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Demand for agri-food attributes and attribute claim assurance in China and Vietnam from importers' perspective

Project report

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Executive summary

To gain a competitive advantage in supplying agri-food products to export markets, Australian agri-food industries require a nuanced understanding of the demand for food attributes and associated assurance systems.

This study aims to develop an in-depth understanding about the demand for agri-food attributes and supporting evidence required by supply chain stakeholders (i.e., importers, wholesalers, retailers, consumers) in Australia's key export markets. The focus of this study is on Australian beef and horticulture (i.e., oranges, tangerines, table grapes, and cherries) exports to China and Vietnam. Interviews with importers, who operated also as wholesalers or retailers, of Australian beef and horticulture products in both countries were conducted.

The following key results were identified:

Main attributes considered in procurement decisions: Key attributes for beef valued by customers in both export markets include product quality (e.g., appearance, freshness), animal breed, and the animal feeding system (e.g., pasture-fed, grain-fed). For horticulture products, the key attributes that influence procurement decisions in both markets were product quality and taste. However, for horticulture products in Vietnam there were other noted attributes such as price, packaging, and brand. This suggests that the two markets put different emphasis on product attributes in their procurement decisions.

Key credence attributes considered in procurement decisions: The credence attributes (i.e., food characteristics that are not observable by search or experience), food safety, animal breed, whole supply chain traceability, and feeding system are important in both beef export markets. For horticulture, country of origin, variety, product safety, and product traceability ranked very high. However, for both beef and horticulture products, there were differences in the rated attribute importance across the stakeholders within a country and between countries. This could imply that different stakeholders within the supply chains value different product attributes, which could further suggest that they have different commercial incentives in demanding and supplying these food attributes.

Credence attributes such as carbon neutral production, production with water management/preservation and biodiversity considerations, environmental health, and social/ethically responsibility appear to be currently unimportant for procurement decisions of beef and horticulture product in both countries. This finding could be due to the limited awareness that stakeholders have about these attributes in the two export markets.

Emerging food attributes: Importers from both countries regard product quality (e.g., appearance, freshness) and food safety as key emerging attributes for both products. Hormone and antibiotic free products as well as the feeding system (e.g., grain-fed/pasture-fed), breed, and marbling are considered emerging product attributes for beef. Convenience, taste, brand, and organic production method also become increasingly important attributes for horticulture customers.

Status of product traceability: While customers in both export markets place a relatively high importance on whole supply chain traceability, most participants reported that their imported Australian beef and horticulture products don't currently have a traceability system in place that is accessible by consumers. However, the importers regarded customs clearance documents and packaging labels as traceable product information. Furthermore, importers' customers potential

willingness to pay a premium price for product traceability appears to be very small (e.g., 1.36-2.55% in addition to the price of a product without traceability).

Quality assurance: While agri-food customers in China and Vietnam appear to highly value quality meat products, they are not willing to pay a price premium for meat quality assurance. Most trusted food attribute assurance providers in both countries appear to be food trade regulating authorities (i.e., Government authority in Australia and the import country) and associated processes (e.g., customs inspection, exporter certifications, official product labels). Customs clearance documents and product labels (not third-party certification labels) are the most common form of evidence for attributes required by customers in both export markets.

Online vs. in-store demand for food attributes: Online and in-store customers have slightly different demands for product attributes. For example, online customers of beef in China mostly consider price, brand, and packaging in their purchase decision, while in-store customers pay more attention to quality attributes such as appearance and freshness.

Australia's reputation as food-exporting country: Australian products in both countries are perceived to be of high-quality, yet weaknesses are seen in high product prices. In China, the current political Sino-Australian relationships are specifically considered as a weakness in Australia's reputation as a food exporting country.

While the current study has developed significant insights into customer's demand on food attributes and associated assurance systems in export markets, several limitations need to be taken into consideration. One limitation includes the small sample size. Additionally, the preferences for food attributes, specifically for credence attributes as an emerging trend in consumers' attitudes, will change over time. Therefore, the findings of this study should be treated as a snapshot in time. Furthermore, the findings presented in this study only reflect the perception of importers and their view on their customers' demand for food attributes, although the importers themselves are also wholesalers and some of them are also retailers.

1 Introduction

The export of agri-food products can offer Australian producers an opportunity to achieve higher income in comparison to supplying only the domestic market. However, the access to export markets can be difficult for Australian producers due to supply competition. To gain a competitive advantage, producers require information about the demand for their products in export markets, specifically the demand for agri-food attributes (e.g., price, appearance, taste, organic production methods).

Food attributes can be categorised into search, experience, and credence attributes. *Search attributes* describe food characteristics that can be verified by buyers (e.g., importers, retailers, consumers) prior to purchase through direct search such as visual or physical inspection (Nelson 1970; Ford *et al.* 1988; Fandos and Flavián 2006; Wirth *et al.* 2011). Examples of search attributes include appearance, colour, price, brand, and other labels.

Experience attributes are food characteristics that can be verified by buyers only after consumption of or experience with the product (Nelson 1970; Fernqvist and Ekelund 2014; Loebnitz and Bröring 2015). These attributes include sensory experiences such as taste and texture.

Agri-food characteristics that are increasingly important in the international trade of agri-food products are credence attributes. *Credence attributes* are product characteristics that cannot be verified by buyers through search or experience (Darby and Karni 1973; Fernqvist and Ekelund 2014; Lee and Hwang 2016). Such food attributes include country of origin, organic production, animal welfare during production and slaughter processes, carbon net-zero production, food safety, and product traceability. These attributes result in an information asymmetry, whereby one party in a transaction is in possession of more information than the other. This information asymmetry occurs among supply chain stakeholders such as producers and consumers and can cause market inefficiencies (e.g., food fraud, food borne diseases due to unsafe products) (Sloman 2006; Dulleck *et al.* 2011). Yet, this information gap among supply chain stakeholders can be addressed through the provision of food attribute assurance systems such as product traceability systems and product certification as communicated through labels or QR codes (Albersmeier *et al.* 2009; Loconto and Busch 2010).

While the provision of some food credence attributes is compulsory in most countries, (e.g., food safety, biosecurity) other credence attributes can be supplied on a voluntary basis (e.g., organic, carbon net zero production) and verified through self-declaration or third-party assurance (Loconto *et al.* 2012; Ha *et al.* 2019; Mancini 2019). The provision of credence attributes typically implies additional production costs for suppliers, which can include the adoption of different production methods and technologies and obtaining food attribute claim assurance through certification processes (e.g., Winter and Davis 2006; Lusk and Norwood 2011).

Information about buyers' demands for food attributes in export markets is fundamental for Australian agri-food industries. This information guides producers' decisions about market access, specifically about product differentiation requirements (e.g., supply of conventional product vs. organic product) and subsequent farm-level (e.g., change in production methods) and industry-level investments (e.g., traceability systems). Such information also includes buyer's potential willingness to pay premium prices for the provision of specific attributes, such as product traceability and quality assistance. This study focuses on wholesalers' and retailers' demands since these supply chain actors typically place consignment orders for Australian agri-food products on behalf of consumers.

This pilot study aims to develop an improved understanding about the demand for agri-food attributes and supporting evidence required by customers (i.e., importers, wholesalers, and retailers) in Australia's export markets. The focus of this study is on Australian beef and horticulture (i.e., oranges, tangerines, table grapes, and cherries) exports to China and Vietnam. The specific questions assessed in this study include:

- What is the structure of the export supply chain for beef and horticulture products?
- Do online and in-store customers have the same demands for agri-food attributes?
- What are the key food attributes that customers consider in their procurement decisions?
- What is the current importance of credence attributes in the procurement decisions of customers?
- What are the emerging food attributes that customers in the export markets are increasingly interested in?
- What is the status of whole supply chain traceability for agri-food products exported from Australia?
- What is the reputation of Australia as a supplier of agri-food products, including Australia's competitive advantages and weaknesses, as perceived in export markets?

To answer these research questions, interviews with 25 importers of Australian agri-food products in China and Vietnam, were conducted, analysed, and summarised. Both countries are relatively large export markets with respect to potential consumers of red meat and horticulture products from Australia.

The findings from this pilot study offer insights about the current demand for agri-food attributes in China and Vietnam. This can be a useful foundation for decisions about farm-level and industry-level investments to ensure the future competitiveness of Australia's agri-food products in export markets.

2 Research methods

To gain an understanding about the demand for agri-food attributes and supporting evidence needed by supply chain stakeholders in China and Vietnam, interviews were conducted with importers who were also wholesalers, processors, or retailers.

Importers were selected as a target group for interviews since they typically deal with supply chain stakeholders in Australia (e.g., procurement of products from Australian suppliers) and are the first stakeholders that either physically or virtually handle the exported agri-food products into the export markets. Importers deal directly with other supply chain stakeholders in export markets which include agri-food wholesalers, retailers, and consumers. Hence, importers are well positioned along the supply chain to provide a comprehensive understanding about the demand for agri-food attributes and evidence for the authenticity of attributes required by other stakeholder groups in their country.

The focus of this study was on Australian beef and horticulture products since these represent current important export product categories (e.g., ABARES 2022; ABS 2022; DAWE 2022). China and Vietnam were selected as case study countries since they are important and valued markets for Australian red meat and horticulture products (ABS 2022; DAWE 2022).

To conduct the interviews, a questionnaire was developed which was based on a literature review that identified a catalogue of food attributes. Although this literature review was not country specific, it incidentally included relevant studies from Vietnam and China (e.g., Ha *et al.* 2019; Khuu *et al.* 2019; Liu *et al.* 2019; Riccioli *et al.* 2020). The questionnaire included general questions about importer's

operations such as the volume and frequency of agri-food imported from Australia, the stakeholders dealt with, and their years of experience as an agri-food importer. The questionnaire also focussed on the research questions stated in the introduction. As such, statements were included about importers' customers potential willingness to pay for specific credence attributes. The interview questionnaire is available in the Appendix.

Feedback on the design of the questionnaire was provided by Meat and Livestock Australia (MLA), the Australian Government Department of Agriculture, Water and the Environment (DAWE), and stakeholders within CSIRO. This ensured that relevant agri-food industry perspectives and international trade aspects were represented in the study. Ethical and privacy approval for primary data collection was granted by CSIRO's ethics and privacy committee (approval number: 183/21).

Austrade assisted the research team in identifying importers of Australian agri-food products in China and Vietnam. The interviews were conducted in both countries from March to May 2022. Interviews were held in the local language by members of the research team. Interviews were recorded, transcribed, and translated into English language for analysis. The final sample included 16 importers for China (i.e., 12 beef importers, 4 horticulture importers) and 9 importers for Vietnam (i.e., 3 beef importers, 6 horticulture importers). Descriptive sample statistics provided in Table 1 show that all interview participants are regular importers of relatively large volumes of agri-food products, including products from Australia. The interviewed importers sell their imported agri-food products at wholesale markets, with some at their retail stores as well.

The analysis of the conducted interviews included quantitative and qualitative elements. For example, mean values of the importance of food attributes were derived from participants' ranking on 1-5 Likert scales where 1 indicates that a food attribute is currently not at all important and 5 indicates a very high importance. Qualitative assessments comprised the identification of themes (e.g., Australia reputation as agri-food exporter) and summary of responses to categories (e.g., types of evidence for attributes claims such as government certification, third-party certification, no certification) that were provided by the interview participants.

Table 1: Sample description

ID	Country	Years of experience	Product imported from AUS	Countries imported from	Total quantity imported annually (All countries)	Import frequency (All countries)	Stakeholder dealt with in AUS	Distribution channels in export market	Sale type in import country
1	CHN	1	Beef	ARG, AUS, BLR, BRA, NZL, RUS, URY	20-30 containers	Monthly	A	W, R, C	ON, OFF
2	CHN	10	Beef	AUS, NZL, NLD	4,000 to 6,000 tons	Weekly	S	W, R, C	ON, OFF
3	CHN	10	Beef	AUS	n/a	Monthly	S	W, R, C	ON, OFF
4	CHN	5	Beef	AUS, USA	600 tons	Monthly	S	W, R	ON, OFF
5	CHN	11	Beef	ARG, AUS, BRA, NZL, URY, USA	5,000 tons	Monthly	S	W, R	ON, OFF
6	CHN	6	Beef	ARG, AUS, BRA, CHL, CRI, NZL, URY, USA	500-800 containers	Monthly	A, S	W, R, C	ON, OFF
7	CHN	10	Beef	AUS	n/a	Weekly	S	W, R, C	ON
8	CHN	6	Beef	AUS, NZL, SA	100,000 tons	Daily	S	W, R, C	ON, OFF
9	CHN	8	Beef	AUS, BRA, USA	120-240 containers	Monthly	S	PM, R	ON
10	CHN	10	Beef	ARG, AUS, CAN, BRA, NZL, URY, USA	30-40 containers	Monthly	A, S	W, R, PM	n/a
11	CHN	7	Beef	ARG, AUS, CAN, BRA, NZL, URY, USA	n/a	Monthly	S	R, C	n/a
12	CHN	10	Beef	AUS, BRA, URY, ZAF	n/a	n/a	S	PM, W, R	n/a
13	CHN	2	Fruit (citrus, table grapes, cherries)	AUS, ESP, EGY, USA, ZAF	4,000 to 5,000 containers	Weekly	F, A	W	ON
14	CHN	15	Fruit (citrus, table grapes, other)	AUS, CHL, PER, ZAF	300-400 containers	Weekly	F, A	W	ON
15	CHN	6	Fruit (citrus, cherries, other)	AUS, CAN, CHL, PER, ZAF, USA, EU	150 containers	Weekly	F, A, PF	W, R	ON, OFF
16	CHN	6	Nuts (macadamia)	AUS, BRA, KEN, ZAF,	300 tons	Bi-monthly	n/a	PF	ON, OFF
17	VNM	17	Beef	AUS	110-140 tons	Monthly	F, A	W, R, C	ON, OFF
18	VNM	6	Beef	AUS	Beef: 24 tons, lamb: 7 tons	n/a	S	W, R, C	ON, OFF
19	VNM	10	Beef	AUS, CAN, USA	6,000 tons	Monthly	A, S	C	ON, OFF
20	VNM	14	Fruit (oranges)	AUS	n/a	n/a	D	C	ON, OFF
21	VNM	10	Fruit (oranges, table grapes, cherries, tangerines)	AUS, CAN, NZL, USA, ZAF	Grapes: 728 tons; tangerines: 183 tons; oranges: 121 tons; cherries: 18 tons	Daily/Monthly	F, A	W, R, C	ON, OFF
22	VNM	6	Fruit (table grapes, cherries)	AUS, CAN, KOR, NZL, USA, ZAF	Table grapes: 12 tons per month, cherries: 1 ton	Daily/Monthly	F, A	R, C	ON, OFF
23	VNM	3	Fruit (cherries, oranges, tangerine)	AUS	50 containers	Daily/Monthly	F	R, C	ON, OFF
24	VNM	3	Fruit (cherries, table grapes, oranges, tangerines, other)	AUS	Grapes: 260-350 tons; cherries: 110-14 tons; oranges: 550 tons	Daily/Monthly	A	W, R	ON, OFF
25	VNM	15	Fruit (oranges, tangerines, table grapes, cherries)	AUS, CHL, EGY, NZL, PER, USA, ZAF	Oranges: 16-18 containers, tangerines: 2-3 containers, grapes: 10 containers	Daily/Monthly	A	W, R, C	ON, OFF

Notes on Table 1: ISO country codes: ARG - Argentina, AUS - Australia, BLR - Belarus, BRA - Brazil, CAN - Canada, CHL - Chile, CHN - China, CRI - Costa Rica, EGY - Egypt, ESP - Spain, FRA - France, KEN - Kenya, KOR - South Korea, JPN - Japan, NLD - Netherlands, NZL - New Zealand, PER - Peru, RUS - Russia, USA - United States of America, VNM - Vietnam, URY - Uruguay, ZAF - South Africa, SA - Other South American countries, EU - Other European countries. Stakeholder codes: A - Agent, F – Farm/producer, PF - Packing house/fruit processors, S - Slaughterhouse/abattoir, D - Distributor in Vietnam, R - Retailers, C - Consumer, W - Wholesalers, PM - Meat processor. n/a - not available (includes information not shared). 'Years of experience' refers to the number of year that respondent has as an agri-food importer. Sales code: ON - Online sales, OFF - Offline/in-store sales. Daily/Monthly – import depends on seasonality of product.

3 Results

3.1 The export supply chain

The participating importers where asked which supply chain stakeholders they typically deal with on the Australian side and their typical customers that they sell the imported product to (Q5 in the questionnaire, see Appendix). The provided information was analysed and used to develop a map of the export supply chain (e.g., stakeholders and links) for beef and horticulture products. The export supply chain for beef is shown in Figure 1 and the supply network for horticulture products is illustrated in Figure 2 (figures correspond to Table 1 columns 'Stakeholders dealt with in Australia' and 'Distribution channels in export market'). No significant differences in the types of stakeholders involved in the export supply chains for both agri-food categories were identified between China and Vietnam. Therefore, the distribution networks shown in Figure 1 for beef and in Figure 2 for horticulture products apply to both countries.

Figure 1: Export supply chain for beef products to China and Vietnam

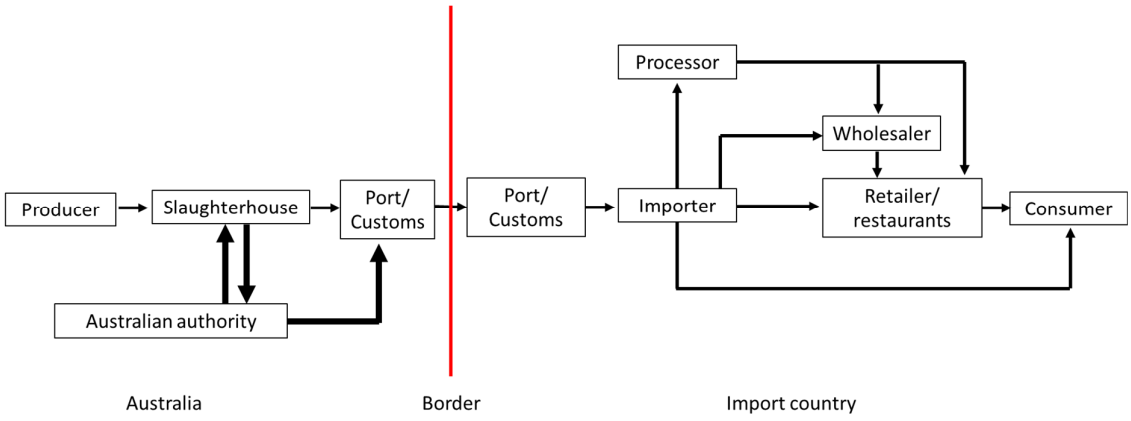
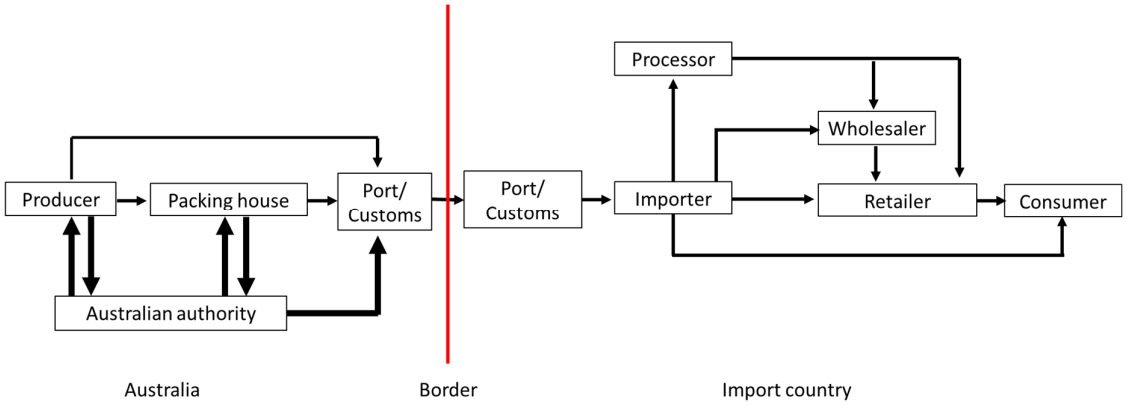


Figure 2: Export supply chain for horticulture products to China and Vietnam



On the Australian side, the export supply chains for both product categories include producers, processors (i.e., packing houses for horticulture and slaughterhouses/abattoirs for meat), and ports/customs. Australian producers and processors need to obtain relevant export registration and certification from the Australian government to export their product to specific countries, including China and Vietnam. The importers were aware that without an export certification and the Australian authority's product clearance the export process for meat and horticulture from Australia is impossible. Product clearance requirements include for example animal health certificates, and country specific compliance certificates for sanitary and phytosanitary (SPS) and technical barriers of trade (TBT) requirements, (e.g., product labelling). The physical product flow is handled by logistics providers. For both product categories, air and sea transport modes are used for the transportation of the goods across borders.

On arrival in the respective export country, the products are inspected by customs officials who provide customs clearance documents such as the SPS and TBT compliance certificates. The product is then released to importers who deal with a range of customers, which include processors, wholesalers, retailers (e.g., chain retailers, restaurants), or consumers. Importantly, importers can also operate as wholesalers and/or retailers.

3.2 Key attributes considered in agri-food procurement decisions

Participants were asked to list the major product attributes that their customers look for (Q7 in the questionnaire, see Appendix).

Beef

Table 2 presents the proportion of participants who mentioned a particular food characteristic as a major product attribute that their customers are looking for.

The key attributes that wholesalers in both countries are interested in are product quality, production system/feeding types (e.g., grain-fed, pasture-fed), and animal breed. Product quality is defined in this study as physical and visual characteristics of agri-food products such as appearance, freshness, and colour, but not product safety and taste which are treated as a separate attribute.

Wholesalers in China also appear to consider the product price as an important attribute. Retailers in both countries appear to value product quality as the most important characteristic. Retailers in China also seem to highly value country of product origin, the quality of meat cut, and price. The results imply that consumers in both countries value product quality as a key attribute. Another attribute that

ranked relatively high for consumers in China is taste. In Vietnam, consumers also seem to value country of origin, the quality of meat cut, packaging, price, product traceability, and taste.

Table 2: Most important beef attributes by stakeholder group and country (proportion of responses)

Attribute	China (N = 12)			Vietnam (N = 3)		
	Wholesalers	Retailers	Consumers	Wholesalers	Retailers	Consumers
Abattoir (slaughterhouse number)	17%	8%	17%	0%	0%	0%
Brand	0%	8%	17%	0%	0%	**33%**
Breed*	**42%**	17%	17%	**33%**	0%	0%
Complete product documents	8%	0%	0%	-	-	-
Country of origin*	25%	25%	8%	0%	0%	**33%**
Cut (e.g., part of beef)/trimming	17%	25%	17%	0%	0%	**33%**
Difficulty of acquisition	0%	0%	8%	-	-	-
Label	8%	0%	0%	-	-	-
Packaging	0%	8%	17%	0%	0%	**33%**
Price	**42%**	25%	8%	0%	0%	**33%**
Product safety*	0%	0%	8%	-	-	-
Production system/feeding types*	**42%**	17%	0%	**33%**	0%	0%
Quality#	**67%**	**75%**	**42%**	**67%**	**33%**	**100%**
Quality/price ratio	8%	17%	**33%**	-	-	-
Shelf life	8%	0%	0%	-	-	-
Taste	8%	8%	25%	-	-	**33%**
Traceability*	8%	0%	8%	0%	0%	**33%**

*Notes: * indicates a credence attribute. # Quality included physical and visual characteristics of agri-food products such as appearance, freshness, and colour. – indicates that this attribute was not mentioned in importer's responses.*

Horticulture

Table 3 shows the most important attributes that supply chain stakeholders in export markets consider in their procurement process. The key attributes that wholesalers in both countries value involve product quality such as appearance, colour, freshness, firmness, and size. In China, wholesalers also value product safety as key attribute. In Vietnam, wholesalers consider brand, packaging, price, and taste (e.g., sweetness) as key attributes for procurement decisions for horticulture products.

For retailers in Vietnam, the product quality, price, and packaging appear to be key attributes as well as the taste of the horticulture product. Chinese retailers did not consider any attributes as highly important.

Table 3: Most important horticulture product attributes by stakeholder group and country (proportion of responses)

Attribute	China (N = 4)			Vietnam (N = 6)		
	Wholesalers	Retailers	Consumers	Wholesalers	Retailers	Consumers
Brand	-	-	-	**33%**	17%	17%
Country of origin*	-	-	-	17%	17%	**50%**
Organic*	-	-	-	0%	0%	17%
Packaging	-	-	-	**33%**	**50%**	17%
Price	-	-	-	**50%**	**67%**	**33%**
Quality	**50%**	0%	**75%**	**50%**	**83%**	**83%**
Product safety*	**50%**	0%	**50%**	-	-	-
Taste (sweetness, texture)	**0%**	0%	**50%**	**33%**	**33%**	17%
Seasonality	-	-	-	17%	**33%**	17%
Variety*	-	-	-	17%	**33%**	17%

*Notes: * indicates a credence attribute. # Quality included physical and visual characteristics of agri-food products such as appearance, freshness, firmness, size, and colour. – indicates that this attribute was not mentioned in importer's responses.*

The results suggest that the key attributes for Chinese consumers are product quality, taste, and safety while Vietnamese consumers rank quality, country of origin, and price as most important.

Across the beef and horticulture products and both countries, product quality appears to be the key attribute that determines procurement decisions by customers. However, the results in Table 2 and Table 3 indicate that there is variation in the perceived importance of other attributes across customer groups. Hence, Australian agri-food suppliers need to meet the various requirements of supply chain stakeholders in export markets in order to ensure continuing demand for Australian agri-food products.

Although credence attributes (e.g., product safety, country of origin, organic production) are considered important in stakeholders' procurement decisions, they seem to be dominated by search attributes (e.g., product quality and price) and the experience attribute of taste (Table 2 and Table 4).

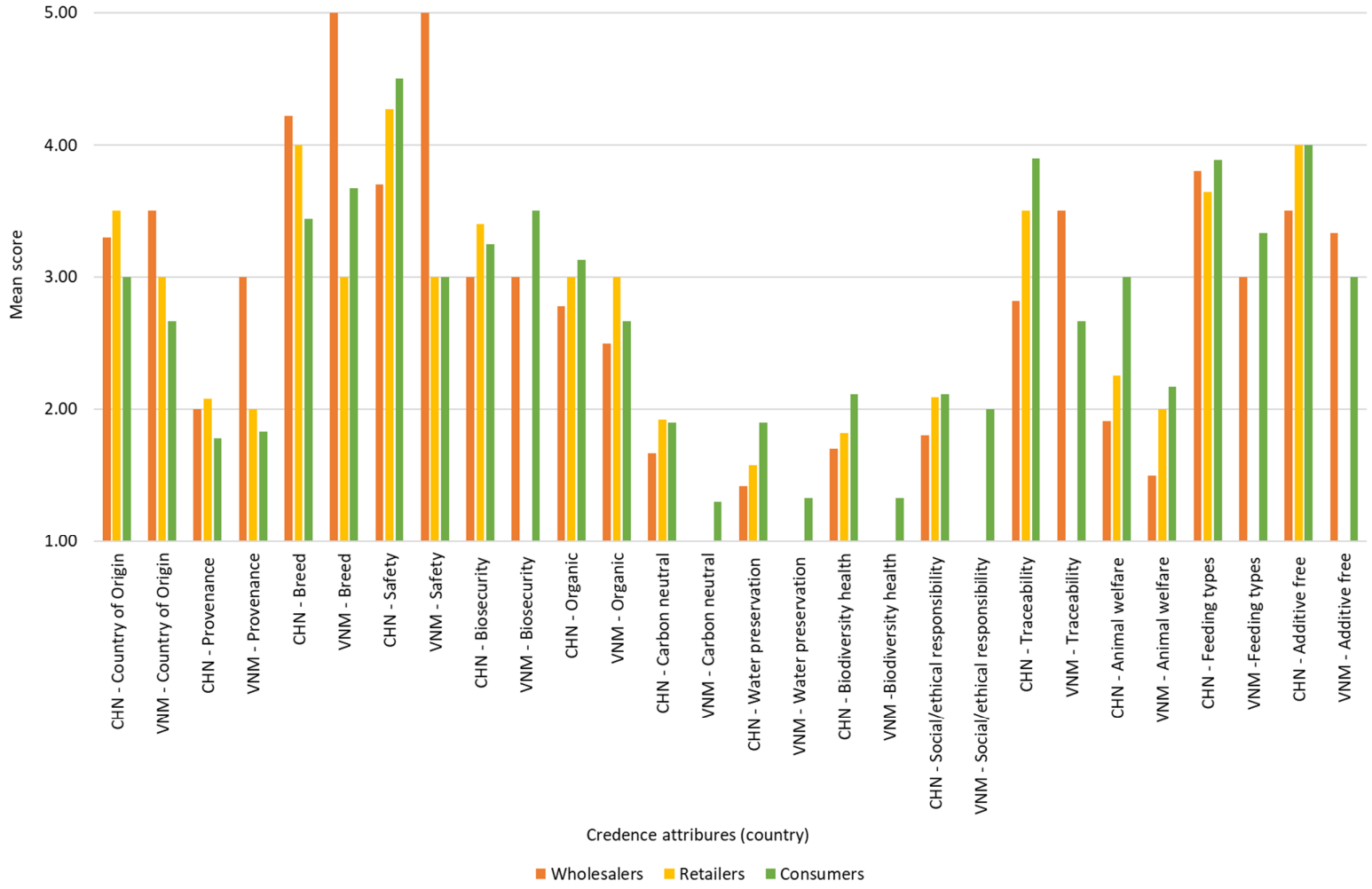
3.3 Importance of credence attributes in stakeholder's purchasing decisions

While the focus of analysis in section 3.2 was on identifying key product attributes for importer's customers' agri-food purchase decisions, this section focuses on a detailed assessment about the role of credence attributes in stakeholder's procurement decisions (Q8 in the questionnaire, see Appendix). To examine this, participants were asked to rank the importance of a list of credence attributes on a 1-5 Likert-scale (5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all).

Beef

Figure 3 presents the mean scores of credence attribute importance in purchasing decisions of beef in China (CHN) and Vietnam (VNM) by wholesalers, retailers, and consumers. The results suggest that the most important credence attributes in procurement decisions in both countries by all three stakeholder groups are the animal breed, followed by product safety, whole supply chain traceability, feeding systems (e.g., pasture-fed, grain-fed), hormone and antibiotic free production, and country of origin.

Figure 3: Mean scores for credence attribute importance in purchasing decisions of beef in China (CHN) and Vietnam (VNM) by stakeholder group



Notes on Figure 3: CHN – China, VNM – Vietnam. Description of credence attributes provided to participants: Country of origin (no further detail provided); provenance for provenance within country of origin; breed for breed (e.g., angus, wagyu, safety for product safety (e.g., herbicide and pesticide residues, foodborne pathogens, use of hazardous chemicals), biosecurity for biosecurity (e.g., pest and disease control); carbon neutral for carbon neutral production (means offsetting the Greenhouse Gas (GHG) emissions it produces during production. Since it's often not possible to have zero emissions during production, "carbon neutral" or "net-zero-carbon" can be achieved by buying "carbon credits" and/or by supporting GHG-reduction initiatives such as renewable-energy projects), water preservation for water management and preservation (e.g., water use efficiency during production process), biodiversity for biodiversity and ecosystem health; social/ethical responsibility for social/ethical responsibility of practices applied by producers/growers (e.g., human and labour rights); traceability for whole supply chain traceability of the product. Here, traceability of food product is about being able to trace all the information (e.g., origin, certification, location and time in transit, storage, handling) about a particular food product from farm to shop shelf; animal welfare for animal welfare are assured during production and slaughter; production system/feeding types (e.g., grain or pasture fed, free-range); additive free for additive free production (e.g., hormone free, anti-biotic free). Scale: 1-5 Likert-scale with 5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all.

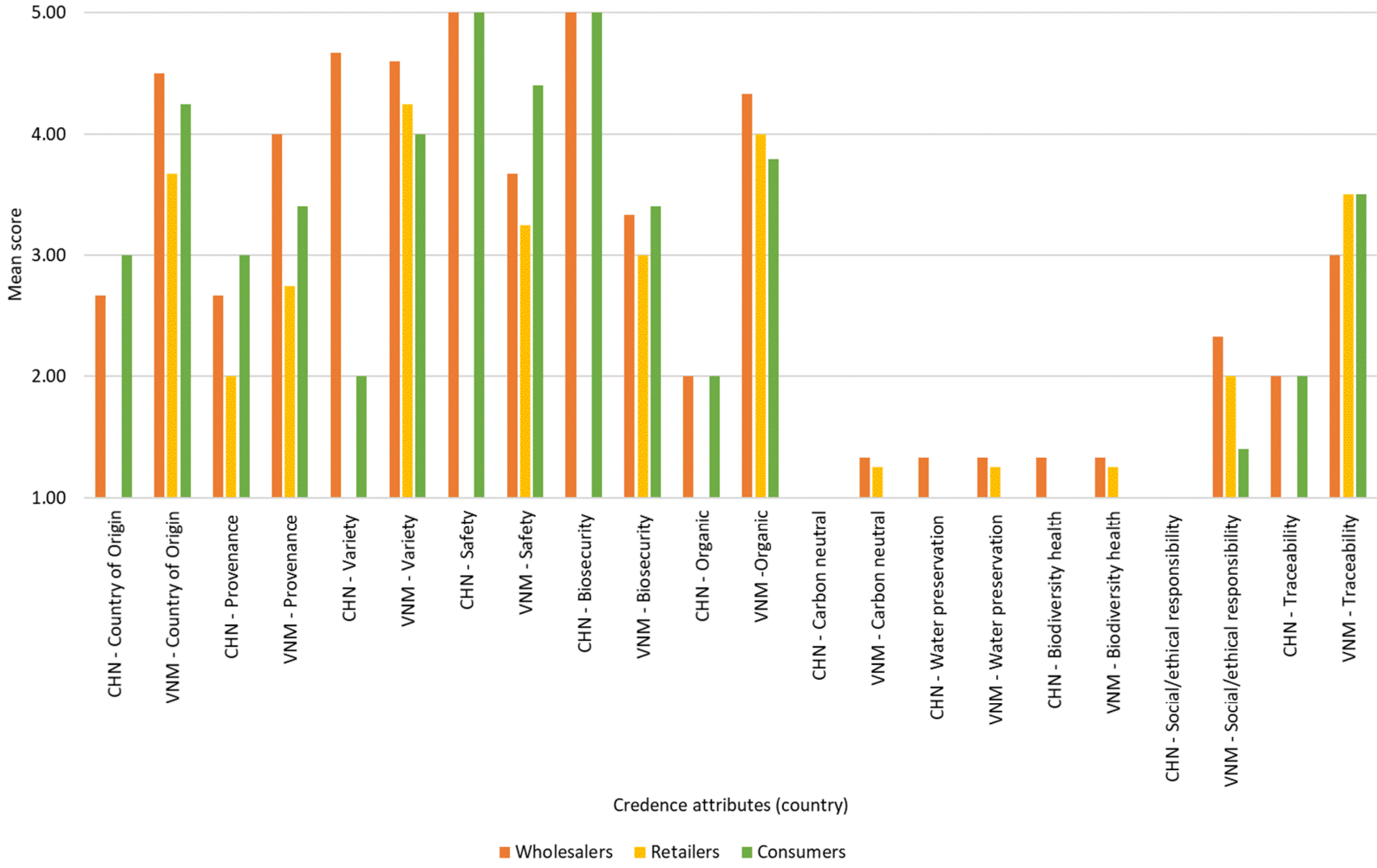
The least important credence attributes for supply chain stakeholders in both countries include provenance, carbon neutral production, water management and preservation in the production process, biodiversity and ecosystem health during the production process, and social/ethical responsibility during the production process.

Further, there are differences in how supply chain stakeholders rate the importance of selected credence attributes. For example, wholesalers in China and Vietnam perceive animal breed as more important than consumers. The same pattern applies to provenance for stakeholders in Vietnam. On the contrary, animal welfare seems to be more important for consumers than for any other supply chain stakeholder group. These differences in the perceived importance across different stakeholder groups may be explained by their role in the distribution network and commercial incentives (e.g., demand of their direct customers, higher prices for specific product attributes such as Wagyu beef).

Horticulture

Figure 4 presents the mean scores of credence attribute importance in purchasing decisions of horticulture products in China (CHN) and Vietnam (VNM) by wholesalers, retailers, and consumers. The results indicate that product safety and biosecurity rank very high (above a mean score of 3) for all stakeholder groups in China and Vietnam. However, the results suggest differences in how the stakeholders in China and Vietnam perceive attributes such as country of origin, organic production methods, and whole supply chain traceability. The stakeholders in Vietnam appear to place a higher importance of these three attributes in their procurement decision than their counterparts in China. While product variety seems to be important for horticulture wholesalers in China (which is similar to wholesalers in Vietnam) this attribute appears to be less important for consumers in China compared to consumers in Vietnam.

Figure 4: Mean scores for credence attribute importance in purchasing decisions of horticulture products in China (CHN) and Vietnam (VNM) by stakeholder group



Notes on Figure 4: CHN – China, VNM – Vietnam. Description of credence attributes provided to participants: Country of origin (no further detail provided); provenance for provenance within country of origin; v variety (no further detail provided, foodborne pathogens, use of hazardous chemicals), biosecurity for biosecurity (e.g., pest and disease control); carbon neutral for carbon neutral production (means offsetting the Greenhouse Gas (GHG) emissions it produces during production. Since it's often not possible to have zero emissions during production, "carbon neutral" or "net-zero-carbon" can be achieved by buying "carbon credits" and/or by supporting GHG-reduction initiatives such as renewable-energy projects), water preservation for water management and preservation (e.g., water use efficiency during production process), biodiversity for biodiversity and ecosystem health; social/ethical responsibility for social/ethical responsibility of practices applied by producers/growers (e.g., human and labour rights); traceability for whole supply chain traceability of the product. Here, traceability of food product is about being able to trace all the information (e.g., origin, certification, location and time in transit, storage, handling) about a particular food product from farm to shop shelf. Scale: 1-5 Likert-scale with 5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all.

Interestingly, carbon neutral production and social/ethical production processes received a mean score of 1 for all stakeholder groups in both China and Vietnam. This indicates that these attributes are not important for horticulture customers' product procurement decisions. A very low mean score (less than 2) was also identified for water management and preservations as well as biodiversity and ecosystems health consideration during production processes. The results suggest that these attributes are currently not important for supply chain stakeholder in China and Vietnam.

Importers highlighted in the interview that the importance of the attribute provenance within country of origin depends on the horticulture product. An example is provided as the following:

> *"For cherry, they [wholesalers] appreciate more the origin. For oranges, grapes, and tangerines, the origin is not really important. With oranges, tangerines they rate the national level. For example, compare Australia's oranges and tangerines with Egypt. In which area does orange and cherry come from? my wholesale has not yet understood."* ID24 (Importer of cherries, grapes, oranges, tangerines, Vietnam)

A comparison of the perceived importance for beef and horticulture products by stakeholder group across both countries (see Figure 3 and Figure 4) reveals that the magnitude of mean scores differs slightly for some attributes (e.g., country of origin, organic, and carbon neutral production). There are also differences in how these attributes are rated across products within a country. For example, while organic production methods appear to be very important for horticulture customers in Vietnam as indicated by a mean score around 4, beef consumers rated this attribute with a mean score of 2.5. These findings suggests that the importance of credence attributes is dependent on the product and the export market.

3.4 Instore vs. online sales of imported products

Within the importing countries, importers and their customers may sell their imported food products either in-stores (offline) or online (Figure 1, Figure 2). According to the interview responses interviews, in-store sales for imported meat and horticulture products seem to dominate total sales with respect to volume, though COVID-19 pandemic has caused an increase in online sales. However, the exact proportions of online and in-store sales of imported products could not be determined based on the

responses from the interview participants. For the present study, the participants were asked whether online and in-store customers demand different food attributes and what they are if differences exist (Q6 in the questionnaire, see Appendix). Table 4 presents the perceived differences in preference for product attributes between in-store and online sales.

Beef

There are differences in the beef attributes that online and in-store consumers value in China and Vietnam. About 80% of the interviewed importers from China noted that online and in-store consumers look for different product characteristics. Price, brand, and packaging appear to be important attributes for online consumers, while in-store consumers mainly search for product quality (e.g., freshness, appearance), and information about the country of product origin. Within the Vietnam sample, only 30% of the participants stated that online and in-store consumers value different beef attributes. Online consumers appear to focus on price and high quality that cannot be found in stores. Interview participants in Vietnam did not indicate any important attributes of beef among in-store customers.

Horticulture products

For horticulture products, participants from China stated that there was no difference in the product attributes that online and in-store consumers value. For Vietnam, only 33% of the interviewees perceived a difference in preference for product attributes between online and in-store consumers. Product packaging appears to be important for online consumers, while quality (e.g., appearance, freshness, smell) seems to be vital for in-store consumers.

Table 4: Perceived difference in demand for product attributes between sales in-store and online

Product/Country	Proportion of respondents who perceived difference in preference for product attribute	Desirable attributes online consumers	Desirable attributes for in-store consumers
Beef			
-China	80%	Price, brand, packaging	Quality (e.g., appearance, freshness), country of origin
-Vietnam	33%	Price, quality	n/a
Horticulture			
-China	0%	n/a	n/a
-Vietnam	33%	Packaging	Quality (e.g., appearance, freshness, smell)

Note: 'n/a' for not available/reported.

The following statements were made by participants about differences in the agri-food attributes that online and in-store customers value:

"Consumers from the physical stores often have a clear purchasing goal and they come to the store to cherry-pick the products." ID1 (Importer of beef, China)

"Online shopping, consumers pay more attention to the price, and consider cost-effectiveness. In-store consumers highly consider their needs. They have a clear product requirement and know what they want. They come to the store to find it. There may not be too much concern for the price but the product itself. Offline consumers will pay more attention to the freshness of products and then the appearance. Most online consumers make purchasing decisions by looking at the pictures and prices." ID2 (Importer of beef, China)

"E-commerce retailers are more price-sensitive, while offline retailers pay more attention to the quality of the objects" ID3 (Importer of beef, China)

3.5 Emerging food attributes

A further research question of this study was to identify food attributes that are becoming more popular in customer's demand in both export markets (Q9 in the questionnaire, see Appendix). The results presented in Table 5 suggest that for beef sold in China, hormone free and antibiotic free production, product safety, and product quality are key emerging characteristics. For beef sold in Vietnam, production system/feeding types (e.g., grain-fed/pasture-fed) seems to be a major emerging attribute demanded by hotels and luxury restaurants. Other emerging attributes in Vietnam are the animal breed, frozen/chilled product forms, marbling, product quality, and taste.

Table 5: Emerging agri-food attributes in China and Vietnam (proportion of responses)

Emerging attributes	China		Vietnam	
	Beef (N = 12)	Horticulture (N = 4)	Beef (N = 3)	Horticulture (N = 6)
Animal welfare*	8%	-	-	-
Brand	-	**25%**	-	**33%**
Breed/variety*	-	-	**33%**	17%
Chilled product	-	-	**33%**	-
Cut	8%	-	-	-
Convenience	8%	**25%**	-	-
Environment*	17%	-	-	-
Fodder safety (no GM fodder)*	8%	-	-	-
Frozen product	-	-	**33%**	-
Health attributes*	17%	-	-	-
Hormone and antibiotic free production*	**25%**	-	-	-
Marbling	-	-	**33%**	-
Organic*	17%	-	-	**33%**
Product safety*	**25%**	**25%**	-	**33%**
Price/quality ratio	8%	-	-	-
Production system/feeding types (e.g., grain-fed/pasture-fed)*	8%	-	**100%**	-
Quality (e.g., freshness)	**25%**	**50%**	**33%**	**83%**
Traceability*	8%	-	-	17%
Taste	-	**25%**	**33%**	**33%**

*Notes on Table 5: - indicates that the attribute was not mentioned for the product in this country as an emerging characteristic. * indicates a credence attribute.*

For horticulture consumers in China, product quality, brand, convenience, product safety, and taste are attributes that are gaining importance. Similar emerging attributes were recorded for customers of horticulture products in Vietnam, but they also appear to increasingly value organic products.

The list of emerging food attributes in China and Vietnam in Table 5 shows that credence attributes such as product safety, organic production and product traceability are becoming important for agri-food customers. Yet, a range of search and experience attributes (e.g., product quality, taste, and brand) still dominate this list

3.6 Food traceability status quo and information needs

The study also aimed to derive information about importers' understanding of the current level of traceability for beef and horticulture products, as well as the information required for traceability system (Q14 in the questionnaire, see Appendix). Traceability is considered as the ability to trace all information about a particular food product from the farm to shop shelf.

Beef

The results for beef exports are shown in Table 6. For China, only one out of the twelve participants (8%) stated that there is currently a traceability system in place and that consumers can trace the Australian product via QR code on the product packaging. Most of the participants regarded the customs clearance documents and package labels as providing some traceability information, on which abattoir numbers and information on the meat such as grass-fed or grain-fed with days are presented. It was also raised that even if the Australian beef product arrives with a QR code holding traceability information, repackaging (e.g., by importers, wholesalers, or retailers) in China makes this information inaccessible for consumers. For Vietnam, all three participants (100%) stated that they have a traceability system in place for their imported beef from Australia. However, they thought that consumers were unable to access this information.

Importers suggested that product traceability is mainly handled via customs clearance documents and packaging labels, which appears to be considered as exchange of product information between Australian supplier and importer, or wholesalers and retailers but not consumers. This is shown in the following statement:

> *"Through your customs clearance documents, you can check the entire chain from the customs clearance to the warehouse [means slaughterhouse]."* ID4 (Importer of beef, China)
>
> *"In the set of documents they send, it is clearly state: which factory produces it; which production. I think they can trace it to the end."* ID19 (Importer of beef, Vietnam)

The participants in China and Vietnam stated that the preferred methods to communicate the traceability information to consumers are QR codes and bar codes since they are considered as convenient and easy to use (Table 6).

Participants listed several types of traceability information needed about Australian beef. For China, these include animal breed, slaughterhouse numbers, production systems/type of feeding method, date/time

of slaughter, and packaging date. For Vietnam, information such as product labels listed on vacuum bags, farm/producer information, feeding type, and slaughterhouse number are expected to be included.

Participants were asked how much more their customers may be willing to pay as a premium price for the provision of their required traceability information listed above. For China, an average price increase ranging from 1.36-2.55% depending on stakeholder group was identified (for details, see Table 6). For Vietnam, the importers stated that none of their customers would be willing to pay a premium price for the traceability information.

The following statements capture importers' views on their customers potential willingness to pay for traceability information:

> *"[Whole supply chain product traceability] is important. But whether it is necessarily important, it may not be. That is, if you can do this without increasing costs, consumers will trust it. […] It is not necessary, and I don't think wholesalers will be willing to pay. [For retailers] it may be one or two cents per product. In this case, I think they should be willing to accept it. [For consumers] depending on the customer groups. For some people, they may be willing to. But some people may just say that this is not important."* ID9 (Importer of beef, China)
>
> *"Not willing to [for WTP of traceability], because he will think this is what it should be provided. If you sell me the products, you should be responsible for the product"* ID11 (Importer of beef in China)
>
> *"The customer is not interested because the Australian documents are very extensive. Retail customers are also never interested in this information. People only know if goods imported from the US or Australia, but they do not care about detailed information such as CO documents or documents from the factory." ID18* (Importer of beef, Vietnam)

Horticulture

About 50% of the interviewees for Vietnam stated that the Australian products that they handle currently have a product traceability system in place (Table 7). However, none of the importers in China reported that this is the case. For example, Chinese consumers appear to be unable to access product information via traceability technologies such as QR codes (e.g., no QR label provided on product packaging), while about 33% of participants stated that Vietnamese consumers were able to access such information.

In both countries, the preferred technology to trace product information is QR codes and barcodes. A range of information types were listed as important to include in product traceability technologies. These include country of origin, farm/producer information, planting time, harvest time, packing location, packaging date, quality standard (e.g., brix, size), and use by date. Yet, willingness to pay for access to product traceability information is zero in China for all stakeholder groups and Vietnamese consumers appear to be willing to pay a premium of only 1-3%.

The following statements from importers of horticulture products offer further insight into why the willingness to pay for traceability information is low:

"One year ago, there was a supplier who wanted to do this concept on their product. However, as I said, he put the QR code on boxes. But when I sell goods, I repacked fruits into small packages so there is no QR code on packages. Moreover, as previously mentioned, consumers do not have free time to stand and scan the QR code to see the origin of this and that. If you want to develop traceability, you are very welcome because it's very good. But you need to do it like marketing, do not force them to find it." ID25 (Importer of oranges, tangerines, grapes cherries, Vietnam)

"No, our customers aren't willing to pay premium for it. It should be provided as an additional assurance but without this information, our customers can still accept the product." ID20 (Importer of oranges, Vietnam)

Table 6: Traceability status quo and information needs for beef products

Product traceability aspects	China (N = 12)	Vietnam (N = 3)
Proportion of participants who stated that Australian imports currently have a traceability system in place	8%	100%
Preferred traceability system interface with customers	QR code, barcode (due to convenience, easy and fast to use)	QR code, barcode (due to convenience)
Traceability information that importers require	Breed, marbling, slaughterhouse number, production systems/type of feeding method (days for specific feed provided), time of slaughter, slaughter/segmentation process, packaging date, time of transportation, process of transportation, country of origin, growing conditions, farm/producer information, age of animal at slaughter	Farm/producers' information, type of feeding, education of consumers about the product, slaughterhouse number. In addition, labels need to be on vacuum bags not just on boxes that contain the vacuum bagged product.
Average WTP an % increase in price for traceability information	Wholesalers: 1.36%; retailers: 1.77%; consumers: 2.55%	Wholesalers: 0%; retailers: 0%; consumers: 0%

Note: WTP for willingness to pay.

Table 7: Traceability status quo and information needs for horticulture products

Product traceability aspects	China (N = 4)	Vietnam (N = 6)
Proportion of participants who stated that Australian imports currently have a traceability system in place	0%	50%
Preferred traceability system interface with customers	QR code (due to easy to use, part of everyday life)	QR code, barcode (due to convenience, easy to use, quick to operate)
Traceability information that importers require	Pesticide residues, orchard source, packaging, transportation	Country of origin, farm/producer information, planting time, harvest time, packing location, packaging date, quality standard (e.g., brix, size), use by date
Average WTP an % increase in price for traceability information	Wholesalers: 0%; retailers: 0%; consumers: 0%	Wholesalers: 0%; retailers: 0%; consumers: 1-3%

Note: WTP for willingness to pay.

3.7 Food quality attribute assurance

A further research question of this study aimed at identifying the type of food attribute assurance that supply chain stakeholders require, and which assurance providers are considered as most trusted in China and Vietnam (Q7, Q8, Q12-Q13 in the questionnaire, see Appendix).

Type of attribute assurance required

Table 8 presents the type of evidence that importers and their customers require as proof for the authenticity for credence food attributes. The results presented in this table include all responses provided, although in some cases this only comprised one response per attribute and country. 'None' indicates that participants did not report any type of evidence needed for respective food attributes. Unfortunately, the responses from importers were not detailed enough to identify whether there are different quality assurance requirements for each stakeholder group.

The most frequent types of evidence reported as most important in stakeholder's procurement decisions (see section 3.2) appear to be customs clearance documents and product labels. These results apply to both countries and both agri-food product categories. Importantly, product label only refers to product claims printed on the product, not to any form of quality certification (e.g., third-party certification).

The relatively high frequency of customs clearance documents as a type of assurance for the listed food attributes suggests that stakeholders in both countries have strong trust in both Australian government and their national food inspection authorities (e.g., customs). These results also indicate high trust in the regulated food distribution processes (e.g., sanitary and phytosanitary requirements) that handle and regulate the export and import of agri-food products.

Third-party product attribute certification was reported as type of evidence required for organic beef and horticulture products in China. Chinese certification of organic production standards (not international standards) appears to be preferred by horticulture stakeholders in China. In contrast, organic certification by third-party assurance providers in exporting country appears to be only needed by stakeholders in Vietnam.

Table 8: Evidence required for food credence attributes

Category/Type of food attribute	Beef		Horticulture	
	China	Vietnam	China	Vietnam
Additive free production	Customs clearance documents	None	n/a	n/a
Animal welfare	Customs clearance documents (slaughterhouse declaration)	None	n/a	n/a
Biodiversity and ecosystem health	Customs clearance documents	None	Customs clearance documents	Product label
Breed/variety	Customs clearance documents (quarantine certificate/health, the domestic sterilization certificate, and the nucleic acid certificate), product label, visual inspections (e.g., colour, texture, marbling)	Product label	Customs clearance documents, visual inspection	Product label, barcode
Carbon neutral production	Customs clearance documents	None	None	Product label
Country of origin	Customs clearance documents (quarantine/inspection certificate, certificate of origin), product label	Customs clearance documents, product label	Customs clearance documents, product label	Customs clearance documents, product label
Organic	Customs clearance documents, third-party certification, product label, advertising brochures	None	Chinese certification	Product label, organic certification of exporting country
Product safety	Customs clearance documents, official certification from a third party (e.g., no detected veterinary drugs, lab report)	Customs clearance documents (food-safety certificate, veterinary inspection certificate)	Customs clearance documents	Customs clearance documents
Production system/feeding types	Customs clearance documents, product label, grades, number of days fed marked on the box, certification from farm, contract with supplier	Customs clearance documents	n/a	n/a
Provenance	Customs clearance documents (slaughterhouse number), product label	None	Customs clearance documents	Product label
Social/ethical responsibility	Customs clearance documents, supplier statement	Product label	Supplier statement	None
Water management and preservation	None	None	None	Product label
Whole supply chain traceability	Customs clearance documents, quarantine/inspection certificate, certificate of origin, slaughterhouse number), QR code, transportation track	None	Customs clearance documents, product label	Product label (QR code)

Notes on Table 8: n/a indicates that this attribute does not apply to horticulture products. None indicates that participants did not report any evidence needed for respective food attributes. Product label only refers to product claims printed on the product, not to any form of quality assurance/certification label.

Specific statements made by importers about evidence required for food safety in Vietnam are presented below:

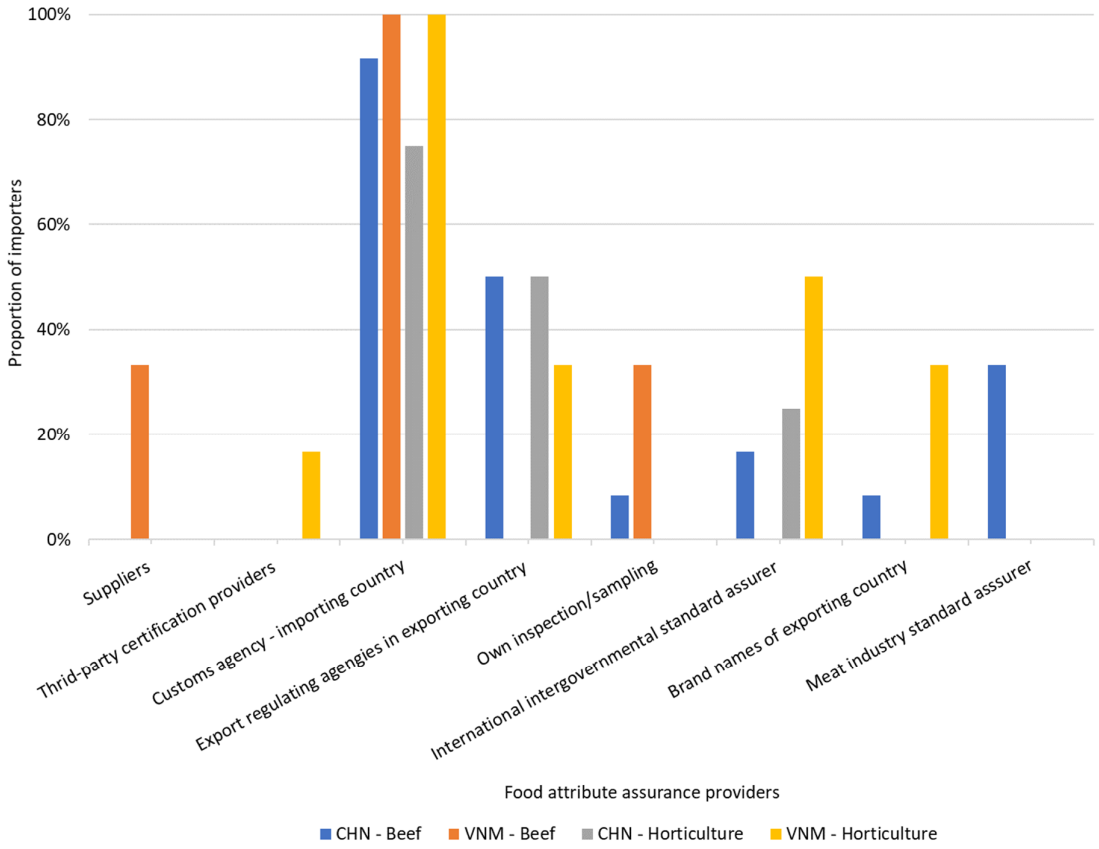
> *"The mindset of consumer will be 5-point [out of 5 for importance of food safety], however, in reality, they rarely ask about [evidence for] food safety. We prepare all the necessary documents related to the food quality and hygiene but only wholesale/retail customers, i.e., supermarkets or shops, sometimes require us to show the legal documents. I give 3-point for wholesale/retail customers."* ID 21 (Importer of oranges, table grapes in Vietnam)
>
> *"Customers always think that the product must meet the standards imposed by the state agency. Imported goods are understood as OK*." ID24 (Importer of cherries, oranges, tangerines, peaches in Vietnam)

These statements suggest that consumers assume that the food provided at the point of sale is safe for consumption and that evidence is not needed. This implies that consumers have trust in the supply chain stakeholders that handle the product and food regulations (e.g., food safety standards). Consumers do not appear to require additional certification for food safety in Vietnam or China.

Trusted attribute assurance providers

Participants were also asked which food attribute assurance providers (e.g., organisations) they most trust (Q12-Q13 in the questionnaire, see Appendix). The results are shown in Figure 5. The proportion of importers (shown on the y-axis) in this figure represents the frequency by which food attribute assurance providers were mentioned by the interview participants. The results suggest that customs agencies of importing country are important for both products, but specifically for beef imports to China. Export regulating agencies in export countries and meat industry standards assurers also appear to be trusted providers for stakeholders in China. Horticulture importers appear to trust international intergovernmental assurance providers and brands from exporting countries.

Figure 5: Most trusted food attribute assurance providers



Notes: Total number of observations for China: 12 beef, 4 horticulture. Total number of observations for Vietnam: 3 beef, 6 horticulture.

Meat quality assurance schemes

The study also aimed to investigate beef importers' familiarity with Australian meat quality assurance schemes (Q16 in the questionnaire, see Appendix). The results presented in Table 9 indicate that the importers in China appear to be somewhat familiar (e.g., ranges between 25%-95% familiarity depending on assurance system) with most meat quality assurance systems, except for the Pasture-fed Cattle Assurance System. Yet, most of the importers' customers in China seem to be unfamiliar with these meat attribute assurance schemes. This suggests that Australian suppliers need to educate their customers about such quality assurance schemes. In contrast, meat importers in Vietnam seem to be mostly unfamiliar with Australian meat quality assurance schemes. Note that, "DAWE's food safety systems" is not actually an existing system. It was added to examine whether participants had a perception of a government-led system in place to ensure food safety. Interestingly, more than half of Chinese participants and one out of the three Vietnamese participants stated that they were aware of such a system. This may imply the presence of a strong belief in the central role which the Australian government plays in ensuring food safety.

Table 9: Importer's awareness about Australia's meat quality assurance systems

Quality assurance systems	China (N = 12)		Vietnam (N = 3)	
	Aware	Not aware	Aware	Not aware
DAWE's food safety systems	58%	42%	33%	67%
Livestock Production Assurance (LPA)	25%	75%	0%	100%
National Vendor Declaration (NVD)	92%	8%	0%	100%
National Livestock Identification System (NLIS)	42%	58%	0%	100%
National Feedlot Accreditation Scheme (NFAS)	25%	75%	0%	100%
Pasture-fed cattle assurance system (PFAS)	0%	100%	0%	100%
Participants' customers' awareness of the above quality assurance systems	0%	100%	0%	100%
Customer's value for quality assurance systems	China		Vietnam	
	WTP - Yes	WTP - No	WTP - Yes	WTP - No
WTP a premium price for quality assurance system in place if customers were aware of them	8%	92%	0%	100%

Notes: WTP for willingness to pay. Questions were framed as a yes or no response in regard to familiarity with Australian meat quality assurance systems.

The overwhelming majority of beef importers in both countries indicated that their customers would not be willingness to pay a premium price for these types of meat quality assurance systems if they were aware of their existence. Further questions about why their customers would not be willing to pay a premium price for these Australian meat quality assurance schemes yielded the following interview responses:

> *"It is not important to them."* ID2 (Importer of beef, China)
>
> *"I don't think they are willing to [pay a price premium]. Because they will think, since I bought the product, this information should already be included.'* ID3 (Importer of beef, China)
>
> *"[…] these are things that should be done. Why should consumers pay for it? Customers have already paid at the production end, why should they be asked to take the increased cost? This is inappropriate."* ID4 (Importer of beef, China)
>
> *"No. It's already expensive now."* ID17 (Importer of beef, Vietnam)
>
> *"I answered no [to customers willingness to pay a premium price for quality assurance systems]. However, we appreciate the complete and clear traceability record, this is a plus."* ID19 (Importer of beef, Vietnam)

3.8 Australian reputation as an agri-food exporting country

The study also explored the reputation of Australia as an agri-food exporting country (Q11 in the questionnaire, see Appendix). The results are presented for each country and combined for both agri-food product categories since responses from beef and horticulture importers were very similar.

Australia's reputation as an agri-food supplier

The word clouds in Figure 6 illustrate importer's perceptions of Australia as an agri-food export country. The size of a word represents the frequency of its occurrence in the participants' responses. The results suggest that Chinese participants perceive Australia as a country with a very good reputation for the supply of good/high quality and safe products, which provides a stable supply and has a long history in

agri-food exports. Vietnamese participants regard Australia as a well-known agri-food exporting country and good product quality supplier, but also raised Australia's relatively high agri-food prices as part of the country's reputation (which is a weakness).

Competitive advantages of Australia's agri-food exports

Figure 7 shows a summary of participants' perception of Australia's competitive advantage as a supplier of agri-food products in their country. Participants in China see Australia's competitive advantages as: supply of high-quality products, Australia's environment and country reputation, standardisation of products (for beef only), and favourable taste among others. In Vietnam, Australia's main competitive advantages are considered as: high quality of products, 'natural' production (not further specified), flexible supply (e.g., suppliers are flexible to accommodate changing product volumes demanded), products are branded, packaging, and a low import tax (due to agri-food trade agreements between Vietnam and Australia) compared to other countries.

Importer's perceived weaknesses of Australia's agri-food exports

The summary of the weaknesses of Australia as a supplier of agri-food products are shown in Figure 8. The results suggest that Chinese participants consider the high product price and current Sino-Australian relationships as weakness of Australia's agri-food exports. In Vietnam, the high price of Australian agri-foods is seen as the key weakness.

Figure 6: Australia's reputation as an agri-food supplier in China and Vietnam

China (beef & horticulture products)

Vietnam (beef & horticulture products)

Notes: To assess participants' responses using a word cloud, the answers were cleaned of filler words such as "like" and "you know". Linking words and phrases such as "and", "or", "another" and "for example" were also removed from the responses. The remaining phrases were used to visualise the word frequency in the responses. The larger the word in the figure, the more frequently the word occurred in participants' responses to the question.

Figure 7: Australia's competitive advantage as an agri-food supplier as perceived by importers in China and Vietnam

China (beef & horticulture products)

Vietnam (beef & horticulture products)

Notes: To assess participants' responses using a word cloud, the answers were cleaned of filler words such as "like" and "you know". Linking words and phrases such as "and", "or", "another" and "for example" were also removed from the responses. The remaining phrases were used to visualise the word frequency in the responses. The larger the word in the figure, the more frequently the word occurred in participants' responses to the question.

Figure 8: Australia's weakness as an agri-food supplier as perceived by importers in China and Vietnam

China (beef & horticulture products)

Vietnam (beef & horticulture products)

Notes: To assess participants' responses using a word cloud, the answers were cleaned of filler words such as "like" and "you know". Linking words and phrases such as "and", "or", "another" and "for example" were also removed from the responses. The remaining phrases were used to visualise the word frequency in the responses. The larger the word in the figure, the more frequently the word occurred in participants' responses to the question.

4 Discussion and conclusion

4.1 Summary of key findings

The key attributes for beef valued by customers in both export markets (see Figure 1) include product quality (e.g., appearance, freshness), animal breed and the animal feeding system (e.g., pasture-fed, grain-fed) (Table 3). For horticulture products, the key attributes that influence procurement decisions of customers in both markets (see Figure 2) were product quality and taste (Table 4). However, for horticulture products in Vietnam there were other key attributes listed by importers such as price, packaging, and brand. This suggests that the two markets may put slightly different emphasis on product attributes in their procurement decisions.

The results for the current importance of credence attributes (Figure 3, Figure 4) showed that food safety, animal breed, whole supply chain traceability, and feeding system are important in both beef export markets. For horticulture, country of origin, variety, product safety, and product traceability ranked very high. However, for both beef and horticulture produce, there were differences in the rated attribute importance across the stakeholders (e.g., wholesalers, retailers, and consumers) within a country and between countries (Figure 3, Figure 4). It could imply that different stakeholders within the supply chains value different product attributes, which may reflect different commercial incentives for the demand and supply of specific food attributes. For example, retailers may demand specific quality assurance (e.g., private standards imposed by retailer groups) which wholesalers need to comply with as a supplier of retailers. However, this conclusion requires further verification through additional data collection. Differences in the rating of credence attributes between the countries could be explained by their development status, stakeholders' awareness about food attributes, and cultural differences. Such country-based differences in customers' demand for food attributes is informative for Australian producers to ensure that they meet the attribute demanded in export markets.

The results from the rating of credence attributes also showed that food attributes such as carbon neutral production, water management/preservations, biodiversity, and environmental health as well as social/ethically responsibility are currently unimportant for procurement decisions of beef and horticulture product in both countries. However, with increasing awareness about food production methods and their impact on environment and society, credence attributes may become more demanded in these export markets in the future. Hence, regular market research is imperative to provide Australian producers with updates on the development of the demand for these food attributes.

The results suggest that an important emerging food attribute in both markets and for both products is product quality (Table 5). While there were other emerging attributes listed by the participants, these attributes varied depending on the product and the export market. This again highlights the need for Australian agri-food suppliers to closely monitor demand trends for individual agri-food products in each export market.

While there seems to be a relatively high importance on whole supply chain traceability by customers in both export markets (Figure 3, Figure 4), most participants reported that their current imported Australian beef and horticulture produce don't have traceability system in place. However, they regarded the customs clearance documents and packaging labels as providing some traceable information. Furthermore, customers' willingness to pay a premium price for product traceability appears to be very small, that is about 1.36-2.55% in addition to the price of a product without traceability. As indicated by the statements of participants (see section 3.6), customers appear to expect agri-food products to be traceable at no additional cost to them. It should also be noted that only specific consumer cohorts may be interested in product traceability and would potentially be willing to pay a higher premium price for

it. Additional consumer demand analysis for product traceability information is needed to gain a deeper understanding. This analysis could further guide producers and agri-food industry's decisions about whether to invest into the development of whole supply chain traceability technology.

This study has also identified differences in desirable product attributes perceived for online and in-store customers (Table 4). While Australian agri-food suppliers may be unable to determine through which channel their product is distributed in export countries, this finding may be useful for their branding and packaging strategies, especially with the significant increase in online sales during the current COVID-19 pandemic.

The results about product attribute assurance suggest that there is high trust in agri-food trade regulation authorities (i.e., Australia and import country) and associated processes (e.g., customs inspection, exporter certifications) by customers in both export markets (Table 8, Table 9). In addition, product labels (e.g., attribute claims) also appear to be an important form of evidence for attribute authenticity customers in both countries. Certification schemes do not currently seem to be considered in both markets as an immediately required form of attribute assurance, except for organic production. The statements of importers about consumers' expectation of food safety (see section 3.7) without additional evidence, highlights the high trust that consumers have in their domestic and exporting countries' food system regulation.

While quality was mentioned as the key product attribute for procurement decisions (Table 3), participants in export markets were partly aware (China) or unaware (Vietnam) of Australian meat quality assurance schemes (Table 10). As for product traceability, the willingness to pay more for traceable food products is very limited. Customers seem to expect that high product quality is supplied at no additional price premium, as the price for Australian beef and horticulture produce is already expensive and any increase will push up the price further. In short, high product quality is expected and valued by customers but there is no willingness to pay for additional product attribute assurance.

4.2 Limitations

Although the current study has developed significant insights into customers' demand for food attributes and associated assurance systems in two Australian export markets, several limitations need to be taken in consideration. First, the relatively small sample size for both countries could have implications for the robustness of the results presented in this study (e.g., sample size and selection bias). However, as shown in Table 1, the quantity and importing frequency of the participants were relatively high. This implies that they are dealing with a large number of customers and therefore, they would have a comprehensive understanding of their customers' preferences. In addition, the analysis of interview data shows thematic saturation to a large degree, suggesting the findings of this study do provide valid understandings of the focal questions under investigation.

Moreover, this study represents a snapshot in time. The preferences for food attributes, specifically credence attributes as an emerging trend in consumers' attitude, will change over time. Therefore, it is recommended to conduct similar analysis on a regular basis, for instance annually or every two years. This will ensure that Australian agri-food producers are well informed about current changes in customers' demand for food attributes and can thereby adjust their operations to meet customers' needs.

Third, the findings presented in this study only reflect the perception of importers and their view on their customers' demand for food attributes. Although the interviewed importers also operated in the wholesale and retail markets, participants' view of wholesalers, retailers, and consumers could be different from stakeholders' actual perspectives. This may particularly be the case for consumers, as

previous research has shown that different consumer cohorts have different preference for food attributes (e.g., O'Donovan and McCarthy 2002; Zanoli *et al.* 2013).

Furthermore, political tensions between China and Australia at the time when this study was conducted were reflected in local importer's sensitivities around participation in the interviews and may also be represented in their responses.

4.3 Further research

As part of CSIRO's Trusted Agrifood Exports Mission, further research is underway to investigate the current demand for food attributes and supporting evidence by importers, wholesalers, retailers, and consumers in Australia's export markets. This includes gaining further insight about different consumer cohorts' demand for food attributes. Information from such analysis will assist agri-food producers to better target the consumer groups through specific branding, presentation, provision of product labels, or product certification.

Furthermore, this pilot study did not explore what (e.g., increasing consumer awareness) or who (e.g., retailers through private standards, Australian producers) is driving the demand for agri-food credence attributes in China and Vietnam. These drivers could be assessed through further research.

Finally, while the present research work did not focus on investigating the potential need for a national brand, customers' trust in the brand and identity of Australian agri-food products, this could be an avenue for further exploration.

Appendix

Interview questionnaire: Agrifood attribute credence and assurance systems

Introductory statement:

Hi, thank you for agreeing to participate in this interview. My name is _____ from Vietnam National University of Agriculture/East China Normal University. This interview is part of a larger project being conducted by the CSIRO, the Australia's national research agency.

As described in the Participant Information Sheet that was sent to you, this interview aims to gain an insight into which product characteristics and assurance of imported agrifood is important to importers, wholesalers, retailers, and consumers, and what supporting evidence they require. This understanding will help Australian agrifood industry work towards meeting their customers' needs.

This interview

The interview normally takes around 45 minutes to complete. I will use audio recorder to record the interview, with your permission, so it can be transcribed and analysed afterwards. As stated in the Participant Information Sheet sent to you earlier, all information provided by you will be anonymous. An ID code is used for recording and notes taking of this interview, so your personal information is not included in any documents from the interview. If any question you think is sensitive, please feel free to not answer it, or answer it in ways you feel comfortable.

Are you ok with the interview being recorded?

[*Should the participant not agree to a recording, the interviewer will need to take written notes of the interview for analysis. The interviewer will inform the participant accordingly.*]

Are you happy for us to start the interview?

If all agreed and ready to proceed: "Great – let's begin!"

INTERVIEW QUESTIONS

1. First,
    - How many years have you been importing food?
    - What major food products do you import and from which country?

[*for the following questions, choose the major food product that this importer imports. They should be either meat or fruit. For meat category, if importing both beef and lamb, choose beef even if importing more lamb. For fruit category, choose the fruit in order of citrus, table grape, or any other fruit*]

2. Roughly, how much yearly and how regularly do you import [*name of the major food product*]?

3. Do you import [*name of the food product*] directly from producers [for meat]/growers [for fruits] directly, or through export agents/brokers, distributors or other?

4. Who do you sell your imported [*name the product*] to? For example, wholesalers, retailers, or sell directly to consumers?

Prompts: Wholesalers, retailers, or sell directly to consumers? [*take note of the answers for later questions*]. The research team is aware of the commercial sensitivity of this question and does not require company names/names of individuals, only stakeholders in the supply chain.

5. [*if the importer sells to consumers directly*]

    - Do you sell [*name of the major food product*] to your consumer mostly in store or online? (If do both), rough % each?
    - Do on-line consumers and in-store consumers look for different food attributes?
        i. Promotes: [if yes] What are they?

6. [*if the importer sells to retailers*]

    - Do the retailers mostly sell the product in store or online? (If do both), rough % each?
    - Do on-line retailers and in-store retailers look for different food attributes?
        i. Promotes: [if yes] What are they?

7. For the [*name of the major food product*] you import, what are the major product attributes that your customers look for? And what evidence do they want for them? The evidence can be certification labels, government official's approval information, or traceability systems like a QR code where you can find all the original data to support the claims.

    Let's start from your customer [*choose those that apply according to Q4*]:
    - For your wholesaler customer
        - what are the major product attributes that they look for? And what evidence they want for each one of them? 【take note of the attributes for the next point】
        - ok, among the attributes you have just mentioned that your wholesaler customers look for, [*name the attributes mentioned above*], could you please rank them in the order of importance such as 5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all?
        - For the [*name of attribute, that was top ranked*], why is it the most important for wholesaler customers?
        - Among the attributes you just mentioned [*mentioning the list of the attributes noted/checked above*], which key attributes attract a premium price and why?
    - For your retailer customer
        - what are the major product attributes that they look for? And what evidence they want for each one of them?
        - ok, among the attributes you have just mentioned that your retailer customers look for, [*name the attributes mentioned above*], could you please rank them in the order of importance such as 5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all?
        - For the [*name of attribute, that was top ranked*], why is it the most important for retailer customers?
        - Among the attributes you just mentioned [*mentioning the list of the attributes noted/checked above*], which key attributes attract a premium price and why?
    - For your consumers
        - what are the major product attributes that they look for? And what evidence they want for each one of them?

- ok, among the attributes you have just mentioned that your consumers look for, [*name the attributes mentioned above*], could you please rank them in the order of importance such as 5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all?
- For the [*name of attribute, that was top ranked*], why is it the most important for consumer customer?
- Among the attributes you just mentioned [*mentioning the list of the attributes noted/checked above*], which key attributes attract a premium price and why?

8. In addition to the attributes you mentioned above, what do you think about the following attributes in terms of their importance for your customers? Rank the importance as in the previous question such as 5=most important, 4=important, 3 = medium important, 2=less important, 1=not important at all. And what evidence would be needed from your perspective? [*Only ask about the attributes in the table that were not mentioned by the interviewee*]

Credence product attributes	Customer – Wholesalers	Customer - Retailers	Customer - Consumers
Country of Origin			
Provenance within Country of Origin			
Fruit only GM free			
Breed (e.g., angus, wagyu) – BEEF / Variety – CITRUS/TABLE GRAPES			
Product safety (e.g., herbicide and pesticide residues, foodborne pathogens, use of hazardous chemicals)			
Biosecurity (e.g., pest and disease control)			
Organic			
Carbon neutral production (**If interviewees ask for meaning**: *Carbon neutral production" means offsetting the Greenhouse Gas (GHG) emissions it produces during production. Since it's often not possible to have zero emissions during production, "carbon neutral" or "net-zero-carbon" can be achieved by buying "carbon credits" and/or by supporting GHG-*			

reduction initiatives such as renewable-energy projects)			
Water management and preservation (e.g., water use efficiency during production process)			
Biodiversity and ecosystem health			
Social/ethical responsibility of practices applied by producers/growers (e.g., human and labour rights)			
Whole supply chain traceability of the product. Here, traceability of food product is about being able to trace all the information (e.g., origin, certification, location and time in transit, storage, handling) about a particular food product from farm to shop shelf.			
Meat ONLY Animal welfare are assured during production and slaughter			
Meat ONLY Production system/feeding types (e.g., grain or pasture fed, free-range)			
Meat ONLY Additive free production (e.g., hormone free, anti-biotic free)			

9 From your interaction with your customers and what is happening in the market, are there any food attributes that are becoming popular with consumers?

10 Linking to "Country of Origin" as a product attribute, how important is the reputation for a country in your and your customer's procurement decisions? 1 means not important at all, 3 means medium important, and 5 means very important.

   a. Does a very good country reputation mean that you have trust in the product attribute claims even if no further attribute assurance is provided, e.g., hormone free, anti-biotic free?

11 Please describe Australia's reputation as a supplier of [*name of the major food product*] in one sentence.

12 For the food attribute certifications of imported foods, which certifying or assurance providing organisations are most trusted by your customers and why?

- Prompts: The exporting country certification agencies, international certification agencies, exporting government approval labels, or Vietnamese/Chinese certification agencies

13 What are the parts of the certification systems that you and your customers really trust?

- Prompts: Is it just the label or the authority who provides certification? Or the ability to double check if attribute certification is legitimate and not fraudulent.

14 The following questions are about traceability systems of [*name of the food product*]. Here, traceability of food product is about being able to trace all the information about a particular food product from farm to shop shelf.

a. Does the [name of the food product] you import from Australia have a traceability system in place?
b. [**If YES to above question**] Does the current traceability system provide confidence about the product you and your customers need?
c. Consumers can access traceability data via barcodes, Quick Response (QR) codes, radio-frequency identification, online links printed on food packaging. Which one would be your and your customers preferred choice? Why?
d. Ideally, how much traceable information would you like to have for the Australian [*name of the food product*] you have been importing?
e. If the traceable information you have just described is provided, do you think your customer will be willing to pay more for those traceable information? Why?
   (**If willing to pay more**) How much more do you think they will be willing to pay?
   Prompt: % increase in price, compared to product without those traceable information.

15 For the [name of the food product] you import from Australia, what credence and attributes does Australia's [name of the food product] have that make it competitive over the product imported from other countries? And what are the weak points compared to the product from other countries?

16 [**For MEAT ONLY**]

The following questions are about the quality assurance systems of Australia's red meat.

- Have you heard about the food safety systems for red meat that are enforced by the Australian Government's Department of Agriculture (Water and the Environment)?
  [**If yes**] What are they?

- Are you familiar with the safety and quality assurance systems that the Australian red meat industry are using?
  [If yes] What are they?

  Prompts if not mentioned:
  Have you heard about Australia's red meat industry's:
  - Livestock Production Assurance (LPA)
  - National Vendor Declarations (NVD)
  - National Livestock Identification System (NLIS)

- National Feedlot Accreditation Scheme (NFAS)
- Pasturefed Cattle Assurance System (PCAS)

- Are your customers familiar with them?
- [**If not**], Do you think your customers will be willing to pay primum price for Australian [name of the food product] if they know those quality assurance system are in place?

Thank you.

End

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