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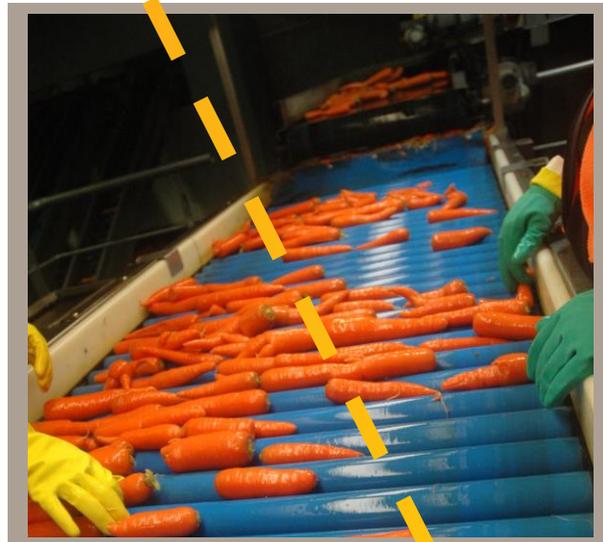


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Horticultural supply chain and exports

Murray Darling Basin Regional Economic Diversification Program

Authors and acknowledgements

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Executive summary

Current horticultural production has the potential to expand but is limited by human resources, investment, packaging and processing infrastructure, logistics and markets.

Developing relationships with local Australian businesses and food distributors and logistics companies in destination countries is critical when exporting fresh and perishable foods. These foods require quality control and timely delivery to ensure optimum shelf life. Developing relationships with the service sectors and investors will be necessary to accelerate the growth of the sector in the Queensland Murray Darling Basin (QMDB).

The solutions to improving export access in the horticultural supply chain include enabling growers to collaborate and share infrastructure; increase quality and volumes of current crops; and increase diversity of crops – with a focus on crops that utilise similar infrastructure but at different harvest times. We outline steps that growers can take to enter export markets and reduce risk. Export growth engages four interrelated components of agricultural value chains and food systems:

1. Creating the financial and business models and services of the future;
2. Planning and co-ordinating the development of integrated food hubs and clusters, including processing, storage, transport logistics, and service sectors;
3. Expanding and developing state of the art food processing facilities to meet emerging demands; and
4. Developing the human capital - skills and expertise in value adding, food processing, exporting, distribution and business to bussines (B2B) networks in export markets.

This report focuses on growing exports, and developing expertise to reduce export risk for growers.

Introduction

This report is Part 4 of Activity 4 of the Queensland Murray Darling Basin Regional Economic Diversification Program commissioned by the Queensland Government. The program aims to establish new, high value, profitable and resilient horticulture value chains in the Queensland Murray Darling Basin.

In undertaking this research we acknowledge that the domestic market for horticultural produce provides limited opportunities for growth. We have therefore explored how to grow this sector with a focus on premium branded fresh and packaged export produce using the new freight services through Wellcamp airport.

Sinclair (2017) in a paper discusses the vulnerability of Australia’s cities to extreme weather events and the importance of Queensland to the national perishable vegetable production, producing 75% of Australia’s vegetables. The map shows that four of the top five perishable vegetable LGAs, 1st Bundaberg 13.5%, 2nd Whitsunday 12.9%, 3rd Lockyer Valley (9.4%) and the Southern Downs (4.0%) is the 5th major production area are in Queensland.

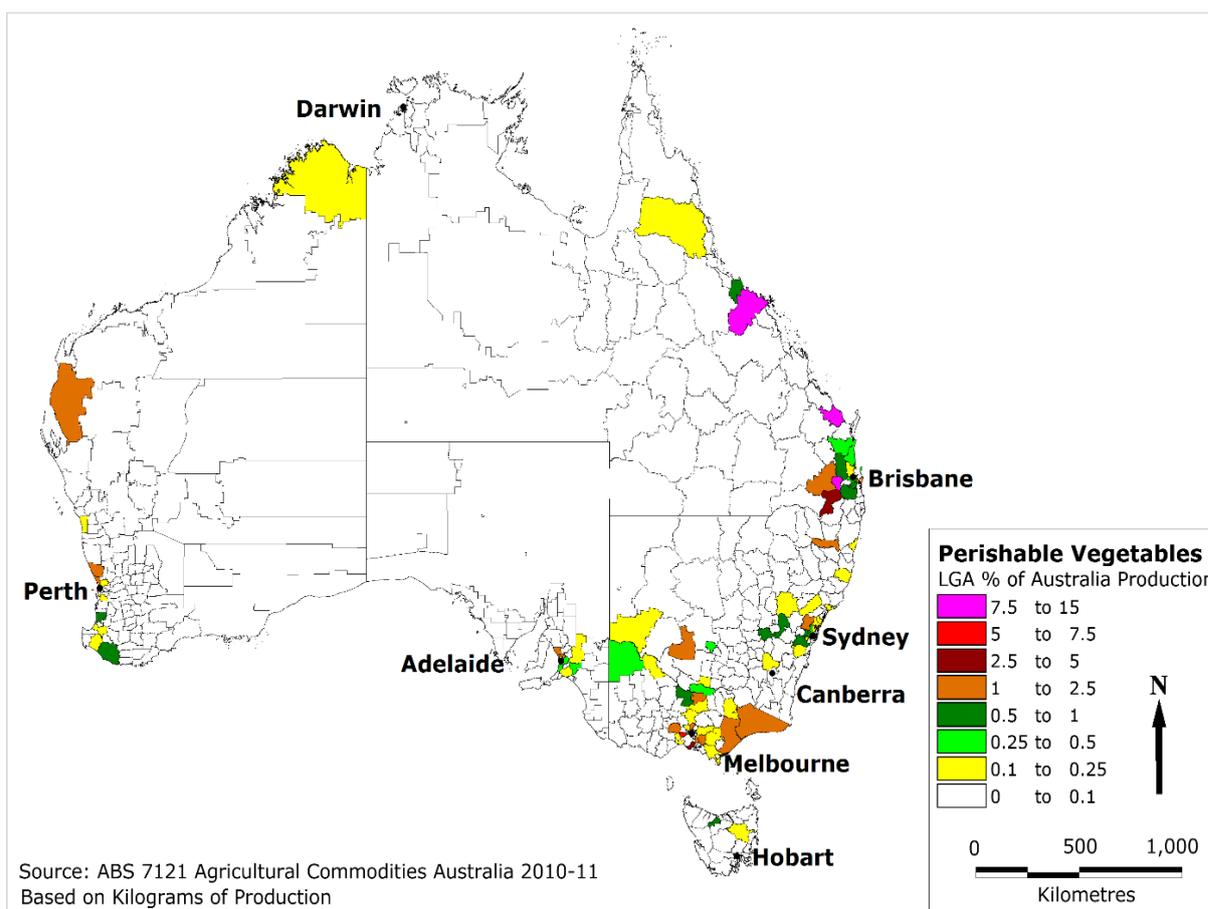


Figure 1: Perishable vegetable production in Australia.

Horticulture in the QMDB region has the potential to expand by rotating and thereby complementing existing commodity crops, such as cotton. The Southern

Downs, which defines the area of the QMDB project, is important because it has different climatic conditions to the coastal regions in Queensland, that is less prone to extreme tropical lows and cyclones that destroy crops in the coastal regions. For example, Cyclone Debbie in 2017, destroyed the Whitsundays winter production of vegetables. Therefore, while we have focused on export markets, there is also an opportunity to reduce the risk of the impacts of extreme climatic events on the domestic market by increasing supply from the QMDB or Southern Downs.

The QMDB geographic area of research in southern Queensland encompasses the areas west of Stanthorpe through to St George. The Queensland New South Wales border is the southern boundary with the northern boundary below a line drawn from Toowoomba in the east through to the top of the St George irrigation area in the west. There are five major agricultural supply chains in the MDB region, cotton lint, cotton seed, grains, horticultural and beef.

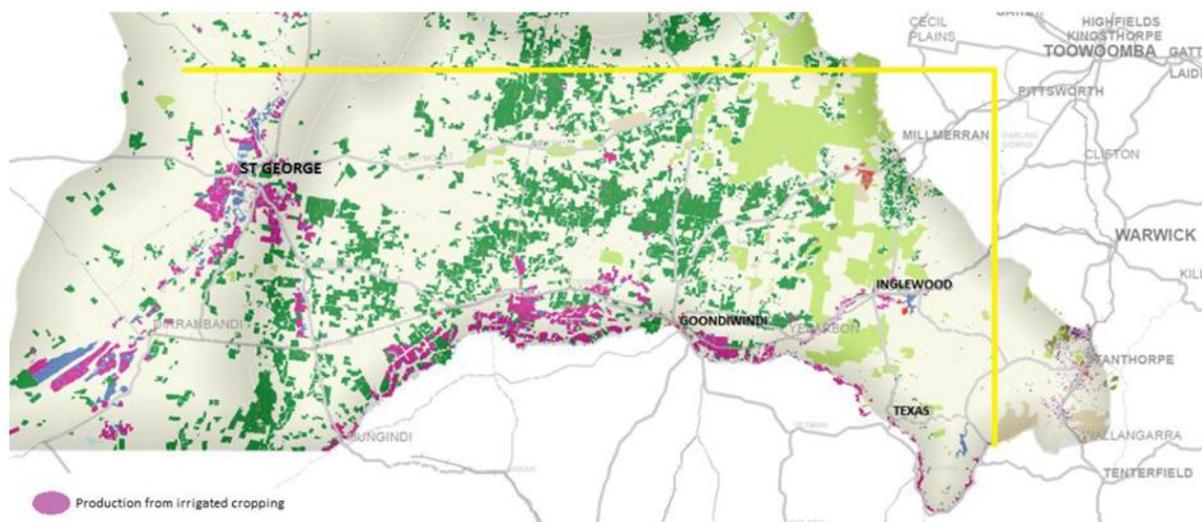


Figure 2: Queensland Murray Darling Basin Economic Diversification Project Region

Source Queensland Murray Darling Committee Activity 2 Resource

This report draws on the three earlier USQ reports where we analysed the infrastructure and logistics options (project 1); the investment options (project 2) and drawing on the expertise in the MDB portfolio, we reviewed the optimum crops for export and their value chains. The aim of this final section is to understand the pathway to grow horticultural exports, how to support the growth of infrastructure, to enable the development of the new products and markets highlighted in earlier research.

We first discuss the trends, risks and gaps in knowledge that define how we consider growing horticultural exports, then we discuss strategies to develop horticultural exports from the MDB region. As noted in earlier USQ reports, most of the current horticulture production is for the commodity markets, margins are low and the profitability is extremely price sensitive. Cost of production including labour, quality control, logistics and storage need to be optimised to compete on global markets. This report builds on this knowledge and focuses on export growth pathways for premium fresh and packaged products.

Key exporting trends, risk and gaps

Demand for premium horticultural produce has been growing in developing countries thus providing an opportunity for the QMDB region to supply new markets. However, these markets are extremely price sensitive and growth in Australian horticultural exports has been limited. Australian vegetable exports are approximately the same value in 2015 as they were in 1998 (¹Ausveg 2017). The highest value market for Australian vegetables is South East Asia. South East Asia buys a diverse range of our fresh vegetable produce, whereas trade to other regions is dominated by single commodities. Our vegetable trade with Europe, for example, is 98% onions and the middle east is 89% carrots.

Capturing the market opportunity requires understanding of a broad range of factors from crop suitability in the QMDB to consumer purchasing behaviour and taste preferences in export destinations. To grow these markets also requires efficient and timely business services and quality control systems. Most significant in the delivery of quality fresh and chilled produce is the cold chain, it is essential for warehouses that are operating worldwide across the cold food to consistently maintain product specific temperatures across the entire chain. In this section we discuss some trends and risks.

The growth of Asian markets

Developing countries are changing at a phenomenal rate compared to developed countries. While Australia has low GDP growth, Vietnam, for example, has experienced 5.5% annual growth since 1990. Urbanisation and the rapid expansion of the middle class are partly responsible for this growth.

Urbanisation is driven by the movement of people from country regions to towns. This trend is creating mega cities, urban populations with over 10 million people. Asia represents the epicentre of this growth with a predicted 30 mega cities by 2030.

These cities are critical hubs. Mega cities are the entrance and exit point for most goods going into and out of the export destination country. The emerging middle classes who are growing in wealth as the cities grow, are busy people. Busy people want convenient food. Traditional practices of purchasing food from 'wet markets' are rapidly being overtaken by the convenience of supermarkets situated in the office and apartment buildings. With their ready to eat packaged

¹ Horticulture Innovation Australia. [Vegetable industry export market development strategy, Vol 3: Situation summary and strategy \(2016\)](#)

foods, supermarkets stock the food of the busy upwardly mobile professional. They demand high quality, safe horticultural produce that can be guaranteed to be grown and packaged in Australia.

The pace of development and infrastructure requirements are confronting. Most mega-cities originally started as trading town, near river deltas. They served as a natural trade junction between land and sea ports. Cold chain logistics were not part of the trading infrastructure. The emergence of the home refrigeration in western countries during the 1950's transformed diets and created the modern supermarket. The reverse trend is occurring in developing countries, dietary preferences for perishable food and the growth of supermarkets are driving change in cold chain logistics and creating markets for home refrigeration.

Traceability and perishable food supply chains

The flow of perishable goods requires a seamless supply chain, whether they are from a global or a local supply chain, fresh and perishable food has a critical path that determines the 'shelf life' of the food product.

It is not uncommon for the normal flow of perishable products to be disrupted due to unplanned and unexpected events when the temperature-sensitive goods are sent to emerging countries (Zhang & Woodhead 2016). In the past farmers and exporters had little opportunity to control the handling of their products in the destination country. However, there are a number of components (discussed in the next section) that determine the success of an export operation and with the emergence of sophisticated traceability software growers and processors can take more control of their products quality control and the development of their export business.

The main causes of disruptions in the destination country (but also in the delivery of goods to the export port) include but not limited to inadequate infrastructure, complexity of interaction of chain members, long transport distances, transport mode changes, fluctuations in demand, lack of standardisation of traceability systems, ineffective transport/storage technologies, absence of refrigerated facilities, lack of managerial skills, ignorant handlers, unskilled staff and misunderstandings, cultural differences, and so forth (Hülsmann and Brenner 2011; Brenner 2015).

New technologies and IT are creating the potential for the grower and/or processor to monitor their products across the supply chain from their farm office. These systems enable the regulation of temperature and tracking of the movement of the carrier. This is a game changer for producer/exporters who wishes to move beyond the commodity supplier and into premium branded products.

The brand owner now has the ability to engage in conversations with the customers, and to get direct feedback on the end quality and satisfaction with their products. While technology is a 'game changer' in terms of monitoring the delivery of the product, two major constraints determine the usefulness of technological solutions:

- first 'garbage in garbage out', if the data monitoring equipment is not accurately recording, not installed in some vehicles, or turned off, then the results are inaccurate or non-existent.
- second, 'lost in translation, culture and language are major barriers to working in most countries and technology cannot replace ongoing face to face communication.

Optimisation of food processing

The growth of food exporting in Australia will also depend on regular, reliable, responsive and cost effective transport systems from farm to export destination along with the optimisation of food packaging and processing facilities close to airports.

There is a growing movement in Australia to re-explore the food processing sector, and move away from a commodity focus, where the producer loses all control of the quality and price post farm gate. Woodhead et al (2017) argue that the "traditional commodity business model is considered safer, simpler and easier than exporting value added differentiated products. It may however be sub-optimal for Queensland communities, because it means the economic and employment benefits of value adding are mostly realised interstate or overseas". The authors discuss a range of models that are evolving for selling premium produce, particularly high value added protein foods, fresh fruit and vegetables, citing the beef sector where "several companies operate a hybrid model whereby they produce both commodity beef and branded produce for domestic and international markets. The main difference is that the premium branded produce uses its place of origin and sometimes the brand to provide a connection between the grower and the customer."

In earlier project research we identified that the infrastructure, consolidation and packaging sheds, along with roads, bridges and other infrastructure in the QMDB were suboptimal and thereby adding additional costs and reducing the quality of the export product. There remains a critical gap in the QMDB supply chains and food processing capabilities, strategically located regional consolidation centres and timely delivery to export ports (airports and seaports) are essential for the growth of the sector.

In the paper for CEDA on integration with global value chains, Woodhead et al (2017) recommend a move towards multi-stakeholder platforms, as a solution to reducing labour and logistics costs and increasing innovation and knowledge sharing. These platforms provide a 'full suite of research and development, processing and business services along with mobile equipment to enable entrepreneurs and start-ups to invest in global value chains'. The authors concluded that by reviewing options for facility placement in or near agricultural production areas a strategic export production and logistics setup can be achieved vs ad hoc geographically dispersed, uncoordinated development.

The aim of this integration are two fold, one to increase efficiency but secondly to increase innovation, the development of new export horticultural crops and products. Project report 3, analysed the gross margins of frozen sweet corn and

fresh blueberries in the QMDB region. While the corn required scale and infrastructure investment to become profitable the blueberries required a longer investment time. However, both were identified as potentially profitable options for certain export destinations, with investment. For example, investment for processing developing a frozen sweet corn factory are between \$10 million for a small operation with optimal productivity being achieved with a \$50 million investment (see project report 3 for processing plant costing models).

To make export supply chains operate efficiently and profitable, Australian investors might need to consider entering joint ventures with off shore investors to develop processing infrastructure or developing alliances to offer services (Woodhead et al 2017). In the next section we look in more detail at the investment options.

Investment models and risk

Perceptions of business and investment risk remains a key barrier to entry to export markets. In the second of the four reports for the QMDB project reviews investment models that enable producers / processors to develop infrastructure and the creation of new products requires investment in skills, technology and infrastructure. But there remains caution about investment. Growers and/or processors who wish to develop an export business, and who wish to become more involved than selling their produce, at wholesale prices, to an exporter, require new skills and knowledge of not just the market opportunities, but the whole process of exporting from documentation to quality control. Our conclusions from the initial analysis are that to accelerate growth companies need support to expand in a number of areas. Firstly, an expansion of production scale and infrastructure will require a substantial injection of capital. Investment is needed to develop and increase the scale of high value horticulture production and related infrastructure such as storage, packing and processing facilities.

Only larger producers that are prepared to commit time and money to the process and to do what is necessary to become investment ready have the capacity to take an investment partner. Our 2nd report in the MDB series aimed to reduce the knowledge gap related to what growers need to know about off-farm investment as a source of expansion capital. Knowledge and capacity gaps related to finance for off-farm investment knowledge, cultural and scale gaps need to be addressed. We noted a difference between how the investor and the grower discussed investment and risk, as discussed in Table 1.

Table 1: Differences between Investor and Grower Perspectives.

Themes	Investor Perspective	Grower Perspective	Gaps
Business Goals	Required, based around profitability	Informal based around family discussion	Needs to be developed and documented
Governance and reporting	Required, must be transparent and regular	Informal only as required by lender	Need for professional assistance to meet required standard
Scale of operation	Needs to be large to justify cost of external due diligence	Constrained	May need aggregation, collaboration with others or demonstrate profit value
Horticulture sector consideration	Focus on market and profitability (good business model)	Set production paradigm (what's known)	Ability to be more market focussed
Roles and Cultural fit	Business minded, sometimes blind to farm based issues	Focussed on the money and the farm. Farm Issues may seem self-evident	Lack of knowledge around evaluating business fit
Being investment ready	Essential	Uncertainty due to lack of knowledge	Steps needed to prepare

Exporting steps and risk management strategies

This section outlines actions for improving efficiencies, reducing constraints and highlighting where resources are best allocated to develop supply chains for products from earlier research.

Value-add is the process of taking a raw food material and changing its form to a higher value product. The value attributed to the product by consumers can come from a range of factors such as convenience, brand, origin, or after sale services etc. However, value can also be lost due to supply chain disruptions, which means the product either does not arrive or does not meet the consumers' expectations, such as packaged vegetables that are partially rotting. Therefore, the value add process includes a broad range of factors, including labour, quality control, logistics and storage. When these issues are managed efficiently there is less risk of the product failing to meet consumer expectations. However, there is no guarantee that what you are selling in Australia will be popular with Asian consumers, therefore the process of value add needs to include an understanding of the consumers.

There are ways to reduce the risk of entering the export markets, identified by the authors and the USQ team including Dr. Ximing Sun and Timothy Nugent, these are

outlined under three headings, getting ready, going into production and growth strategies.

1. Getting ready to export

I. Choosing and understanding the destination country

Each country has its own particular set of issues that need to be considered, such as market access, demographics, distribution channels and retail outlets. A range of resources from Austrade are available to help exporters assess destinations.

II. Competitor analysis

Once a destination market has been determined, it is important to understand the competition. Questions such as:

- How does the competition position their products in the destination market?
- Are their products and services highly regarded?
- What are the gaps, are there niches in the market that provide opportunities?

Opportunities for entering the market competitively can come from seasonal gaps in production (such as northern v southern hemisphere), and economic advantage such as lower freight costs. A critical analysis of your business and competitors can help you to identify the right value added products. A common technique is to create detailed profiles about your major competitors. These profiles give an in-depth description of the competitor's background, finances, products, markets, facilities, personnel, and strategies.

III. Consumer research

The value perceived by consumers can be attributed to a range of factors, taste packaging, quality, and service. Austrade and private agencies provide services that can be employed to assess consumers, however, it is also important for producers to visit the destination market and observe how consumers relate to food.

2. Going into production

I. Production and distribution

Understanding the production costs is critical but it needs to be assessed from the point of view of what your customer is willing to pay. Then the profit margin can be deduced by considering production costs by volume and other factors such as distribution costs.

Our research has shown that understanding the distribution channel is critical for successful exports. Disruption to the cold chain in destination cities is the biggest threat. Disruptions to this critical path can be caused by fragmented supply chains, inadequate infrastructure, complexity of interaction of chain members, long transport distances, transport mode changes, fluctuations in demand, lack of

standardisation of traceability systems, ineffective transport/storage technologies, absence of refrigerated facilities, lack of managerial skills, ignorant handlers, unskilled staff and misunderstandings, cultural differences, and so forth.

To manage these disruptions an exporter, producer can consider taking these steps (Zhang and Woodhead 2016):

- a. Walk the distribution channels – get to know where the food products are going, how they get there. Find out if the end customers are satisfied with produce that arrives from different distributors. Find out which distributors manage the premium produce, professionally and efficiently. They won't be the cheapest.
- b. Due diligence – At each step of the supply chain investigate each distribution business– beware of claims on web sites and certificates – delve deeper to get proof of qualifications and proficiency. If possible, get personal recommendations from other exporters.
- c. Quality control - Cold chain infrastructure is highly variable and many facilities in Asia are very basic with minimum temperate settings. Freezing or under cooling reduces shelf life and most likely will destroy the food. Visit the facilities and make sure that they are the ones used by that distributor – not a facade.
- d. Assess the range of freight companies on price, but also on their Australian and destination country networks, quality control and efficiency. Can they do test runs, will they provide monitoring data, can you track your product throughout the trip. How the product is transported depends on its perishable status, sea vs air. Who is best to undertake this service depends on their expertise in this area. The logistics company that is chosen should have a reasonable large footprint in the destination country. For example, Toll is big in Singapore, whereas Linfox has a bigger presence in Thailand and Vietnam. They should also have a reasonable large network in Australia that services your region to help manage inbound freight costs.
- e. When supplying export market, the importance of an effective quality management system along the chain is becoming vital. No matter how good your internal management system and how consistent your product quality, the product quality can change because of the extended physical distribution system for exporting. The extended physical distribution system means that there are additional demands on the storage, handling and transport, particularly for products with major quality concerns associated with perishability, damage and contamination.
- f. Use technology. While relationships are very important, technology can help to protect your premium produce and to trace where failures are occurring across the distribution system. Packaging innovations are reducing damage in transit and stop counterfeiting and adulteration.
- g. Monitor the distribution system. Monitor the distributors and measure customer satisfaction. Even if quality control is excellent, sometimes things go wrong. Fast problem solving is essential to maintain customer satisfaction. When enquiring about cold chain logistics providers the processor need to assess the:

- Age, quality and maintenance of refrigeration equipment
- How products are managed during packaging and transport
- The information technology systems and reporting systems
- Quality control measure of fresh products delivered and consumer expectations
- Timeliness – do the products arrive as scheduled
- Training and professional knowledge of logistics and warehouse personnel

Preparing to enter a market also requires consideration of your brand, which includes your products and your company. In today's market the ability of the consumer to trace the product is becoming more important. While Australia's advantage is the clean, green position, that needs to be explained through a range of medium, packaging, internet, personal connections and responsiveness to consumer enquiries.

One issue that wholesalers and retailers are always focused on is the reliability of the supplier. Fluctuations in the quality of the supply need to be reduced – consistent quality produce is essential. If this is managed, then the transaction cost of maintaining the relationship should be minimal. The relationship with the supplier extends beyond the quality of the product. Building a relationship, either directly with a retail outlet or with a distributor that responds quickly, also means that the supplier in Australia needs to respond quickly.

Sharing the tasks, through growers' co-operatives has some potential benefits in the export arena, in that the quality control and management of export operations can be shared across a team of growers. Further growers of some crops can stagger production and thereby maintain a more consistent supply. There are a range of other growth and management strategies that are discussed in the next section.

3. Growth strategies

I. Sharing resources

Producers and processors can take steps to identify where resources should be allocated to export operations. Sharing resources, such as cold storage or packing houses can accelerate the development of premium food and exporting value adding, services and expertise, by

- enabling agribusinesses to reduce capital investment
- creating an environment for shared learning and resources among the food service sector, processors, exporters and so forth

II. Investment risks and strategies

Financial risks include expected return on investment not being realised and can stem from a range of risks such as market risks from competitors or changes in

consumer preferences, inability to supply consistently, unexpected rises in costs of production or supply chain. For existing growers in the region, potential ways to participate in the development and raise finance to facilitate vertical or horizontal expansion needed to access high value export markets include:

- c. Increased bank finance;
- d. Off-farm investment/partnering with investors from outside the region; or
- e. Pooling resources through an arrangement such as strategic joint venture or cooperative.

It may be possible to share the financial risk of expansion with an off-farm investment partner. This will normally require some changes to business structure and governance arrangements. For example, the establishment of a board of directors and increased financial reporting requirements.

Vertical/value chain expansion of farming enterprises - There is an emerging class of investor that is looking more closely at investment arrangements with family farms as an option to outright acquisition. Equity finance and passive joint ventures are types of arrangements between the existing owners and investors where control and ownership of the farming enterprise is shared between the parties.

These options would require the existing owners to consider becoming shareholders in the enterprise rather than being sole owners. The continued involvement of the farmers can be viewed by the investor as reducing their risk in the knowledge that the grower has the local experience and required skill to manage production. Taking on investors will undoubtedly be more complex to manage, but it also offers the opportunity to significantly expand the scale of the business.

There are three main types of investors in Australian agriculture:

- Institutional investors such as superannuation, agricultural or private equity funds
- Private investors including high net worth individuals and family offices
- Strategic or corporate investors interested in securing supply

Investors may be domestic or international, with the majority of international investment coming from North America, Europe and Asia. The scale of investments ranges from \$3-25 million for private investors, through to \$250 million or more for large institutional investments.

Private equity funds tend to invest for periods of between four and seven years, and they are often used in the development of food and beverage manufacturing, especially for branded products. Superannuation funds and corporate investors are likely to invest for longer terms. Smaller investors could include Self-Managed Superannuation Funds or producers from other regions wanting to diversify through investment partnerships. The process of matching investors to farms is managed by agricultural investment professionals who hold knowledge of both groups of stakeholders.

Some investors, particularly strategic or supply line investors may present opportunities to form a strategic joint venture. Under these arrangements the

grower and one or more parties agree to pool their resources for the purpose of accomplishing a specific business activity.

Strategic joint ventures and other forms of business collaboration could, if embraced, provide opportunities for the region's producers to share storage and packing infrastructure, increase market access for regional products and develop value-adding facilities. Collaborative business models can take many forms ranging from informal arrangements between neighbours, supply contracts, joint ventures, through to the formation of formal cooperative enterprises. Many of the growers in the region that we interviewed expressed a preference for working in partnership with known locals rather than unknown investors. The potential for the formation of grower collectives in the QMDB area is still rudimentary with only ad hoc discussions occurring and almost no real structured plans in place to market products. It is possible that such groups may form in response to the needs of investment.

Building on the research undertaken in the QMDB project, we suggest engagement mechanism that incorporates adaptation scenarios. With all complex problems, regular 'sense making' is required. Decisions and analytical processes are dependent on available data and expert informants. As emergent issues are considered, refinements are made. Therefore, the above presents a proposed route, but not a blue print.

Conclusion

While the horticultural sector in the QMDB is excited by the new 'Asian export opportunities' there is also concern across the sector about the export risks and their ability to develop and expand the sector. The complexity of exporting and the limits of existing processing facilities, technology, skills and export expertise are barriers to growth.

In this final USQ report for the QMDB, we have acknowledged that the development of the horticultural sector will be slow without co-development of grower skills, investment and alignment of packaging, processing and export sectors.

Bringing farmers and companies to work together is always challenging. SME and corporates have very different business cultures and access to resources. Historically Australian farmers have exported commodities, however, the Asian dining boom, a low Australian dollar and faltering domestic demand present a stronger case for collaborative export processing and value adding. In this instance new, young leadership in the farming community and food entrepreneurs will be essential for the development of new business models suited to the new economy.

Possibilities exist for Australian agribusinesses to share resources and build competitiveness. However, successful exporting also requires that agribusiness engage with the destination country and understand how their product is distributed and continually monitor the consumers of the produce to ensure they are receiving high quality produce, consistently.

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