion by 2030 (Exhibit 7).⁵² Australian agri-food businesses are well-placed to capture these opportunities, given their reputation for producing high-quality, nutritious, organic and sustainably produced food.⁵³

- **Production.** The production area of the food value chain will experience some of the largest shifts as the SDGs are implemented. Water, energy and land-intensive products like beef will face constrained growth from rising costs caused by reductions in resource subsidies and the pricing of environmental externalities. In their place, less resource-intensive food groups, such as cereals, fish and poultry, will experience faster growth. There will be shifts towards sustainable agriculture approaches including holistic farming, no-till agriculture and micro-irrigation, as well as an increased focus on animal health and welfare. Contract farming and new partnership models with smallholder farmers will become increasingly prevalent and there will be a step change in the application of technology to farming, with increasing use of big data to enable precision farming. The inputs to the agricultural and fisheries sectors will be transformed by the SDGs' emphasis on ending hunger, improving agricultural productivity and adapting to climate change. While traditional fertilisers may face constraints to volume growth, there could be a shift in value towards microbial fertilisers. New breeding techniques will be needed to develop crops appropriate to changing environmental conditions. Aquaculture disease control and feedstock innovation could transform the inputs to protein production. The SDGs also call for the end of overfishing and unregulated fishing, which will further drive the development of aquaculture.
- **Supply chain.** There will be a shift of value towards low-waste producers given a combination of cost concerns and consumer focus, supported by increasing sustainability reporting requirements for food retailers. Concerted efforts to reduce the impact of noncommunicable diseases (NCDs), including obesity, are an important element of the SDGs and a growing concern for governments and consumers. In response, producers will need to focus on product reformulation to reduce fat and sugar and improve the nutritional content of processed food. The SDGs also aim to reduce food losses along production and supply chains. Logistics will therefore need to change, with the rapid growth of cold storage systems and full traceability of products to address consumers' food safety and sustainability concerns.
- **Retail.** The retail sector will undergo one of the biggest transformations in the value chain, with opportunities for new markets serving low-income consumers, and sustainably sourced products emerging from a niche category to the industry standard. According to Nielsen's Global Health and Wellness Survey – a survey of 30,000 consumers in 60 countries – young

⁵¹ Indonesia Investments (2016), "Weak infrastructure blocks investment in Indonesia's cold storage industry" Available at: <https://www.indonesia-investments.com/news/todays-headlines/weak-infrastructure-blocks-investment-in-indonesia-s-cold-storage-industry/item6830?>

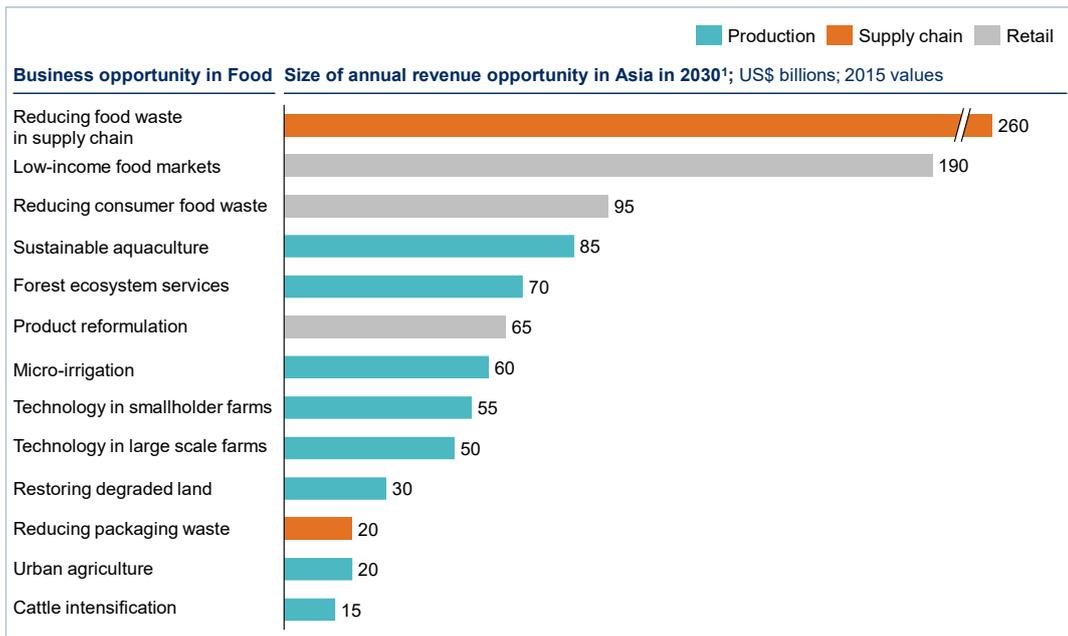
⁵² AlphaBeta for the Business and Sustainable Development Commission [BSDC] (2017), *Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth*. Available at: <http://s3.amazonaws.com/aws-bsdc/Valuing-the-SDG-Prize.pdf>

⁵³ Deloitte (2019), "Where are the growth opportunities in Australian agriculture?" Available at: <https://www2.deloitte.com/au/en/pages/consumer-business/articles/where-are-growth-opportunities-australian-agriculture.html>

people are much more interested in sustainably sourced food and are willing to pay a premium for it. Among consumers under 20 years of age, 41 percent said they would willingly pay a premium for sustainable products, compared to 21 percent of Baby Boomers (aged 50 to mid-60s). Consumers are also increasingly concerned with animal treatment, animal-welfare standards, and overall farming conditions.

EXHIBIT 7

There are over US\$1 trillion of opportunities by 2030 in food in Asia related to the SDGs, spread across production, supply chain, and retail



1. Based on estimated savings or projected market sizings in each area. Only the high case opportunity is shown here. Rounded to nearest US\$5 billion.
 SOURCE: AlphaBeta report for Business and Sustainable Development Commission (BSDC): *Valuing the SDG Prize in Asia*

2. There is large untapped export demand for Australian agri-food products in ASEAN

The six key food trends in ASEAN could support higher demand for Australian agri-food products in the future. Which products hold the highest potential? This chapter reviews trends in trade growth for key products between ASEAN and Australia to identify those with the largest untapped export demand in 2025.

15 agri-food products hold the highest export potential for Australia to ASEAN

Considering all agri-food products exported from Australia to the ASEAN region, 15 hold the highest future export potential (Exhibit 8). These products were identified based on a review of three key sources of information:

- **Current exported products.** Australia's top exported agri-food products to ASEAN between 2012 to 2017 were considered, as other products are unlikely to be major sources of demand by 2025 if not included among top exports today.⁵⁴ Over 2012 to 2017, wheat, live cattle, cane sugar, beef, and milk and cream powder comprised Australia's top five exports to the region.
- **Projected top exports.** Australia's top export opportunities to ASEAN through 2023 as projected by the International Trade Centre (ITC) were considered, as these are an indication of untapped opportunities based on size and growth of destination markets, geographical distance, tariffs, and so on.⁵⁵ ITC considers wheat, beef, live cattle, milk and cream powder and table grapes as the products with the highest projected exports from Australia to ASEAN.
- **Products recommended by complementary research.** Products highlighted by the North Queensland Agricultural Market and Supply Chain Study (NQAMSCS) were also considered, as product recommendations were based on export demand in key overseas markets and supply feasibility in the Townsville area of northern Queensland – a key agricultural landscape in Northern Australia.⁵⁶ Products considered from this analysis include beef, rock lobsters, macadamia nuts, avocados, and soybeans.

Each product from these lists was assigned an index score based on volume of historical exports and projected top exports, and the 15 products with the highest scores are considered to hold the highest future potential. For detailed notes on the methodology behind the identification of these products, please refer to the Appendix.

⁵⁴ Data sourced from International Trade Centre (2019), *Trade Map*. Available at: <https://www.trademap.org/Index.aspx>

⁵⁵ Data sourced from International Trade Centre (2019), *Export Potential Map*. Available at: <http://exportpotential.intracen.org/#/home>

⁵⁶ KPMG and Townsville Enterprise (2019), *North Queensland Agricultural Supply Chain Study*. Available at: <http://www.crcna.com.au/news/new-study-identifies-billions-in-unmet-market-demand-for-nq-agricultural-producers/>

A total of 15 agri-food products have been filtered for further evaluation, based on Australia's current and potential exports to ASEAN

 Covered by NQAMSCS study¹

Index rank	Product	Agri-food ranking, top exported products to ASEAN, 2012-17 ²	Agri-food ranking, top potential exports to ASEAN, 2023 ³	Combined index score ⁴
1	Wheat 	1	1	200
2	Live cattle 	2	3	197
3	Beef 	4	2	196
4	Milk and cream powder 	5	4	192
5	Malt 	7	5	186
6	Grapes 	12	8	184
7	Sheep meat 	15	11	174
8	Cheese 	16	16	158
9	Milk and cream 	18	13	158
10	Oranges 	26	20	156
11	Infant food preparations 	32	18	153
27	Rock lobsters 	107	7	94
47	Macadamia nuts 	47	NA ⁴	41
67	Avocados 	72	>150 ⁵	19
-5	Soybeans 	112	100-150 ⁵	-. ⁶

1. The Northern Queensland Agricultural Market and Supply Chain Study (NQAMSCS) developed by Townsville Enterprise explores top export opportunities in Asia Pacific for Northern Queensland.

2. Agri-food products were assigned ranks by sum of total exports from 2012-17, and highest export potential value from 2017-22.

3. Agri-food products placing within the top 100 total exported products (or products with highest potential) were assigned weighted index scores out of 100 based on the number of products in the top 100. E.g. if 50 agri-food products were found in the top 100 products; the first ranked product was assigned a score of 100, the second 98, the third 96, and so on. The products with the highest combined scores were selected for this analysis.

4. Under export potential product codes, macadamia nuts are classified under a grouped code for miscellaneous nuts, and grouped codes have not been assigned rankings.

5. Due to time-intensive nature of data gathering and cleaning process for export potential, exact agri-food rankings for avocados and soybeans has not been determined as their potential is low.

6. Products placing outside the top 100 rankings on both lists were not assigned an index score.

SOURCE: International Trade Centre (ITC); UN Comtrade; Team analysis

Three growth scenarios for exports through 2025 reveal large potential opportunities for Australia in ASEAN

Three growth scenarios were considered to identify the range of projected exports across these 15 agri-food products in 2025:

- Historical export growth.** A “business-as-usual” view to export growth – assuming that export growth rates from Australia to ASEAN through 2025 follow historical patterns from 2012 to 2017. Of the 15 products, soybean displays the highest export growth during this time period at a 36 percent compounded annual growth rate (CAGR).
- Historical ASEAN import growth.** A “match the market” view to export growth – assuming that export growth rates from Australia to ASEAN through 2025 follow historical imports by the ASEAN region from all trade partners for the product in question from 2012 to 2017. Of the 15 products, live cattle imports have grown fastest in ASEAN during this time period at a 32 percent compounded annual growth rate (CAGR).
- ITC export forecast.** An export forecast through 2025 based on a range of assumptions, including simulated GDP growth in the domestic and target markets, population growth, potential removal of trade barriers, and dynamic supply conditions (e.g. possibility of re-

exports).⁵⁷ Of the 15 products, infant food preparations have been forecast to show the fastest growth at 40 percent compounded annual growth rate (CAGR).

For the detailed methodology behind these growth scenarios, please refer to the Appendix.

Across the three growth scenarios, the largest projected exports in 2025 is in three agri-food products: wheat, live cattle, and beef (Exhibit 9).

EXHIBIT 9

The largest export opportunities in 2025 for Australia to ASEAN are in wheat, live cattle, and beef

Top 3 products

Australian exports to ASEAN; A\$ millions	Growth scenarios: Future exports, 2025					CAGR (2017-2025; %)		
	Current exports, 2017 ¹	Historical export growth	Historical ASEAN import growth	ITC export forecast ²				
Wheat	2,811	2,689	7,103	7,308	-1	12	13	
Live cattle	1,038	7,972	9,406	1,858	29	32	8	
Beef*	504	803	1,086	6,289	6	10	37	
Milk and cream powder	324	176	232	433	-7	-4	4	
Malt	200	127	213	324	-6	1	6	
Grapes	130	772	331	496	25	12	28	
Sheep meat	131	461	400	211	17	15	6	
Cheese	58	64	73	37	1	3	-5	
Milk and cream	69	212	165	35	15	12	-8	
Oranges	46	92	58	110	9	3	12	
Infant food preparations	18	2	18	260	-22	0	40	
Rock lobsters*	359	605	747	343	7	10	-1	
Macadamias*	41	66	49	144	6	2	17	
Avocados*	9	16	57	0	7	25	-36	
Soybeans*	5	55	5	1	36	1	-18	

1. Base export data is current exports as defined by the ITC Export Potential Map as of 2017. This data can differ to exporter reported trade flows on Comtrade due to data adjustments made based on the reliability of exporter-reported trade flows, such as for rock lobster and macadamias.
 2. ITC forecasts export potential in 2023 – the implied CAGR from 2017-23 has been taken to project exports forward to 2025.
- * Product covered by Northern Queensland Agricultural Market and Supply Chain Study (NQAMSCS).
SOURCE: International Trade Centre; UN Comtrade; ABARES; Team analysis

The largest “upside” opportunity is in live cattle, beef and wheat

The “upside” opportunity (i.e. untapped export demand) is the incremental annual opportunity in 2025 defined as the difference between the highest and lowest export forecasts in the three growth scenarios considered. This approach highlights the potential upside opportunity from a more proactive approach, and is consistent with existing literature highlighting incremental business opportunities.⁵⁸

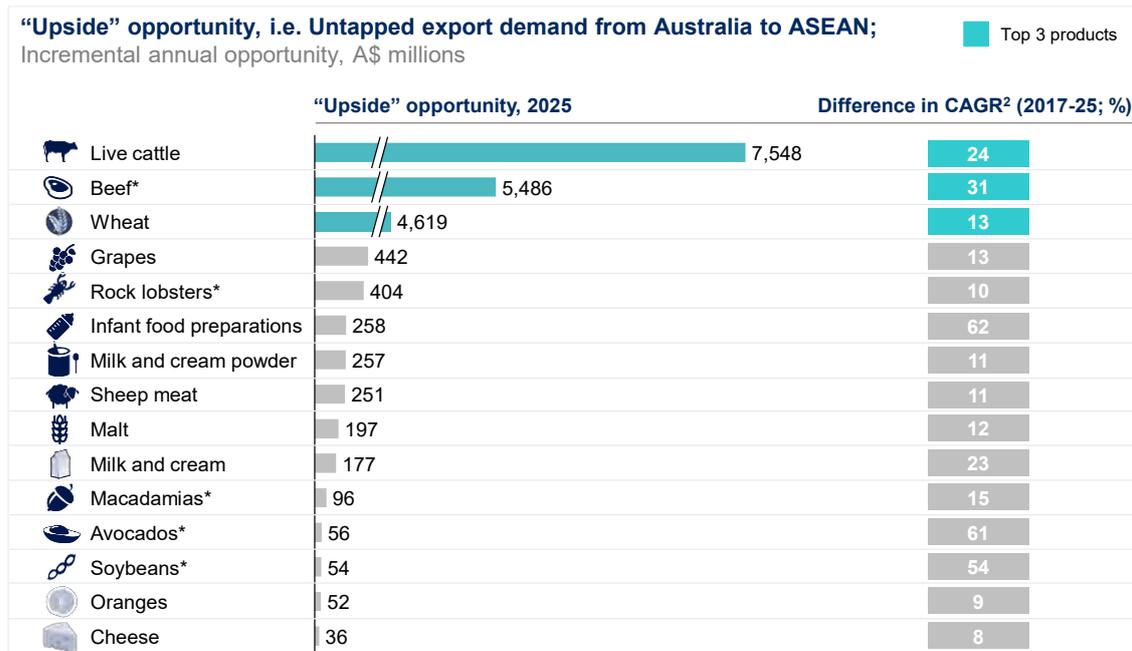
⁵⁷ ITC's export forecast is for products through 2023; the implied CAGR in growth from 2017 to 2023 is considered to forecast exports through 2025.

⁵⁸ Including KPMG and Townsville Enterprise (2019), *North Queensland Agricultural Supply Chain Study*. Available at: <http://www.crcna.com.au/news/new-study-identifies-billions-in-unmet-market-demand-for-nq-agricultural-producers/>

The largest untapped export demand in ASEAN for the Australian agri-food sector through 2025 lies in live cattle (A\$7.5 billion), followed by beef (A\$5.5 billion), and wheat (A\$4.6 billion) [Exhibit 10].

EXHIBIT 10

The products with the largest upside opportunity in 2025 for Australia to ASEAN are live cattle, beef, and wheat



1. “Upside” opportunity is an incremental annual opportunity defined as the difference between the highest and lowest projected exports in 2025 in the growth scenarios. It is not intended as a specific export forecast or target and is a thought experiment to highlight the potential growth opportunity.
 2. Difference in CAGR between the highest and lowest export growth scenarios.
 * Product covered by Northern Queensland Agricultural Market and Supply Chain Study (NQAMSCS).
 SOURCE: International Trade Centre; UN Comtrade; ABARES; Team analysis

It is important to note that this upside opportunity is not intended as a specific export revenue forecast or target, but is a thought experiment to highlight the potential growth opportunity available for these products in ASEAN. Capturing the opportunity would require addressing a range of major challenges in regulation, demand and supply conditions.

3. Northern Australia's ability to supply the ASEAN market varies significantly by agri-food product

Northern Australia is well-placed to capture the upside opportunity in 2025 for agri-food products that are suited to production in the region, have existing expertise for production in the region, and have an established supply chain. This chapter explores supply feasibility for the 15 products identified in Chapter 2.

For the 15 agri-food products considered in Chapter 2, supply feasibility in Northern Australia is highest for live cattle, beef, and rock lobsters

To understand the relevance of the 15 agri-food product opportunities identified in Chapter 2 to Northern Australia, a supply feasibility index was constructed for these products in consultation with industry experts. Four criteria – production conditions, disease tolerance, existing production expertise, and existing supply chain – were weighted equally and assigned scores out of 100.

- **Production conditions.** The degree to which Northern Australia has appropriate climatic conditions suitable to the production of the product in question (applies to base crop for processed products e.g. barley for malt). Sub-criteria include temperature, precipitation and soil. A low score indicates highly challenging production conditions, whereas a high score indicates ideal production conditions across major climatic areas.
- **Disease tolerance.** The degree to which the crop in question is tolerant to possible disease outbreaks in Northern Australia. Sub-criteria include degree to which crop is disease prone, instances of recent outbreak, and (if any) success of disease management strategies deployed during recent outbreaks. A low score indicates a disease-prone crop with recent outbreaks having been difficult to contain, whereas a high score indicates a crop that is not prone to diseases.
- **Existing production expertise.** The degree to which there is existing capacity to produce the product in Northern Australia. Sub-criteria include share of national production relative to other products, and ability to scale production based on existing expertise in the region. A low score indicates no existing production of note and relative difficulty to scale production in Northern Australia, whereas a high score indicates a product with significant production and high corresponding production expertise required to scale production.
- **Existing supply chain to support exports.** The availability of an existing supply chain to support exports from Northern Australia. Sub-criteria include product durability, existing storage infrastructure in the region, and the importance of Northern Australia to national exports. A low score indicates a perishable product with no suitable storage infrastructure and negligible exports, while a high score indicates a durable product with sophisticated storage infrastructure and supply chain available with a high share of national exports.

For more details on supply feasibility sub-criteria and scoring, please refer to the methodology in the Appendix.

Three agri-food products have the highest supply feasibility in Northern Australia – live cattle, rock lobsters, and beef (Exhibit 11):

- **Live cattle.** There is an established production and export hub for live cattle across the Northern Territory and Queensland. Production conditions are suitable across all three territories, and potential transfer of diseases to northern livestock from other regions are mitigated well through strict cattle mobility policies both within Australia and from overseas.⁵⁹ 38 percent of live cattle exports over 2012 to 2017 were managed out of the port of Darwin in the Northern Territory, with a further 21 percent managed from ports such as Brisbane and Townsville on Queensland's coast.⁶⁰
- **Rock lobsters.** Tropical rock lobster (including both juvenile, live, and frozen varieties) is primarily produced in Northern Australia along the northeast coastal seaboard of Queensland in the Torres Strait. Production conditions are suitable across the tropical marine waters of the north, although there are some challenges that require research and investment to overcome. For instance, both wild and cultivated catch in Queensland are constrained by policies regulating nutrient flow in and out of the Great Barrier Reef area – deploying protein absorbent microalgae in key areas has shown strong potential to manage this requirement. Sturdier sea cages are also required to withstand cyclone damage on the north and northwest coasts. There is high potential for hatcheries and on-shore aquaculture to be deployed across the north – successful commercial trials from Tasmania are being tested in Queensland. There is good supply chain infrastructure and access to markets from key areas such as Cairns, Townsville and Darwin; investment is required to develop a cost-effective supply chain in more remote coastal areas such as the Kimberley region in Western Australia.
- **Beef.** Queensland's large beef processing industry is a central pillar of its agri-food industry – the state alone manages nearly half of domestic beef processing, with live cattle often being sent from neighbouring areas in the north to commercial feedlots and abattoirs in the state.⁶¹ Although this industry is concentrated in southeast Queensland with fewer facilities in the north, existing production expertise in the state and ever-improving export facilities translate to large untapped potential for expansion through beef intensification in cattle farms in northern Queensland.⁶² Key gaps include a lack of production expertise and facilities across the remainder of the north; investment, skills, and advisory required to implement integration across the beef cattle value chain; and commercially viable complementary agriculture (e.g. broadacre crops and cotton seeds that can utilise vast areas of available land to achieve commercial scale, while servicing cattle feedlots).

⁵⁹ Expert interview. For more information on the Northern Territory's animal surveillance policies, please visit: Northern Territory Government (2016), *Animal health surveillance*. Available at: https://dpir.nt.gov.au/_data/assets/pdf_file/0006/233277/817.pdf

⁶⁰ Mercado (2018), "The importance of live cattle exports to regional Australia" Available at: <http://blog.mecardo.com.au/the-importance-of-live-cattle-exports-to-regional-australia-part-1>

⁶¹ Mercado (2018), "The importance of live cattle exports to regional Australia" Available at: <http://blog.mecardo.com.au/the-importance-of-live-cattle-exports-to-regional-australia-part-1>

⁶² Beef intensification refers to vertical integration across the beef value chain for producing entities, which could include complementary agriculture (e.g. broadacre crops, soybeans, cotton, etc.) to support on-farm or centralised regional feedlots, abattoirs to process and package beef products, and integration with supply chains to export hubs.

Overall supply feasibility is highest for live cattle, rock lobsters and beef

Top 3 products

Product	1. Production conditions	2. Disease tolerance	3. Production expertise	4. Supply chain	Final index score ¹	Rationale
Live cattle	100	67	97	92	89	Suitable conditions, large production/export hub in NT and QLD
Rock lobsters	100	100	68	75	85	Good production and supply chain in QLD, expansion planned
Beef	100	67	75	75	79	Suitable conditions across north, key agri-food industry in QLD
Avocados	100	67	71	75	78	Good production and packhouses, concentrated in northern QLD
Macadamias	100	67	61	83	78	Conditions suitable but low production north of Bundaberg, QLD
Soybeans	100	67	65	58	73	Durable and production trials in place, but weak supply chain
Milk & cream	67	67	39	42	54	Dairy cattle unsuited to north; local consumption-oriented
Milk powder	67	67	30	50	54	Dairy cattle unsuited to north; processing mainly in VIC And NSW
Cheese	67	67	23	42	49	Dairy cattle unsuited to North; processing mainly in VIC
Infant food prep	67	67	20	42	49	Manufacturers in southern states; failed prior attempts
Oranges	67	33	28	33	40	Unsuitable conditions; failed prior attempts; small mandarin industry
Malt	33	67	7	50	39	Extremely unsuitable conditions for barley; processing in south
Grapes	67	33	29	17	37	Few suitable climatic zones; major investment required to support
Sheep meat	0	67	37	42	36	Climate in Northern Australia inhospitable to sheep
Wheat	0	67	13	42	30	Extremely unsuitable conditions; extremely low existing yield

1. Final score is measured as the simple average of the four supply metrics.

SOURCE: AgriFutures Australia; ABARES; NQAMSCS; Expert interviews; Industry associations; Literature review; Team analysis

While other product categories have some suitable aspects of supply feasibility, there are constraints in other areas (Exhibit 11):

- Horticulture products.** Horticulture-appropriate zones in the north tend to be restricted to smaller regions and potential to expand is contingent on research and development of suitable varieties. For instance, the northern avocado production industry is concentrated in the Atherton Tablelands of Queensland; although growth potential is high in this region, there are few suitable expansion areas available in the north outside this region.⁶³ Similar to soybeans, Australia is also a net importer of avocados, with increased production likely to service local markets first. Production conditions for macadamia nuts are generally suitable across Northern Australia; however, natural varieties only occur in and around the Bundaberg region in Queensland which is the state's largest producing region.⁶⁴ Crops such as table grapes and oranges are generally not suitable for production in the north, although there is a smaller Australian mandarin industry (relative to oranges) with roots in Emerald and Mareeba in Queensland, Katherine and Darwin in the Northern Territory, and Kununurra in Western Australia.⁶⁵

⁶³ AgriFutures Australia (2017), *Farm diversity – Avocados*. Available at: <https://www.agrifutures.com.au/farm-diversity/avocados/>

⁶⁴ AgriFutures Australia (2017), *Farm diversity – Macadamia*. Available at: <https://www.agrifutures.com.au/farm-diversity/macadamia/>

⁶⁵ Hort Innovation (2019), *Australian Horticulture Statistics Handbook 2017/18 – Fruit*. Available at: <https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/>; and Citrus Australia (2016), "Our Industry – Australian Citrus" Available at: <https://www.citrusaustralia.com.au/growers-industry/our-industry>

- **Broadacre crops.** Crops such as wheat and barley (for malt) have unsuitable production conditions in the north, with previous attempts having proven unsuccessful. Yields are extremely low – a single large wheat farm in southern Australia is capable of producing more wheat than all existing broadacre crop farms north of the Tropic of Cancer. Consequently, a supporting supply chain has not been established for these products. Recently, efforts have been made to expand production in other broadacre crops. For instance, the northern non-GMO soybean industry, albeit small, has expanded beyond northeast Queensland with commercial trials underway in the Northern Territory. Although soybean is suited to many production areas across the north, particularly as a rotational crop with sugarcane as it is a legume, it is unlikely to be a large export industry in the immediate future as Australia is still a net importer of soybeans.⁶⁶ New varieties of sesame seeds are also being developed suited to production in the north.
- **Dairy products.** High temperatures in Northern Australia are generally unsuitable for dairy cattle and management of dairy products. A supportive supply chain has not been developed, and most production of milk and cream is destined for domestic consumption without processing. Dairy investors generally favour well established and profitable operations in southern states such as Victoria.

⁶⁶ AgriFutures Australia (2017), *Farm diversity – Soybeans*. Available at: <https://www.agrifutures.com.au/farm-diversity/soybeans/>

4. There are 10 prioritised country-product opportunities for Northern Australia in ASEAN

Leveraging on insights from Chapters 2 and 3 on agri-food products for which there is both high untapped export demand and supply feasibility, this chapter identifies the top product export opportunities for Northern Australia in ASEAN. It further identifies the top 10 country opportunities in ASEAN for these products.

Live cattle and beef have been shortlisted as key export opportunities for Northern Australia to ASEAN; avocados and macadamias are considered as “smaller bets”

Live cattle and beef are considered as key export opportunities for Northern Australia to ASEAN, as they place above the median values for upside opportunity (i.e. untapped export demand) and supply feasibility (Exhibit 12). Live cattle (A\$7.5 billion) and beef (A\$5.5 billion) are significantly larger opportunities than other product opportunities, as discussed in Chapter 2. These products also have the highest supply feasibility in Northern Australia, as discussed in Chapter 3. Opportunities by ASEAN member states (AMS) are detailed in the next section.

Rock lobsters have been excluded from the shortlist of key export opportunities, despite having high upside opportunity and supply feasibility, due to the nature of historical demand from ASEAN and how this will change in the future. Current exports in the product from Australia to ASEAN are almost entirely concentrated in Vietnam – however, industry experts estimate that around 95 percent of exports have historically been destined for China.⁶⁷ This arrangement, where product was often illegally carried over borders by Vietnamese importers into China, was leveraged by traders to satisfy demand for Australian rock lobsters in China while circumventing prohibitively high tariffs (16.4 percent) for the product. However, with the implementation of the China-Australia FTA in late 2015, these tariffs were set to gradually decline to zero by January 2019. This, coupled with a crackdown on illegal imports by Chinese authorities, indicates that indirect exports to China via Vietnam will be substituted by direct exports to China in the near future – and evidence suggests that volumes through Vietnam declined even before 2019.⁶⁸ Rock lobsters exports from New Zealand similarly declined to Hong Kong when an FTA erased tariffs in 2012, with almost all indirect exports via Hong Kong replaced by direct exports to China.⁶⁹ However, experts have noted the potential emergence of demand for juvenile rock lobsters in Vietnam, as well as in Indonesia and the Philippines. This market could be monitored in the future.

In general, aquaculture product exports to ASEAN are less relevant for Northern Australia as the region is largely self-sufficient in this sector. In fact, ASEAN has been described as the world’s “fish net” – growing from around 20 percent of global fish production in 2014 to 25 percent by 2030.⁷⁰ Five

⁶⁷ Louis Harkell (2017), “Trade analysis \$500m Australia-China seafood ‘grey trade’ still going strong” Available at: <https://www.undercurrentnews.com/2017/03/06/trade-analysis-500m-australia-china-grey-seafood-trade-still-going-strong/>

⁶⁸ China Fisheries and Seafood Expo (2019), “China’s direct imports of crustaceans now worth billions” Available at: <http://chinaseafoodexpo.com/2019/02/07/chinas-direct-imports-of-crustaceans-now-worth-billions/> ;

Fisheries Research and Development Corporation (2019), *Rock Lobster Exports*. Available at: <http://www.frdc.com.au/Services/Seafood-Trade-and-Market-Access/Rock-Lobster-Exports>

⁶⁹ Louis Harkell (2017), “Trade analysis \$500m Australia-China seafood ‘grey trade’ still going strong” Available at: <https://www.undercurrentnews.com/2017/03/06/trade-analysis-500m-australia-china-grey-seafood-trade-still-going-strong/>

⁷⁰ World Fish (2017), *Fish to 2050 in the ASEAN region*. Available at: http://pubs.iclarm.net/resource_centre/2017-01.pdf

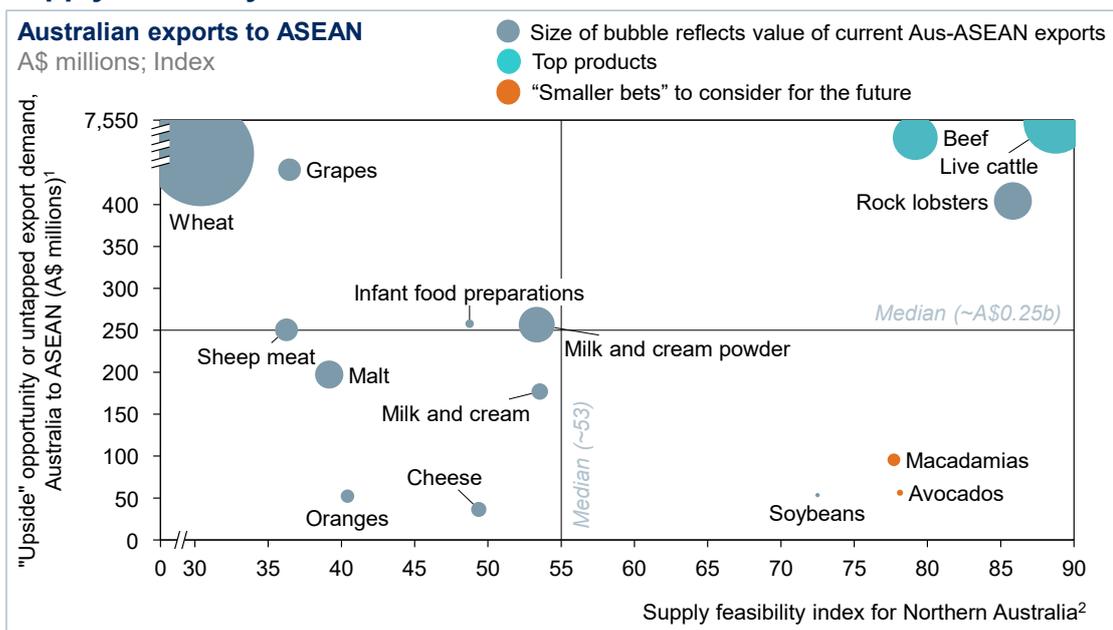
of the top 15 largest seafood producers are in the region – Indonesia, Vietnam, the Philippines, Malaysia, and Thailand.⁷¹ The fisheries industry is among ASEAN’s top 12 priority sectors for integration.⁷² Australia imports over 70 percent of its seafood consumption – and this includes large quantities of products such as frozen prawns, squid and octopus from Vietnam and Indonesia and canned tuna from Thailand.⁷³

In addition to beef and live cattle, avocados and macadamias could be considered as “smaller bets” as they have relatively high supply feasibility in Northern Australia but low forecasted export demand – although there are efforts being made in both industries to increase production and develop export-oriented growth strategies. This has been explored in further detail in Chapter 5.

Despite relatively high supply feasibility for soybeans, untapped export demand is substantially lower than that for most products analysed, making this a less attractive expansion opportunity for northern agriculture. Conversely, despite high untapped export demand for wheat, table grapes, infant food preparations, and milk and cream powder, supply potential in Northern Australia is lower than for all products analysed, implying unsustainable costs of production to tap on the export opportunity. Other products analysed do not cross median thresholds across the two indicators.

EXHIBIT 12

The agri-food products with highest untapped export potential and supply feasibility are live cattle and beef



1. Incremental annual opportunity represented by the difference in export revenues in 2025 between the highest and lowest growth scenarios.
2. An equally weighted index considering production feasibility; disease tolerance; existing production expertise; and supply chain feasibility.

SOURCE: Team analysis

⁷¹ UN Food and Agricultural Organisation [FAO] (2018), *The State of World Fisheries and Aquaculture*. Available at: <http://www.fao.org/3/i9540en/i9540en.pdf>

⁷² Invest in ASEAN (2019), *Fisheries*. Available at: <http://investasean.asean.org/index.php/page/view/fisheries>

⁷³ Australian Marine Conservation Society (n.d.), “Australian Seafood Overview” Available at: <https://www.sustainableseafood.org.au/pages/html>

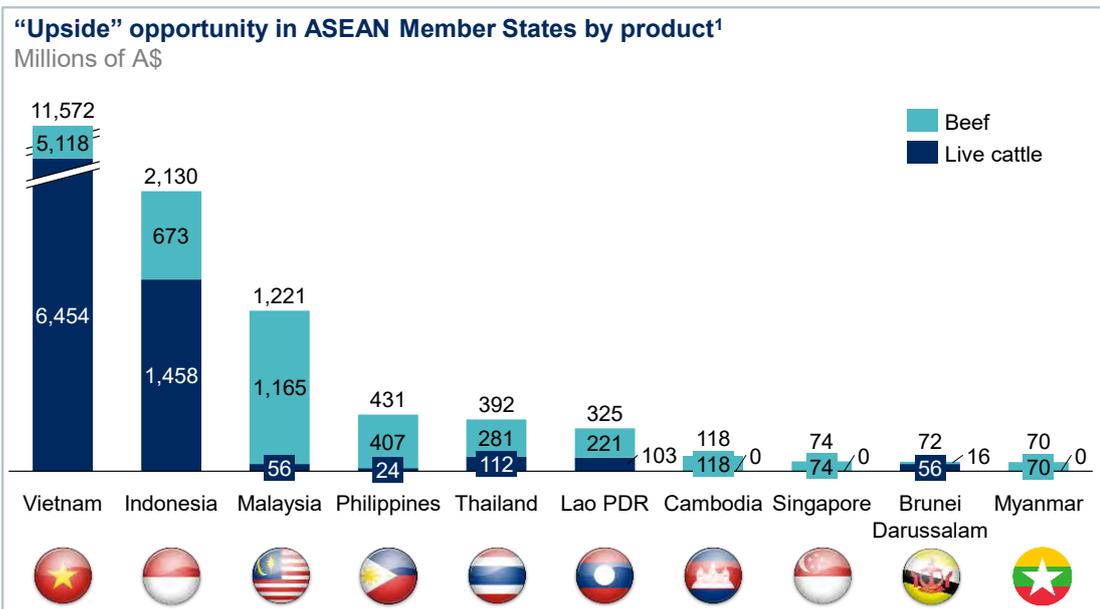
The standout country opportunities for the top three shortlisted products are in Vietnam, Indonesia and Malaysia

ASEAN’s constituent member states display different trends in import growth, both from Australia and with other trading partners. There are various factors driving differences in regional demand, including varying income levels, market sizes, market maturity (in terms of trade supply infrastructure and consumer supply models) and diets. The upside opportunity was accordingly calculated individually for each AMS for live cattle and beef to account for these regional variations. Forecasts for avocados and macadamias by individual AMS were not calculated as present day exports and historical trends are largely insignificant and forecasts based on these factors would not accurately represent a potential export opportunity in 2025.

Untapped export demand is largest in Vietnam – with A\$6.4 billion worth of opportunities in live cattle and A\$5.1 billion in beef (Exhibit 13).⁷⁴ Vietnam has experienced high overall import growth in live cattle – 49 percent CAGR over 2012 to 2017. The ITC forecasts that beef exports from Australia to Vietnam could potentially double each year – fuelled by strong growth in domestic demand due to rising incomes, as well as improved market access as Vietnam plans to reduce trade barriers over the next few years.

EXHIBIT 13

The standout country opportunity is in Vietnam, with large opportunities in Indonesia and Malaysia as well



1. “Upside” opportunity or untapped export demand value by product has been calculated independently for each ASEAN Member State. This is not intended as a specific export forecast or target and is a thought experiment to highlight the potential growth opportunity. Totals by product will not match with untapped export demand listed in section 4 as growth scenarios are calculated considering each country’s individual trend and forecast data.
SOURCE: Team analysis

⁷⁴ Totals across AMS by agri-food product will not match total untapped export demand by product as in Chapter 2 / Exhibit 12 as untapped export demand has been calculated individually for each AMS under a different set of assumptions. This upside opportunity is not intended as a specific export revenue forecast or target, but is a thought experiment to highlight the potential growth opportunity available for these products in ASEAN. Capturing the opportunity would require addressing a range of major challenges in regulation, demand and supply conditions. For detailed methodology, please refer to the Appendix.

Indonesia ranks as the second-largest country opportunity in ASEAN – with a total untapped opportunity worth A\$2.1 billion. Two-thirds of this opportunity is in live cattle, which is predominantly exported to Indonesia today from Darwin in the Northern Territory. The remainder of this country opportunity is in beef. Malaysia follows Indonesia in third place – with total untapped opportunities worth A\$1.2 billion almost entirely concentrated in beef.

When comparing all product opportunities by AMS, the top three opportunities are live cattle in Vietnam, beef in Vietnam, and live cattle in Indonesia (Exhibit 14). Vietnam, Indonesia, and Thailand (two each) have the highest number of country opportunities in the top 10 – with four other countries represented. The most product opportunities in the top 10 are in beef (seven). In light of these opportunities, continued development of beef cattle sector holds the most potential for Northern Australian agri-food exports to ASEAN, with live cattle playing a critical role in the short- to medium-term, and beef intensification being an important medium- to long-term bet. Specific product action plans have been developed in further detail in the following chapter.

EXHIBIT 14

The top two country-product opportunities are in Vietnam; majority of opportunities in beef



Top 3 opportunities

#	Country	Product	Size of opportunity (A\$ million)
1	Vietnam	Live cattle	6,454
2	Vietnam	Beef	5,118
3	Indonesia	Live cattle	1,458
4	Malaysia	Beef	1,165
5	Indonesia	Beef	673
6	Philippines	Beef	407
7	Thailand	Beef	281
8	Lao PDR	Beef	221
9	Cambodia	Beef	118
10	Thailand	Live cattle	112

1. "Upside" opportunity is an incremental annual opportunity defined as the difference between the highest and lowest projected exports in 2025 in the growth scenarios. It is not intended as a specific export forecast or target and is a thought experiment to highlight the potential growth opportunity.

SOURCE: Team analysis

5. Market dynamics present a unique set of challenges and opportunities

This chapter leverages trade data, existing research, and over 35 stakeholder interviews to detail key supply and demand trends to review market opportunities and challenges for each of the top 10 country-product combinations for live cattle and beef in ASEAN, identified in Chapter 3. It also provides additional perspectives on the opportunities for avocados and macadamias.

I. Live cattle ⁷⁵

Live cattle has been identified as the top export opportunity for Northern Australia through 2025, with Indonesia, Thailand, and Vietnam identified as key markets in which to pursue this opportunity. In the 1990s and early 2000s, expansion of live cattle trade was seen as a “gateway” or prelude to expansion of the beef trade in markets such as Indonesia and the Philippines over the recent decade. This trade remains relevant for Northern Australia, given the present level of development of cattle intensification in the region, as well as characteristics of livestock product demand from key ASEAN markets. There are three historical drivers of live cattle trade between Australia and ASEAN:

- **Lack of beef processing facilities in Northern Australia.** The lack of abattoirs in the north has been a critical gap in the beef production system – the Northern Territory’s sole abattoir was closed recently and there are minimal processing locations in remote north Western Australia and northern Queensland.⁷⁶ In many instances, it has also proven cheaper to transport live cattle to ASEAN as opposed to other abattoirs in Australia. As a result, a large share of the northern cattle herd (particularly in the Northern Territory) is diverted to the more profitable option of live cattle exports.
- **Cheaper costs of processing beef overseas.** Experts have indicated that cheaper costs of operating feedlots and labour in favour of beef processing in ASEAN as opposed to in Northern Australia. Lower cost of production is a key factor in maintaining price competitiveness – particularly for the mass market beef (e.g. non-loin cuts, manufacturing beef, offal, bones, etc.) that Northern Australian live cattle provides.
- **Easier Halal compliance.** Processing of live cattle directly in Halal markets (e.g. Indonesia) is cheaper than processing within Australia – removing the need for producers to obtain Halal certification prior to exports which, although compliant with all international and country-specific standards, is not uniformly accepted across ASEAN.

1. Supply trends

Australia is an important supplier of live cattle to ASEAN. Exhibit 15 displays the top sources of supply for live cattle imports across AMS – official trade data for 2012 to 2017 indicates Australia is

⁷⁵ Multiple references from this section have been taken from Meat and Livestock Australia (2018), *Market Snapshots – Beef (October 2018)*. Available at: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/oct-2018-snapshots/all-beef-markets-snapshots-oct2018.pdf>

⁷⁶ The Australian Agricultural Company’s (AACo.) abattoir in the Northern Territory was closed in 2018 due to unsustainable costs of operation. See ABC news (2019), “Australia’s biggest cattle company announces massive cattle losses in Qld floods” Available at: <https://www.abc.net.au/news/rural/2019-02-11/aaco-stock-losses-extreme-on-gulf-of-carpentaria-stations/10800366>; and EY (2018), *The Queensland Beef Supply Chain*.

presently a top five supplier in at least six countries. Northern Australia is a key export hub for Australian live cattle exports – 38 percent of live cattle exports over 2012 to 2017 were managed out of the port of Darwin in the Northern Territory, with a further 21 percent managed from ports such as Brisbane and Townsville on Queensland’s eastern coast.⁷⁷ These ports, in particular Darwin, primarily export to large ASEAN markets like Indonesia and Vietnam.

EXHIBIT 15

Trade data indicates that Australia is the top source of imports for live cattle in Cambodia, Indonesia, Malaysia, and Vietnam



Top sources of external supply (i.e. imports) by ASEAN member state for live cattle¹; Value of imports by source, cumulative from 2012-17²

■ Top 10 opportunity

Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia
1 Malaysia	1 Australia	1 Australia	1 Vietnam	1 Australia
2	2 Austria	2	2 Thailand	2 Thailand
3	3 Vietnam	3	3 Japan	3 New Zealand
4	4 Thailand	4	4 Australia	4 India
5	5	5	5	5 Myanmar

Myanmar	Philippines	Singapore	Thailand	Vietnam
1 Thailand	No data available	No data available	1 USA	1 Australia
2			2 Australia	2 USA
3			3 Brazil	3 New Zealand
4			4 Luxembourg	4 Thailand
5			5	

1. Exact values of total imports by exporting country have not been reported as importer-reported datasets are incomplete. Data will not match exporter-reported datasets used in Chapter 4. Data has not been aggregated at the ASEAN level as there is intra-regional trade.
 2. Data has been aggregated for 2012-17 to smooth out volatility in imports; where 2017 data is unavailable, 2012-16 aggregates have been reported.

SOURCE: International Trade Center (ITC); Expert interviews; Team analysis

Supply factors in focus markets for live cattle favour supply from Northern Australia:

- **Indonesia.** Australia’s proximity to ASEAN, particularly Indonesia, is favourable to live cattle shipments due to a short shipping route of eight to 10 days – loss of live cattle tend to increase after 10 or more days in transit. Indeed, Australia is reported to be the only significant source of overseas supply for live cattle. Northern Australian cattle is suited to the tropical conditions in Indonesia, and local producers are familiar with managing Australian herds. This arrangement also favours Australian producers as it removes the need for them to process beef according to Indonesia’s strict Halal requirements, the responsibility of which falls on local producers instead. However, experts indicate that the largest source of competition to Australian cattle meat that is processed in local abattoirs is direct imports of mass market beef sourced from India and South America. Further complicating matters is the protection afforded to local cattle producers by the Indonesian government through price controls and volume restrictions on imports of live cattle and beef products. In particular, supply of frozen Indian

⁷⁷ Mercado (2018), “The importance of live cattle exports to regional Australia” Available at: <http://blog.mecardo.com.au/the-importance-of-live-cattle-exports-to-regional-australia-part-1>

buffalo meat has been a source of strong competition since its entry in 2016 and subsequent allowance of higher import volumes. It has substantially increased penetration across retail, foodservice, and manufacturing sectors. Indonesian importers can now purchase frozen Indian buffalo meat and South American beef at cheaper rates than importing and processing Australian cattle, and this is likely to negatively impact exports.

- **Thailand.** External supply constitutes a low proportion of Thailand's overall herd. Australia places second in Thailand's list of external suppliers of live cattle, but is the only country supplying live cattle for slaughter. External supply from Australia (as well as other suppliers) has declined over the years. Thailand has a well-developed domestic beef industry that is extremely price competitive and is a strong player in the regional cattle trading industry.
- **Vietnam.** Australia is the largest external supply of live cattle for processing in Vietnam's feedlots and abattoirs. Small amounts of bovine produce from Vietnam is exported to nearby ASEAN markets such as Cambodia and Lao PDR – highlighting its potential relevance as a “hub” market. This trade could be supported by the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). Australian cattle meat that is processed locally competes with mass market frozen beef products from India in mixed fresh meat products and with meat processing manufacturers, although the volume of Indian buffalo meat imports has not increased significantly in recent years.
- **Other markets.** Australia is also the top supplier of live cattle to Malaysia and Cambodia, although experts have indicated that trade with the latter has ceased. These exports are significantly lower than those to Indonesia and Vietnam. There could also be further supply of Australian cattle to Lao PDR via Vietnam (and further on to China) that is not captured by direct trade data. Direct product delivery from Australia is structurally difficult as Lao PDR is a landlocked country and air freight is not commercially feasible, as attempted previous trial shipments have shown.

2. Demand trends

Emerging concerns in focus markets may impact forecasted growth in live cattle demand (specific drivers of protein and beef demand have been explored in detail in the following section on beef):

- **Indonesia.** Live cattle imports are seen as critical in supporting the increased demand for beef in Indonesia, which at present rates of herd growth (particularly outside of areas serving major economic centres) cannot be satisfied by local production. Live cattle imports have increased by around 18 percent (both globally and from Australia) over 2012 to 2017, and are expected to grow by at least 7 percent through 2025.⁷⁸ The Indonesian mass market beef segment will continue to drive this growth, and Northern Australian cattle meat serves this segment – accounting for around 20 percent of total beef consumption. Many older buyers outside of large urban centres are familiar with purchasing fresh meat, bones, and other beef products directly from butchers and wet markets; supermarkets or hypermarkets are more suited to premium boxed beef products (i.e. loin cuts suitable for steaks and similar preparations). The price-sensitive mass market consumer is willing to pay a small premium for fresh meat from imported Australian cattle as compared to frozen Indian buffalo meat and South American beef that is cheaper.

⁷⁸ Data sourced from International Trade Centre (2019), *Trade Map*. Available at: <https://www.trademap.org/Index.aspx> ; and International Trade Centre (2019), *Export Potential Map*. Available at: <http://exportpotential.intracen.org/#/home>

- **Thailand.** Although imports of live cattle have declined in Thailand, the export opportunity remains for beef as demand is expected to rise, particularly for premium beef loin cuts.
- **Vietnam.** Vietnam's rapid economic progress has resulted in more meat-intensive diets – the average Vietnamese now eats four times more meat now than compared to 30 years ago.⁷⁹ Consequently, live cattle imports have increased sharply in recent years to add to the domestic herd – with imports from all trading partners rising by 48 percent year-on-year over 2012 to 2017 (37 percent from Australia). In fact, such trends suggest that Vietnam could overtake Indonesia as the primary export destination for Australian cattle. Similar to Indonesia, meat and other beef products from Northern Australian cattle serves the mass market through traditional distribution channels such as wet markets. Experts indicate that the largest threat to fresh beef from imported cattle is boxed beef from Australia, the US, and South America, as consumers mature and opt for higher quality beef products.
- **Other markets.** Experts have indicated potential increase in live cattle demand from Lao PDR where there could be a shortage of beef supply from local herds, although this demand will be structurally difficult to service.

3. Opportunities and challenges

As highlighted above, the growing consuming class and associated demand for beef, supported by an increasing focus on food safety, are two powerful tailwinds creating potential opportunities for Northern Australian producers. However, there are a range of challenges that could restrict export growth. The drivers of competitiveness of Northern Australian live cattle can be grouped into four categories (Exhibit 16):

- **Production competitiveness.** These relate to factors determining Northern Australia's competitiveness in production, including the degree to which there is sufficient scale in production and logistics to drive down product costs, sophistication of existing production approaches and access to relevant skills and supporting actors, and climate-related risks.
- **Supply chain competitiveness.** These challenges relate to supply chain infrastructure in Northern Australia (i.e. farm to port transport and logistics including quality of packing and freight facilities at for exports), supply chain infrastructure in ASEAN markets (i.e. port to product delivery including port infrastructure, product management, logistics, and transport to points of further processing or purchase), and processing and retail capacity of local producers or retailers to effectively sell the product in ASEAN markets.
- **Regulatory barriers.** Regulations impacting imports include tariff and quotas placed on products in ASEAN markets, import license regimes, price controls, relevant technical market access conditions such as sanitary or phytosanitary restrictions that are applied on products to restrict entry of harmful diseases or reciprocity of product certification schemes (e.g. for Halal), and associated challenges include degree to which customs processes in ASEAN are efficient, fairly and uniformly applied in customs offices, available information is reliable, and regulation is stable.
- **Market-related factors.** These relate to concerns associated with the competitive landscape in each market, including brand recognition and promotion of the (Northern) Australian brand, and price competitiveness of the product in destination markets.

⁷⁹ Arve Hansen (2018), *Meat consumption and capitalist development: The meatification of food provision and practice in Vietnam*. Available at: <https://www.sciencedirect.com/science/article/pii/S0016718518301477>

Climate-related risks and regulatory barriers in ASEAN pose significant challenges to growth of live cattle exports



■ Strong performance
 ■ Some gaps
 ■ Significant gaps

Competitiveness drivers		Description	Performance
Production competitiveness	Scale of existing production	Degree to which there is sufficient scale in production and logistics, and value chain integration to drive down product costs	
	Sophistication of production approaches and available skills	Degree to which latest production technologies are being utilised in Northern Australia and there is access to relevant skills and supporting actors	
	Climate-related risk factors	Risk of extreme weather events impacting production in Northern Australia including droughts, floods, cyclones, etc.	
Supply chain competitiveness	Supply chain infrastructure in Northern Australia	Presence of a supply chain from farm to port in Northern Australia, including quality of packing and freight facilities for exports	
	Supply chain infrastructure in ASEAN markets	Quality of port management facilities, logistics, and transport for product delivery in ASEAN export markets	
	Processing and retail in ASEAN markets	Processing capacity and ability to sell product effectively in relevant retail locations in ASEAN export markets	
Regulatory barriers	Tariffs, quotas, import licensing, and price controls in ASEAN	Presence of tariffs and import quotas, import licensing regime, and price controls imposed on the product in relevant ASEAN markets	
	Technical market access in ASEAN markets	Degree to which there are relevant product restrictions that could be non-tariff barriers in ASEAN markets e.g. (phyto)sanitary restrictions, Halal, etc.	
	Customs laws and processes in ASEAN markets	Degree to which customs processes in ASEAN are efficient, laws are uniformly applied, available information is reliable, and regulation is stable	
	Regulations in (Northern) Australia	Degree to which regulatory regime in (Northern) Australia is supportive of export trade in the relevant product	
Market factors	Brand recognition and promotion	Degree to which (northern) Australian produce commands a premium in export markets	
	Price competitiveness of product	Degree to which Australian products are price competitive, accounting for relative wages, distance to market, and exchange rates	

SOURCE: Literature review; Expert interviews; Team analysis

Although the live cattle trade between Northern Australia and ASEAN is well-developed, climate-related risks and regulatory barriers pose challenges to this trade in the future.

Production competitiveness

- Scale of existing production.** Substantial live cattle production occurs in Northern Australia, but there are gaps in integration across the value chain of conversion to beef products. There are large existing cattle herds across the Northern Australian territories, managed by large companies including the Consolidated Pastoral Company (CPC) and the Australian Agricultural Company (AACo.) – the latter which manages over half a million cattle across 24 stations and feedlots.⁸⁰ Accordingly, there are scale economies in logistics from critical cattle stations to ports, and as discussed, there are efforts being made to connect more remote locations to the supply chain. However, there is a lack of integration along the value chain once live cattle exit Australian shores. Until recently, CPC was the only large agri-food business from Northern Australia operating feedlots in-market in Indonesia, in Java and Sumatra. Majority of cattle are imported by few local importers and feed into both large state-owned and smallholder facilities. More Australian agribusinesses are required to fully capitalise on the export opportunity presented through greater involvement in beef processing overseas in order to maintain better control over the production process, ensure quality, and drive down costs through scale. Investment in processing facilities in Indonesia

⁸⁰ Meat and Livestock Association (2018), *Fast Facts 2018 – Australia’s beef industry*. Available at: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/fast-facts--maps/mla-beef-fast-facts-2018.pdf>

could also enable a more manageable trade relationship – at present, the Indonesian government is keen to reduce its trade deficit with Australia, particularly through key export sectors such as live cattle.

- *Sophistication of production approaches and available skills.* The (Northern) Australian cattle industry has strong on- and off-farm research and development capabilities through the leadership of the Meat and Livestock Association (MLA) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). There is uniform application of best practice quality control across the live cattle value chain in all parts of the country – including pasture and grazing management; water, waste, and soil management; feed, fodder, and nutrition; genetics, breeding, and other reproductive services; and animal health, welfare, and biosecurity.⁸¹ The ESCAS system is also mandatory for all cattle exporters and conforms to international best practices for animal welfare, supply chain control, traceability, and independent audit. New technologies that enable precision livestock management are being deployed commercially, including GPS-enabled herd tracking, algorithmic calculation of health status, 3D digital imaging to estimate meat yield and eating quality for value-based pricing, and robotic processing.⁸² These are being developed in conjunction with industry to ensure relevance and reach. MLA is also reportedly testing the viability of using automated drones to monitor herds on cattle properties across the sparsely populated northern terrain.⁸³ Relatedly – it is interesting to note that a few Australian agribusiness leaders have settled in Indonesia and Vietnam and operate import businesses, while also serving as regional export consultants to Australian businesses.
- *Climate-related risk factors.* Climate change and associated extreme weather events are a major threat to northern cattle herds. The repeated failure of the monsoon season in many parts of Northern Australia (in conjunction with reduced profitability) has resulted in many producers reducing their cattle herds in anticipation of a longer dry season with minimal pastureland to support their herds.⁸⁴ On the other hand, the four-year drought in northern and northwest Queensland was brought to an end in early 2019 with a series of damaging floods, leading to a loss of around half a million head of livestock and millions of dollars' in property and feedlots over 20 million hectares of land.⁸⁵ The newly established North Queensland Livestock Recovery Agency seeks to address the damage caused to cattle communities, and will provide emergency assistance, restocking grants, concessional loans, and access to mental health support.

Supply chain competitiveness

- *Supply chain infrastructure in Northern Australia.* There is an established supply chain from cattle farms to Darwin in the Northern Territory, which is the primary port serving ASEAN, as

⁸¹ Australian Trade Commission [Austrade] (n.d.), *Beef technology and services*. Available at:

<https://www.austrade.gov.au/ArticleDocuments/2814/Beef-Technology-Services-Capability-Report.pdf.aspx>

⁸² Meat and Livestock Association (2016), "New technology investment to 'transform' meat industry" Available at: <https://www.mla.com.au/News-and-events/Industry-news/New-technology-investment-to-transform-meat-industry>; and

The Conversation (2014), "Technology is changing the face of Northern Australian cattle farming" Available at: <http://theconversation.com/technology-is-changing-the-face-of-northern-australian-cattle-farming-31552>

⁸³ Beef Central (2018), "NTCA 2018: How technology is changing the beef industry faster than you think" Available at:

<https://www.beefcentral.com/news/ntca-2018-how-technology-is-changing-our-industry-faster-than-you-think/>

⁸⁴ Southeast Asian Beef Market Report (2019), "March Market Report: S.E. Asian Beef Industry" Available at:

<https://seabeefreport.com/2019/04/15/march-market-report-s-e-asian-beef-industry-3/>

⁸⁵ ABC News (2019), "Flood-ravaged north Queensland cattle industry to get help from new recovery agency" Available at:

<https://www.abc.net.au/news/2019-03-01/flood-ravaged-north-queensland-cattle-industry-agency-announced/10860538> ;

ABC News (2019), "Queensland floods have likely killed hundreds of thousands of cattle, farmers facing 'catastrophic' losses" Available at: <https://www.abc.net.au/news/2019-02-08/graziers-confronted-with-devastation-as-floods-kill-cattle/10793502>

well as Townsville in northern Queensland. There is also significant investment being made in upgrading transport infrastructure supporting cattle trade. The A\$100 million Northern Australia Beef Roads Program aims to upgrade high priority roads essential to the movement of people and freight to improve the reliability, productivity, and resilience of cattle supply chains.⁸⁶ Investment in this supply chain has also increased from other ASEAN countries in addition to Indonesia in recent years. The Sarawak Economic Development Corporation (SEDC) in Malaysia acquired the Carmor Plains Cattle Station in Darwin in 2019 to serve as a feedlot for cattle from the Rosewood Cattle Station in Western Australia, in turn supplying cattle and Halal beef to Sarawak via Darwin.⁸⁷ There has also been some interest from Vietnamese (and Chinese) businesses in investment in pastoral lands in the north in order to secure live cattle and beef supply. Filipino family business conglomerates have similarly shown a propensity to invest in large agri-food “assets”, for instance, one recently acquired a fast-food chain in New Zealand. Beef intensification across Northern Australia, however, could potentially reduce the supply of live cattle available for direct exports in favour of beef products exports.

- *Supply chain infrastructure in ASEAN markets.* Although there is an established supply chain in Indonesia and Vietnam, experts have noted critical gaps in port management of live cattle and transport facilities to feedlots in ASEAN. For instance, the transport of animals to feedlots and abattoirs via refrigerator cars or “reefers” in Vietnam has been highlighted as a key step in the supply chain where animal mortality rises due to poor handling. Additionally, attempts at improving supply conditions have often taken place in areas outside centres of demand. For instance, the Indonesian government has prioritised expansion of supply chain infrastructure to remote and underdeveloped regions in the country where demand is presently low due to development status. Strengthening of existing supply chains to major centres of demand is a lower priority and is expected to leverage private sector investment.
- *Processing and retail in ASEAN markets.* Importers of Australian live cattle in ASEAN are generally experienced producers of beef that meets local standards and tastes, and there is an established distribution network to wet markets and butchers. However, trade was temporarily halted to Vietnam in 2016, as supply chain actors in these countries that were certified by Australia’s Exporter Supply Chain Assurance System (ESCAS) system violated production standards for animal welfare.⁸⁸ Processing capabilities that match international standards are being investing heavily in to satisfy increasing domestic demand, although there is less investment in centralised slaughter, processing, and distribution.⁸⁹ Retail locations such as wet markets and small stores are gradually installing on-site cold storage to improve product shelf-life.

Regulatory barriers

- *Tariffs, quotas, import licensing, and price controls.* There are a range of concerns across ASEAN live cattle export markets, particularly in Indonesia where the cattle industry is

⁸⁶ National Infrastructure Construction Schedule (2019), *Northern Australia Pipeline of Projects*. Available at:

<https://www.nics.gov.au/Project/NapopProjects>; and Department of Infrastructure, Transport, Cities and Regional Development (2018), *Northern Australia Beef Roads Program*. Available at:

<https://investment.infrastructure.gov.au/infrastructure-investment/northern-australia-beef-roads.aspx>

⁸⁷ Daily Express (2019), “Sarawak to become leading ASEAN beef supplier” Available at:

<http://www.dailyexpress.com.my/news/135875/sarawak-to-become-leading-asean-beef-supplier/>

⁸⁸ Live cattle supply chains in overseas markets are required to be ESCAS-approved. Department of Agriculture and Water Resources [DAWR] (2019), *Exporter Supply Chain Assurance System (ESCAS) – Overview*. Available at: <http://www.agriculture.gov.au/export/controlled-goods/live-animals/livestock/information-exporters-industry/escas>

⁸⁹ VN Express (2018), “Vietnam spends big on abattoir training to secure Aussie cow imports” Available at:

<https://e.vnexpress.net/news/business/vietnam-spends-big-on-abattoir-training-to-secure-aussie-cow-imports-3722306.html>

economically and politically important with self-sufficiency in beef being a key national priority. This has resulted in a highly regulated market with government intervention. Live cattle imports are subject to a 5 percent tariff in Indonesia under present trade agreements (including AANZFTA and Indonesia-Australia Comprehensive Economic Partnership Agreement); the same as for Indian buffalo meat. However, volumes are carefully managed by the Indonesian government's import permit system, and import permits were only recently extended to 12 months with volumes obligated to be released gradually during this period of validity. The "5:1 feeder to breeder" import policy requires importers to import one breeder for every five feeder cattle came into effect in October 2016 (for which the first audit was in December 2018), and this could impose significant herd management costs on Northern Australian exporters if enforced comprehensively. The Indonesian government is also keen to intervene in market determination of prices – importers have been threatened in the past with revocation of licenses if prices are not kept sufficiently low for Australian cattle products to compete with local domestic industry products. There appears to be no active import tariffs and volume restrictions for live cattle in the remaining ASEAN countries, although there are some restrictions on beef products (discussed in the following section).

- *Technical market access.* Market access is inconsistent due to variations in product standards and transparency across ASEAN countries, creating major compliance issues. For instance, the Indonesian market is highly regulated with complex import conditions and laws. The Australian ESCAS system requires all live animals exported to be subject to strict regulations on animal welfare, supply chain control, traceability, and documentation and audit.⁹⁰ Experts have indicated that Indonesian customs authorities are unfamiliar with this system, often duplicating supply chain certification and monitoring requirements that are covered by ESCAS and adding additional costs to exports for Australian businesses. Vietnamese customs have similarly reported issues with ESCAS in the past. Thailand also manages its beef industry carefully and imported cattle must meet a range of standards to mix with local herds. Vietnam has similar concerns. Such sanitary restrictions and lack of reciprocity in certification are significant non-tariff barriers to trade.
- *Customs processes.* Customs laws and processes in ASEAN markets consistently pose major challenges to trade irrespective of commodity or product. Instability of regulation is an issue largely in Indonesia, similarly so in developing markets such as the Philippines, Cambodia, and Lao PDR. Governments have been known to regularly update import rules and requirements and revoke import licenses en-masse in the past. In Indonesia, importers have been moved to sell feedlots and divest from the live cattle trade in recent years due to such uncertainty. Uniform applicability of the rules of trade is a key issue across ASEAN, particularly pronounced in markets such as Indonesia and Vietnam. Issues in document transparency, slow bureaucracy, long wait periods for inspection, lack of electronic processing and certification, and bribery and corruption are commonplace. In fact, corruption was cited as the top challenge of operating in ASEAN by Australian business in the region in 2019 – it was also the only challenge to feature among the top three across all AMS.⁹¹ These impose huge costs on traders in getting their product to market efficiently, are a strain on profitability, and necessitate building personal relationships with customs officials and ground staff in agricultural ministries. It is hoped that trade agreements such as Indonesia-Australia

⁹⁰ Department of Agriculture and Water Resources [DAWR] (2019), *Exporter Supply Chain Assurance System (ESCAS) – Overview*. Available at: <http://www.agriculture.gov.au/export/controlled-goods/live-animals/livestock/information-exporters-industry/escas>

⁹¹ AustCham ASEAN (2019), *Australian Business in ASEAN Survey 2019*. Available at: <http://austchamasean.com/wp-content/uploads/2019/03/Australian-Business-in-ASEAN-Survey-2019.pdf>

Comprehensive Economic Partnership Agreement (IA-CEPA) and CP-TPP (in addition to AANZFTA) will improve these aspects of the trade environment.

- *Regulations in (Northern) Australia.* The Australian government is generally supportive of live cattle exports as a key source of livelihood for many Northern Australian producers. However, ESCAS requirements due to animal welfare concerns impose compliance costs on exporters, and the live animals trade could come under scrutiny in the future if compliance issues persist. For instance, in a parallel development, it has been suggested in the past that Australia wind down live sheep exports over the next three to four years due to animal welfare and environmental concerns.⁹²

Market-related concerns

- *Brand recognition and promotion.* There is little brand recognition for beef products from Northern Australian cattle, based on the clean and green Australian brand – although this is largely a function of processing and distribution standards. Such beef is generally treated as “local” produce despite Australian origins, with producers in Indonesia even pushing back against the need for ESCAS-approved supply chain systems for this reason. They are largely sold at butchers or chilled at wet markets – and accordingly have little to no opportunities for promotion through packaging- or labelling-based branding.
- *Price competitiveness.* Price competitiveness is a key issue in Indonesia, but less so in Vietnam. Price controls and import oversupply have resulted in falling prices for Australian live cattle in Indonesia; exports fell marginally owing to increased regulatory complexity and strong competition from Indian buffalo meat, which can be produced and shipped frozen at cheaper prices than beef from imported Northern Australian cattle in Indonesia. On the other hand, falling live cattle prices in Vietnam resulted in higher exports over the past year. There are no currency concerns at present, with the depreciating Australian dollar maintaining a relatively stable exchange rate in both markets, and competitors such as India maintaining similar patterns.

II. Beef⁹³

Australian boxed beef, manufacturing beef, and offal are ubiquitous products in many ASEAN food markets. Beef has been identified as the second largest export opportunity for Northern Australia through 2025, with Vietnam, Malaysia, Indonesia, Philippines, Thailand, Lao PDR, and Cambodia identified as key markets in which to pursue this opportunity. There are three historical drivers of the beef trade between Australia and ASEAN:

- **Population growth.** Population growth accounted for around 80 percent of global protein demand growth between 2000 and 2018 – and this pattern was particularly evident in ASEAN. For instance, over the same period in Indonesia, protein consumption grew by 64 percent –

⁹² Beef Central (2019), “No live cattle export closure under Labor, pledges Fitzgibbon” Available at: <https://www.beefcentral.com/news/no-live-cattle-export-closure-under-labor-pledges-fitzgibbon/>

⁹³ Multiple references from this section have been taken from Meat and Livestock Australia (2018), *Market Snapshots – Beef (October 2018)*. Available at: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/oct-2018-snapshots/all-beef-markets-snapshots-oct2018.pdf>

and population growth drove 76 percent of this increase.⁹⁴ Australian beef became an important component of the regional diet, particularly given that ASEAN's food supply could not keep pace with its population boom and shifting diets.

- **Rise of the consuming class.** ASEAN's rapid economic progress resulted in the rise of a consuming middle class not only demanding a higher quantity of food, but also a larger variety of premium produce particularly in high-end restaurants and hotels. Australian beef has benefitted from this trend, leveraging its global reputation for being high quality, clean, organically fed, and sustainably produced.
- **Well-developed trade business relationship.** As a regional neighbour, Australia has been well-placed to be the partner of choice for ASEAN's food needs as its prosperity has grown, particularly over the last two decades. Trade deals such as AANZFTA and bilateral agreements have significantly improved technical market access and reduced tariff barriers to trade. Experts have noted that the strong trade relationship between business communities in the regions has been a key factor in building a preference for Australian beef products over those from other countries such as the US or Brazil.

1. Supply trends

Australia is the top source of import supply for beef products in Indonesia; is the second highest source in Brunei, Malaysia, Myanmar, Philippines, Singapore, and Thailand; third in Cambodia, and fourth in Vietnam (Exhibit 16). Markets such as Singapore, Vietnam, and Thailand are regional export hubs for beef.

Processed beef products that cater to mass market consumers (particularly manufacturing beef, offal and mixed meats) comprise well over half of beef imports in ASEAN from Australia. There is strong competition in this low-value segment, particularly from local producers and Indian buffalo meat. In fact, buffalo meat from India now constitutes half of Southeast Asian imports (ex-Indonesia). However, in the "premium" or high-value consumption segment (e.g. boxed loin cuts for high-end hotels, supermarkets, and restaurants), Australian beef is generally the top consumed product. Across both segments, the proportion of imports supplied by Northern Australia is extremely low, particularly in the premium segment, as the inferior *Bos Indicus* variety is largely raised for slaughter.

⁹⁴ FIAL (2019), *Protein Market: Size of the prize analysis for Australia*. Available at: https://fial.com.au/Attachment?Action=Download&Attachment_id=200

Trade data indicates that Australia is the top source of imports for beef in Indonesia; second highest source in six ASEAN countries



1. Exact values of total imports by exporting country have not been reported as importer-reported datasets are incomplete. Data will not match exporter-reported datasets used in Chapter 4. Data has not been aggregated at the ASEAN level as there is intra-regional trade.
 2. Data has been aggregated for 2012-17 to smooth out volatility in imports; where 2017 data is unavailable, 2012-16 aggregates have been reported.

SOURCE: International Trade Center (ITC); Expert interviews; Team analysis

Focus markets have varying levels of supply from Northern Australia:

- Cambodia.** Cambodia largely imports beef products for the premium market – for which Australia is a key supplier and competes with Japan, the US, and New Zealand. However, this is an extremely small market given purchasing power in Cambodia is extremely low and imported Australian produce is priced at a premium. The proportion of Northern Australian beef in this trade is reportedly low or negligible. The mass market is largely catered to by local producers, often raised for subsistence in rural areas.
- Indonesia.** Trade data shows that Australia is the top supplier of beef products in Indonesia, accounting for three-quarters of all beef imports in 2018, leveraging on its geographical proximity (with shorter shipping routes) and high-quality product. It is one of the leading markets for Australian frozen boxed beef, manufacturing beef, and offal exports, and this position is expected to improve even further with the IA-CEPA eliminating all remaining tariffs on red meat and livestock lines and improving import processes currently in place. However, the proportion of supply from Northern Australia is lower (particularly in its strongest segments i.e. manufacturing meat and offal), although this does not account for meat from Australian live cattle processed and finished in Indonesia. As discussed earlier, frozen Indian buffalo meat is a major competitor for both meat from Australian live cattle as well as direct beef imports since its legal entry in 2016, and has been able to penetrate multiple segments at a consistently lower price point than Australian produce (although both are subject to price controls from the Indonesian government). Competition is expected to further intensify as the Indonesian government has allowed higher supply from new entrants from South America, in a bid to

reduce prices by diversifying beef supply. In the premium beef segment, competitors include the US and New Zealand. Indonesia is also one of the world's largest markets for Halal beef, and although Australian abattoirs and certifying bodies are well-equipped to meet strict Halal requirements, Australian certification is often not uniformly accepted in-market.

- **Lao PDR.** Australia is reportedly not a significant direct supplier of beef to Laos as the only channel for direct supply would be air freight, which is commercially cost ineffective at present. External supply of mass market beef largely comes in from Vietnam, which is in turn supplied by Australian live cattle. The direct supply of premium beef in Laos is largely controlled by Thai supermarkets, which bring produce from their existing supply chains in Thailand.
- **Malaysia.** Australia is the second-largest supplier of beef products in Malaysia – similar to Indonesia and Vietnam, Northern Australian beef competes heavily with locally produced beef and imported Indian beef that is frozen and channeled into wet markets and meat processing manufacturers. Experts have noted that beef supplied to Malaysia cannot be supplied elsewhere due to strict and unique Halal requirements, adding to the costs of supply. However, Malaysia is the world's largest exporter of Halal products, and there is potential to leverage this status to create an export hub for Australian Halal beef supplied to specifications of smaller markets in the region and larger markets in the Middle East.
- **Philippines.** Imports are an important source of beef supply in the Philippines, and Australia is the second-largest supplier of beef products in the Philippines. Manufacturing meat comprises around 85 percent of these exports, and the Philippines is Australia's second-largest destination for frozen manufacturing beef in ASEAN. Northern Australian beef products comprise a small proportion of this trade, although northern ports are favoured for exports due to shorter (and cheaper) shipping. Indian buffalo meat provides strong competition to Australian beef in the mass market segment as it is available at cheaper prices. In the premium segment, Australia is reportedly the largest supplier and commands a significant price premium. Beef from the US across both mass market and premium segments has also grown in recent years – in fact, the Philippines accounted for 41 percent of the increase in US beef imports in ASEAN (ex-Indonesia) in 2018. Although there is no bilateral trade agreement between the Philippines and Australia, the AANZFTA has significantly helped expand beef trade – which has nearly doubled in value over 2011 to 2018.
- **Thailand.** Australia is Thailand's second-largest supplier of beef products, although the local industry is relatively strong and the proportion of imports in total supply is among the lowest in the region. The manufacturing and mass market segments are largely controlled by local producers, and there are volume restrictions on imports of beef from key suppliers (including Northern Australia), so many opt to compete in the premium segment. Accordingly, premium Australian beef is extremely popular in Thailand – competing with other high-quality produce from New Zealand and fatty cuts from Japan. Despite being more expensive, Australian produce controls a large share of this market as consumers in this segment are generally price inelastic. North and Latin American producers are not key competitors in Thailand.
- **Vietnam.** Australia is the third largest supplier of beef products in Vietnam. Northern Australian beef competes in the mass market segment; trade data does not reflect Northern Australian live cattle slaughtered locally. Similar to Indonesia, the competitive landscape has become more complex with the increased penetration of frozen Indian buffalo meat at cheaper prices in the mass market segment, and growing imports from the US, New Zealand, and Europe in the premium segment. There is perceived to be a supply “shortage” of Australian products, particularly beef, and experts believe that it is a key market opportunity that is still under-prioritised by major beef exporters in Australia in favour of markets such as China that

are perceived as more lucrative. As product volume is lower than optimal, this has an impact on prices – for instance, American beef is generally imported in larger quantities, driving prices down.

- **Other markets.** Singapore is the only other relatively large ASEAN market that is supplied directly by major producers – Brazil is Australia’s largest competitor in this market in both mass market and premium segments. It is Australia’s largest destination for chilled beef in the region, although Brazilian beef has displaced a proportion of this trade. Singapore is also a key export hub – being an important part of the global cold freight supply chain that distributes products to markets around the world.⁹⁵ Brunei is also an important destination for Halal beef in Southeast Asia and is largely supplied by Indian meat – the proportion of which has been increasing rapidly over the past five years, although supply from Australia has remained consistent over the same period but has declined as a proportion of overall imports. Import supply in Myanmar is almost completely dominated by Chinese beef.

2. Demand trends

As highlighted in Chapter 1, the rapid growth of the consuming class in ASEAN has led to an increase in high-fat and high-protein diets – with demand set to rise for high quality dairy and meat products.⁹⁶ Meat-based proteins (e.g. beef, poultry, pork, mutton) have historically been the most valuable category of proteins, and will continue to be so across all protein types globally through 2025 under a range of assumptions in economic and demographic growth, dietary shifts, and technological breakthroughs.⁹⁷ Beef is expected to be the largest opportunity in terms of value driven by its relatively higher prices.

Developments in focus markets indicate rising demand across a range of different beef products:

- **Cambodia.** Beef is a premium product even in the mass market segment in Cambodia. Poultry, pork, and unconventional meats such as horse are more widely consumed. However, beef is used extensively in Cambodian-style barbecue preparations that are a central element of communal dining, prepared over an open grill and consumed together with beer in group settings. Experts indicate that this is a key opportunity for Australian beef in general – if branded well and sold in traditional retail locations such as butchers and wet markets.
- **Indonesia.** While population growth has driven a large share of Indonesia’s protein consumption growth over 2000 to 2018, a slowing growth rate is expected to shift the drivers of increased consumption to consuming class and urban population growth. Beef is considered to be the most important source of protein in Indonesia despite only being the country’s third most consumed protein.⁹⁸ Beef consumption in Indonesia was 2.6 kg per capita in 2016, and is expected to rise to 3 kg per capita in 2020 – an increase of 15 percent.⁹⁹ Demand is expected to rise primarily in the large urban centres such as Jakarta, Surabaya, and Medan, with experts cautious on growth prospects in other parts of the country. In fact,

⁹⁵ Farm Weekly (2019), “Singapore’s Coolport hub helping Aussie food exports grow” Available at: <https://www.farmweekly.com.au/story/6082097/hot-singapores-cool-port-of-call-for-global-perishable-produce/>

⁹⁶ Rabobank (2015), *AEC: One Large Non-Homogenous Market*.

⁹⁷ Scenarios covered by the FIAL Protein Market study include a “business-as-usual scenario” based on historical growth of demographics and demand; a “plant-based diets” scenario which considered a higher level of plant-based protein consumption with equivalent declines in meat, aquaculture, and wild catch fisheries (based on expected rates of vegetarianism due to health and ethical reasons); and a “tech breakthroughs” scenario based on increased consumption of aquaculture products based on projections for technology-based productivity improvements and accompanying declines in meat production. See FIAL (2019), *Protein Market: Size of the prize analysis for Australia*. Available at: https://fial.com.au/Attachment?Action=Download&Attachment_id=200

⁹⁸ Meat and Livestock Australia (2018), “Rising demand in Indonesia supported by trade deal” Available at: <https://www.mla.com.au/prices-markets/market-news/trade-deal-supports-rising-demand-in-indonesia/>

⁹⁹ Meat and Livestock Australia (2016), *Market Snapshot | Beef – Indonesia*. Available at: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/red-meat-market-snapshots/mla-indonesia-beef-snapshot-2017.pdf>

the island of Java – home to 50 percent of the country’s population – accounts for 70 percent of the country’s beef demand. Beef is widely used in the local cuisine and is popular during special occasions, such as the month of Ramadan. Historically, while Australian boxed beef corresponding to Halal standards has been the most supplied product to the market and has performed extremely well in the premium cuts segment, mass market consumers favouring non-prime cuts and offal are extremely price sensitive and have shown a propensity to shift consumption to cheaper Indian buffalo meat – posing a substantial threat to continued demand for Australian beef.

- **Lao PDR.** The average consumer in Lao PDR purchases beef largely from wet markets, generally favouring beef produced locally or from neighbouring Vietnam that is cheaper and of lower quality than other imported produce. Wet market beef is around twice as expensive as other meat options such as buffalo, pork, and poultry – fluctuations in these prices in turn impact beef demand. The growing consuming class has only recently been afforded the option of buying beef from supermarkets over the past three or four years, although the supply of beef in this segment is controlled by Thai chains that operate such supermarkets under licenses issued by the Laotian government. As a result, experts indicate that high-end restaurants and hotels in cities such as Vientiane and Luang Prabang are the strongest opportunity for Australian beef, provided it is well-branded as Australian beef commands a premium in this segment.
- **Malaysia.** Beef is the second-most consumed meat protein in Malaysia after poultry as it is a predominantly Islamic country. Halal compliance, food safety, and freshness are the top three determinants of consumer choices for beef, and this translates to strong preference for Australian beef, particularly in restaurants and hotels. Malaysian consumers generally purchase less than 20 percent of their beef from grocery retail stores, but this proportion is significantly higher for Australian beef – closer to 70 percent.
- **Philippines.** There are four key sectors driving higher beef demand in the Philippines – fast food chains, FMCGs, high-end supermarkets, and premium restaurants and hotels. The former two segments are suitable for supply from Northern Australia, and generally use manufacturing beef. In particular, the fast food segment, where tastes of the Filipino consumer are strongly aligned with the American consumer, is a suitable segment. Local brand Jollibee, the country’s most popular fast-food chain that is famous for its poultry-based products, is looking to expand into beef-based products for which it already sources beef from Australia. Large family-owned businesses such as San Miguel Foods are key importers of manufactured beef in the FMCG sector. Demand from the high-end retail, restaurants, and hotels segments represents a large opportunity for premium Australian beef, drawing on strong growth in the consuming class in Manila and smaller cities such as Cebu and Davao, and rapid Westernisation of diets in the Philippines. There is also demand for “fatty” cuts of beef such as wagyu from Japan.
- **Thailand.** Australian beef is extremely popular in Thailand in both retail and hospitality sectors, although this largely relates for premium beef cuts. Thai consumers purchase 30 percent of their beef from super- and hypermarkets on average – this is the second highest proportion in Southeast Asia after Singapore – and 60 percent of Australian beef from such retailers. Westernisation of the urban consumer’s diet is expected to drive demand for loin-style cuts, and increasing interest in Japanese- and Korean-style dining is expected to drive demand for fatty cuts such as wagyu.
- **Vietnam.** Although pork is the most consumed meat protein in Vietnam, demand for beef is growing in line with the consuming class, the urban consumer, and westernisation of dietary

choices.¹⁰⁰ However, it is expected that demand for beef and poultry will rise sharply this year, as the extensive culling of pigs following the African swine fever outbreak in Vietnam (and China) during the first half of 2019 has reduced pork supply and drained consumer confidence in its product safety.¹⁰¹ Experts suggest that imported beef demand in Vietnam is largely concentrated in urban centres such as Hanoi, Ho Chi Minh City, and Da Nang that are home to the “sophisticated” consumer. Australian beef has proven extremely popular in the rapidly growing high-end restaurant, and hotel sectors. It is also proving extremely popular across a range of retail locations – both wet markets and supermarkets – where consumers purchase large cuts or ground quantities of beef (around 3-4kg) to store and consume at home. However, higher premium is assigned to finished products, and this represents a key value-add opportunity for Northern Australian producers if products are branded compellingly. Vietnam’s family-oriented society also generally chooses products based on perceptions of health, safety, and quality – translating to strong positive perceptions of red meat products from Australia, as well as the US and New Zealand, that are produced under strict safety standards. This focus on food hygiene has been further emphasised by food safety scandals from Chinese products in recent years.

- **Other markets.** Despite its small market size, Singapore is a lucrative market in the premium foodservice segment, being home to a large proportion of wealthy consumers and expats and a strong tourism industry. Singapore also has a well-developed and sophisticated retail market – over 60 percent of beef purchases are made in super- and hypermarkets. Online butchers and grocery subscription plans represent a small but rapidly growing direct-to-consumer (B2C) segment. Consumers prioritise food safety, freshness, and natural sourcing when purchasing beef. Muslim consumers from both Singapore and neighbouring Brunei have also driven demand for Halal products, although this is smaller than in Indonesia and Malaysia.

3. Opportunities and challenges

There are many challenges posed to trade between Northern Australian and ASEAN in beef in terms of production competitiveness, supply chain constraints, and climate-related risks (Exhibit 18).

¹⁰⁰ The Diplomat (2018), “Vietnam’s meat boom” Available at: <https://thediplomat.com/2018/06/vietnams-meat-boom/>

¹⁰¹ The Straits Times (2019), “Vietnam culls 1.2 million pigs as African swine fever spreads nationwide” Available at: <https://www.straitstimes.com/asia/se-asia/vietnam-culls-12-million-pigs-as-african-swine-fever-spreads-nationwide>

Supply chain constraints, customs barriers, lack of expertise, and climate-related risks pose significant challenges to beef exports



■ Strong performance
 ■ Some gaps
 ■ Significant gaps

Competitiveness drivers		Description	Performance
Production competitiveness	Scale of existing production	Degree to which there is sufficient scale in production and logistics, and value chain integration to drive down product costs	Significant gaps
	Sophistication of production approaches and available skills	Degree to which latest production technologies are being utilised in Northern Australia and there is access to relevant skills and supporting actors	Some gaps
	Climate-related risk factors	Risk of extreme weather events impacting production in Northern Australia including droughts, floods, cyclones, etc.	Significant gaps
Supply chain competitiveness	Supply chain infrastructure in Northern Australia	Presence of a supply chain from farm to port in Northern Australia, including quality of packing and freight facilities for exports	Significant gaps
	Supply chain infrastructure in ASEAN markets	Quality of port management facilities, logistics, and transport for product delivery in ASEAN export markets	Some gaps
	Processing and retail in ASEAN markets	Processing capacity and ability to sell product effectively in relevant retail locations in ASEAN export markets	Strong performance
Regulatory barriers	Tariffs, quotas, import licensing, and price controls in ASEAN	Presence of tariffs and import quotas, import licensing regime, and price controls imposed on the product in relevant ASEAN markets	Some gaps
	Technical market access in ASEAN markets	Degree to which there are relevant product restrictions that could be non-tariff barriers in ASEAN markets e.g. (phyto)sanitary restrictions, Halal, etc.	Some gaps
	Customs laws and processes in ASEAN markets	Degree to which customs processes in ASEAN are efficient, laws are uniformly applied, available information is reliable, and regulation is stable	Significant gaps
	Regulations in (Northern) Australia	Degree to which regulatory regime in (Northern) Australia is supportive of export trade in the relevant product	Strong performance
Market factors	Brand recognition and promotion	Degree to which (northern) Australian produce commands a premium in export markets	Some gaps
	Price competitiveness of product	Degree to which Australian products are price competitive, accounting for relative wages, distance to market, and exchange rates	Some gaps

SOURCE: Literature review; Expert interviews; Team analysis

Production competitiveness

- Scale of existing production.** A critical lack of abattoirs and associated supply chain logistics have translated to a small footprint for Northern Australian beef, both as a proportion of domestic production as well as exports to ASEAN. Experts posit that a “proof of concept” or viable business model needs to be presented to cattle farms in Northern Australia to incentivise beef intensification and mobilise investment. A greater number of feedlots and processing facilities would substantially reduce costs of raising cattle for slaughter in Northern Australia, and create scale economies to leverage for supply chain logistics from abattoirs to ports. Similarly, arrangements with large importers that leverage centralised storage and distribution in destination markets would further drive down product costs.
- Sophistication of production approaches and available skills.** Cattle management technology in Northern Australia is generally advanced and beef production approaches adhere to national standards for safety and quality (including for pre- and post-slaughter hygiene inspection, microbial assessment and monitoring, and red meat safety programmes run by MLA). However, beef processing has not reached commercial scale and profitability due to a lack of skilled labour and limited availability of capital to capitalise on the production expertise available. Cattle herds in Northern Australia also largely support mass market meat products, and there is scope for development of breeds that produce premium beef products (e.g. loin cuts and fatty varieties like wagyu). Additionally, there is a lack of complementary

agriculture available to support beef intensification, although trials are underway for cotton, sesame, and soybean among other agri-food products.

- *Climate-related risk factors.* As discussed earlier, climate change poses a substantial risk to the cattle industry in Northern Australia. Extreme weather events including prolonged droughts and damaging floods have reduced herd size significantly.

Supply chain competitiveness

- *Supply chain infrastructure in Northern Australia.* The under-development of key elements in the beef value chain need in Northern Australia is a key challenge to be addressed. The lack of abattoirs in the north is a critical gap in the production system – with the Northern Territory’s sole abattoir having been closed in recent months as well as there being minimal processing locations in remote north Western Australia and northern Queensland.¹⁰² Consequently, there is a lack of packing and freight facilities accessible to support an expansion of beef production; logistics and transportation services are under-developed as well, and northern ports such as Darwin, Cairns, and Townsville at present do not have the expertise to manage increased trade volumes. However, there is strong potential for this supply chain to be developed and scaled with the requisite investment in research, infrastructure, and human capital leveraging on widespread industry expertise in southeast Queensland as well as across Australia. As highlighted earlier, investment is already being made in upgrading land transport infrastructure supporting cattle trade through the Northern Australia Beef Roads Program.¹⁰³ The Queensland Government has earmarked A\$10 million for the development of a northern export hub, with proposals to further develop Cairns international airport in place – it is presently an important link to ASEAN and can process wide-body cargo aircraft. The port of Townsville can also now manage shipping containers and reefers in addition to bulk shipment. Austrade helps importers from ASEAN to secure their supply chains in Northern Australia through requisite investments in cattle stations and abattoirs. The Northern Australia Infrastructure Facility (NAIF) has committed A\$5 billion to building infrastructure for economic benefit, including commissioning projects to develop agriculture – however, the fund could help develop projects as a viable “proof of concept” or business model that can be scaled across the north.¹⁰⁴
- *Supply chain infrastructure in ASEAN markets.* There are supply chain concerns across a range of ASEAN focus markets. Port management, cold storage facilities, transportation infrastructure, and access to market outside of large urban centres and ports are key challenges in Indonesia, Vietnam, Cambodia, the Philippines, and Lao PDR. Ports are often ill-equipped to manage large quantities of shipped products, lacking proper handling from ship to storage – this problem is compounded by product often being quarantined due to import restrictions (discussed below). Cold storage logistics are also unevenly developed between and within countries, although efforts to upgrade infrastructure in major centres is expected in Indonesia, Vietnam, and the Philippines. Transportation infrastructure, including roads, reefer cars and trains that transfer produce to other parts of the country, and ground staff managing product logistics, often do not meet quality standards required for chilled or frozen beef, resulting in heavy product losses. For

¹⁰² EY (2018), *The Queensland Beef Supply Chain*.

¹⁰³ National Infrastructure Construction Schedule (2019), *Northern Australia Pipeline of Projects*. Available at: <https://www.nics.gov.au/Project/NapopProjects> ; and

Department of Infrastructure, Transport, Cities and Regional Development (2018), *Northern Australia Beef Roads Program*. Available at: https://investment.infrastructure.gov.au/infrastructure_investment/northern_australia_beef_roads.aspx

¹⁰⁴ Department of Industry, Innovation and Science | Office of Northern Australia (2018), *Developing Northern Australia – Implementation Report 2018*. Available at: <https://www.industry.gov.au/sites/g/files/net3906/ff/2018-10/our-north-our-future-developing-northern-australia-2018-implementation-report.pdf>

instance, only 20 percent of roads in Vietnam are paved. Cases of pilferage and theft have also been reported by importers. Additionally, the archipelago nature of Indonesia and the Philippines is a challenge – product losses have long been reported with the use ships and ports for product delivery outside of major centres. DFAT supports some ASEAN countries in improving supply chain infrastructure – for instance, it works with large, family-owned firms in the Philippines (in conjunction with local governments) to develop secure logistics and supply chains across agri-food products.

- *Processing and retail in ASEAN markets.* Beef product processing and retail after delivery in ASEAN is generally effective. Importers of Australian beef in ASEAN supply beef to both traditional (e.g. wet markets and butchers) and modern (e.g. supermarkets, hypermarkets, and online) retail locations, food manufacturers, and the foodservice sector through restaurants and hotels. The modern grocery retail and foodservice sectors are the primary outlets for Australian beef – these sectors are developing rapidly in ASEAN in major top-tier cities as well as middleweight regions, and represent strong growth opportunities in the future. The traditional retail sector, which constitutes a smaller segment of Australian beef sales, is upgrading its capabilities to sell more product varieties including frozen cuts through small-scale cold storage installations.

Regulatory barriers

- *Tariffs, quotas, import licensing, and price controls.* Regulatory barriers exist in two out of the seven focus markets – Thailand and Indonesia. Thailand imposes import tariffs and volume restrictions on beef imports to protect their local beef industry. There is presently a “safeguard quantity” of ~1,500 metric tonnes of beef imports; a 2.67 percent tariff within the prespecified quota and 50 percent tariff outside of this quota – but this tariff is expected to reach zero by 2020. Similar tariffs and quotas are applied to other countries as well. In Indonesia, similar to live cattle, there is a five percent tariff on boxed beef which is due to be eliminated by 2020, and import volumes are carefully managed by the government’s import permit system (although there are no official quotas).¹⁰⁵ Indian buffalo meat and US beef also have five percent tariffs applied. Government-determined price controls to promote beef self-sufficiency have significantly reduced profits for Australian exporters to Indonesia – by comparison, cheaper frozen beef from India and South America has been less impacted. Indonesia also runs a significant trade deficit in the agri-food sector with Australia, and the government is keen to prevent this deficit from growing by targeting high-quantity and value imports such as beef. Experts have indicated that in order to maintain their import permits, individual importers in Indonesia must increase exports of Indonesian agri-food products back to Australia, or add value to imported products and export these on to other markets. On the other hand, investment from Australia into the Indonesian agri-food sector may also reduce political scrutiny caused by this trade deficit. In all other ASEAN markets, there are no reported import tariffs or volume restrictions, largely due to a low domestic production base. Indian buffalo meat still faces some short-term tariffs – six percent in the Philippines (due to be eliminated in 2019) and 12 percent in Vietnam (due to be eliminated in 2022).
- *Technical market access.* Although there is general recognition of the strict food safety regulations in Australia, technical market is inconsistent due to the lack of efficient and

¹⁰⁵ Although the tariff appears to apply only to boxed beef imports, experts have noted that it is also applied to other cuts including manufacturing beef and offal.

harmonised sanitary restrictions and testing standards which result in products being quarantined (often close to or past shelf life). Halal standards are another prescient issue in the beef sector. ASEAN's three large Halal markets – Indonesia, Malaysia, and Singapore – each have differing certification standards for Halal beef. Such differences impose high costs on producers, who must not only produce products tailored to each market, but also obtain certification often from separate organisations. There are several Halal certifying organisations in Australia with non-uniform coverage across products and country standards. This issue is further compounded by lack of reciprocity of certification in export markets, with customs and agricultural ministries often requiring duplication of certification by local certifying bodies despite maintaining foreign Halal certifying bodies. In comparison with other large Halal regions such as the Middle East, Southeast Asian markets are reported to have the most restrictive Halal requirements and complex certification systems that involve a mix of government bodies and private sector firms. Food Industry Asia (FIA) and the ASEAN Food and Beverage Alliance (AFBA) are working with authorities and stakeholder in promoting greater alignment in Halal standards in Southeast Asia, as a lead-up to alignment at a global scale. Nutrition labelling regulations are also different across countries – varying in requirements for content and language and often changing without prior notice.

- *Customs processes.* Irregular changes to import laws and restrictions, inefficient bureaucracy, and widespread corruption in customs offices are major challenges to agri-food trade across ASEAN, and these impose high operating costs on exporters. The trade environment is expected to improve under agreements such as IA-CEPA and the CP-TPP. Experts have emphasised that bureaucratic and cultural business norms are likely to persist over the long-term in ASEAN, and trade deals or formal relationships with authorities and importers alone will not provide an enabling environment for increased trade. Exporters must develop an on-ground market presence through staff and business partners to represent their interests with agriculture ministries, customs officials, and logistics and retail partners on a daily basis in order to navigate lengthy red tape and corruption, cultivate informal and personal relationships with business partners, and build market intelligence.
- *Regulations in (Northern) Australia.* Federal agencies and state governments are extremely supportive of growing beef exports in ASEAN as a means of promoting growth and value-added jobs in Northern Australia. However, experts have indicated that this could be enhanced via greater on-ground presence of government trade officials in focus markets like Vietnam and the Philippines.

Market-related concerns

- *Brand recognition and promotion.* Australian beef commands a premium in retail and foodservice, leveraging high safety standards and Australian produce's "clean and green" brand image – but this does not generally apply to Northern Australian beef. Austrade and MLA in particular have been active promoters of the overall beef brand in ASEAN, marketing premium cuts of grass-fed beef through online and offline workshops with chefs, retailers, and consumers in countries such as Indonesia and the Philippines. However, experts have indicated that there is potential for Northern Australian beef to leverage this reputation and the ASEAN consumer's demand for safe and nutritious food to command a small price premium in the mass market segment. This could be achieved through packaging- or labelling-based product branding in both traditional and modern retail spaces. This strategy is not presently being pursued, but has been suggested by experts in northern Queensland as a viable opportunity to differentiate all

Australian produce through science-based marketing on quality and health advantages, and ensure consistency in supply across the state.

- **Price competitiveness.** Australian beef faces strong competition based on price. Australian beef, regardless of market segment, is generally more expensive than competitors' produce due to the strict quality standards of the Australian production process and higher labour costs (particularly in Northern Australia where there is a shortage of skilled labour and lack of operational scale). While higher price is not a significant barrier to additional sales in the premium cuts segment where consumers are relatively price inelastic, even marginally higher prices are a barrier to additional sales in the mass market segment which is presently where Northern Australian beef competes. Favourable trade deals are also not expected to provide a tariff advantage in the long run – with major competitors such as India gaining tariff parity by 2022 in Vietnam. Price controls in Indonesia further reduce profitability. Accordingly, price competitiveness could be a significant hurdle contingent on market segmentation.

III. Avocados and macadamias – Smaller bets to consider for the future

In addition to beef and live cattle, avocados and macadamias are considered as “smaller bets” as due to their relatively high supply feasibility in Northern Australia and efforts being made by both industries to increase productivity and develop export-oriented growth strategies:

- **High supply feasibility.** Both products are suitable for production in certain zones in northern Queensland. The Atherton Tablelands is already the largest producer of avocados in Australia and there is an established supply chain complete with packhouses and port logistics.¹⁰⁶ The Bundaberg region produces around half of Australia's macadamias and has a well-developed export supply chain that services markets around the world.
- **Efforts being made to increase productivity.** Both products are expected to see significant growth in production levels in the long-term. For instance, avocados output is expected to increase by over 50 percent by 2025, and macadamias productivity is targeted to increase to five tonnes per hectare by 2022 (up from three tonnes per hectare in 2018).¹⁰⁷
- **Export-oriented growth strategies.** The additional growth in avocado production is expected to outpace local market demand, creating surplus that could service increased demand from ASEAN. Opportunities will arise from both raw and processed products (such as guacamole). This will require further investment in supply chain and logistics, particularly in new production areas where that are yet to achieve commercial scale. Increased supply macadamia supply could be directed towards new centers of demand such as ASEAN, which is both feasible for Australia to service and important to service as well, given an expected global supply increase and higher competition in existing markets such as China, the US, and Europe.

A. Avocados

1. Supply trends

Australia is a small producer of avocados in the global market – producing less than 1 percent of global production and exporting 2.3 percent of national production volumes, a large share of which

¹⁰⁶ Avocados Australia (2018), *Facts at a glance 2017/18 for the Australian avocado industry*. Available at: https://www.avocado.org.au/wp-content/uploads/2018/10/2017-18_AAL-Facts-at-a-glance_FINAL.pdf

¹⁰⁷ HortInnovation (2019), *Strategic Investment Plan full documents – Macadamias*. ; and *Strategic Investment Plan full documents – Avocados*. Available at: <https://www.horticulture.com.au/growers/funding-consulting-investing/investment-documents/strategic-investment-plans/>

originate from northern Queensland which accounts for 52 percent of national production.¹⁰⁸ Australia remains a net importer of avocados (primarily from New Zealand), as the majority of production is destined for local consumption and there is a gap in annual supply observed in summer from November through March. However, it is planned that expanded production (particularly in Western Australia) will be able to service local demand and create a surplus for exports. Export share of production is envisaged to reach 10 percent by 2021.¹⁰⁹ There are two ASEAN markets at present for Australian avocados – Malaysia and Singapore – and air freight from ports such as Townsville provides Australia with a competitive advantage as the fruit can be harvested and transported to market within 48 hours, ensuring maximum quality.

- **Malaysia.** Malaysia has no recorded domestic avocado production. It is Australia's top export destination for avocado exports (45 percent of export volumes), and Australia is in turn Malaysia's top source of avocado import supply (36 percent of import volumes).¹¹⁰ In this market, Kenya is Australia's largest competitor (26 percent of supply) and is projected to overtake Australian supply in volume terms in coming years – trade has increased by a factor of 10 over 2014 to 2017 – and the recent entry of Mexican imports is also a significant threat. Both countries can provide similar quality produce at cheaper prices.
- **Singapore.** Singapore has no local avocado production. It is Australia's second-highest destination for avocado exports (37 percent of export volumes) and Australia is Singapore's second-highest source of avocado imports (19 percent of import volumes). Mexico is Singapore's top supplier (39 percent of overall import supply) and this trade has more than doubled in recent years to the detriment of exports from the US and Australia – Mexican produce is generally cheaper, of similar quality, and there is year-round supply. Experts have indicated that Singapore could potentially be an export hub for Australian avocados to other lucrative markets, including where technical market access is not available such as China.
- **Other ASEAN markets.** Australia either has lack of technical market access in other ASEAN markets (e.g. Thailand and Vietnam) or negligible existing export volumes (e.g. Indonesia – 1 percent of Australian exports). Markets like Vietnam, however, could serve as export and processing hubs.

2. Demand trends

Avocado consumption in ASEAN remains low in comparison to other parts of the world, and this is likely due to avocados being a premium food, available for sale only in organised retail locations and generally not featured in local cuisines. For instance, consumption in Malaysia was 0.07 kg per capita per annum in 2017, and in Thailand this was 0.01 kg – in comparison to other markets such as Hong Kong (0.7 kg), Japan (0.58 kg), and the US (3.14 kg). Consumption in Singapore is higher (0.87 kg per capita) but the country's small market size makes it a less attractive export destination in comparison to markets such as China.

However, avocado consumption is growing in line with the trend of Westernisation in diets – indicating the potential for a larger market emerging in the future. The avocado's status as a “superfood” with a range of health benefits has largely driven this popularity. Raw avocados are a

¹⁰⁸ Avocados Australia (2018), *Facts at a Glance 2017/18 for the Australian avocado industry*. Available at: https://avocado.org.au/wp-content/uploads/2018/10/2017-18_AAL-Facts-at-a-glance_FINAL.pdf

¹⁰⁹ HortInnovation (2019), *Strategic Investment Plan full documents – Macadamias*; and *Strategic Investment Plan full documents – Avocados*. Available at: <https://www.horticulture.com.au/growers/funding-consulting-investing/investment-documents/strategic-investment-plans/>

¹¹⁰ Avocados Australia (2018), *Global Market Data Analysis – Avocado Import Markets 2018*.

popular “brunch” dish with millennial consumers, and preparations such as guacamole are being used in restaurants and sold in supermarkets. It has also been reported that avocado is used in traditional-style desserts in the Philippines. Future market development in ASEAN could feature development of such products that incorporate avocados as a key ingredient in conjunction with local chefs – helping drive down avocado product prices and stimulate demand in price-sensitive market segments. An increase in tourism around ASEAN is also expected to increase avocado consumption in food service.

3. Opportunities and challenges

- *Production competitiveness:* Australia’s avocado production is competitive but would benefit from increased scale. The Atherton Tablelands in northern Queensland is Australia’s avocado export hub, and there are well-developed production techniques including micro-climate management that could be replicated in newer growth regions (although cyclone-prone coasts are challenging environments). However, given that avocado cultivation has only recently commercialised in Australia (in comparison with horticultural staples such as tomatoes), agronomists indicate substantial potential to improve productivity on existing orchards to drive scale and reduce costs over the long-term, while creating a surplus for exports. The Australian avocado industry has developed a comprehensive Strategic Investment Plan (SIP) under Horticulture Innovation Australia through 2021, which outlines the target to improve productivity by 15 percent on average by 2021 through the establishment of baseline and time series data on farm productivity by region, promotion and uptake of best practices, increased access to sustainable crop pesticides, and the identification and use of technologies and automation to reduce costs.¹¹¹ Additional research on increasing the shelf-life of avocados would complement productivity gains and extend supply during off-seasons.
- *Supply chain competitiveness:* Supply chain infrastructure is largely favourable for avocado exports within Northern Australia. Key advantages include an established supply chain in northern Queensland, and expansion of general air freight and port facilities to support increased exports from Northern Australia. It is important to note that higher production will place strain on supply chain infrastructure, including temperature-controlled on-farm or centralised warehouses and logistics capabilities, which would need to keep pace. However, there are major challenges in ASEAN include poor handling and management of products – raw avocados are an easily perishable product. Experts have also indicated that grocery retail establishments often experience product losses due to improper storage and premature product removal before shelf-life has been reached.
- *Regulatory barriers:* Technical market access in ASEAN is the major regulatory hurdle for avocados, particularly in Thailand and Vietnam where imports have been banned due to fruit fly risk and associated requirements for cold treatment in packaging. Experts have indicated that negotiations for market access are making slow progress. Thailand has a small local production base and only allows imports from New Zealand. Vietnam largely imports avocados from the Americas via Hong Kong, although both trade and production data is considered unreliable. Cross-cutting non-tariff barriers to trade apply to the avocado trade in ASEAN – including slow bureaucracy, lack of transparency in import protocols, corruption, and so on.

¹¹¹ HortInnovation (2019), *Strategic Investment Plan full documents – Avocados*. Available at: <https://www.horticulture.com.au/growers/funding-consulting-investing/investment-documents/strategic-investment-plans/>

Importers have reported that delays in product approval which results in lengthy border quarantine is detrimental to product shelf-life and causes losses.

- **Market-related factors:** Low consumption in ASEAN linked to limited product exposure and uncertainty around increase in future demand linked to price competitiveness are the primary challenges to growth in Australian avocado exports. Price competition from producers in the Americas, that are able to produce avocados at a larger scale and with cheaper labour, is also a major challenge. Expected productivity gains in important production regions such as the Atherton Tablelands may contribute to lower prices, but it is expected that Australian produce will still be priced at a premium and would require strong complementary marketing to sustain demand.

B. Macadamias

1. Supply trends

Australia is the world's largest producer of macadamias, with its 50,000 tonnes of production contributing over 30 percent of global total.¹¹² 70 percent of this is exported to over 40 countries, primarily to China, Japan, the US, and Europe. Macadamias are cultivated in the Northern Rivers region of northeast New South Wales and the Bundaberg region of southeast Queensland; each region accounts for around half of national production and the latter is Australia's fastest growing producer.¹¹³ Bundaberg lies south of the Tropic of Capricorn and definitions vary as to its inclusion in the geography of Northern Australia.

Vietnam is the only major ASEAN market for Australian macadamias. It is Australia's second-largest export destination for in-shell macadamias, account for 28 percent of total exports in 2018 (largest was China, with 41 percent). Australian produce competes with that from South Africa and Kenya, with smaller import quantities from China as the country has a large local market to service. Vietnam's Ministry of Agriculture has plans to expand macadamia plantations significantly within the next 10 years having learned from previous attempts to produce locally, and will expand its processing capacity – potentially adding to competition for Australian imports.¹¹⁴ Singapore, the Philippines, Malaysia, and Thailand are other consumers of Australian macadamias, although these are substantially smaller markets.

2. Demand trends

Vietnam is a processing hub for macadamia products, and is also the world's second largest importer of in-shell macadamia nuts.¹¹⁵ However, general consumption of macadamias in ASEAN is low in comparison to the rest of the world. For instance, consumption in Singapore was 0.03 kg per capita per annum in 2016, in Malaysia this was 0.007 kg per capita – in comparison to Australia

¹¹² Australian Macadamias (2019), *Macadamia Story*. Available at: <https://www.australian-macadamias.org/consumer/our-story>

¹¹³ HortInnovation (2019), *2017/18 Australian Horticulture Statistics Handbook*; and Australian Macadamias Society (2019), *Australia's macadamia industry in numbers*. Available at: https://app-ausmacademia-au-syd_s3.ap-southeast-2.amazonaws.com/factfigure/wNu2i3awkACVahT73qwcNtHTrw71qqY0bj2LMt2r.pdf

¹¹⁴ References taken from Vietnam Net (2017), "Vietnam takes heed to Macadamia nut" Available at: <https://english.vietnamnet.vn/fms/business/177757/vietnam-takes-heed-to-macadamia-nut.html>; Voice of Vietnam (2017), "Vietnam back to mulling macadamia nuts as cash crop" Available at: <https://english.vov.vn/economy/vietnam-back-to-mulling-macadamia-nuts-as-cash-crop-349060.vov>; and

VN Express (2017), "Macadamia millionaire dream slowly dies in Vietnam's Central Highlands" Available at: <https://e.vnexpress.net/news/business/macadamia-millionaire-dream-slowly-dies-in-vietnam-s-central-highlands-3471337.html>

¹¹⁵ International Nut and Dried Fruit (2018), *Nuts and Dried Fruits Statistical Yearbook 2017/2018*. Available at: https://www.nutfruit.org/files/tech/1524481168_INC_Statistical_Yearbook_2017-2018.pdf

(0.14 kg per capita). This is largely because the ASEAN market has not been developed by the Australian Macadamias Society and Austrade, as more lucrative markets such as China and Japan have been favoured, with South Korea and Taiwan chosen as new markets to develop. Consequently, there has been a lack of supply available to direct to ASEAN, and the ASEAN consumer has had little exposure to the macadamia nut.

Globally, macadamia demand greatly exceeds present supply; macadamias constitute less than two percent of global nut consumption. Demand is driven by the perception of nuts as a healthy snack food – which have been pushed as part of a public policy healthcare agenda by governments around the world.¹¹⁶ For instance, the Australian health board has recommended a 300 percent increase in nut consumption, and China has recommended that its citizens consume 30 grams of nuts daily. Macadamias are suitable to all forms of diets – vegetarian, plant-based, vegan, gluten-free, paleo, keto, low-fat, and so on. There are also a range of products that include macadamia nuts, including chocolates, cereals, and even milk (which is particularly relevant for lactose-intolerant diets). Macadamias are the second most expensive nut globally (after pine nuts) and usage in combination with other ingredients could reduce product prices and appeal to a wider range of consumers. For instance, fast food chain Subway is one of the largest corporate buyers of macadamias globally for its cookies. This is an under-developed outlet for the macadamia industry – only 30 percent of current sales are for ingredient purposes as opposed to 60 percent for the almond industry.

Experts are confident that these demand drivers will sustain in the long-term, driven by public health policy encouraging consumption of macadamia and other nuts. The rise of health-conscious Southeast Asian consumers is likely to support a large export opportunity for Australian macadamias, supported by headwinds in demographic and economic growth.

3. Opportunities and challenges

- **Production competitiveness:** Australia has the world's most well-developed macadamia production industry; major growing areas such as Bundaberg in Queensland and the Northern Rivers in New South Wales border Northern Australia. It is reportedly the only horticultural industry with its own independent strategy for research and development, and market development – this is levy-funded with an annual budget of around A\$2.2 million (half through levies and half matched by HortInnovation through federal government funding). The industry's main strategic imperative is to increase scale of production by improving average productivity in these existing regions, through improved nutrition and soil health, better canopy management, and enhanced pests and disease protection. Macadamias have comparatively been the subject of less research than staple horticultural products (e.g. tomatoes), and agronomists believe in substantial gains from the increased application of technology and uniform usage of best cultivation practices. The Australian Macadamias Society is confident that productivity could not only surpass the stated goal of reaching five tonnes per hectare in 2022 (from three in 2017), but even achieve ten tonnes per hectare beyond 2030.¹¹⁷ As existing facilities are approaching capacity constraints, there must be requisite investment in new processing facilities to dry and roast macadamia nuts – larger processing hubs could

¹¹⁶ ABC News (2019), "Macadamia nuts double in price as growers struggle to keep up with demand" Available at: <https://www.abc.net.au/news/2019-03-11/health-food-trends-drive-surge-in-macadamia-price/10886728>

¹¹⁷ ABC News (2018), "Macadamia orchards cropping up amongst the cane sugar fields in Queensland sugar heartland of Mackay" Available at: <https://www.abc.net.au/news/rural/2018-01-16/macadamias-in-mackay-sugar-heartland/9310878>

further help drive down production costs. Accordingly, new production areas in Northern Australia have been afforded less attention, although they could become more relevant if land prices for macadamia orchards in existing regions rise. Regions north of the major growth hubs run along the eastern coast from Mackay and Rockhampton through to Cairns, and require development of macadamia breeds more suited to their specific sub-climes, shade cropping, and irrigation systems. This is particularly relevant as a diversification option for the Australian cane sugar industry along the eastern seaboard of Queensland, which it is currently facing a global supply glut and reduced profits.¹¹⁸ The Kimberley region in Western Australia also has an appropriate climate for macadamia cultivation, but setting up a commercially viable production hub would require a large growing area and large investment in processing facilities to achieve scale.

- **Supply chain competitiveness:** The macadamia nut supply chain is well-developed from orchard to port, serving over 40 countries globally. It is a “low-maintenance” product that is suited to trade in ASEAN from existing shipping facilities in Darwin and air freight from Cairns and Toowoomba. These presently serve the processing hub in Vietnam – the only supply chain to ASEAN developed at significant scale. A highly limited volume of macadamias retail in ASEAN grocery and convenience stores, and are directly sold to the foodservice sector. As there are an extremely low number of exporting producers and importers involved in the macadamia trade to ASEAN, an increase in this trade could strain existing infrastructure in the region.
- **Regulatory barriers:** There are few regulatory challenges to Australia’s macadamia exports. Given the disease-resistance of in-shell macadamias and the durability of roasted macadamias, technical market access across ASEAN markets has been obtained. There are reportedly no tariffs or quotas as well, given a lack of local production. Cross-cutting non-tariff barriers such as lengthy red tape and corruption would apply to macadamias.
- **Market-related factors:** Low consumption levels in ASEAN due to lack of market development, resulting in poor brand awareness and high costs of import, are the key challenge to export growth. Low supply and lack of sustained marketing efforts for Australian macadamias and associated products at retail locations in ASEAN has resulted in low awareness and an under-developed consumer preference. However, the Australian macadamia industry has largely been responsible for the promotion of macadamias globally – it is the only exporting country with an integrated global marketing and branding strategy across all destination markets. A\$2.5 million is spent on marketing and consumer awareness annually, and a share of this could be devoted to market development in ASEAN. Developing the ASEAN market with a “first-mover advantage”, where Australia has a geographical advantage, could be important to sustaining macadamias export growth as global market competition is increasing. For instance, increased supply from South Africa and Kenya has the potential to raise global supply to up to three times today’s level by 2030, which could lower prices and reduce profitability. These countries could serve major existing demand centres in North America and Europe more competitively than Australia. Additionally, market access in new markets such as India is proving difficult – tariffs are presently at 40 percent and are being reviewed under a proposed FTA.

¹¹⁸ ABC news (2018), “Australian sugar industry sours as competing nations create a global supply glut, causing a price drop” Available at: <https://www.abc.net.au/news/rural/2018-05-09/sugar-industry-hit-by-global-glut-low-prices/9739584> ; and

6. Strategic recommendations to capitalise on the ASEAN agricultural opportunity

This chapter outlines four key strategic recommendations that propose solutions to the current challenges to export growth in live cattle, beef, avocados, and macadamias identified in Chapter 5. These recommendations have been developed in consultation with industry leaders and stakeholders in Northern Australia and ASEAN.

#	Key priority actions for sector development	Action owner and key partners	Pathways to implementation and timelines	Intended industry impacts
Reducing barriers to trade in ASEAN				
1	Engage regulators in ASEAN Member States to address the key regulatory impediments noted by Australian producers (related to quotas and non-tariff barriers). This would include channels such as industry recommendations to regulators involved in the review of multilateral (e.g. ASEAN Australia New Zealand Free Trade Agreement) and bilateral trade deals (e.g. IA-CEPA); engagement with relevant ASEAN working groups; and advocacy through the ASEAN Business Advisory Council (ABAC). Key	<p><i>Action owner:</i> Australia-ASEAN Chamber of Commerce (AustCham ASEAN)</p> <p><i>Key partners:</i></p> <ul style="list-style-type: none"> • Australian Department of Foreign Affairs and Trade (DFAT) • Australian Department of Agriculture and Water Resources (DAWR) • Food Industry Asia (FIA) • ASEAN Food and Beverages Alliance (AFBA) 	<p>Lead and coordinate a strong alliance of key partners in developing and implementing an ongoing strategic action plan, including:</p> <ul style="list-style-type: none"> • Agreed strategic action plan developed and benefits estimated by June 2020. • Supporting DFAT as the industry voice in the review of key regional trade deals, including AANZFTA, CP-TPP, and IA-CEPA as encapsulated in each agreement.¹¹⁹ • Supporting FIA and AFBA's efforts to obtain Halal harmonisation and promote use of Codex labelling 	<p>This strategy would result in:</p> <ul style="list-style-type: none"> • Improved market access for Northern Australian agri-food producers in ASEAN; • Reduced costs of compliance with trade regulations.

¹¹⁹ AustCham ASEAN has worked extensively with businesses to identify key non-tariff measures in agri-food exports, through working group discussions with leaders across the dairy, grain, meat, and food and beverage sectors. See Australia-ASEAN Chamber of Commerce (2019), *Non-Tariff Measures in Agriculture and Food in Australia and ASEAN*. [Forthcoming]

	<p>regulatory issues to be addressed include:</p> <ul style="list-style-type: none"> • Volume restrictions on live cattle in Indonesia • Halal standards harmonisation • Transparency in product and facility certification 	<ul style="list-style-type: none"> • The Cooperative Research Centre for Developing Northern Australia (CRCNA) • Meat and Livestock Australia (MLA); Jakarta and Sydney offices • HortInnovation • Avocados Australia 	<p>standards in ASEAN by December 2020.</p> <ul style="list-style-type: none"> • Building on DAWR's efforts to obtain technical market access for avocados in Thailand, and strengthen efforts in Vietnam by December 2020. 	
2	<p>Develop a “farm-to-fork” supply chain diagnostic tool to analyse beef and live cattle supply chains from Northern Australia into ASEAN markets, measuring time and cost at each stage of the supply chain and identifying key drivers of impediments (e.g. missing infrastructure, technical barriers to trade, etc.) and relevant actions related to regulatory engagement and infrastructure development (e.g. centralised processing for live cattle in Indonesia to drive down costs). This would complement the study of time and costs along priority trade routes that is being driven by the ASEAN Secretariat under the Masterplan for ASEAN Connectivity 2025 (the development of which was supported by DFAT).</p>	<p><i>Action owner:</i> Australia-ASEAN Chamber of Commerce (AustCham ASEAN)</p> <p><i>Key partners:</i></p> <ul style="list-style-type: none"> • Business chambers in focus countries e.g. Indonesia-Australia Business Council (IABC), Australian Chamber of Commerce in Vietnam (AusCham Vietnam), Australian-Thai Chamber of Commerce (AustCham Thailand) • Potential research partners (e.g. local universities) • Australian Department of Agriculture and Water Resources (DAWR) • Select exporters / importers • Meat and Livestock Australia (MLA), Jakarta office 	<p>Develop comprehensive “farm-to-fork” diagnostic framework and methodology; and identify partners with which to trial this system by December 2019. Countries to prioritise include Indonesia, Vietnam, and Thailand. This would build on existing supply chain diagnostic studies that have been undertaken by partners such as MLA, and seek to identify ways in which this exercise could complement that existing work.</p> <p>Conduct pilot diagnostic with selected partners during 2020 and identify major trade impediments to address and supply chain investment required in 2021.</p> <p>Link action plan with ongoing efforts by AustCham ASEAN to improve trade environment; Austrade and MLA efforts to identify and incentivise investment in ASEAN supply chains; and initiatives by recommendation owners of supply chain</p>	<p>This strategy would:</p> <ul style="list-style-type: none"> • Better inform regulatory advocacy efforts; • Identify supply chain strengthening and investment opportunities in ASEAN; • Link to ongoing IA-RCMP efforts to improve supply chains in Northern Australia.

		<ul style="list-style-type: none"> • The Cooperative Research Centre for Developing Northern Australia (CRCNA) • Multilateral institutions such as the Asian Development Bank (ADB) • Central Queensland University (CQU) 	<p>freight projects commissioned by the CRCNA in Northern Australia by December 2021. In particular, this work could lead to a follow-on project that would engage key Australian producers to seek to enhance their supply chain logistics into ASEAN.</p> <p>These pathways to implementation will be further developed and finalised under the CRCNA's beef sectoral plan for Northern Australia.</p>	
Increasing production and/or supply availability of agri-food products to ASEAN				
3	<p>Explore an export strategy for bovine genetic materials, including semen, embryos, and germplasm. Australia is presently “underweight” in bovine genetics exports (in comparison to beef product exports) and the Australian Registered Cattle Breeders Association (ARCBA) believes that export value of beef (and sheep) genetics could rise ten-fold by 2023.</p>	<p><i>Action owner:</i> Commonwealth Scientific and Industrial Research Organisation (CSIRO)</p> <p><i>Key partners:</i></p> <ul style="list-style-type: none"> • Australian Centre for International Agricultural Research (ACIAR) • Australian Registered Cattle Breeders Association (ARCBA) • Meat and Livestock Australia (MLA) • Australia-ASEAN Chamber of Commerce (AustCham ASEAN) 	<p>Identify relevant genetic material appropriate for usage by breeds in herds in focus markets (i.e. Indonesia, Vietnam, and Thailand) by December 2020. Engage focus markets to help educate them about appropriate breeds for their conditions, in order to create market demand (particularly given many projects are government-funded).</p> <p>Assess current capacity for production in Northern Australia, achieved through industry consultations with ARCBA, producers, veterinary scientists, supply chain experts, etc. by June 2021.</p> <p>Develop business model with one or two select producers in Northern Australia, incorporating elements related to</p>	<p>This strategy would:</p> <ul style="list-style-type: none"> • Provide an alternative export product for Northern Australia producers that may have to reduce herd size and diversify export produce due to extreme weather events; • Support beef intensification and increase herd productivity across animal lifespan; • Ensure sustainable development in key agri-food export sector

		<ul style="list-style-type: none"> • Select producers in Northern Australia (e.g. AACo.) • The Cooperative Research Centre for Developing Northern Australia (CRCNA) • Australian Department of Agriculture and Water Resources (DAWR) 	<p>establishment of storage facilities, farm staff training, and exporter logistics, by June 2022.</p> <p>Identify regulatory challenges (e.g. quarantine requirements) that could impact opportunity and engage relevant ASEAN working groups (through AustCham ASEAN).</p> <p>Launch, monitor, and evaluate business model through December 2023, together with development of long-term industry strategy if pilot proves successful.</p> <p>These pathways to implementation will be further developed and finalised under the CRCNA's beef sectoral plan for Northern Australia.</p>	<p>and help create high-skilled jobs in veterinary sciences and herd management.</p>
4	<p>Develop a market research study for Australian macadamias in ASEAN (building on this current research effort) which would go deeper into understanding major importers, retail partners, distribution networks, and the competitor landscape. This would build on the current efforts of AMS in South Korea and Taiwan.</p>	<p><i>Action owner:</i> Australia Macadamias Society (AMS)</p> <p><i>Key partners:</i></p> <ul style="list-style-type: none"> • HortInnovation • The Cooperative Research Centre for Developing Northern Australia (CRCNA) • Greater Whitsundays Alliance (GW3), Townsville Enterprise 	<p>Determine key markets for development in ASEAN by December 2019 and determine required funding to conduct a detailed market research study. AMS suggests that Indonesia, Singapore, Malaysia, and the Philippines could be priority markets.</p> <p>Identify research partner and launch study by July 2020.</p> <p>Finalise research study by December 2020 and develop action plan.</p>	<p>This strategy would:</p> <ul style="list-style-type: none"> • Diversify export for Australian macadamia producers in the face of strong global competition; • Offer new production regions in Northern Australia a diversification opportunity away from sugarcane, which is

		<p>Limited (TEL), and Advance Cairns</p> <ul style="list-style-type: none"> • Northern Territory Farmers Association (NT Farmers) • Australia-ASEAN Chamber of Commerce (AustCham ASEAN) • The Australian Trade and Investment Commission (Austrade) 	<p>Explore new growth regions for production such as north of Bundaberg in Queensland and the Ord in Western Australia by December 2021, accounting for sufficient time to conduct multi-seasonal production assessment and gain understanding of processing infrastructure and freight arrangements.</p>	<p>facing excess global supply and reduced profitability.</p>
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Appendix: Methodology

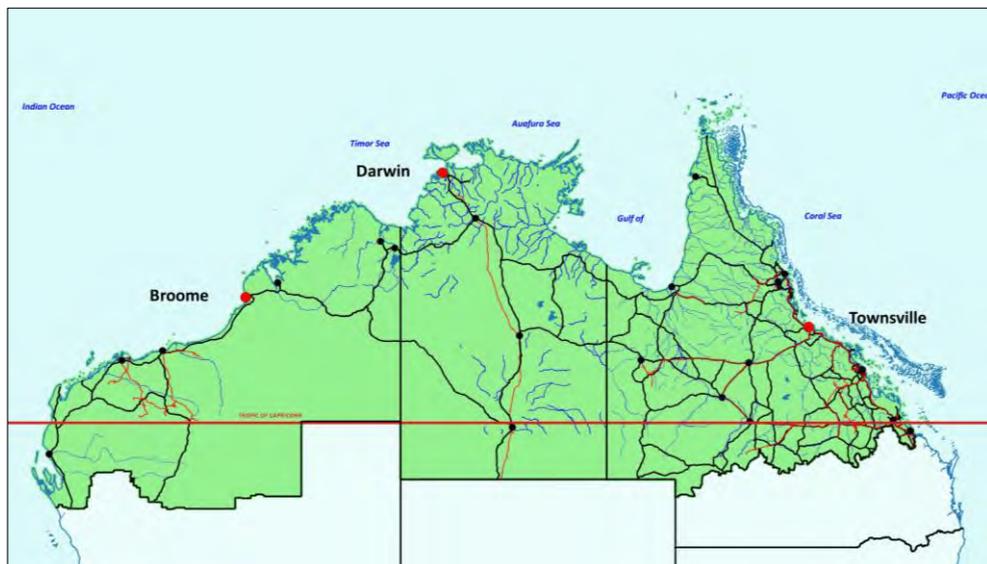
The research for this study was conducted in two phases:

1. Prioritise opportunities in the agri-food sector in ASEAN for Northern Australia
2. Develop action plan for priority country-product opportunities

Northern Australia's geographical boundaries as referred to in this report are defined in Exhibit A1.

EXHIBIT A1

Northern Australia covers 53% of Australia's landmass across Queensland, the Northern Territory, and Western Australia



SOURCE: CRCNA

Phase I: Prioritise opportunities in the agri-food sector in ASEAN for Northern Australia

A five-step process was used to identify the top 10 prioritised country-product combinations in ASEAN member states (AMS):

1. Analyse key trends in the food sector in ASEAN
2. Filter agri-food exports into 15 most relevant products
3. Analyse export growth scenarios for filtered products
4. Short-list top product opportunities
5. Prioritise AMS by product opportunities i.e. country-product combinations

Step 1 leveraged AustCham ASEAN and AlphaBeta (www.alphabeta.com) research with additional insights from desktop research, and key sources have been highlighted in-text. The methodology used steps two through five has been described below.

Step 2: Filter agri-food exports into 15 most relevant products

In step two, a set of 15 agri-food products were initially filtered for further analysis. The data sources used during this analysis are listed in Table 1.

TABLE 1

Data	Relevant chapters	Sources
ITC Trade Map – historical export data for Australia and ASEAN	Chapter 2, 4	International Trade Centre (2019), <i>Trade Map</i> . Available at: https://www.trademap.org/Index.aspx
ITC Export Potential Map – forecasted export data for Australia to ASEAN	Chapter 2, 4	International Trade Centre (2019), <i>Export Potential Map</i> . Available at: http://exportpotential.intracen.org/#/home
Relevant products for agri-food expansion in northern Queensland	Chapter 2, 4	KPMG and Townsville Enterprise (2019), <i>North Queensland Agricultural Market and Supply Chain Study</i> . Available at: https://www.townsvilleenterprise.com.au/key-projects/agriculture/north-queensland-agricultural-market-supply-chain-study/
Harmonized Commodity Description and Coding Systems (HS) codes	Chapter 2, 4	United Nations Comtrade (2019), <i>Commodity List</i> . Available at: https://comtrade.un.org/db/mr/rfCommoditiesList.aspx?px=H1&cc=TOTAL

Products were considered from the following sources:

- **Current exported products.** Australia's top 100 exported agri-food products to ASEAN between 2012 to 2017 were considered, as, if not included among top exports today.

- **Projected top exports.** Australia's top 100 export opportunities to ASEAN through 2023 as projected by the International Trade Centre (ITC) through the Export Potential indicator were considered.¹²⁰
- **Products recommended by complementary research.** Products highlighted by the North Queensland Agricultural Market and Supply Chain Study (NQAMSCS) were also considered (beef, rock lobsters, macadamia nuts, avocados, and soybeans).

Each agri-food product from these lists was assigned an index score based on volume of historical exports and projected top exports. Four steps were involved in this analysis:

1. **Data gathering.** Data on all exported products from Australia to ASEAN was downloaded from the ITC Trade Map for 2011 to 2018, and agri-food products were identified within this dataset and ranked by sum of total exports from 2012-17 to account for yearly fluctuations (2011 and 2018 appeared to be incomplete datasets). Simultaneously, data on top potential agri-food exports from Australia to ASEAN in 2023 was collected from the ITC Export Potential Map. This was limited to the top 100 products due to the time-intensive nature of data gathering and cleaning process for export potential; therefore, exact agri-food rankings for avocados and soybeans was not determined as their export potential is low
2. **Data cleaning and standardisation.** Products with six-digit Harmonised Commodity Description and Coding Systems (HS) codes were assigned one of the following product categories: raw (i.e. primary crop or produce), processed, grouped (i.e. multiple products, e.g. miscellaneous nuts which includes macadamias) and non-edible. For the top 100 products from the Export Potential Map, inconsistent commodity codes were matched with standardised HS commodity codes as listed by the UN Comtrade and reported on the ITC Trade Map.
3. **Product index scoring.** Raw and processed agri-food products placing within the top 100 lists of either total exported products or products with highest export potential were assigned index scores out of 100 based on the number of relevant agri-food products in the top 100. For instance, if 50 agri-food products were found in the top 100; the first ranked product was assigned a score of 100, the second 98, the third 96, and so on. Products placing outside the top 100 rankings on both lists were not assigned an index score. Each product's index score on both lists were summed to a combined index score.
4. **Final selection.** The top 11 products with the highest combined index score, in addition to the four NQAMSCS prioritised products that did not appear in the top 11, were considered for further analysis. Many products had similar products listed under different codes; for instance, beef – bovine cuts bone-in (fresh or chilled), bovine cuts bone-in (frozen); cheese – processed, grated, fresh; etc. In such cases, the first relevant code's appearance has been reported as the score for the main product type.

¹²⁰ Export Potential is a forecast of are calculated considering dynamic demand and supply conditions, including size and growth of production and destination markets, geographical distance, tariffs and trade complementarities, possibility of re-exports, diversion of exports to satisfy domestic market demand, etc. During this research, the International Trade Centre was interviewed to better understand data from the Export Potential index. The full methodology behind the calculation of export potential is available at: Yvan Decreux and Julia Spies (2016), *Export Potential Assessments*. Available at: http://exportpotential.intracen.org/media/1089/epa-methodology_141216.pdf.

Step 3: Analyse export growth scenarios for filtered products

In step three, three growth scenarios were considered to identify a range of projected exports in 2025 across the 15 agri-food products identified in step two.

The base year export data in 2017 is considered is current exports as defined by the ITC Export Potential Map. This data can differ to exporter reported trade flows on the ITC Trade Map or by UN Comtrade due to data adjustments made based on the reliability of exporter-reported trade flows; for instance, this has been done for rock lobsters and macadamias.

The three scenarios were considered were:

- **Historical export growth.** A “business-as-usual” view to export growth – assuming that export growth rates from Australia to ASEAN through 2025 follow historical CAGR from 2012 to 2017. CAGRs were calculated using data from the ITC Trade Map (see Table 1).
- **Historical ASEAN import growth.** A “match the market” view to export growth – assuming that export growth rates from Australia to ASEAN through 2025 follow historical imports by the ASEAN region from all trade partners for the product in question from 2012 to 2017. CAGRs were calculated using data from the ITC Trade Map (see Table 1).
- **ITC export forecast.** Assume that Australia achieves exports forecasted by the ITC through the Export Potential Map. ITC’s export forecast is for products through 2023; the implied CAGR in growth from 2017 to 2023 was considered to forecast exports through 2025. CAGRs were calculated using data from the ITC Export Potential Map (see Table 1). ITC’s export forecast may imply negative expected export growth, and this could be due to several reasons, including (but not limited to):
 - *Downward adjustment to account for re-exports (out of total exports):* Due to a lack of data on re-exports; countries (i.e. Australia) that are global net importers for a particular product have their forecasted exports scaled down by total export to import ratio. For instance, this has been done for avocados, for which Australia is a net importer. This adjustment may disguise potential export opportunities for the exporter from local production to regions from where the product is not imported.
 - *Estimates for substitution elasticity:* Expected competition from other suppliers for products is factored into substitution elasticity (a variable in the calculation of forecasted exports), which is based on price forecasts for 43 goods sectors. Price-based assessments at a sectoral level to calculate elasticities may disguise export potential for products with relatively inelastic demand.
 - *Estimates for income elasticity:* Slow import demand growth in key target markets may produce negative export growth either because of slow GDP per capita growth or because of a low pass-through, i.e. rising GDP per capita does not translate into additional demand for these items; calculated separately for developed and developing economies. Assessment at a country grouping level to calculate elasticities may disguise export opportunities to countries with higher income effect on imports i.e. imports increase at a similar rate to GDP per capita.

Step 4: Short-list top product opportunities

Top agri-food product opportunities were highlighted based on two criteria – “upside” opportunity or untapped export demand and supply feasibility in Northern Australia.

Upside opportunity or untapped export demand is the annual incremental export opportunity in 2025 defined as the difference between the highest and lowest export forecasts in the three growth scenarios considered in Step three. This approach highlights the potential upside opportunity from a more proactive approach, and is consistent with existing literature highlighting incremental business opportunities. This upside opportunity is not intended as a specific export revenue forecast or target, but is a thought experiment to highlight the potential growth opportunity available for these products in ASEAN. Capturing the opportunity would require addressing a range of major challenges in regulation, demand and supply conditions.

A supply feasibility index was constructed for the 15 agri-food considered in steps two and three products in consultation with industry experts. Four criteria were weighted equally and assigned scores out of 100, and the final score was measured as the simple average of the four criteria:

- **Production conditions.** The degree to which Northern Australia has appropriate climatic conditions suitable to the production of the product in question (applies to base crop for processed products e.g. barley for malt).
- **Disease tolerance.** The degree to which the crop in question is tolerant to possible disease outbreaks in Northern Australia. Sub-criteria include degree to which crop is disease prone, instances of recent outbreak, and (if any) success of disease management strategies deployed during recent outbreaks.
- **Existing production expertise.** The degree to which there is existing capacity to produce the product in Northern Australia. Sub-criteria include share of national production relative to other products, and ability to scale production based on existing expertise in the region.
- **Existing supply chain to support exports.** The availability of an existing supply chain to support exports from Northern Australia. Sub-criteria include product durability, existing storage and logistics infrastructure in the region, and the importance of Northern Australia to national exports.

Each criterion was broken down and scored by sub-criteria to arrive at an overall criterion score. Exhibit A2 details each sub-criteria. A range of data sources were considered during scoring of sub criteria – select sources have been highlighted in Table 2.

Top product opportunities were identified by considering products with untapped export demand and supply feasibility higher than the median value across both indicators. Median values were considered as mathematical averages skewed results towards products with outsized untapped export demand.

Each criteria is broken down and scored by sub-criteria to arrive at an overall criteria score

		Sub-criteria 1	Sub-criteria 2	Sub-criteria 3	Criteria score
Criteria 1	Are there conducive production conditions?	Temperature – if ideal crop production temperature occurs in NA (“Yes” or “No”)	Precipitation – if ideal crop production rainfall occurs in NA (“Yes” or “No”)	Soil – if ideal crop production soil is present in NA (“Yes” or “No”)	100 = Yes x 3 67 = Yes x 2, No x 1 33 = Yes” x 1, No x 2 0 = No x 3
Criteria 2	Is the crop disease tolerant?	Degree to which crop is disease prone under general production conditions in NA (“Yes” or “No”)	Recent outbreak – if there has been a recent outbreak during the last two production cycles in Australia (“Yes” or “No”)	Outbreak managed – in the event of a recent outbreak, if this was contained (“Yes” or “No” or “NA”)	100 = No-No-NA 67 = Yes-No-NA 33 = Yes-Yes-Yes 0 = Yes-Yes-No
Criteria 3	Is there existing production expertise in Northern Australia?	Share of national production – indexed relative to other 15 agri-food products (i.e. product with highest share given score of 100)	Ability to scale – ease of production and existing expertise in NA (100 = easy, 75 = moderately easy, 50 = neutral, 25 = moderately difficult, 0 = extremely difficult)	NA	Simple average of score between share of national production and production complexity
Criteria 4	Is there an existing supply chain to support exports from Northern Australia?	Crop durability – degree to which crop has long shelf life (100 = 1 year and over; 75 = 6-12 months; 50 = 1-6 months; 25 = 2-4 weeks, 0 = less than 2 weeks)	Storage infrastructure – degree of availability of cold storage, granaries, etc. (100 = good existing facilities and logistics, 75 = some facilities, 50 = low-scale/investments planned, 25 = leverage other sectors, 0 = none)	Importance to national exports – NA’s importance to Australia exports (100 = top region, 75 = top 3 region, 50 = top 5 region, 25 = minor region, 0 = negligible)	Simple average of score between crop durability, storage infrastructure, and importance to national exports

SOURCE: Team analysis

TABLE 2

Data	Relevant chapters	Sources
AgriFutures Australia – Farm Diversity database, including for wheat, beef, barley, dairy products, citrus fruit, macadamias, avocados, soybeans, etc.	Chapter 3, 4	AgriFutures Australia (2017), <i>Farm diversity</i> . Available at: https://www.agrifutures.com.au/farm-diversity/soybeans/
Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES) – subnational production data for a range of products	Chapter 3, 4	ABARES (2019), <i>Data</i> . Available at: http://www.agriculture.gov.au/abares/data
Australian Bureau of Statistics (ABS) – data on agricultural production in Australia	Chapter 3, 4	ABS (2019), <i>Agriculture</i> . Available at: https://www.abs.gov.au/agriculture

Data	Relevant chapters	Sources
Expert inputs including status of agri-food sector development strategy for Northern Australia – gathered through interviews	Chapter 3, 4	<ul style="list-style-type: none"> • Australian Trade and Investment Commission (AusTrade) • Avocados Australia • Coriolis Research • Commonwealth Scientific and Industrial Research Organisation (CSIRO) • International Trade Centre (ITC) • James Cook University • KPMG Australia • Meat and Livestock Australia (MLA) • The University of Queensland
HortInnovation – Statistical Yearbook 2017/18; subnational production and export data for vegetables, fruits, nuts and other products	Chapter 3, 4	HortInnovation (2019), <i>Australian Horticulture Statistics Handbook 2017/18</i> . Available at: https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/
HortInnovation – Strategic Investment Plan (SIP) by product, including avocados, citrus fruits, macadamias, table grapes, etc.	Chapter 3, 4	HortInnovation (2019), <i>Strategic Investment Plan full documents</i> . Available at: https://www.horticulture.com.au/growers/funding-consulting-investing/investment-documents/strategic-investment-plans/
Industry associations data – research on production, disease prevalence, supply chains, etc.	Chapter 3, 4	Including, but not limited to: <ul style="list-style-type: none"> • Citrus Australia: https://www.citrusaustralia.com.au/ • Dairy Australia: https://www.dairyaustralia.com.au/ • Meat and Livestock Australia: https://www.mla.com.au/
State governments’ departments of agriculture – research on production, disease prevalence, supply chains, etc.	Chapter 3, 4	<ul style="list-style-type: none"> • Queensland Department of Agriculture and Fisheries: https://www.daf.qld.gov.au/ • Northern Territory Department of Primary Industry and Resources: https://dpir.nt.gov.au/about • Western Australia Department of Primary Industries and Regional Development: https://www.agric.wa.gov.au/

Step 5: Prioritise AMS by product opportunities i.e. country-product combinations

For the shortlisted products from step four, upside export opportunity by product was calculated individually for each AMS to account for regional variations in import demand.

The steps involved in this calculation were similar the same as those used at the aggregate ASEAN level, i.e. use of three growth scenarios (historical export growth from Australia to country in question, historical import growth by country in question with all trade partners, ITC export forecast) and calculation of untapped export demand as the difference between the highest and lowest projected export value. The data used in this calculation can be found in Table 1.

Aggregated untapped export demand by product will not match with untapped export demand calculated in step four as growth scenarios are calculated considering each country's individual trend and forecast data.

Phase II: Develop an action plan for priority country-product opportunities

During Phase II, the following four dimensions were explored for each of the prioritised agri-food product opportunities:

- **Supply trends.** A review of current sources of import supply by country-product opportunity (e.g. live cattle in Vietnam) and competitive landscape, considering factors such as price, quality of product, distance to market, emerging trade issues, export hub status, local production, and so on.
- **Demand trends.** A review of relevant demand trends by country-product combination, including demographic and economic changes, dietary shifts, health concerns, sector segmentation, retail preferences, and so on.
- **Opportunities and challenges.** Identification of key opportunities and barriers to expanded trade by product; organised by challenges faced in the supply chain (in both Northern Australia and ASEAN markets), regulatory barriers, and market-related concerns.
- **Strategic recommendations.** A set of key strategic recommendations were developed to act on the opportunities and challenges identified. Recommendations were developed in conjunction with industry experts.

A range of data sources were considered during this analysis – select sources with multiple references have been highlighted in Table 3.

TABLE 3

Data	Relevant chapters	Sources
AgriFutures Australia – Farm Diversity database for beef, avocados, and macadamias	Chapter 5	AgriFutures Australia (2017), <i>Farm diversity</i> . Available at: https://www.agrifutures.com.au/farm-diversity/soybeans/

Data	Relevant chapters	Sources
<p>Expert inputs including status of agri-food sector development strategy for Northern Australia – gathered through interviews</p>	Chapter 5, 6	<p>Experts from the following organisations were consulted:</p> <ul style="list-style-type: none"> • Australia-New Zealand Bank (ANZ) • Australian-ASEAN Chamber of Commerce (AustCham ASEAN) • Australian Chamber of Commerce in Cambodia (AusCham Cambodia) • Australian Chamber of Commerce in Lao (AustCham Lao) • Australia-Myanmar Chamber of Commerce (AustCham Myanmar) • Australia-New Zealand Chamber of Commerce Philippines (ANZCHAM) • The Australian Chamber of Commerce, Singapore (AustCham Singapore) • The Australian-Thai Chamber of Commerce (AustCham Thailand) • Australian Chamber of Commerce in Vietnam (AusCham Vietnam) • Australian Trade and Investment Commission (AusTrade) • Australian Macadamias Society • Avocados Australia • Central Station • Coriolis Research • Central Queensland University (CQU) • Commonwealth Scientific and Industrial Research Organisation (CSIRO) • Department of Agriculture and Water Resources (DAWR) • Greater Whitsunday Alliance (GW3) • Horticulture Innovation Australia • Indonesia-Australia Business Council (IABC) • International Trade Centre (ITC) • James Cook University • Department of Jobs, Tourism Science and Innovation, Government of Western Australia (JTSI) • KPMG Australia • Malaysia-Australia Business Council (MABC) • Meat and Livestock Australia (MLA) • The Meat Club Singapore • Ostra Fine Foods Cambodia • Queensland Government Department of Agriculture and Fisheries (DAF) • The University of Queensland • Trade and Investment Queensland Australia (TIQ)

Data	Relevant chapters	Sources
HortInnovation – Statistical Yearbook 2017/18; subnational production and export data for fruits and nuts	Chapter 5	HortInnovation (2019), <i>Australian Horticulture Statistics Handbook 2017/18</i> . Available at: https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/
HortInnovation – Strategic Investment Plan (SIP) for avocados and macadamias	Chapter 5, 6	HortInnovation (2019), <i>Strategic Investment Plan full documents</i> . Available at: https://www.horticulture.com.au/growers/funding-consulting-investing/investment-documents/strategic-investment-plans/
Industry associations' data – research and publications on production, exports, competition, demand in overseas markets, etc.	Chapter 5, 6	Including, but not limited to: <ul style="list-style-type: none"> • Australian Macadamias Society: https://australianmacadamias.org/industry • Avocados Australia: https://www.avocado.org.au/ • Meat and Livestock Australia: https://www.mla.com.au/
ITC Trade Map – historical export data for Australia and ASEAN Member States	Chapter 5	International Trade Centre (2019), <i>Trade Map</i> . Available at: https://www.trademap.org/Index.aspx