Investigating the physical supply chain to improve transport efficiency

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Supply Chain STO

Project Number: VG13084

VG13084

This report is published by Horticulture Innovation Australia Ltd to pass on information concerning horticultural research and development undertaken for the vegetables industry.

The research contained in this report was funded by Horticulture Innovation Australia Ltd with the financial support of the vegetables industry.

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ISBN 0 7341 3458 4

Published and distributed by:
Horticulture Innovation Australia Ltd
Level 8
1 Chifley Square
Sydney NSW 2000
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Keywords

Supply Chain, Value Chain, Distribution Channels, Supply, Demand, Utility, Consolidation, Transport, Transport Policy, Retail, Wholesale, Global Trends, Transnational Procurement, Producer Clubs.

Summary of Findings

1. Supermarkets (ALDI, Coles, Woolworths) and Independent Grocery (FoodWorks, IGA, SPAR) control most of the sales of fresh and processed vegetables.

The supply chains into the larger organisations are increasingly efficient and effective. If there are any cost efficiencies created in these supply chains the retailers tend to extract almost all of the savings. They then attempt to hold onto as much of this value but competitive pressures see much of it leaking to consumers.

2. There are structural inefficiencies in supply chains to smaller retailers.

Anything that moves through the wholesale markets will have to bear the costs of the system. The role of the market to mediate between supply and demand is still important. Given the large number of independent greengrocers and the size of the hospitality sector, it is likely that the markets will remain for some time to come. As the amount of produce going via Distribution Centres (DCs) increases, pressure on the financial viability of the merchant/wholesale sector will also increase.

3. There are structural impediments in export supply chains.

The degree of handling of full containers and unit load devices (ULDs) prior to export is inefficient. The inefficiencies at ports are driven by the structure of relationships between stevedores and shipping companies and by the loading and unloading monopoly that stevedores have on individual vessels.

It is unlikely that growers, or their peak industry bodies, can influence change in these areas. Furthermore, given that fresh produce represents such a small proportion of exports, and that the exporter, in many cases is not the grower, the effect of any change may not filter back to growers anyway.

4. More efficient supply chains do not translate into improved grower profits.

Vegetable supply chains are complex. In most cases, vegetable growers have no control of their produce once it exits the farm gate. This means that growers have little or no control of the supply chain. They have no real influence over the effectiveness or the efficiency of the total supply chain and unless they vertically integrate in to wholesale or retail roles, they will continue to have very little influence. If the grower wants to capture more value from the supply chain, the grower has to do something more than just grow produce.

5. Fundamental economics must be understood.

Understanding that consumers frequently value having the product in the right place at the right time, more than they value the product may seem counter-intuitive. The fact that consumers buy at stores and not at farms proves the value of time and place. Growers will always be price takers, unless they add value.

The paradox of high prices when supply cannot meet demand, regardless of quality (and the reverse), are a fact of life for producers of commodities. Improving the quantity and quality of product into the market may increase end-user satisfaction but this alone will not increase demand. In fact, demand may decrease and adversely effect grower returns.

6. Reliable data is a big problem.

The Australian Bureau of Statistics (ABS) produces large amounts of agricultural data every year. With the exception of Potatoes, Tomatoes, Mushrooms, Melons, Onions and Carrots, the data for vegetables is very poor.

7. Marketing costs (the difference between Gross Value of Production (GVP) and Local Value of Production (LVP) seem to move independently of GVP.

Our analysis indicates that regardless of the movement in the GVP, the grower loses. Marketing Costs appear to rise faster and fall slower than the GVP.

8. Grower numbers across all commodities appear to be declining.

The number of smaller growers is reducing and the number of larger growers is increasing.

9. Vegetables are predominately transported by road.

Vegetables are only transported by rail when the journey is very long (roughly over 1,500 km's). Predominately this is on the Eastern State-Perth route and the Melbourne-Brisbane route. Some produce does move from Far North Queensland and The Northern Territory, to the southern states. Sea freight movements are required across the Bass Strait.

10. Access to specialised transport equipment can be problematic.

Access to refrigerated containers and trucks can be problematic, especially in summer. The seasonal nature of fresh produce can also exacerbate access. Unfortunately, on a large hot continent, this can be difficult to avoid, even with careful planning.

11. Shipping is vital to Tasmanian growers and processors.

The Federal Government has yet to provide a formal response to the Productivity Commission (PC) report into the Tasmania Freight Equalisation Scheme (TFES).

12. Shipping calls out of Perth have reduced.

This is due to a softening in demand and the use of larger ships.

13. The Federal Governments plan on airfreight security is being re-cast.

The previous government was about to instigate a scheme that would affect airfreight exports significantly. The change of government has seen this process stall as the new Minister has asked for alternatives to be investigated.

14. Road transport regulations are likely to get tougher.

Australian truck drivers work some of the longest hours of any developed nations. Our trucks are heavier and longer than most other countries. Road safety is a priority and regulations around Fatigue Management (FM) and Chain of Responsibility (CoR) appear to be getting stricter.

15. Globally, large retail is consolidating.

Australia is already heavily consolidated given the size and market share of Coles and Woolworths. However, new entrants such as ALDI and, to a lesser extent Costco, will have an impact on the market. As this competition is likely to result in price pressure, growers may not see increased prices.

16. Value adding is continuing to proliferate.

The increase in number and acceptance of pre-packed products, especially in supermarkets, is obvious. Private Label continues to gain in market share.

17. The wholesale sector is consolidating.

Anecdotally, the number of wholesalers is decreasing. Larger groups such as Costa and Moraitis have backward integrated into growing. They also provide more sophisticated services such as category management and inventory management to their large supermarket clients.

18. Farming is consolidating

Internationally, farming in developed economies is becoming corporatised. Farms are getting bigger and growers are becoming fewer. These trends are also visible in Australia and if the newspapers are to be believed all Australian farms will be in the hands of overseas investors before long.

Summary of Recommendations

1. Develop extension material that explains basic economics.

Understanding the role of basic economic and how it influences grower profitability is vital for long-term success.

2. Develop extension material that explains basic supply chain structures.

Vegetable supply chains are complex. As growers cede control they are further disconnected from the market.

A workshop or roadshow to addresses recommendation 1 and 2 should tour the major growing regions to educate levy payers.

3. Develop a data requirements statement.

There is insufficient data available for decision-making and planning purposes.

4. Investigate marketing costs.

Growers seem to be losing no matter which way the GVP moves.

5. Monitor the TFES.

This is providing some relief to Tasmania growers and processors. If it is to change, Ausveg should be on the ”front-foot”.

6. Monitor changes to airfreight security.

Again, changes that may disadvantage vegetable exports are distinctly possible, Ausveg must be fully informed to limit any damage to growers. Close liaison with the Office of Transport Security (OTS) at the federal Department of Infrastructure and Regional Development (DITR) is recommended.

7. Develop industry extension plans and training on transport regulations.

We strongly recommend that Ausveg develop extension material for growers to keep them informed of their responsibilities under Chain of Responsibility (CoR).

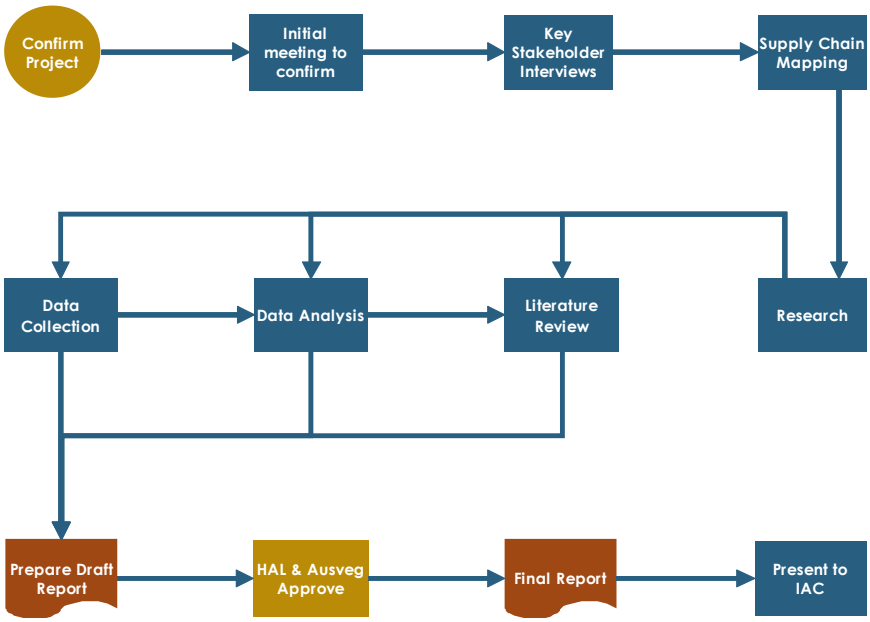
Furthermore, we suggest that it is in the interest of the industry to be regarded as good corporate citizens rather than to seek special treatment.

Methodology

The methodology for this project is outlined in Figure 1. The key phases are:

1. Stakeholder Interviews;
2. Supply Chain Mapping;
3. Research;
    a. Data collection,
    b. Data Analysis,
    c. Literature Review.

Figure 1: Methodology



On completion of these phases, a draft report was produced and once approved by Ausveg and HAL, a Final Report was delivered. A presentation of the findings and recommendations, to the industry advisory committee was the final task of the project.

Outputs

The tender brief for this project (HAL, 2013) stated the following outputs:

1. A map or diagram of the current infrastructure for transporting Australian leviable vegetables from the grower to end user in Australia and export markets. This should include all modes of transport.
2. Report detailing findings from extensive consultation with all sectors of the supply chain involved in the transportation of fresh vegetables, including regulatory authorities particularly where there are seen to be bottlenecks or other inefficiencies.
3. Recommend improvements throughout the value chain that could deliver lower wastage levels, higher quality product and subsequently greater profitability through more efficient processes.
4. Outline of the extension activities for information transfer and adoption of the recommendations.

Output one is addressed in the section entitled Distribution Channel Identification and in a separate document that provides a large-scale map of Australia indicating the major transport routes and vegetable growing regions. Given the physical size required to make the map legible, it is provided as a separate document.

Output two, three and four are addressed in the body of the report.

Outcomes

The tender brief for this project stated the following:

> *Fresh produce will be delivered on time, cost effectively and at optimal quality when it reaches the end user, resulting in less waste along the whole supply chain and improved consumer satisfaction with Australian vegetables leading to increased demand and greater profitability for Australian growers* (HAL, 2013).

The consultant requested clarification on the stated outcome and received the following response:

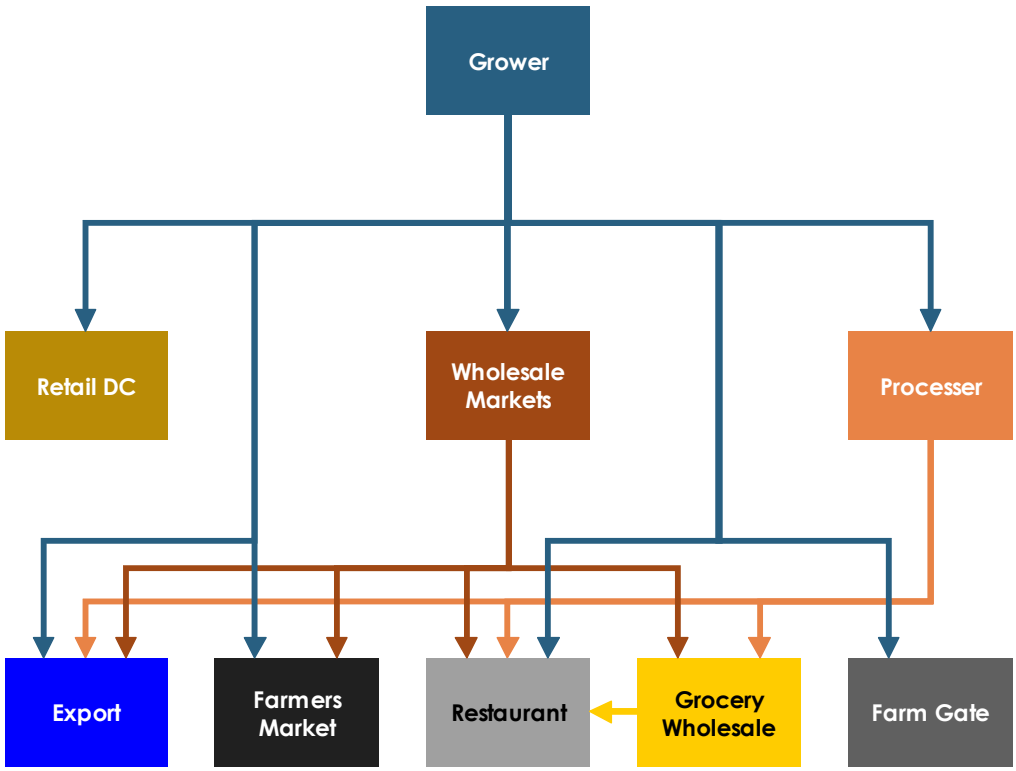
> *This is a preliminary project to map the current logistics for getting fresh produce to market. It is anticipated that the report will identify opportunities to improve efficiencies along the supply chain and will include recommendations that can be addressed either through industry representation to policy making and regulatory bodies, consultation or workshops with the relevant sector of the supply chain/transport industry and/or implementation of recommended process changes* (Lorimer, 2013).

Distribution Channel Identification

The consultants held discussions with growers, merchants, transport companies, retailers, food service organisations and peak industry bodies, in order to develop an overview of distribution channels. Earlier studies in other fields of horticulture (Supply Chain STO P/L, 2005), (Horticulture Supply Chain Services, 2009), (Supply Chain STO P/L, 2011) demonstrate that regardless of commodity or geographical location, a number of common distribution channels exist. Whilst there will be some differences from enterprise to enterprise, the same general activities take place, frequently in the same order.

Grower distribution channels are depicted in Figure 2. At the primary level, produce leaves the farm gate and is delivered to Retail DCs, Wholesale Markets or to Food Processors. This accounts for the vast majority of produce.

Figure 2: Major Distribution Channels



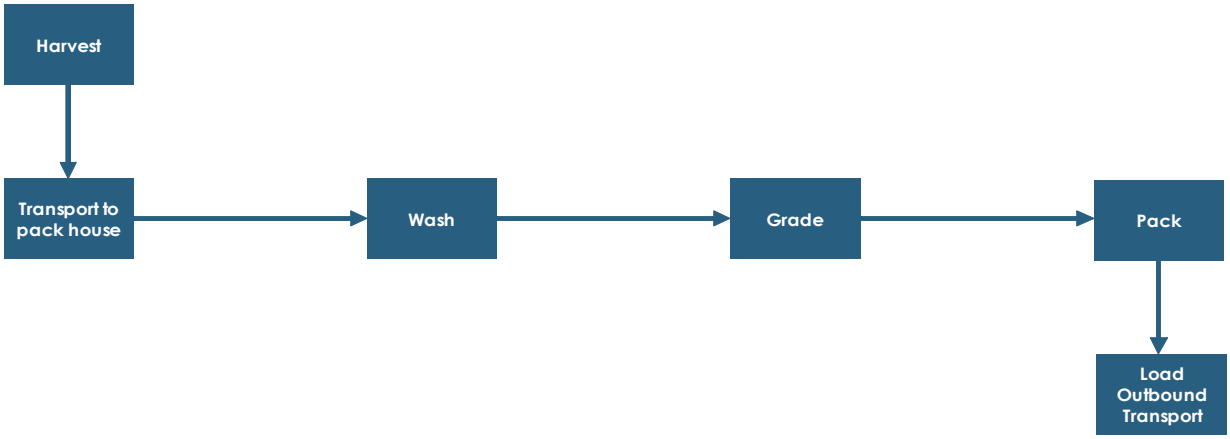
A small amount of fresh produce is exported. Australian exports for 2013-14 were valued at $272,979 million. All fruit and vegetables exports accounted for $2,426 million or less than 1 per cent of the total (ABS, 2014). Quantities find their way from the packing shed into Farmers Markets, Restaurant and Food Service and also to the Farm Gate. In order to understand areas for improvement in fresh produce supply chains, it is first necessary to identify them. The following sections disaggregate the distribution channels into logical sections.

We have used the colours in the diagram above to indicate the various players in vegetable supply chains and carry them forward in each chart.

Grower Activities

The distribution channel for fresh vegetables starts immediately after harvest. The activities shown in Figure 3 are common to virtually all commodities. Post harvest, the product is generally transported back to a packing shed. Produce may be washed (or brushed), graded, packed and frequently chilled, depending on requirements. These activities are not considered food processing, as they do not transform the product. Processes that transform the product are addressed in the Processer Activities section of this report.

Figure 3: Grower Activities



When an order is completed, a vehicle will be loaded. Commonly, belonging to a third-party transport organisation, less frequently, a grower-owned vehicle. Generally, this signals the end of the growers' physical involvement in the supply chain. This first activity is common to all distribution channels. The differences in each channel are outlined in the following.

Retail DCs

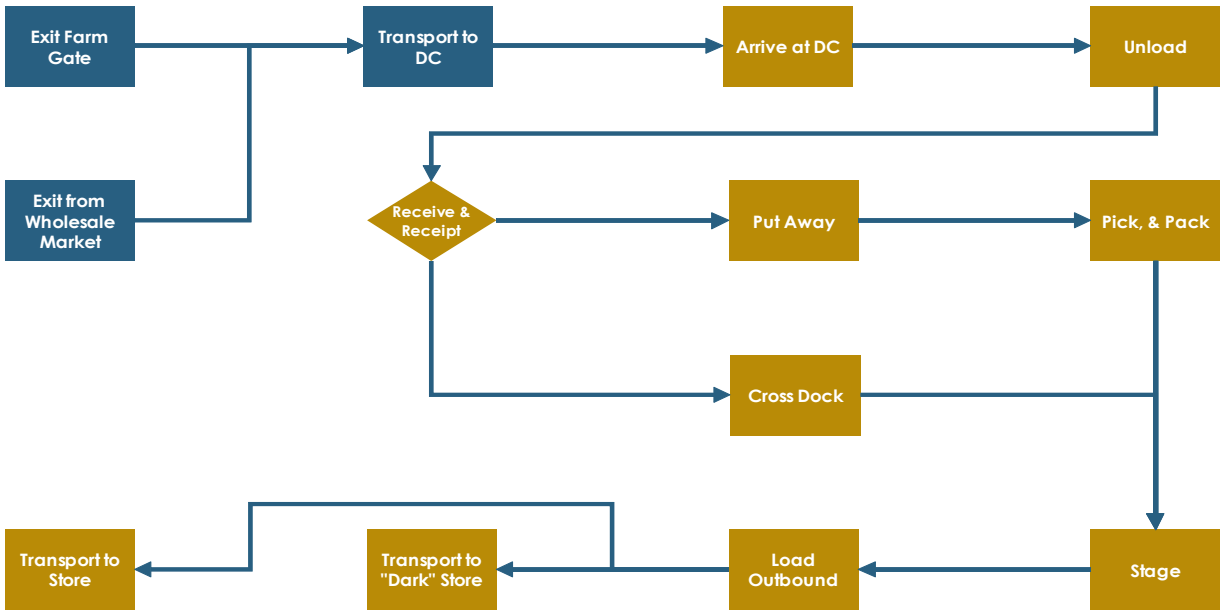
Produce that leaves the farm bound for supermarket DCs goes through a process detailed in Figure 4. Supermarkets also source from wholesale markets (see Figure 8). Ultimately, each channel ends up at a DC where the goods are unloaded. Retail DCs (Coles, Woolworths, ALDI, etc) are for all intents and purposes the equivalent of an "in house" wholesale division.

Once unloaded, the goods are receipted (formally recognised as having arrived, in the information management system) and received. Some produce is cross-docked – *"A DC that has the facility to transform an inbound load of goods into a number of outbound orders without the items being stocked…"* (Oakden & Leonaite, 2011) – into an outbound staging area.

Other produce may be put into storage for subsequent pick and pack. The DC dwell time for fresh produce is however, very short. Once packing is complete the goods are delivered to a staging area prior to loading.

Once the goods are loaded to outbound transport they are dispatched directly to a retail store, or a "Dark" store. *"It looks like a normal supermarket, complete with fruit and vegetables, meat and freshly baked bread, but there's one thing missing from Woolworths' newest store – the customers."* (Mitchell, Woolworths opens first online-only "dark" store, 2014). Woolworths store in Mascot, NSW is the first of its type in the country. It has been designed to specifically support its online business.

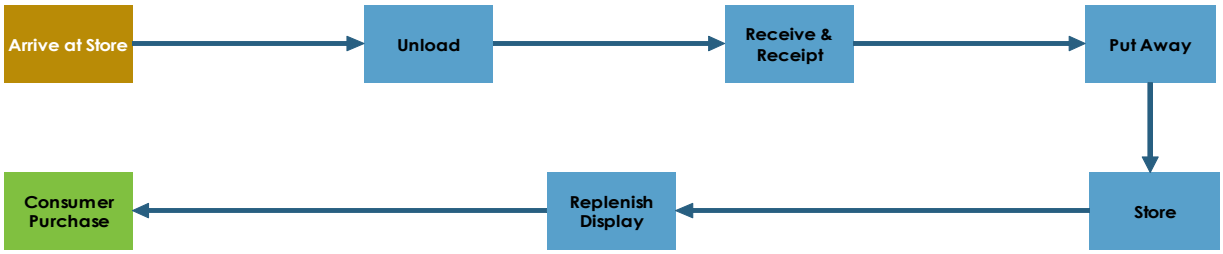
Figure 4: Retail DC



Retail Store Activities

When the vehicle arrives at the retail store, the goods are unloaded, received and receipted. They are usually put away into a storage area at the rear of the shop and shelves are replenished as required. The "night fill" takes place afterhours to ensure that the shelves are appropriately stocked for the start of business the next day. All that is now required is for the customer to go shopping.

Figure 5: Retail Store Activities

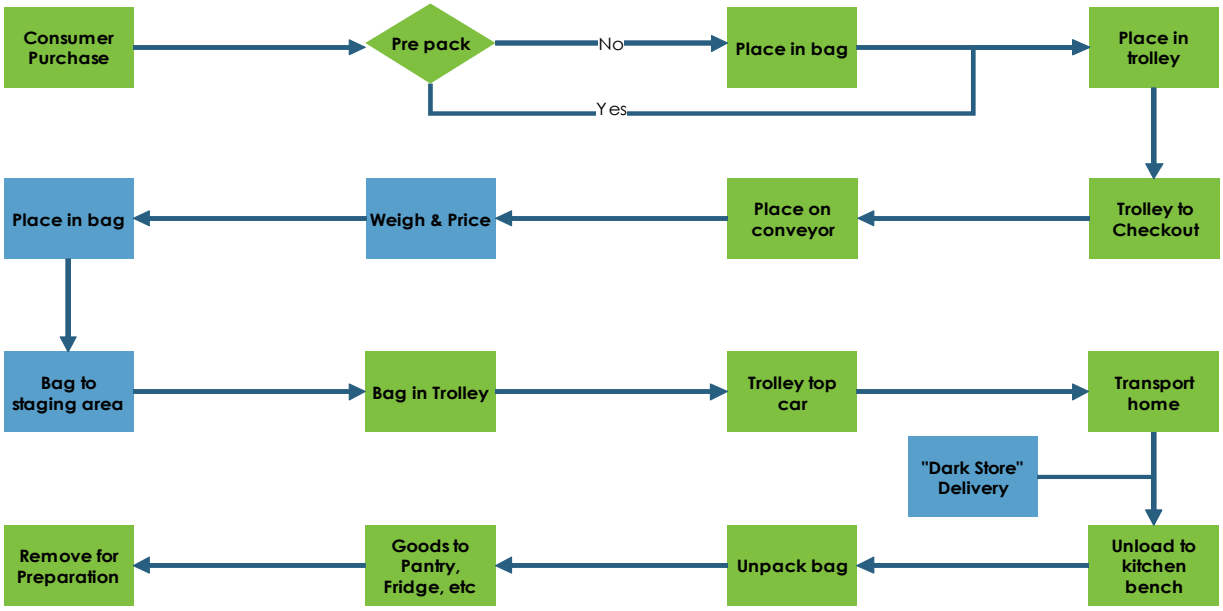


Customer Activities

The process of shopping (Figure 6) is rather more complicated than one might think. If the customer buys a pre-pack of salad leaves, for example, they will be placed directly into the shopping basket or trolley. If the customer buys a loose product, for example, Runner Beans, they will likely be bagged by the customer and than placed in the basket or trolley.

When the customer has finished shopping, the goods are brought to a checkout and placed on a check-out conveyor; a store member will weigh, scan and place the items into a shopping bag. When the bag is filled, it is placed in a staging area behind the cash register. The customer will likely place the bags in a trolley (for a large shop) and after paying for the goods, return to their vehicle.

Figure 6: Customer Activities



The shopping is placed in the car and transported back to the customers' home. The customer will generally unload the shopping bags to the kitchen (or if it is an online shop, the delivery driver may bring the goods to the kitchen (Figure 7). The bags will be unpacked and the goods stored in the pantry and fridge, etc. They will remain there until they are removed for preparation, or disposed of due to deterioration.

"Dark" Store Activities

As mentioned earlier, there is currently one "Dark" store in Australia, but more are sure to appear if the overseas experience is an indicator of future trends. Figure 7 outlines the activities in the "Dark" store. Essentially this is a combination of Figure 5 and Figure 6; store personnel are physically doing the customers shopping and all other customer functions, up to the point of bringing the goods into the customers' kitchen.

"Dark" store and online selling by the major supermarket chains presents a shift in the relationship between the customer and retailer. Should the retailer be out of stock of a particular item, they will provide a substitute product, unless the customer has specified that a substitution is not acceptable.

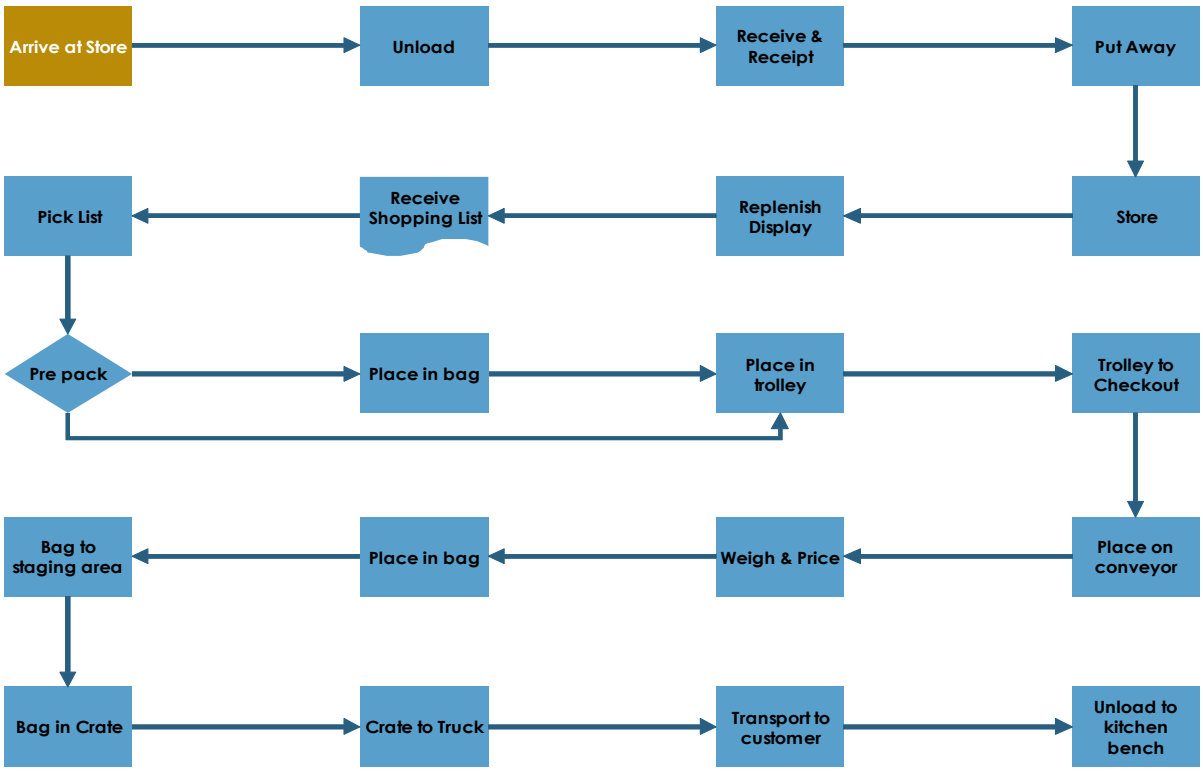
It seems likely that the retailer may select a substitute that provides the greatest profit – a private label product for instance (see Value Adding, page 54).

Wholesale Market Activities

Produce that leaves the farm bound for wholesale markets goes through the process outlined in Figure 8. Once the goods have arrived at the markets they are unloaded by an on-market unloading service. Depending on the terms of trade, the cost of unloading will be charged back to the grower by the merchant/wholesaler or absorbed by the merchant (the terms "merchant" and "wholesaler" are used interchangeably in this report). The goods are then delivered to the merchant's storage facility/selling floor. The goods will be received and receipted and then put away into storage.

Once the merchant has completed a sale the goods will be picked and packed and brought to a staging area. In general terms, buyers on the market arrange their own transport from the market.

Figure 7:"Dark" Store Activity



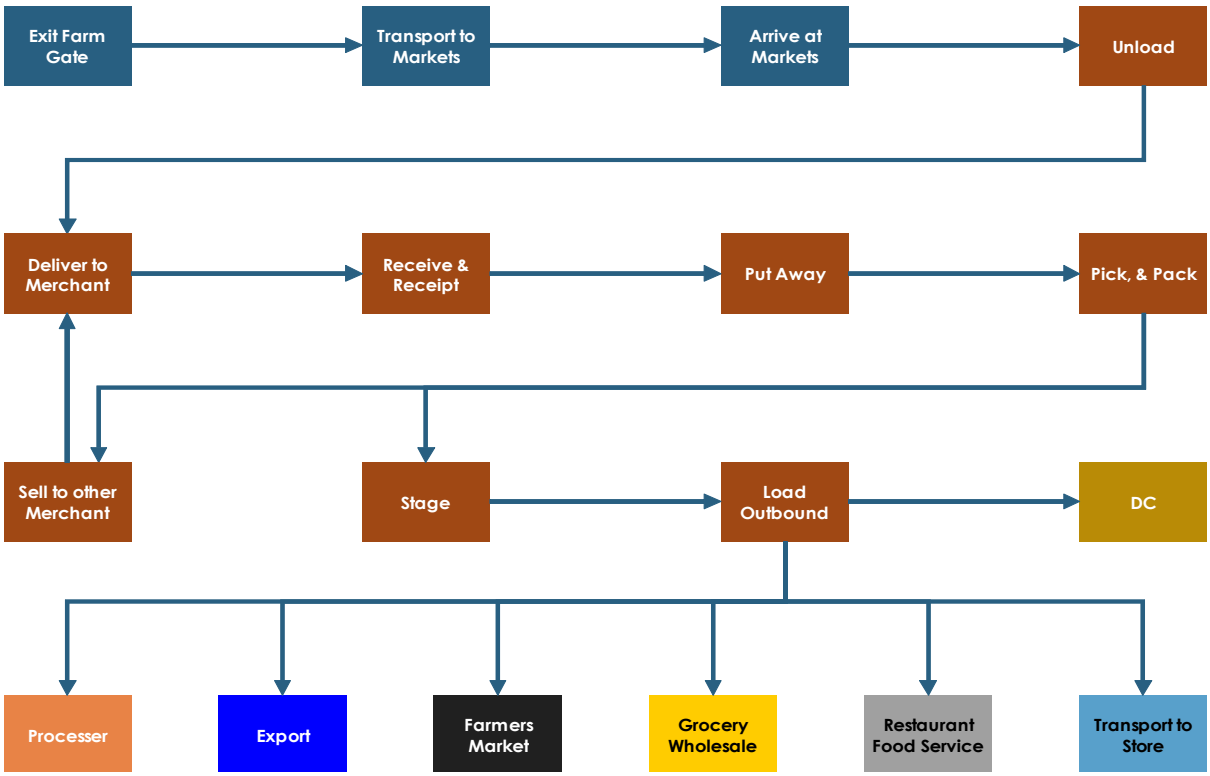
It is not unusual for merchants to trade with each other. In such cases, the goods may be sent to the second merchant (and go through the same handling process) or directly to the staging area. At the staging area, the goods are loaded on to outbound transport; from there they will be:

- Delivered to a Retail DC (Figure 4);
- Delivered to a Processer (Figure 9);
- Bound for Export (Figure 10);
- Bound for a Farmers Market (Figure 11);
- Bound for Restaurant/Food Service (Figure 12);
- Bound for a Grocery Wholesaler (Figure 14);
- Transported to a Retail store (Figure 5).

Processer Activities

Goods for Processing leave the farm gate and are transported to the Processer (food manufacturer). This can be for primary processing (washing and pre-packing), secondary processing (such as canning, jarring of sliced or diced produce, freezing, pickling, preserving, drying), or tertiary processing that includes transforming the produce into complex products (including meals). Secondary and tertiary processing differs from primary processing in that the finished product has a significant shelf life. Another important difference is that, very frequently, they are branded goods.

Figure 8: Wholesale Market Activities



Once the produce arrives at the processing facility, it will be unloaded, receipted and received. At this point, the produce may be graded (size, weight, ripeness, etc.) and decisions regarding processing methods may be made (e.g. suitable for juicing only).

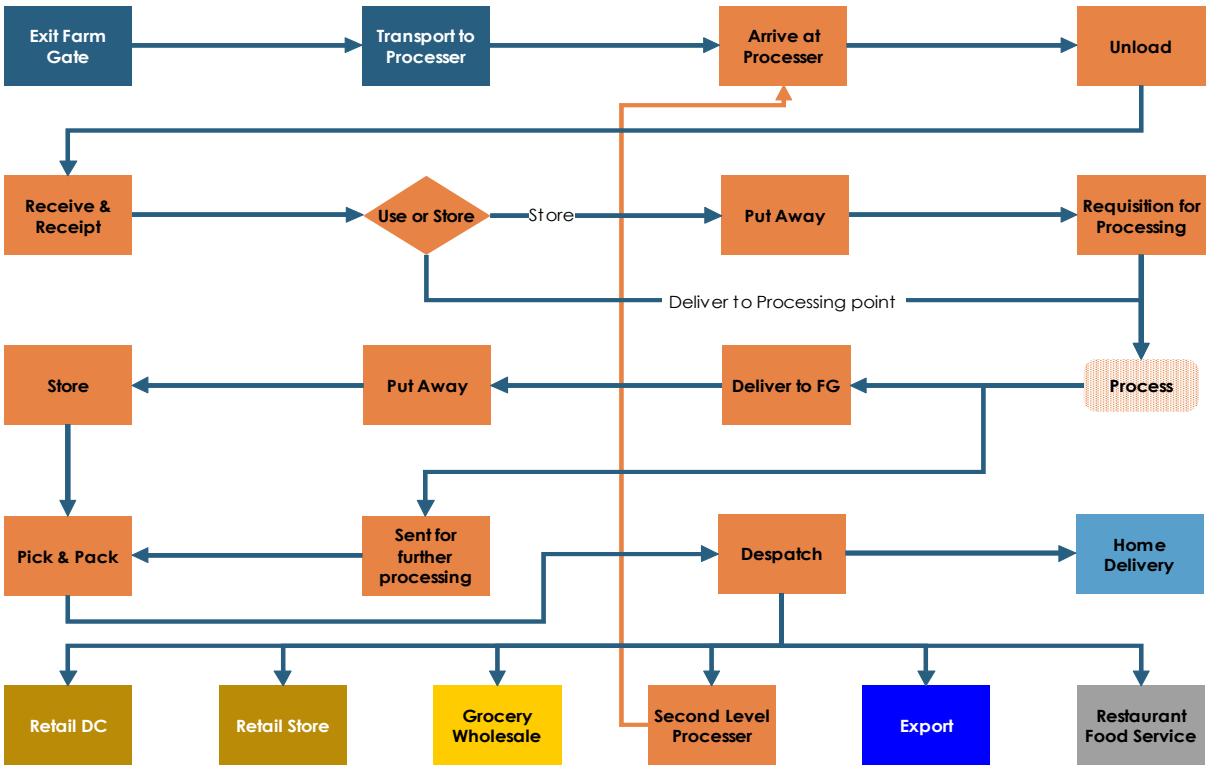
If the produce is to be processed immediately it will go straight to the processing point, otherwise it will be placed into storage where it will be requisitioned for further processing at a later time.

Once the processing is complete (the process includes transformation and packaging into finished goods (FG), the product will be delivered to a FG warehouse, where it will be put away and stored, or it may be sent for further processing (in-house) or to a third-party. When an order is received for the goods, they will be picked, packed and dispatched.

Typically, processed produce will be:

- Delivered to a Retail DC (Figure 4);
- Delivered to a Retail Store (Figure 5);
- Delivered to a Grocery Wholesaler (Figure 14);
- Delivered to a Secondary Processer (Figure 9);
- Bound for Export (Figure 10);
- Bound for Restaurant/Food Service (Figure 12).

Figure 9: Processer Activities



Export Activities

Goods for export travel either by airfreight or sea freight. Data for the second half of 2012 valued fruit and vegetable exports at $1,125 million (ABS, 2014). During the same period estimates for airfreight exports were approximately $40 million (see Table 4). These estimates suggest that 96 per cent of exports travel as sea freight whilst 4 per cent travel by air. Generally they are exported by one of the following supply chain participants:

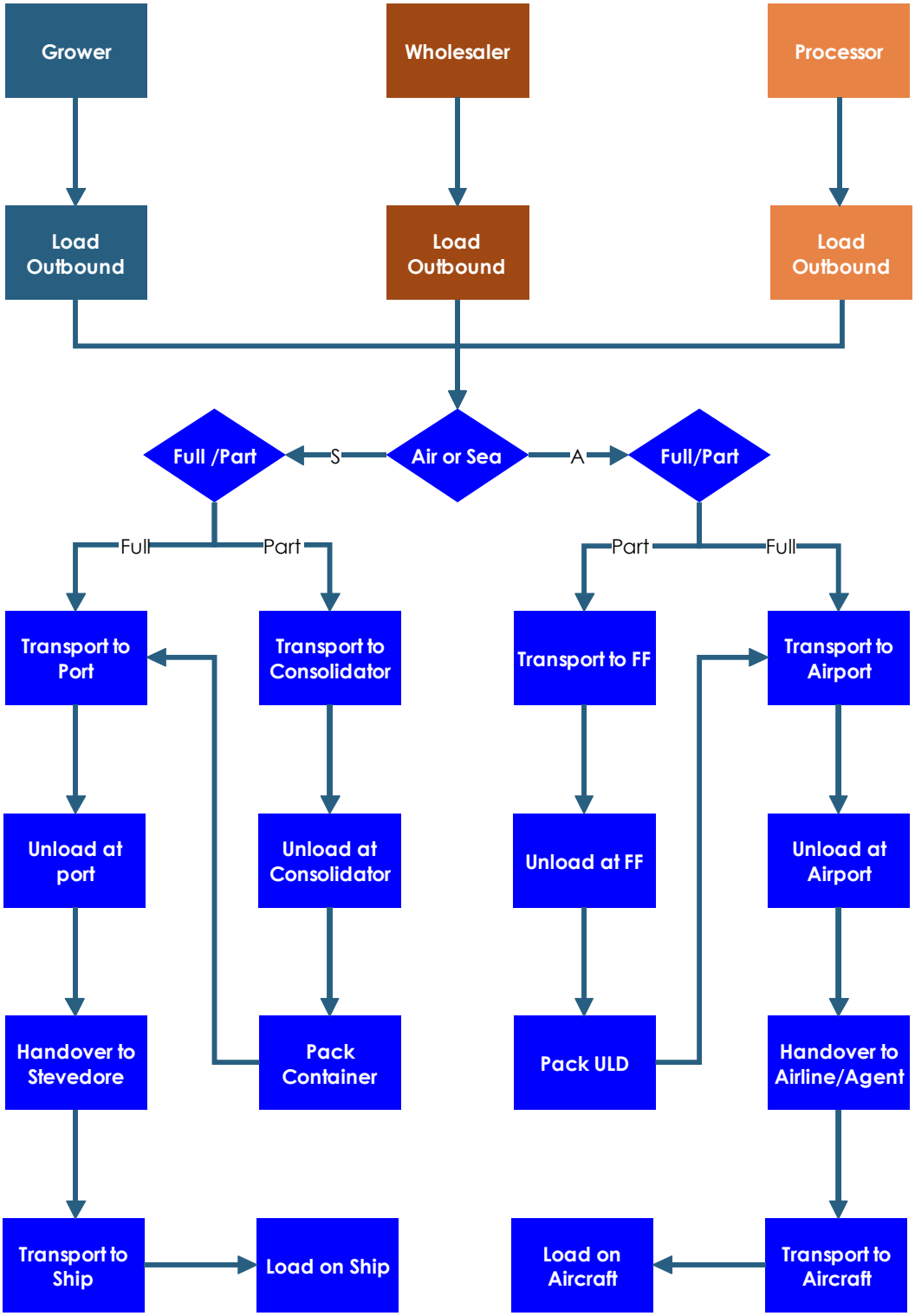
- The Grower (see Figure 3 for originating activities);
- The Merchant (see Figure 8 for originating activities);
- The Processer (see Figure 9 for originating activities).

Once the exporting party has loaded the product onto an outbound vehicle the goods take slightly different routes depending on the mode of transport (air or sea) and the size of the load.

Sea Freight

In general terms, a fully loaded sea container (20' or 40') will be transported to the port, were it is unloaded and handed over to a stevedore. The stevedore is responsible for transporting the container alongside the vessel and loading it on to the ship. In reality, many full containers are picked up and brought back to the freight forwarders yard (or their haulage contractors yard). Were they are unloaded and held for a short period of time. They will be re-loaded on to larger trucks (B-doubles) that can carry two 40' or four 20' containers. These larger vehicles can usually only operate in the port precinct and are a more efficient method of delivering containers onto the port.

Figure 10: Export Activities



This system has developed largely due to the inability of stevedoring companies to be effective and efficient. For example, if a freight forwarder or haulage contractor has a timeslot to deliver a container, to the port and they are late, they have to pay a charge for missing the slot. If the stevedore causes a delay, the hauler is unable to charge them.

This imbalance exists because stevedoring companies initially had a monopoly on providing port services. Whilst many of the major ports have more than one stevedore operating, the stevedores are contracted to the ship owner. The monopoly still exists. If one wants a container on a particular ship one does not have a choice of stevedore.

The New South Wales state government addressed this imbalance. If stevedores do not achieve certain operational standards as outlined in the Ports and Maritime Administration Regulation 2012 (NSW, 2014), they incur a financial penalty, which must be paid to the hauler.

There are also demurrage and detention charges applied - when trucks are detained (and containers are retained) beyond a specified loading or unloading time (APICS, 1998).

If the consignment is less than a full load it will have to be consolidated. Rather than going direct to the port, the goods will have to be transported to the consolidating point. The consolidator (usually the freight forwarder or their haulage contractor) will combine these goods with goods from other sources, in order to fill a container. On completion, the container is taken to port and treated as a full container, described in the preceding passage.

Air Freight

A fully loaded ULD - a pallet or container used to load freight (IATA, 2014) would normally be transported directly to the airport whereupon it would be unloaded from the vehicle.

It would then be passed over to the airline (or their handling agent), transported to the aircraft at the appropriate time and then loaded onto the aircraft.

If the goods do not constitute a full ULD, they will have to be consolidated. In which case they would be transported to the freight forwarder (or their agent) unloaded, and consolidated into a full ULD. This full ULD would then follow the same process as described for a fully loaded ULD.

Farmers Market Activities

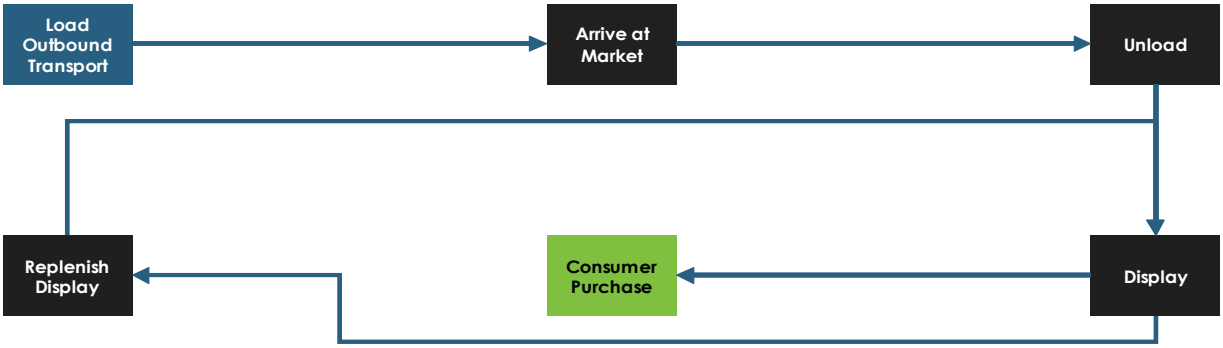
The Australian Farmers Markets Association (AFMA) web site contains a host of definitions and recommendations as to who should and should not be present at a farmers' market (AFMA, 2014). Rather unsurprisingly re-sellers and agents are on the "not recommended" list.

This is an effort to maintain the idea that the sellers are the grower, hunter, value-adder or gatherer of the products for sale – provided, of course, they have not been gathered from a wholesale market.

Whilst this is an admirable ideal, frequently farmers' markets are something else entirely. They usually include all types of food stalls, at least one barista, a children's jumping castle, a petting zoo, a butcher, a baker and produce vendors. Sometimes these vendors grew the produce for sale. Frequently, it seems that the vendors are market wholesalers or are customers of market wholesalers.

Figure 11 assumes the AFMA model. A grower will load produce at their farm, arrive at a market, unload and display their produce. When the customer purchases the product they follow an abbreviated version of Figure 6 and the grower will replenish the stall display.

Figure 11: Farmers Market Activities



However, evidence suggests that intermediaries in fact, sell a large quantity of produce sold at Farmers' Markets. They may be a wholesaler, or someone that has purchased goods from the wholesale markets. If this is indeed the case, the produce will have followed the activities in Figure 8 to get to the market.

Restaurant Activities

The restaurant business is vast. The ABS estimates that in Australia there were over 80,000 establishments in the Accommodation and Food Services sector at the end of 2112-13 (ABS, 2014). Restaurants can be classified into four broad categories:

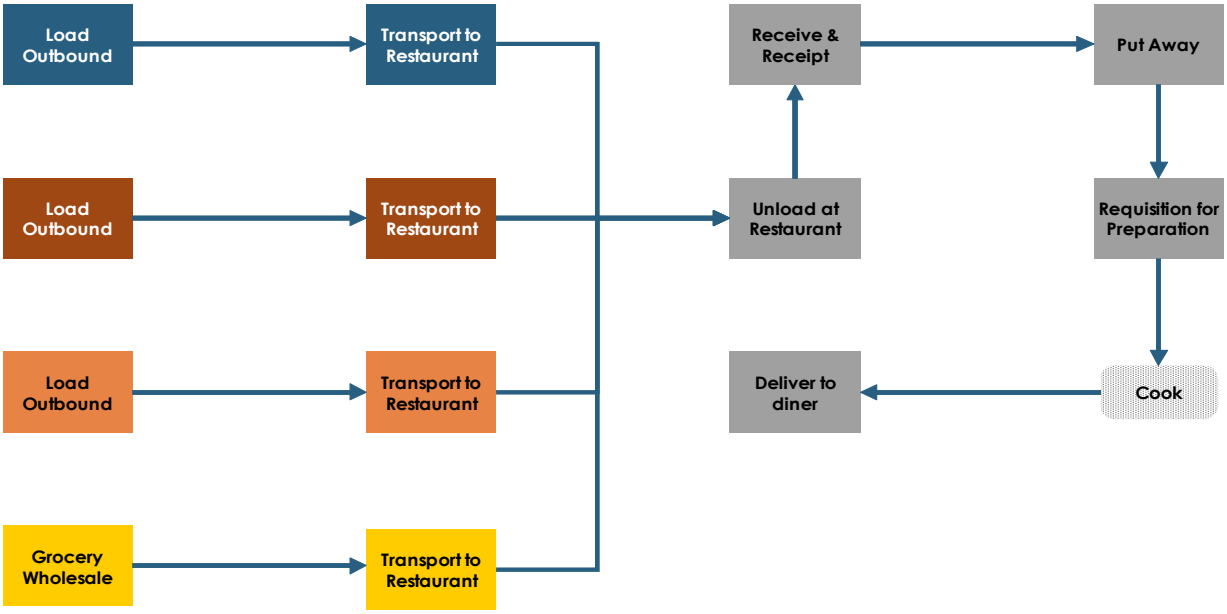
- Quick Service Restaurants (QSRs);
  - McDonald's, Pizza Hut, Red Rooster.
- Limited-service Restaurants (LSRs);
  - Coffee Club, Grill'd, Guzman Y Gomez, Mad Mex.
- Casual;
  - Local take away (Thai, Indian, Italian, Fish and Chips),
  - Bistro, Pub, Club, Café.
- Fine Dining;
  - 10 William St, 85 Miskin St, Akachocin, and many others.

Figure 12 attempts a brief overview of the sector. All of these organisations use fresh produce. QSRs, McDonald's for example, source lettuce and onion (the two main fresh vegetables they use) through a third-party. The third-party provider will purchase, prepare (shred or slice) to their specification and deliver the goods to their logistics providers DC. In turn, the logistics provider delivers to the individual outlets.

LSRs behave in a similar manner. The scope of their operations generally reflects their sophistication. Large operations such as the Retail Food Group (bb's café, Michel's Patisserie, Pizza Capers) and Collins Foods Limited (operate Sizzler Australia wide and KFC in Queensland, Western Australia and the Northern Territory) generally specify that the fresh produce used in their operations is prepared off-site and largely, ready to serve or use.

Most Casual Dining establishments are single operating outlets. They tend to have developed relationships with a small number of merchants at wholesale markets. They may make daily trips to the wholesale markets. Any processed vegetables are usually sourced through Grocery Wholesalers, see Figure 14 (or Food Service/Providore organisations).

Figure 12: Restaurant Activities

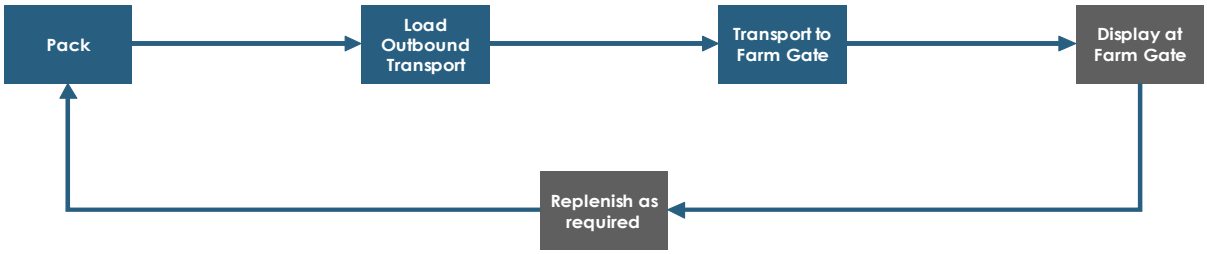


Fine Dining restaurants are the most likely establishments to have direct contact with growers. Frequently, their menus contain information on the provenance of ingredients, including facts such as organic or biodynamic status. Much of the emphasis tends to be on animal products. This may assure the diner that the animal lived a happy and healthy life on the way to the plate.

Farm Gate Activities

Farm gate purchases are widespread. In many parts of the country, the "honesty" box still has a place. There is no data available on the value of this channel. As it is carried out on a cash basis, it seems reasonable to assume that data will not be available for the foreseeable future. The distribution channel is very simple and depicted at Figure 13.

Figure 13: Farm Gate Activities



Grocery Wholesaler Activities

For the purpose of this report, Grocery Wholesalers excludes the large supermarket chains (Coles, Woolworths, ALDI and Costco) and the Independent Grocery Sector (IGA, SPAR). The grocery sector is reviewed later in this report.

The variety of grocery wholesaling business operations is surprising. Many of these businesses are classified somewhat differently to traditional grocery wholesaling and can be classified as:

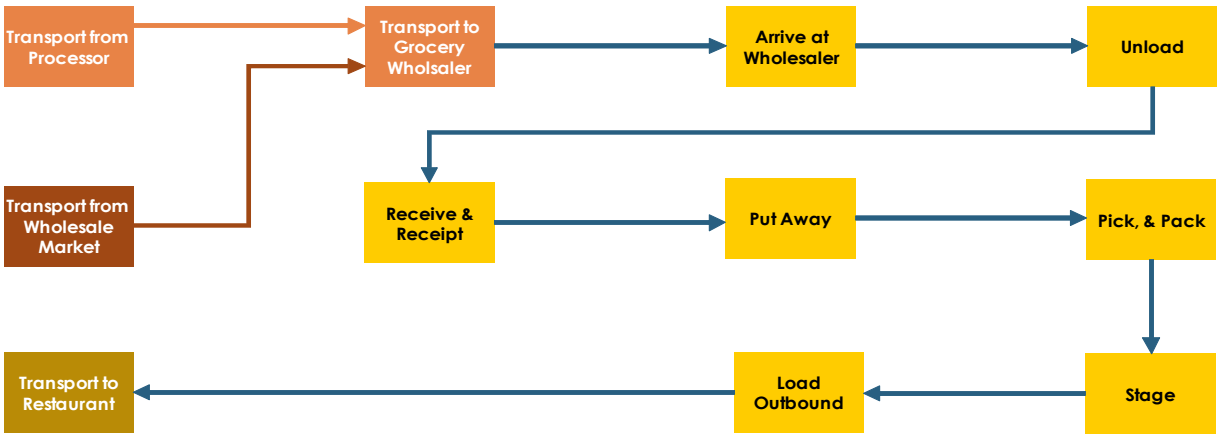
- Food Service;
  - Organisations that supply ingredients and finished goods to the Restaurant sector (see Restaurant Activities, p 21).
  - Usually these goods are packaged and can be dry, canned, frozen or chilled. Some of these organisations may also provide fresh produce, cheese, meat and fish; however, this is the exception rather than the rule.
- Providores;
  - The historical description for organisations that supplied ships.
  - In current times, "providore" tends to identify an organisation that trades in specialty products. Typically they will supply to higher end restaurants, hotels, etc.

Where any of these organisations are involved in distribution of fresh produce, it is generally sourced from wholesale markets rather than direct from growers. Other processed vegetable products would be sourced from Processers. The general activities are described in Figure 14.

Goods arrive at the Grocery Wholesaler from the identified sources. They are unloaded, received, receipted and put away.

When the Grocery Wholesaler receives an order the goods are picked, packed and staged. From that point they are loaded onto a delivery vehicle and delivered to the restaurant.

Figure 14: Grocery Wholesaler Activities



The Role of Economics

All commodities are subject to the laws of supply and demand. Growers know that prices drop in times of oversupply. Frequently, in times of oversupply product quality is very good. The problem of oversupply is generally caused by an excellent growing season with very high yields.

When demand outstrips supply, prices rise. If demand greatly outstrips supply, prices can rise, even as quality drops. Vegetable growers are price takers and unless something changes, they will remain so.

It is worth returning to and considering the Outcome of the project specified in the tender documents.

> *Fresh produce will be delivered on time, cost effectively and at optimal quality when it reaches the end user, resulting in less waste along the whole supply chain and improved consumer satisfaction with Australian vegetables leading to increased demand and greater profitability for Australian growers.* (HAL, 2013).

The tender document also stated that an Output would be:

> *Recommend improvements throughout the value chain that could deliver lower wastage levels, higher quality product and subsequently greater profitability through more efficient processes.* (HAL, 2013).

Of the first statement, growers can only control "optimal quality" as far as the farm gate. Once the product has left the farm, the grower has effectively lost control of quality (assumes 3rd part transport provider)

Furthermore, the grower cannot control the timeliness of delivery (assuming a 3rd party transport provider), nor can the grower control the cost effectiveness of transport (unless it is the growers vehicle).

Both of quotations presume lower wastage will equate to greater demand and profitability. This may well be the case, but we would offer a contrary view.

If a greater volume of produce (regardless of quality) reaches the market, supply and demand will do what supply and demand have always done. The grower may get less revenue per unit, in fact significantly less than the cost of production. During the course of this project it was reported that Queensland strawberry growers were receiving a price that was equivalent to 33 per cent of production costs, due to massive oversupply (ABC, 2014). Oversupply situations accompanied by grower losses are frequent experiences.

If customer satisfaction improves because quality improves and waste decreases, there is no reason to believe that the consumer will buy more. It may mean that they waste less because it deteriorates more slowly in their home, therefore they may actually buy less!

If processes that are not controlled by the grower become more efficient, there is no reason to believe that the grower will receive a share of the improvement. Capitalism, generally, does not work that way.

The *only* way that growers are likely to increase their returns (natural disasters to their competitors excluded) are:

- Monopoly;
    - Difficult to achieve legally,
    - Plant breeder rights only extend to variety.
- Co-operative selling;
    - Culturally difficult and some consumer law considerations.

- Develop a niche;
    - Must be big enough to be rewarding whilst being small enough to be unattractive to others.
- Get Big;
    - Develop economies of scale (not especially easy and may be capital intensive).
- Develop a brand;
    - But it won't be stocked in any of the major supermarket chains, so at least 50 per cent of the market is not accessible,
    - May get some traction at wholesale,
    - May need a distribution network,
    - Will need marketing.
- Export
    - Most promising if profitable markets can be found,
    - Also removes product from the local market, which may increase local prices,
    - If the work is left to an intermediary, the grower will receive the domestic market price.

Economic Utility

In order to be a price maker, an organisation must add-value, or in economic terms, it must posses some utility that a buyer desires. There are four types of economic utility (Stock & Lambert, 2001):

- Form;
    - A motor vehicle is the sum of its parts. A person might buy the individual parts and assemble a vehicle. Alternatively, a finished vehicle can be purchased. The form – a vehicle, normally has more value to an individual than the form – a collection of parts.
- Time;
    - Providing a product (or service) precisely when a customer requires it may create value that a customer will pay a premium to gain.
- Place;
    - Providing a product (or service) precisely where a customer requires it may create value that a customer will pay a premium to gain.
- Possession;
    - Allowing a customer to take ownership (not necessarily legal title) of a product, on credit, can create significant value.

Vegetables are commodities. Commodities, by definition are very simple in "form". Fresh vegetables in particular, undergo little or no transformation. Depending on the product, a little transformation can be profitable. During the course of this project, the consultant noted mushrooms that had been sliced and packaged were almost $20 per kg, whilst the same variety of loose mushrooms were only $10.00 per kg.

The supply chain provides both "time" and "place" utility. Curiously, consumers frequently place a higher value on "time" and "place" than they do on the "form" of most vegetables. This is easily proven by the fact that consumers flock to supermarkets and stores to make their purchases, rather than drive to farms.

Data Analysis

The consultants have worked across a number of horticultural industries. In general, whilst there is an abundance of data, the quality of these data can vary quite dramatically.

The ABS publishes large amounts of agricultural data, annually. Reviewing historical horticultural data in an attempt to identify trends is complicated by:

- A change of business register;
    - Prior to financial year 2005-06 the ABS maintained its own register of agricultural establishments. From 2006 onwards, the ABS moved to a register sourced from the Australian Tax Office's Australian Business Register (ABS, 2008).
- A move to a new method of classification;
    - Previously the data reported was based on the Australian and New Zealand Industrial Classification (ANZSIC) 1993. ANZSIC 2006 was adopted for publications from 2005-06 onwards. The adjustments in the ANZSIC updated the system to account for changes in the structure of the economy and to make Australian data more compatible with international standards (ABS, 2008).
- Inconsistent reporting at a commodity level;
    - Many of the published series show data at different classification levels, and in some years, data for certain commodities was not published by the ABS.

Unfortunately, these factors reduce the reliability of analysis, however, we believe there is some merit in investigating long-term trends.

Industry Overview

The vegetable industry has shown steady growth, in terms of GVP since financial year 2005-06 to 2012-13. This is clearly illustrated in Figure 15.

Data at the commodity level (with the possible exception of Potatoes, Tomatoes, Mushrooms, Melons, and Onions) is of poor quality, relative to other horticultural and agricultural industries. Perhaps this is a reflection in the diversity and the "long tail" – a large number of commodities individually accounting for a very small proportion of total GVP. Table 1, indicates that nine commodities account for 66 per cent of the GVP of vegetables.

It should be noted that Potatoes, Tomatoes, Mushrooms, Melons, and Onions, approximately 50 per cent of GVP, collect their own levy and are therefore, not subject to the Vegetable levy.

The "long tail" is well illustrated in an earlier release (2008-09) of the same data set, displayed in Figure 16 (ABS, 2010). Of the top ten commodities, Potatoes, Tomatoes, Mushrooms, Melons, and Onions accounted for 51 per cent of the GVP, whilst the top five Vegetable Levy-paying commodities (Lettuce, Carrots, Capsicums (excluding Chilies), Broccoli and Beans (all types) account for almost 22 per cent of GVP.

Figure 15: Vegetable Industry GVP (2005-06 to 2012-13)[1]

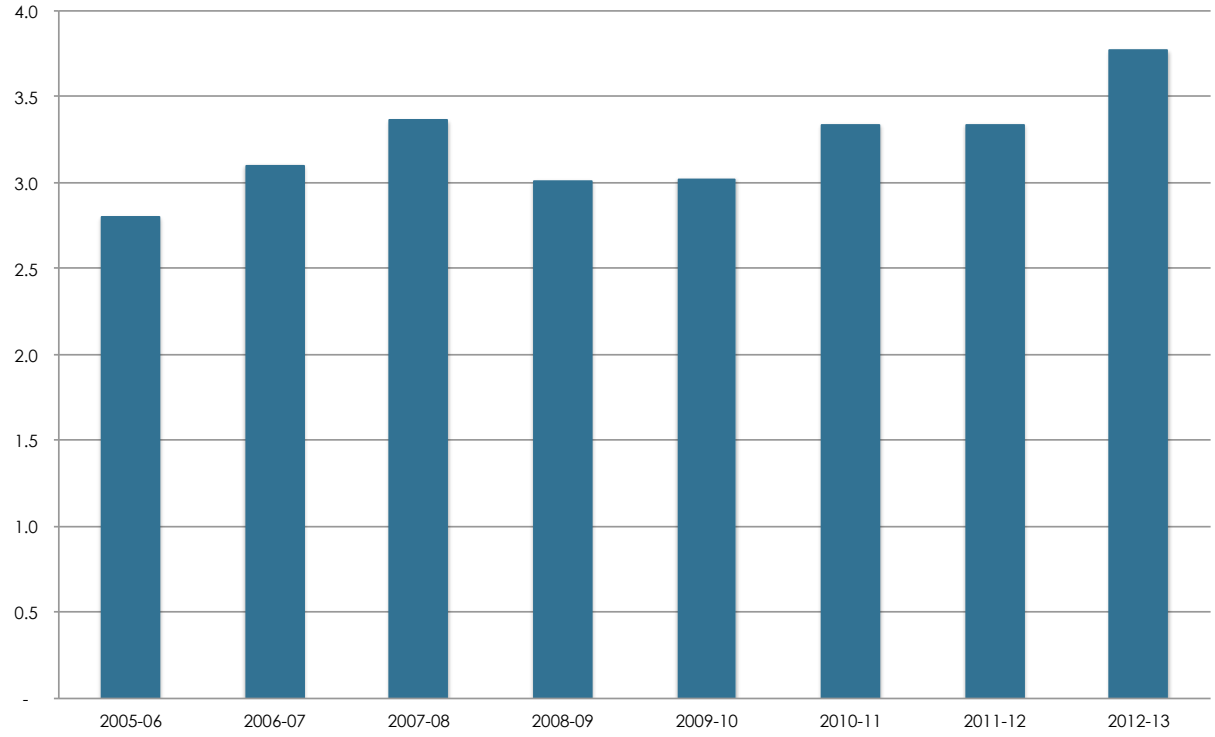
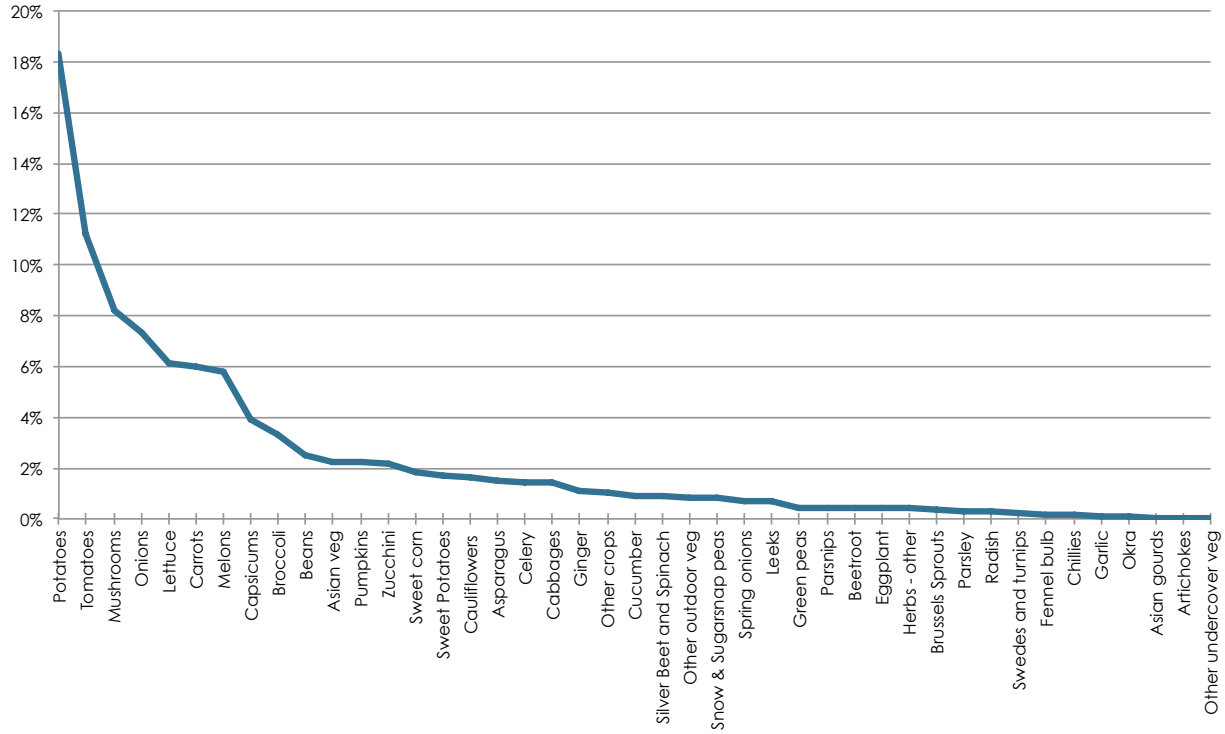


Table 1: Vegetable Industry GVP 2012-13 (ABS, 2014)

Commodity	GVP $m	GVP %
Potatoes	690.18	18%
Tomatoes	438.74	12%
Mushrooms	284.63	8%
Melon	234.29	6%
Onions	199.58	5%
Carrots	194.20	5%
Lettuce	193.05	5%
Beans	162.78	4%
Capsicum	96.81	3%
All other vegetables	1,275.38	34%
Total Value	**3,769.64**	

[1] Source: (ABS, 2008), (ABS, 2008), (ABS, 2010), (ABS, 2010), (ABS, 2011), (ABS, 2012), (ABS, 2013), (ABS, 2014).

Figure 16: Relative GVP of commodities – the "long tail"



The ABS defines Marketing Costs as the difference between GVP and LVP.

Specifically, Marketing costs

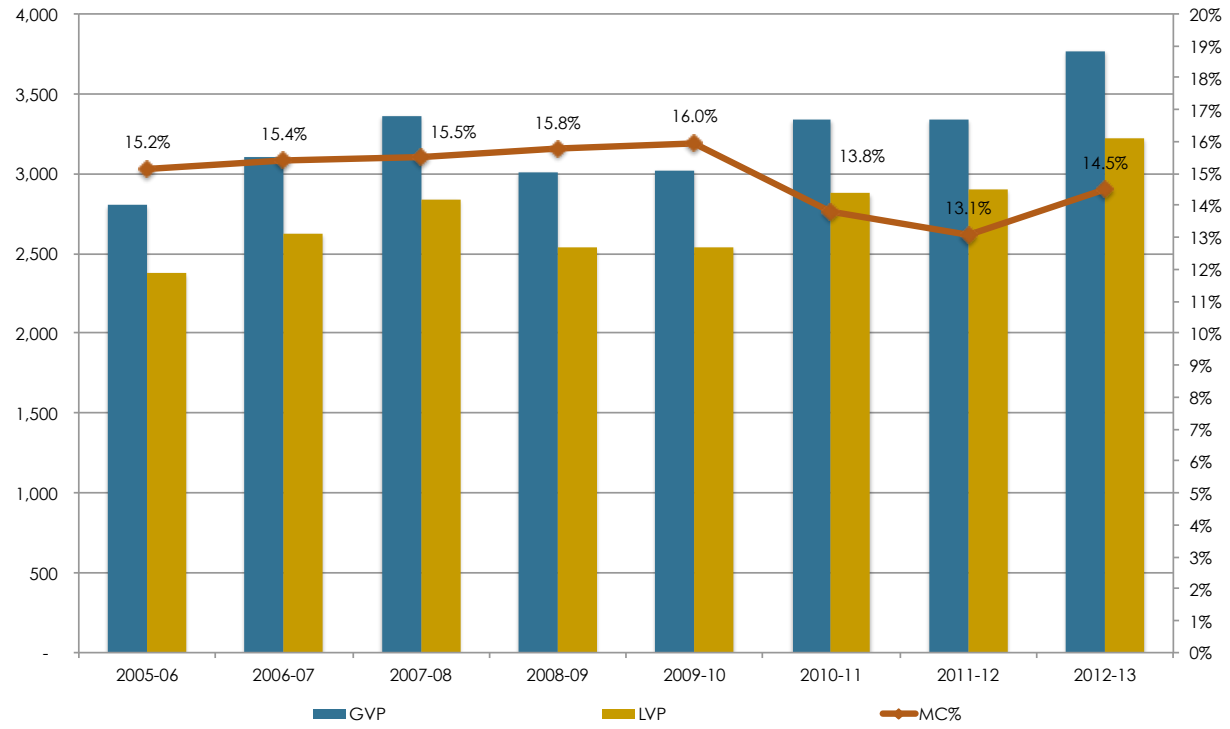
> *Represent the difference between gross and local values. Although there are difficulties in obtaining complete information on marketing costs (which include freight, cost of containers, commission and other marketing charges), the information provides a perspective on the marketing costs of major commodities. Significant differences in the marketing costs for individual commodities may occur as a result of different marketing arrangements.* (ABS, 2012).

Whilst the difficulties pointed out by the ABS are accepted, it is interesting to note that Marketing Costs seem to move, somewhat independently of GVP (Figure 17). This suggested that further analysis might offer interesting insights.

Figure 18 is intriguing. The blue bars represent the increase or decrease of GVP when compared to the previous year. Therefore the first observation indicates that GVP in 2006-07 was 11 per cent higher than the previous year.

The yellow bar represents the rate of change in Marketing Costs (as a percentage of GVP). The first observation indicates that Marketing Costs rose by 13 per cent in 2006-07 – at a faster rate than GVP, which rose by 11 per cent.

Figure 17: GVP, LVP (millions) and Marketing Costs[2]



In 2007-08, Marketing Costs rose by 9 per cent on the previous year, whilst GVP rose by only 8 per cent. Financial year, 2008-09 saw the GVP drop by 10 per cent, but marketing costs fell by only 9 per cent. The following year, 2009-10, the GVP showed very little movement (0.01%), yet Marketing Costs increased by 2 per cent.

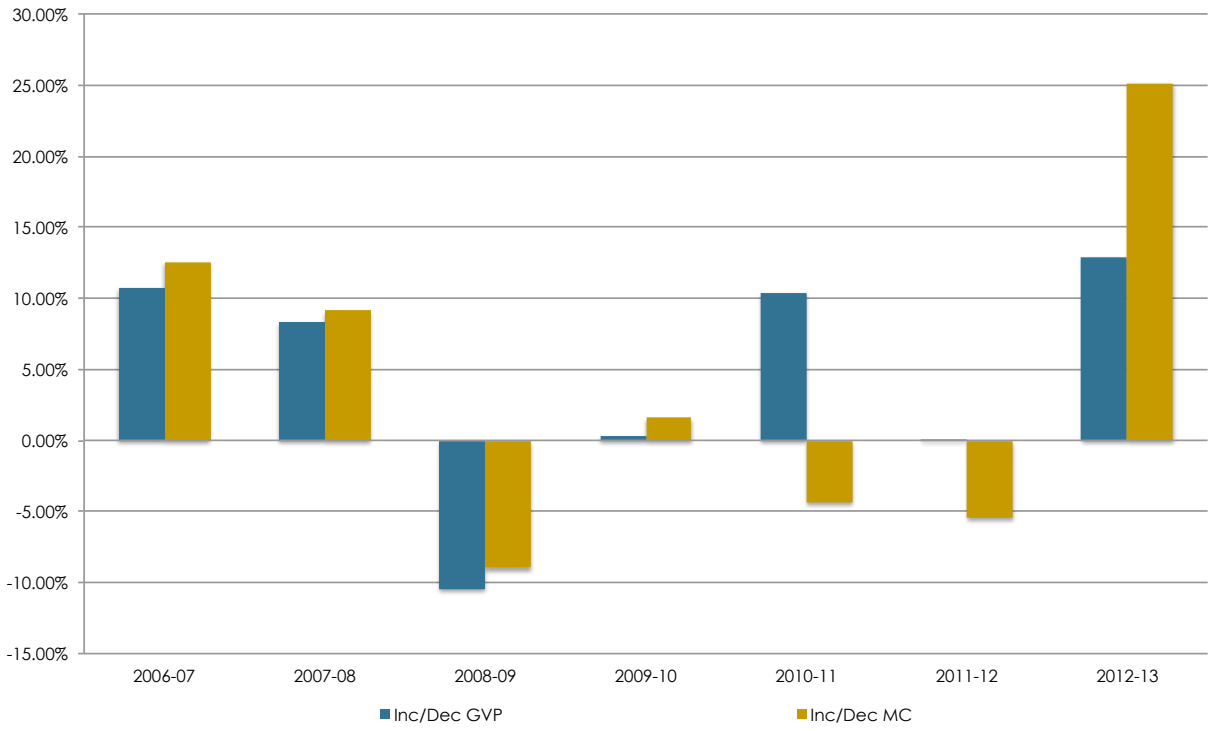
This indicates that regardless of the movement in the GVP, the grower "lost". Marketing Costs were rising faster and falling slower, than the GVP.

The next two financial years (2010-11 and 2011-12) indicate that the balance was moving back toward the grower. GVP increased by 10 percent in 2010-11 and remained stable the following year. Marketing Costs dropped by 4 per cent and then by 5 per cent. Whether growers noticed a difference is debatable, as in real terms, the "saving" was in the region of $46 million, or 1 per cent of GVP.

The last observation, 2012-13 is very disturbing. The GVP increased by 13 per cent – whilst Marketing Costs increased by over 25 per cent.

[2] Source: See Note 1.

Figure 18: Rate of Change in GVP and Marketing Costs



When one considers that Labour, Fuel, Capital, Maintenance and Insurance account for 84 per cent of Linehaul Costs (KordMentha, 2012), these seemingly small changes will have some influence on overall transport costs. Other factors, such as agent commissions and packaging costs also need to be considered.

Grower Numbers

Where information is available, the trend across all major commodities shows a decline in the number of growers. This is clearly indicated in Figure 19**.**

The ABS also produces a data set that estimates the total number of vegetable growers. These data are presented as a time-series in Figure 20. Clearly, the number of vegetable growers is decreasing. The difference between 2005-06 and 2010-11 is a decrease of over 18 per cent - approximately 3.4 per cent, per year.

Further investigation (see Table 2) reveals that the number of growers with an Estimated Value of Agricultural Operations (EVAO) below $1 million per year has declined, whilst the number of growers with an EVAO greater then $1 million per year has increased, slightly.

Figure 19: Number of Growers by Major Commodities [3,4]

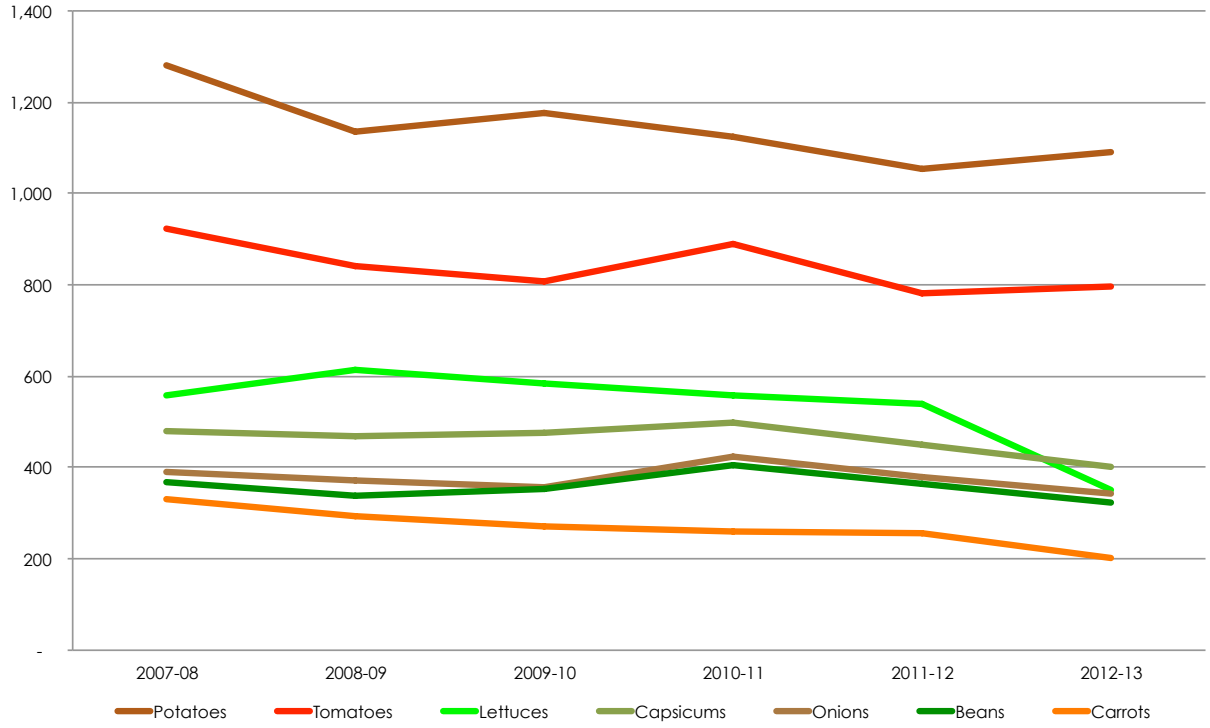
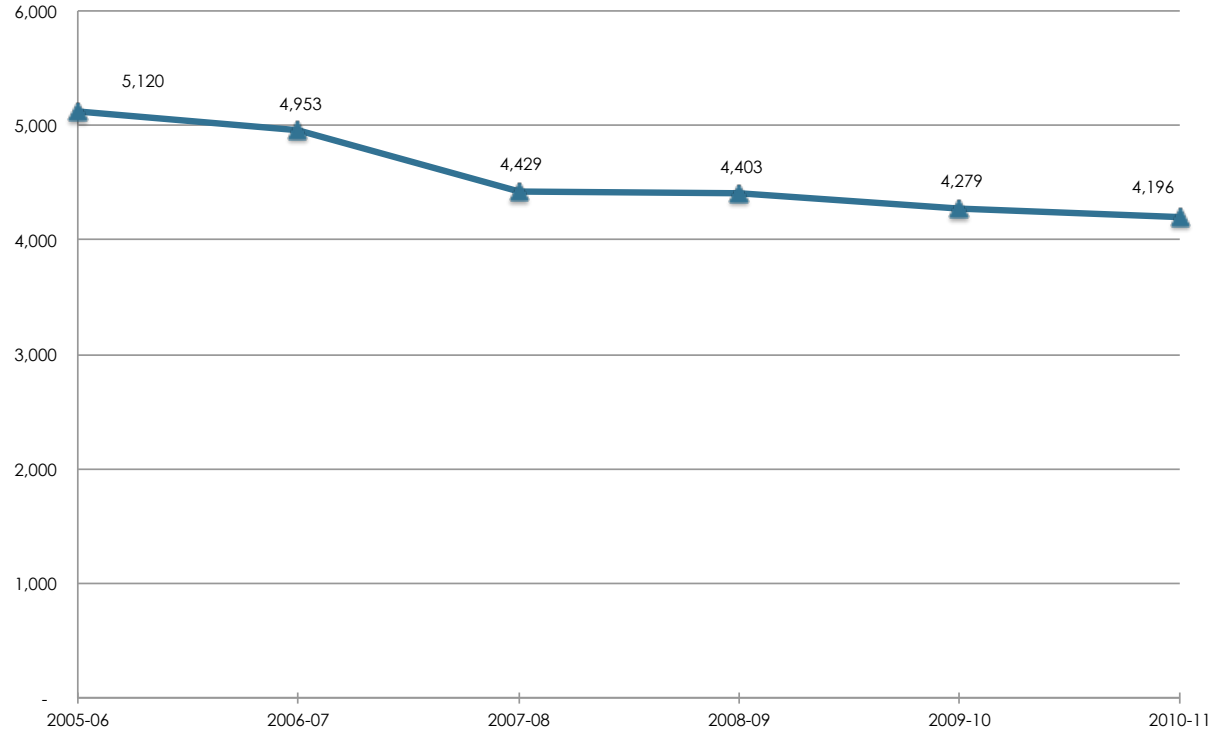


Table 2: Number of Growers by EVAO

Year	<$100k per year	>$100K < $500k per year	> $500k <$1m per year	>$1m <$2m per year	>$2m per year
2005-06	2,343	1,713	508	307	250
2006-07	1,911	1,872	597	314	259
2007-08	2,181	1,342	441	263	202
2008-09	1,778	1,598	449	290	289
2009-10	2,075	1,266	446	247	245
2010-11	1,798	1,366	449	310	271

[3] Source: (ABS, 2014), (ABS, 2013), (ABS, 2012), (ABS, 2010), (ABS, 2010), (ABS, 2009)
[4] Where data is missing the values have been interpolated using a simple mean of the previous observations.

Figure 20: Total number of Vegetable Growers 2005-2011[5]



[5] Source: See Note 1.

Transport in Australia

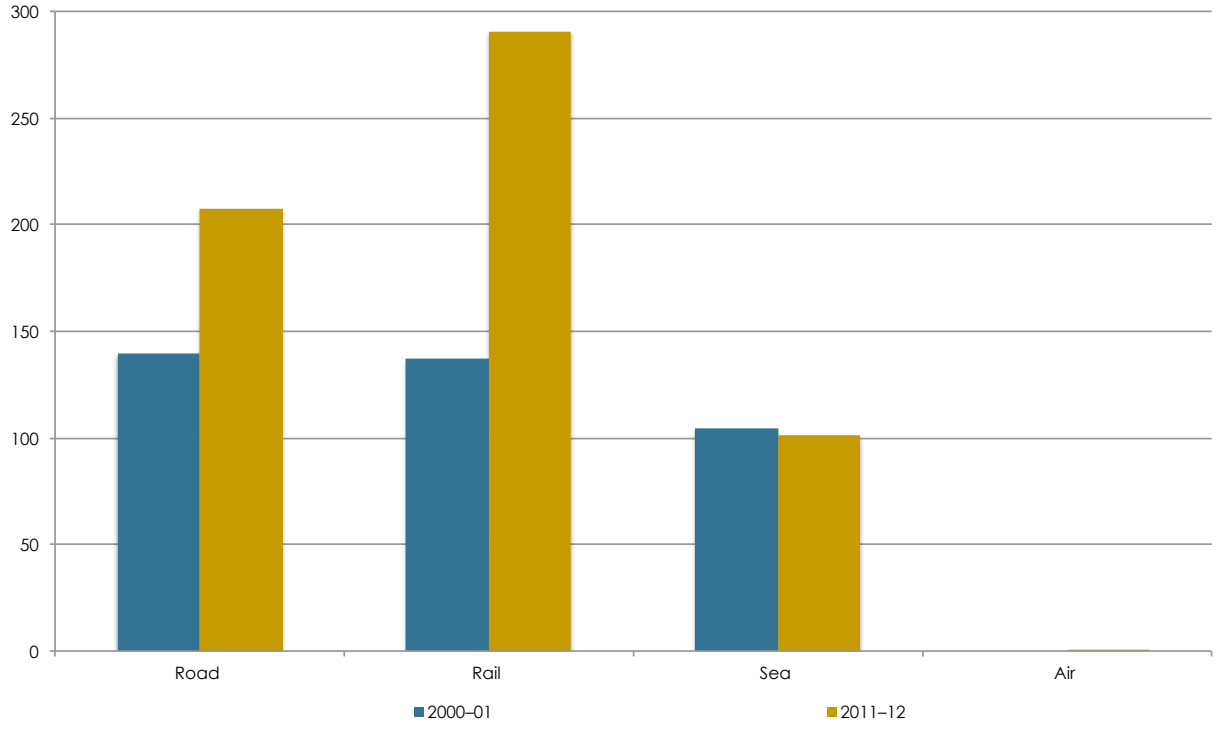
The following sections provide a brief overview of the Australian freight task.

Rail Freight

The vast majority of freight (measured by tonne kilometer) in Australia is moved by rail (BITRE, 2014). In 2011-12 rail accounted for almost 50 per cent of the freight task. The vast majority (80 per cent of rail freight) was iron ore and coal. The recent mining boom has increased rail freight significantly since 2007.

Rail is the dominant mode of transport for bulk freight, over long distances. The main commodities after iron ore and coal are grains, sugar, fertilizer and other bulk (non-packaged) commodities.

Figure 21: Australian Transport Task 2000-01 and 2011-12 (billion tonne kms)



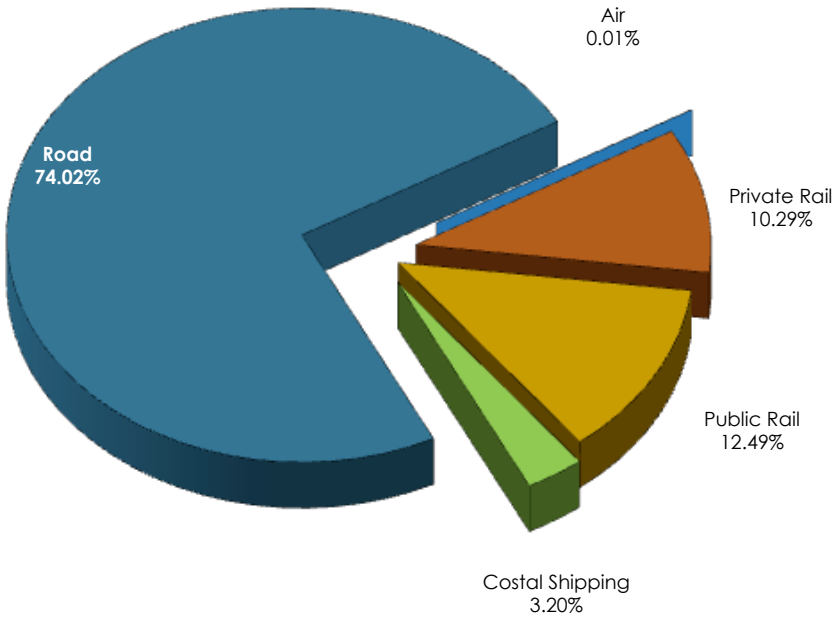
Less than 10 per cent of Rail Freight is non-bulk (or packaged) product. This travels predominately on long-haul routes. Most is carried on the Eastern States-Perth corridor (approximately 70 per cent). Rail freight to and from Perth compares very favorably on price and transit time, when compared to road transport. The other main route is between Melbourne and Brisbane (30 per cent). Rail transit time is similar to the road but freight rates are more competitive.

Fresh produce, including vegetables, moves from North Queensland and the Northern Territory to southern markets and on the Eastern States-Perth corridor.

Road Freight

Road transport is the main mode of transport (by weight) for most products produced or consumed in Australia (Figure 22) and has been long recognised so.

Figure 22: Relative tonnes carried by mode (Gilmour, 1993).



A significant problem in Australia is that of imbalance. This is largely driven by where we choose to live. ABS population statistics indicate a strong Urban/Rural divide – 89 per cent of us live in cities (ABS, 2014). This plays out in freight movements and again is long recognised.

Figure 23 shows the imbalances on selected freight routes as far back as 1988-89. The two largest cities, Sydney and Melbourne are relatively well balanced – a 49:51 ratio. However, the ratios between Melbourne and Brisbane, Melbourne and Adelaide, Sydney and Brisbane were close to 2:1 in favour of the larger city. The same was true of the balance of freight flowing from the eastern states to Perth.

About 50 per cent of road transport movements are between capital cities and regional areas, either interstate or intrastate. Approximately 20 per cent of movements are inter-capital, whilst the balance is comprised of in-city and inter-urban transport (BITRE, 2014).

Agriculture accounted for approximately 11 per cent of the road freight task during 2011-12 (KordMentha, 2012). This includes bulk commodities (grains, sugar, etc.), livestock, fruits and vegetables.

Vegetables are grown predominately in rural (or peri-urban) areas. Generally these areas are net exporters – they send out more freight then they consume. This creates an imbalance in transport – growers need trucks to get produce to market. Grower demands can be seasonal and if the demand is for specialised equipment (refrigerated trailers) the service may well be priced to reflect this.

Figure 23: Imbalances on selected freight routes

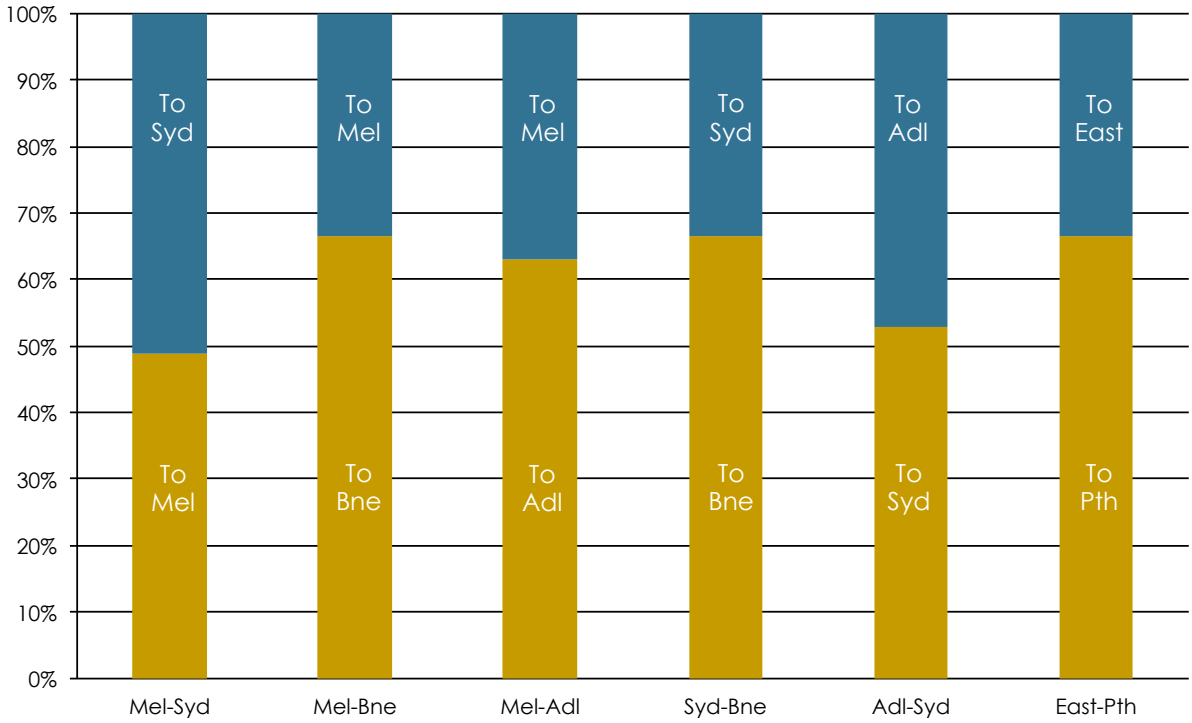
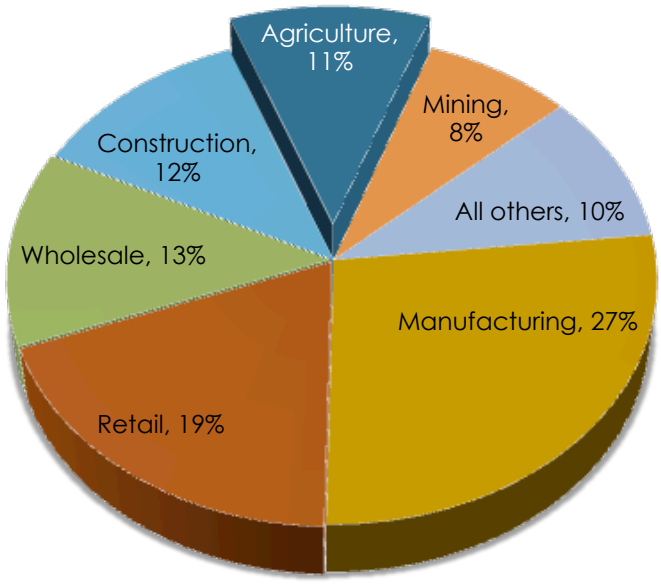


Figure 24: Road Transport demand by Industry 2011-12



Sea freight

The domestic sea freight task (about 17 per cent of domestic freight) is dominated by the movement of bauxite from Weipa to Gladstone and iron ore from the Pilbara to Port Kembla. Together, these two lanes

account for 50 per cent of sea freight volumes in Australia. Movements between eastern states and Perth combined with Bass Strait movements account for less than 5 per cent of the domestic freight task (BITRE, 2014).

Movement of commodities from Tasmania across to the mainland is, probably, the most important domestic sea freight movements of vegetables in Australia. The Total GVP for all vegetables in Tasmania is estimated at $237 million, about 6 per cent of the National GVP (ABS, 2013). The TFES has been in operation since 1976 "In 2012–13, the Australian Government provided $111 million in assistance under the scheme" (DITR, 2014).

Whilst the amount of vegetables transported across the Bass Strait is negligible, the scheme is important. Table 3 indicates that in financial year 2011-12 Simplot Australia, McCain and Ertler Trading P/L claimed almost $15 million in freight equalization assistance (Productivity Commission, 2014).

Table 3: Top 10 Claimants for commodities shipped

Claimant	Main commodity claimed	Amount paid ($m)
Simplot Australia	Frozen/processed/prepared vegetables	10.7
Norske Skog Boyer	Newsprint	7.8
Net Sea Freight Tasmania P/L	Various (freight admin services)	7.1
J Boag & Son	Beer	6.2
Cadbury Australia	Confectionery	4.8
McCain	Frozen/processed/prepared vegetable	3.0
Monson Shipping Tasmania P/L	Processed wood	2.9
Cascade Brewery Co	Beer	2.7
Ertler Trading P/L	Fresh vegetables	2.6
Murray Goulburn Co-op Co Ltd	Dairy	2.5

The PC delivered its Final Report to the Federal Government at the end of June 2014. The government has yet to make a formal response. Importantly, the TFES does not apply to exports.

Prior to commencement the consultant was advised "Anecdotally, industry advice is that transport to and from some regions is less than optimal (e.g. shipping calls for exports out of WA …)" (Lorimer, 2013). There is some truth to this statement that is supported by data.

In 2013-14 the number of container ships calling to Freemantle was down by 10 per cent on 2010-11. However, the gross tonnage these ships carried was over 3 per cent more than in 2010-11.

Many Australians are not aware of the number of empty containers that the country exports every year. "The need to reposition and thereby transport empty containers arises because of imbalances in international trade" (Lubulwa, Bolin, Slatter, & Carmody, 2008). As there are imbalances between city pairs in the Australian road and rail freight network, so Australia is, in world terms, a back loading port.

Figure 25: Container Ship Visits to Freemantle 2005-2014[6]

[6] Source: (Freemantle Ports, 2014), (Freemantle Ports, 2011), (Freemantle Ports, 2008).

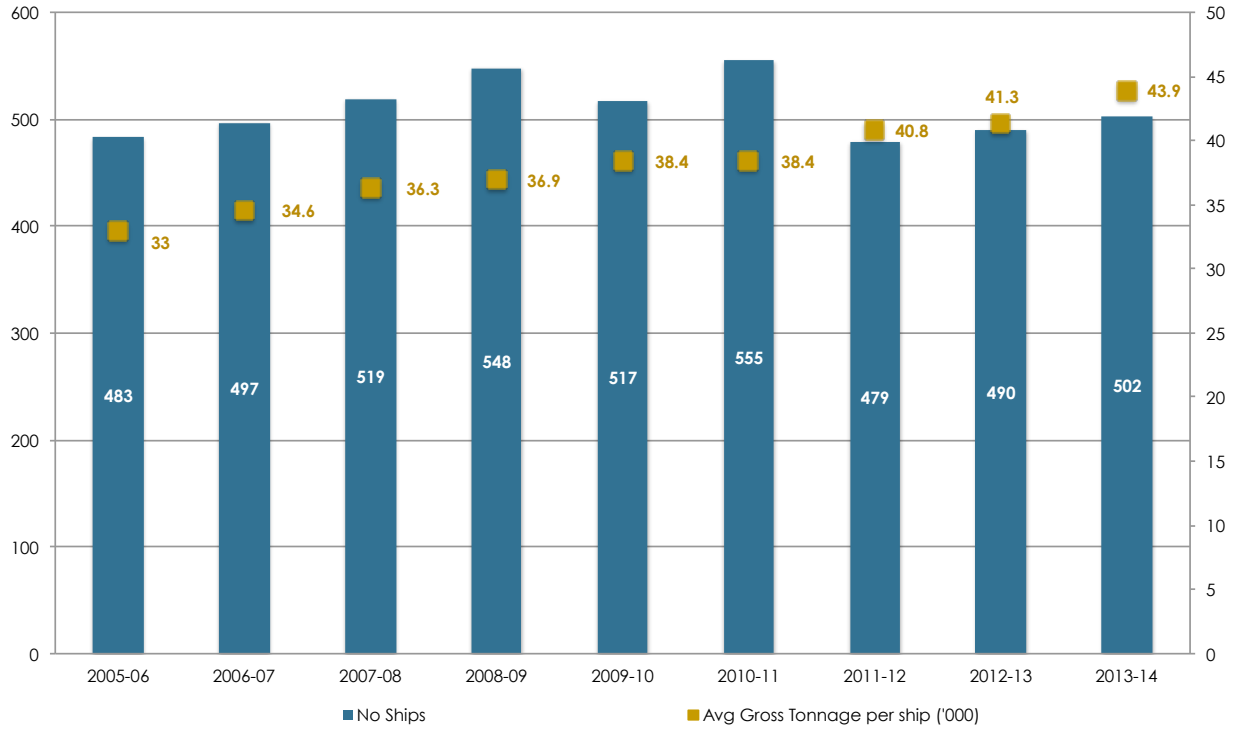
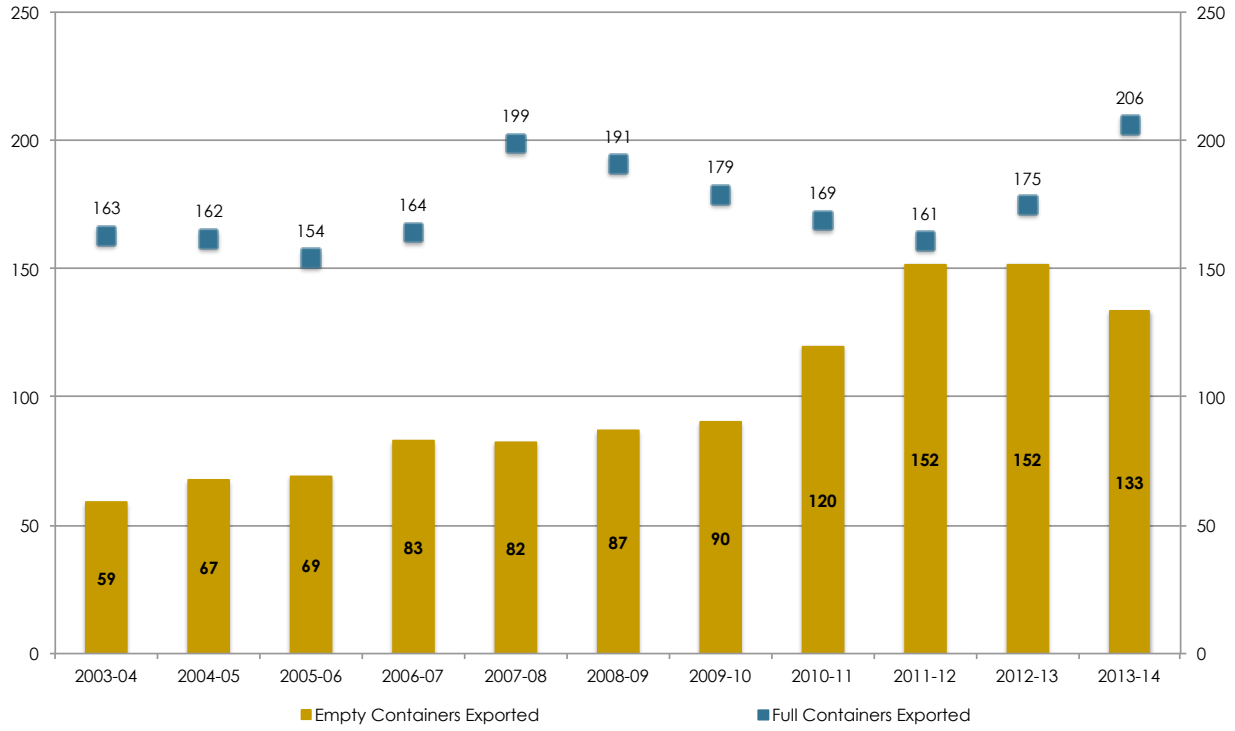


Figure 26: Container Exports (,000) through Freemantle 2003-2014[7]



The data for container exports through Freemantle is contained in Figure 26. Empty containers were between

[7] Per Note 6

27 per cent and 33 per cent of export containers from 2003 through to 2010. In 2010-11 they reached 41 per cent of exported containers, this was the year the number of ships calling at Freemantle peaked at 555.

In 2011-12, as fewer and large ships visited, empty containers reached a peak of 49 per cent of all containers exported through Freemantle. At the end of 2014, they dropped to 39% of exported containers.

Air freight

Domestic airfreight accounts for less than 0.01 per cent of the freight task. In terms of domestic vegetables, airfreight is insignificant.

Export of fruit and vegetables by airfreight is a different matter. The last Federal Labour government intended to introduce changes to security requirements for air cargo. A discussion paper was released in March 2013 that estimated the cost impact for exporters at 10 to 40 cents per kg (DITR, 2013). DITR later suggested that the real cost might be in the realm of 6 to 10 cents but refused to release the documentation that supports either costing.

In the last six months of 2012, the Free On Board (FOB) value of exports was $123.44 billion of goods (ABS, 2013). "The total FOB value of the goods includes all costs incidental to the sale and delivery of the goods on to the exporting vessel/aircraft" (ACBPS, 2009).

In October 2013 a paper was presented to the 13th Annual AusIntermodal Conference (Rafferty, 2103) that made the following points:

- The five biggest cities in Australia exported air cargo with an FOB value of $11.7 billion to the five most important ports of disembarkation for each city. In total twelve different ports.
- Fruit and Vegetables make up about only 1 per cent of the FOB value of our exports.
- Fruit and Vegetables account for almost thirteen and a half thousand tonnes of product valued at just over $40 million (Table 4)
- Another notable airfreight category is Precious Metals, Stones, Art – four hundred and eighty-four tonnes at over $7.7 billion dollars FOB.

Table 4: Volume and Value of Air Cargo Exports Jul-Dec 2012

Category	Volume (t)	Value (FOB)
Meat	23,204	$162,269,509
Machinery & Equipment	14,560	$2,089,937,106
Fruit & Vegetables	**13,479**	**$40,591,484**
Other Goods	12,326	$899,437,265
Confidential & Special Transactions	6,598	$366,699,811
Food, Beverages, Tobacco, Cosmetics	5,166	$92,066,864
Seafood	4,546	$167,986,060
Other Agricultural Products	4,336	$143,359,851
Precious Metals, Stones, Art	**484**	**$7,764,226,452**
Total	**84,698**	**$11,726,574,402**

In the last 6 months of 2012, air cargo exports from Brisbane (Table 5) amounted to almost fifteen thousand tonnes of goods, at a value of $387 million to five destinations (Singapore, New Zealand, Hong Kong, Papua New Guinea and the United Arab Emirates). Again, Fruit and Vegetables and Precious Metals, Stones, Art are emphasised.

Fruit and Vegetables represent 43 per cent of the weight of Brisbane exports - over six thousand tonnes - but only 4 per cent of the value. Exports of Precious Metals, Stones, Art - only six tonnes - were more than double the value of six thousand tonnes of fruits and vegetables.

The important point is that Fruit and Vegetables (and Meat) will bear most of the cost of any new regulation based on the volume of the goods.

Table 5: Brisbane Air Cargo Exports Jul-Dec 2012

Category	Volume (t)	Value (FOB)
Fruit & Vegetables	**6,319**	**$16,475,665**
Meat	3,894	$41,897,783
Machinery & Equipment	1,478	$185,382,679
Other Goods	1,098	$62,977,566
Food, Beverages, Tobacco, Cosmetics	741	$6,597,574
Seafood	462	$9,043,072
Other Agricultural Products	453	$11,512,529
Confidential & Special Transactions	377	$17,213,520
Precious Metals, Stones, Art	**6**	**$35,371,762**
Total	**14,829**	**$386,472,150**

If we take a different view, and consider exports out of Brisbane based on volume, we discover that Fruit and Vegetables account for 43 per cent of the total weight of exports but only 4 per cent of the FOB value (Table 6). Furthermore, the FOB yield averages about $2.60 per kilogram.

Table 6: Top Four Export Categories by Volume (ex-Brisbane - Jul-Dec 2012)

Category	Volume (t)	% Vol (kg) All Cargo	Total FOB Value ($m)	% FOB Value	Average (FOB) Yield (Kg)
Fruit & Vegetables	6,319	42.61%	$16.5	4.3%	$2.60
Meat	3,894	26.26%	$42.0	10.8%	$10.80
Machinery & Equipment	1,478	9.97%	$185.4	48.0%	$125.00
Other Goods	1,099	7.41%	$62.9	16.3%	$57.00
Total	**12,789**	**86.25%**	**$306.7**	**79.4%**	

This average is deceptive. Sweet Potatoes have an average FOB yield of less than $1.00 per kg. A product like cherries can yield an FOB of as much as $13.00 per kg. The proposed system will see the largest proportion of costs being applied to the goods that are of the lowest value and the lowest FOB yield.

Based on the data for exports out of Brisbane for the last six months of 2012, at 40¢ per kg, Fruit & Vegetables would have incurred additional costs in the region of $2.5 million, on $16.5 million of FOB value. This is an increase in the order of 15 per cent.

Precious metals, Stones and Art would incur an additional cost of $2,300 on an FOB value of $35.4 million – an increase of less than 0.01 per cent.

Economic theories frequently have little respect for national boundaries or the abstract idea that is the nation

state. A country may pass all the laws it likes, make as many rules and regulations as deemed fit, but if it makes trade uncompetitive another economic theory kicks in ... price elasticity of demand.

In normal terms we understand this to mean that as the price increases, demand decreases - however, as the price of Australian goods increase in overseas markets, demand may not decrease - it may just switch to an available substitute from another market. So, what Australian exporters may experience as a demand decrease, is in fact, a switch to a lower cost competitor.

Fruit and Vegetables are not complex manufactured goods. Almost anything can be grown almost anywhere as climatic conditions can be reproduced in protected cropping environments such as hydroponics, greenhouses or both.

If Fruit and Vegetable exports become uncompetitive, the product bound for export markets will have to be sold on domestic markets. So if the sweet potato that was destined for the United Arab Emirates suddenly has to be cleared through the domestic market, the price of *all* sweet potatoes, on the domestic market, may drop. This gets to the heart of grower profitability.

In discussion with the consultant, DITR indicated that after the change of government late in 2013, the new Minister has asked DITR to re-assess scheme.

Road Transport Policy

The regulatory system that is designed for all road users focuses on three areas - infrastructure, environment and by far the most emotive, road safety.

Road Safety

At June 30, 1970 the Australian population was estimated at 12.5 million with approximately 4.8 million registered vehicles and 3,798 traffic accident fatalities (Milne, 1985). This was the year when, in a pivotal event for Australian road safety, seat belt wearing finally became compulsory.

There were two more pivotal events in 1989 that provided a catalyst for much needed review. On October 20th, near Grafton, a bus and semi-trailer collided at about 4:00 am. Twenty-one people, including the truck driver, were killed.

The truck driver had a concentration of ephedrine in his blood (a similar molecular structure to methamphetamine) that was *eighty times* above normal therapeutic levels. The reason for the truck veering onto the wrong side of the road was, according to a contemporary vehicle engineering report, unknown. It also stated that the driver was known to have previously falsified his logbook and it appeared he had been working exceptionally long hours.

An even greater disaster was just down the road, literally, near Kempsey, on December 22nd of the same year. The NSW Coroner's inquiry found that the McCafferty's Coaches bus driver fell asleep, crossed on to the wrong side of the road and collided with an oncoming coach, at about 3:30am. Thirty-five people died, including both drivers.

In 1991, two years after these accidents, road fatalities had decreased by 25 per cent to 2,113 (BITRE, 2014). Speed, alcohol and fatigue are now the prime focus of authorities. As of 30th June 2013, the population was estimated at 23.1 million (ABS, 2014), there were more than 17.1 million vehicles registered (ABS, 2014) and fatalities had fallen to 1,192.

Since the 1989 accidents the population has increased by 40 per cent, vehicle registrations have almost quadrupled yet fatalities have been cut by almost 60 per cent. Something is working.

There is however one troubling statistic. In 1991 Heavy Vehicles (Light Rigid, Heavy Rigid, Articulated trucks and buses) accounted for 4.8 per cent of registered vehicles and were involved in 10.2 per cent of traffic fatalities (215 deaths).

In 2013 they accounted for 3.9 per cent of vehicles but were involved in 16.3 per cent of traffic fatalities (194 deaths). So whatever is working in terms of reducing road fatalities, is not working so well for drivers of heavy vehicles.

This has seen the introduction of FM and CoR legislation and regulations.

Fatigue Management (FM)

An Australian truck driver can work, under certain conditions, 14-hour shifts. Within the fourteen hours, they cannot work for more than six hours without taking a 15-minute break. In a nine-hour period they must have at least a 30-minute break (in blocks of 15 minutes). In twelve hours, they must have 1 hour of rest time in blocks of at least 15 minutes. After 14 hours, they must have a 7-hour stationery rest time (NTC Australia, 2008).

Furthermore, any hour worked after twelve hours, or if worked between midnight and 6:00 am, is considered a long or night hour. In a seven-day period only 36 long or night hours may be worked. It is legal for a truck driver to work 79 hours in a 6-day period and 36 of those hours can be long/night hours. This is close more than double the standard 38-hour week.

In Canada, a driver can be on duty for 14 hours per day, but can only drive for 13 of those hours. Then they must have an eight-hour break (ADrivers, 2013).

In New Zealand, after a 24-hour break, a driver may work for three 13-hour days once they have at least 10 hours of continuous rest each day (NZ Transport Agency, 2013).

In the US a driver must follow three maximum duty limits at all times. The 14-hour "driving window" limit, the 11-hour driving limit, and 60-hour/7-day and 70-hour/8-day duty limits (FMCSA, 2011).

In the European Union regulations specify a maximum of nine driving hours per day that can be extended to ten hours twice, per week. Furthermore, there must be at least eleven hours rest every day. This can be reduced to nine hours but only three times per week (GOV.UK, 2014).

Comparatively, Australian drivers can work far longer than most of their overseas counterparts.

Chain of Responsibility (CoR)

> *If you consign, pack, load or receive goods as part of your business, you could be held legally liable for breaches of road transport laws even though you have no direct role in driving or operating a heavy vehicle. In addition, corporate entities, directors, partners and managers are accountable for the actions of people under their control. This is the 'Chain of Responsibility'* (NHVR, nd).

CoR aims to ensure that everyone in the supply chain shares responsibility to ensure transport laws and regulations are adhered to. For instance, at the major ports, port operators weigh vehicles prior to departure to ensure they meet mass regulations. If a truck is found to be overweight or if the weight distribution across axels is incorrect, the truck will not be allowed to leave the port.

CoR law recognizes that several parties can be responsible for offences committed by operators or drivers. CoR applies to:

- Speeding;
- Breaches of FM regulations;
- Breaches to loading regulations (mass, dimensions, etc);

A member of the supply chain is acting illegally if they require a driver or operator to break the law, regardless of any contract. There have been a number of high-profile prosecutions of late including:

- Coote's Transport fined $50,000 over defects (Carlyon, 2014);
- Scott's Transport fined $1.25 million for repeated speeding violations (Dowdell, 2014);
- Lennon's fined $1.3 million for failure to design a system to ensure compliance (Bibby, 2014)

In June of 2014 the CoR Taskforce completed a review, which is still under ministerial consideration (The CoR Taskforce, 2014). Should the minister accept the findings of the report it is likely amongst other things, that:

- Compliance will be strengthened by changing enforcement powers;
- The CoR regime will be extended to vehicle standards and roadworthiness;
- New enforcement guidelines for authorised officers will be developed;
- The establishment of a CoR enforcement unit be expedited (with cross-border jurisdiction);
- Penalties be reviewed;
- Prosecutions guidelines be developed;
- Court-ordered enforceable undertakings be adopted.

Even the most optimistic reading of this document suggests that the regulatory burden will become more onerous and penalties will become more severe.

Growers that dispatch produce from their farms are already accountable under current CoR legislation.

Mass Limits

Mass limits for a six-axel semitrailer (a standard semi-trailer) for Australia and comparable countries are outlined in Table 7.

The Gross Vehicle Mass (GVM) quoted for each country have caveats, in the way our National Heavy Vehicle Accreditation Scheme does. The weight limits in the US are constrained by the Federal Bridge Gross Weight Formula. Whilst the Americans have been at the forefront of building a national highway network, the age of the infrastructure has become a limiting factor in transport efficiency.

Table 7: Six Axel Semitrailer (or nearest equivalent) dimensions and mass

Country	Max Length	Gross Vehicle Mass (GVM)
Australia	19 Meters	45.5 tonnes
Canada	23 Meters	46.5 tonnes
New Zealand	19 Meters	42.0 tonnes
UK	16 Meters	44.0 tonnes
USA	48 feet (14.6 Meters)	80,000 lbs. (36.3 tonnes)

Australian drivers work longer hours than most of their overseas counterparts. They drive vehicles that are bigger than most of their overseas counterparts (excluding Canada). However the most troubling statistic is around fatalities.

It appears that whilst great strides have been made in reducing road fatalities in Australia, it is at the expense of heavy vehicle drivers. In 1991 Heavy Vehicles accounted for 4.8 per cent of registered vehicles and were involved in 10.2 per cent of traffic fatalities (215 deaths).

In 2013 they accounted for 3.9 per cent of registered vehicles but their involvement in traffic fatalities increased to 16.3 per cent (194 deaths). So whilst the death toll on Australian roads is decreasing, the rate of reduction for heavy goods vehicles is stalling.

It is against this background that transport regulations are being framed. We believe that regulations will get tougher and that may mean shorter driving hours, lower vehicle mass and increased costs.

Retail Sector

The number of grocery stores in Australia at the end of 2003-04 is shown in Table 8 (Retail World, 2004).

Table 8: Grocery Stores 2003-04

Supermarket Chains		Independent Grocery	
Company	**No Outlets**	**Company**	**No Outlets**
Action	81	AUR	587
ALDI	54	FAL	51
Coles	697	FoodWorks	136
Franklins	77	IGA	1,082
Woolworths	698		
Total	**1607**	**Total**	**1,856**

Since that time, there have been some significant shifts in the retail landscape. The total number of grocery stores in Australia during 2013-14 is estimated in Table 9. The changes are illustrated in Figure 27.

Table 9: Estimate of Grocery Stores in Australia, 2014

Supermarket Chains		Independent Grocery	
Company	**No Outlets**	**Company**	**No Outlets**
ALDI	340 (SMH, 2014)	FoodWorks	400 (FoodWorks, nd)
Coles	762 (WES, 2014)	IGA	1,762 (Metcash Limited, nd)
Woolworths	872 (WOW, nd)	SPAR	400 (SAL, 2014)
Total	**1,974**	**Total**	**2,562**

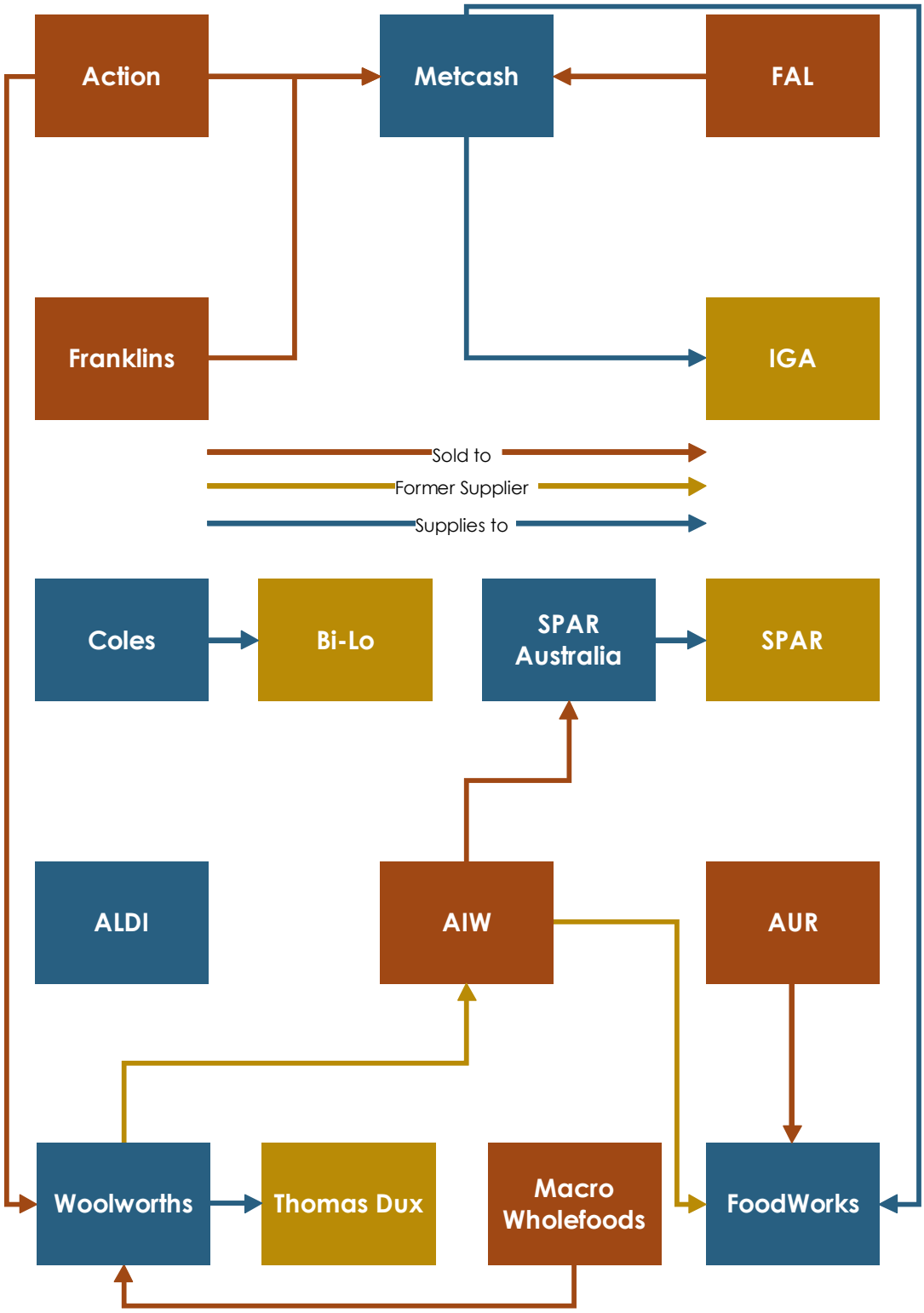
The total, 4,536 has increased from 3,463 in Table 8. It should be noted that the data in Table 9 does not include the 636 Coles Express petrol outlets (Coles Express, nd) or the 550-plus co-branded Caltex Woolworths petrol outlets (WOW, nd). It is also important to appreciate that few of the independent grocery outlets would be of a similar size to a typical Coles or Woolworths store and would therefore be unlikely to offer a similar range.

A note of caution is required. The details outlined in the following section are drawn from the websites of the individual organisations. The published information can be inconsistent. For instance FoodWorks "has close to 650 supermarkets, food and convenience stores spanning seven states and territories nationally with over 400 of these operating under the FoodWorks brand" (FoodWorks, nd). However, Metcash claim to distribute to 484 FoodWorks stores (Metcash Limited, nd).

In 2005 the owners of Action Supermarkets, (The Foodland Group) was sold. The Australian Competition and Consumer Commission (ACCC) allowed Woolworths to buy 19 supermarkets whilst Metcash (owners of IGA) bought the remaining stores along with Foodland's wholesale business (McMahon, 2005).

ALDI has been opening new stores on a consistent basis and by 2011 had 258 outlets (Mitchell, Planning and Zoning stall Aldi's (sic) grocery train, 2011). ALDI stores are currently limited to New South Wales, Victoria, Queensland and the Australian Capital Territory, but have plans to open 130 stores across South Australia and Western Australia starting in 2016 (Mitchel, 2014).

Figure 27: The Grocery Sector 2011



The company is notoriously private regarding financial information. However, their market share has been estimated at 10.3% (Roy Morgan Research, 2014). Interestingly, in their (ALDI's) submission to the Competition Policy Review they did not state their market share, but preferred to reference Roy Morgan Research. They did however admit that Australian revenues exceeded $5 billion (ALDI Stores, 2014).

On the 23rd November 2007, Westfarmers Limited formally took control of the Coles Group of supermarkets, in what was the largest corporate takeover in Australian business history (Carson, 2007). Prior to the formal takeover, Coles had started to re-brand the Bi-Lo chain (AAP, 2006). The number of Coles Supermarkets (including the remaining Bi-Lo stores) rose to 742 (WES, nd).

In July 2010 Metcash bought the Franklins supermarket chain (Bennet, 2010). At that time there were 77 company-owned stores and another 8 that were operated by independent owners. Metcash planned to sell the stores and re-brand them as IGA supermarkets. The ACCC raised legal objections to the transaction but the Federal Court dismissed these in August 2011.

As mentioned above, Woolworths purchased 19 Action Supermarkets from Foodland in 2005. During 2008, the organisation announced plans to re-brand the Safeway stores in Victoria as Woolworths (Sharp, 2008). Woolworths acquired Safeway in 1985 and re-branded the Queensland and New South Wales stores shortly thereafter.

In 2009, Woolworths bought the Macro Wholefoods organic food chain (Speedy, 2009). Macro had 8 sites that were re-badged as Thomas Dux stores. Woolworths now has 873 stores plus 10 Thomas Dux outlets (WOW, nd).

Late in 2004 Australian United Retailers Limited (AUR) and FoodWorks Supermarket Group Ltd (FoodWorks) merged. The merger was flagged earlier that year (Wood, 2004) and brought together the following brands: AUR, Foodstore, FoodWorks, Buy Rite, Cut Price, 727, Rite-Way, Food-Rite, Tuckerbag and Food-Way proprietors. The group now trades under the FoodWorks banner and has close to 650 Supermarkets (FoodWorks, nd).

Independent Grocers Alliance (IGA) operates three distinct store formats:

- Supa IGA;
    - Large format stores, carrying a full and large supermarket range. These stores primarily cater to shoppers who wish to purchase all of their grocery and fresh food requirements in one location.
- IGA;
    - Medium format stores that carry a mid-sized supermarket range. These stores are neighbourhood stores catering to shoppers who purchase less *(sic)* items, but do so more regularly.
- IGA X-press;
    - Small format stores that attract a convenience market with a concentration on high service. These stores supplement a full grocery shop and specifically target the shopping demographic in their area (IGA, nd).

There are now approximately 1,400 IGA outlets in Australia (IGA, nd). Metcash Trading Limited carries out wholesale distribution to these outlets, under the IGA Distribution brand. In recent years, Metcash has made great efforts to incorporate the distribution of fresh produce to these outlets, with mixed results. Many of the independently owned stores evolved from local green grocery outlets into supermarkets of varying size and complexity. Many still see fresh produce as the core component of their offering and source their

requirements, independently, from local wholesale produce markets. Metcash also distribute to 117 Foodland stores, 484 FoodWorks stores and 245 Lucky 7 convenience stores (Metcash Limited, nd).

Woolworths Limited established Australian Independent Wholesalers (AIW) in 1986 as a competitor to Metcash (then known as Davids Holdings P/L) and supplied wholesale groceries to the then independent FoodWorks chain. In 2002, AIW lost the contract to supply groceries to FoodWorks (Todd, 2002). Metcash were to commence supply to FoodWorks in FY2003. In August 2002, Woolworths announced the sale of AIW to United Star Supermarkets Limited (USSL), for an undisclosed sum (just-food.com, 2002).

In December 2002 USSL set up Australian Retail Logistix Limited (ARLL) to run the wholesale distribution business. "In December 2005 USSL and ARLL were merged and in October 2006, following shareholder approval, the name of the merged Company was changed to SPAR Australia Limited." (SPAR, 2008).

> *SPAR supplies grocery products and marketing and retail support services to approximately 300 independent retail supermarkets including the SPAR and 5 Star banner groups located in Queensland, New South Wales, Australian Capital Territory, Northern Territory and Pacific Island areas"* (SPAR, 2008).

SPAR franchises the SPAR, SPAR Express and 5-Star brands to 300 independent grocers (SPAR, 2008).

The latest competitor of significance to the Australian grocery sector is Costco Wholesale Australia P/L (Costco). Currently there are six stores (one each in Queensland and the Australian Capital Territory, and two each in New South Wales and Victoria.

> *Costco Wholesale Corporation operates an international chain of membership warehouses, under the "Costco Wholesale" name, that carry quality, brand name merchandise at substantially lower prices than are typically found at conventional wholesale or retail sources. The warehouses are designed to help small-to-medium-sized businesses reduce costs in purchasing for resale and for everyday business use. Individuals may also purchase for their personal need* (Costco Wholesale Australia P/L, nd).

Costco opened its first store at Docklands in Melbourne in August 2009 and reported its first profit in September 2012 (Greenblat, Costco bulks up to take sales from Coles and Woolies, 2013) on annual sales of $609.5 million. Like ALDI, Costco appears to be relying on organic growth to build their Australian business. Also like ALDI, planning regulations is hampering progress.

Market Size

Establishing market share of the major supermarket chains is not straightforward; it is further complicated by purposeful efforts to confound just exactly how to define "the market".

In a submission to the ACCC inquiry into the competitiveness of retail prices for standard groceries, it was argued that, "supermarkets compete with a range of retail outlets for the sale of groceries" and that "Unrealistically restricting the market leads to inaccurate analysis of the grocery industry" (WOW, 2008).

In essence, Woolworths are suggesting that they (and by extension, Coles) are not only competing with each other but also competing with every butcher, baker, fishmonger, wine merchant, delicatessen and greengrocer in the country.

This view, whilst intellectually defendable, may appear disingenuous to a reasonable person. The local butcher may be competing with Woolworths, but only with their meat department; the same holds true for the baker, fishmonger, wine merchant and greengrocer – all competing with a department or a category – clearly, not competing with the entire store and certainly unable to compete with a national organisation.

This is analogous to suggesting that individuals in a primary school rugby team are competing for a position in the Wallabies – whilst they're all playing ball (competing), they are not in the same stadium (market).

A rather more prosaic analysis suggested

> *Market share statistics and trends across the grocery channels and even within the key supermarket channel, are hard to stabilize, due to different methodologies and data coverage across different sources. As such, the focus is on range of market share as opposed to exact measures.* (Accenture, 2010).

The National Association of Retail Grocers of Australia (NARGA), a federation of associations representing independent grocery retailers, commissioned Accenture Australia Limited to undertake an Industry Sizing Study.

This report suggests that

> *Combined market share of Woolworths and Coles ranges between 77 and 80.4 per cent. Shares for IGA banners range from 11.3 per cent … to 14.4 per cent* (Accenture, 2010).

The ABS produces a quarterly report that provides "estimates of the value of turnover of "retail trade" for Australian businesses". The data for selected statistical sub-divisions, for 2009-10 (ABS, 2011) and 2012-13 (ABS, 2014) are shown in Table 10.

Table 10: Retail Turnover, 2009-10 and 2012-13 ($m)

Category	2009-10	2012-13
Food Retailing	$95,337	$115,632
Cafes, restaurants and catering services	$30,425	$37,816
Total	$125,762	$153,448

The categories in Table 10 are defined in ANZSIC - the Australian & New Zealand Standard Industry Classification (ABS, 2006) as follows:

- Supermarket and grocery stores and non-petrol sales (convenience stores) of selected fuel retailing;

- Cafes, restaurants and catering services;

Woolworths Limited revenues for Food and Liquor for 2013-14 are stated at $41.2 billion, for Petrol $7 billion and for liquor $5.6 billion. Therefore, grocery revenues are in the region of $29 billion. Their grocery and liquor brands include Thomas Dux, Dan Murphy's, BWS and Woolworths Liquor. In total, Woolworths have 1,402 liquor stores (WOW, 2014).

Coles' revenues for 2014 are stated at just over $37.3 billion. The Coles brands include Bi-Lo, Coles Express, Vintage Cellars and 1st Choice Liquor (WES, 2014). Unfortunately, the Wesfarmers Annual Report does not separate liquor sales from grocery, making like-for-like comparison difficult. However, the figures, reproduced in Table 11, suggest that both organisations control *at least* 64 per cent of the Grocery and Liquor Markets. It is unlikely that removing liquor from the equation will significantly change the overall combined market share of the Supermarket and grocery category.

Table 11: Market Share - Woolworths and Coles ($m)

Category	Total	WES	WOW
Supermarket and grocery stores	$115,632	$37,300	$35,600
Market Share	100%	33%	31%
Total	$115,633		

In its "Report of the ACCC inquiry into the competitiveness of retail prices for standard groceries" the ACCC states

> *Statistics analysed by the ACCC suggest that Coles and Woolworths account for approximately 70 per cent of packaged grocery sales in Australia and approximately 50 per cent of fresh product sales, such as meat, fruit and vegetables* (ACCC, 2008).

The ACCC appear to have formed this view based on submissions; that is, the ACCC did not attempt to design and implement a study that may have answered the market share question with accuracy.

On page 219 of the same report, the ACCC also "estimated that only 20 to 30 per cent of MSC [major supermarket chains] produce is now purchased from wholesalers".

Greengrocers

Establishing even an approximation of the number of independent greengrocers in Australia is surprisingly difficult. The ABS last produced statistics in 1991-92 (Table 12), the usefulness of these data, even at the time of publication, is highly questionable.

The ABS defines Supermarket and Grocery Stores as "…units mainly engaged in retailing groceries or non-specialised food lines, whether or not the selling is organised on a self-service basis" (ABS, 1993). This is a very wide definition and is evidenced by the number of outlets.

Table 12: Food Retailing, By Sector - 1991-92 (ABS, 2001)

Sector	No Retail Locations	Proportion of total food retailing
Supermarkets and grocery stores	9,476	14.4%
Fresh meat, fish and poultry retailing	7,337	11.2%
Fruit and vegetable retailing	3,650	5.6%
Bread and cake retailing	4,755	7.2%
Takeaway food retailing	20,334	30.9%
Specialised food retailing n.e.c.	5,773	8.8%

n.e.c = not elsewhere classified

A search of the Yellow Pages Directory using the search term "green grocers" (Yellow Pages, nd) yields 2,052 results. An individual search, state by state, yields the results in Table 13.

Table 13: No. Greengrocers Listed in Yellow Pages

State/Territory	No Business Listed	State/Territory	No Business Listed
NSW	763	SA	157
Vic	587	Tas	29
Qld	337	ACT	29
WA	142	NT	8
	Total	**2,052**	

According to one source, 27 per cent of fresh produce is purchased at greengrocers (Kanj, 2010) because the produce is of better quality, stays fresh longer and is priced competitively.

The share of fresh produce sales through Supermarket Chains (Coles, Woolworths, ALDI, Costco) and Independent Grocery (FoodWorks, IGA, Spar) is difficult to estimate. As stated previously, it is believed to be in the region of 50 per cent (ACCC, 2008).

Whatever, source one chooses to quote, it is generally accepted that the supermarket chains control a large section of the Australian market for fresh vegetables. Over the years, their approach to supply chain and logistics has continued to evolve. The trend of delivery from the farm to DC is well established. Along with that, the chains are dealing with fewer growers and turned to intermediaries to act as category managers.

Global Trends

There are four significant echelons identified in vegetable supply chains, growers, wholesale, retail and transport. Transport aside (it serves every industry in some form) the other trading strata have followed the general trend of consolidation seen in other developed economies.

Retail

Earlier sections of this report indicate the dominance of Coles and Woolworths in the Australian grocery market.

In major overseas markets, the trend towards consolidation has been a regular feature of the sector for over two decades. Table 14 lists the Top 5 Global retailers in 2001 (The Food Institute Report, 2002). Ten years later (Table 15) there are some significant changes (Kanter Retail, 2011).

Table 14: Top 5 Global Retailers 2001

Rank	Name	Nationality	Revenue US$ Billions
1	Walmart	U.SA.	$217.79
2	Carrefour	France	$62.29
3	Ahold	Holland	$59.70
4	Kroger	U.S.	$50.10
5	Metro AG	Switzerland /Germany	$44.37

Notably, Royal Dutch Ahold, have fallen from the top ten.

> *The accepted rationale for Ahold's dramatic reversal attributes the problem directly to the detection of major accounting scandals in the company's US food service unit (Seth & Randall, Supermarket Wars: Global Strategies for Food Retailers, 2005).*

These accounting irregularities claimed the Chief Executive and the Chief Financial Officer of the organisation. The Chief Marketing Director of the US FoodService division was sentenced to seven years imprisonment for fraud (Neumeister, 2007).

Ahold is now the world's 15th largest retailer. Kroger has dropped to 6th whilst Tesco (10th to 3rd) and Costco (9th to 5th) have consolidated their positions in the top five.

In 2010 Wesfarmers ranked at 21st place followed by Woolworths at 22nd place. In 2001, neither appeared in the top 30 and ALDI Sud (now 26th) had a grocery business that was bigger than Coles and Woolworths grocery sales, combined.

Table 15: Top 5 Global Retailers 2010

Rank	Name	Nationality	Revenue US$ Billions
1	Walmart	USA	$421.89
2	Carrefour	France	$124.36
3	Tesco	United Kingdom	$93.17
4	Metro	Germany	$87.38
5	Costco	USA	$78.39

As mentioned earlier, Costco opened its first store in Australia in August 2009. The Costco model is a new concept to Australia. The impact is therefore, difficult to assess. However,

While the direct effect of Costco will be felt more in the medium term as warehouses are progressively rolled out, the indirect impact on prices will be felt as soon as Costco enters a market (The Intermedia Group, 2011).

The Costco warehouse style will affect retailers of electrical, furniture and clothing but they also offer a significant range of groceries, liquor, fresh meat and fresh produce. Importantly, Costco derive a large proportion of their profit from membership fees. This allows the company to sell at significantly lower margins than their competitors. As Costco expands it is likely to change the shopping habits of people in the immediate vicinity of their stores.

Table 16 indicates the dominant operation format of the Top 100 Global Retailers (Deloitte, 2011). The Hypermarket/Supercentre/Superstore sector has become the principal global retail format. This format is starting to become more popular in Australia.

Earlier examples, the original Pick-n-Pay (now part of Wesfarmers) failed to reach a significant critical mass. Costco, classified as a Warehouse Club, is an established international player, has entered the market with a great deal of experience, and importantly, sufficient capital to drive the format development in Australia.

Most disruptive of all the changes in global retail is the online channel. In 2009 Amazon was ranked as the worlds' 38th largest retailer, without any physical stores. Internet purchases appear to be growing at exponential rates; a strong Australian currency provides additional encouragement to consumers. The Non-Store (Online channel) has come of age and now provides a significant challenge to traditional retailers in all categories, including fresh produce. According to one source, "US retail e-commerce sales are expected to reach US$250 billion by 2014" (PwC, 2011). The US census Bureau estimated that the first two quarters of 2014 were US$141 billion, suggesting the PwC forecast was conservative (U. S. Census Bureau, 2014).

Table 16: Format and Value of the Top 100 Global Retailers

Format	2009 Revenue (U.S. $million)	2009 Revenue (per cent)
Hypermarket/Supercenter/Superstore	$897,075	28%
Supermarket	$846,339	26%
Drug Store/Pharmacy	$241,387	7%
Department Store	$183,499	6%
Discount Store	$175,648	5%
Cash & Carry/Warehouse Club	$172,998	5%
Home Improvement	$155,095	5%
Other Specialty	$132,421	4%
Electronics Specialty	$94,914	3%
Non-Store	$91,688	3%
Convenience/Forecourt Store	$83,332	3%
Apparel/Footwear Specialty	$72,130	2%
Discount Department Store	$65,357	2%
Discount	$19,824	1%

By the end of 2012 Woolworths and Wesfarmers were included in the Top 20 global retailers based on revenues. Amazon, in two short years had jumped to 16th place, with revenues just US$30 million below Woolworths in 15th place (Deloitte, 2014).

The major players in Australian grocery have developed their own online offerings that include delivery to the consumers home. They're also facing competition from specialty online businesses such as organicfood.com.au, wholefoodcentral.com.au, myfruit.com.au and Aussie Farmers Direct, to name just four.

It is interesting to note that in 2011, three of the top 100 global retailers (Amazon, Otto and Dell) are non-store businesses (Deloitte, 2011). Furthermore, Amazon offers groceries in the US market and currently offers a limited range of fresh produce (meat and fruit baskets, etc.).

In the UK, "The top four companies [Tesco, Asda, Sainsbury's and Morrison] … account for 75 per cent of retail business" (Seth & Randall, 2011).

The market share of independent grocers in the UK has been in long decline for many years.

> *Demand for independent grocers has been squeezed since the development of supermarket multiples. While independent grocers accounted for 80 per cent of grocery sales in 1900, in 2010 they are predicted to account for just 3 per cent of the sector* (Cobweb Information Ltd, 2009).

In 1994 the 10 largest food retailers in the US controlled 27% of the market. By 2000 they controlled 50% of the market (Drake, 2001).

This is a trend that is also visible in Western Europe. Of the fourteen countries selected in the chart in Figure 28 (Cook, Globalization of Food Retailing Presents Challenges and Opportunities to Ag Suppliers, 2003), all but two (Italy and the USA) have 5 or fewer players dominating over 50% of the respective markets, with 7 countries having 5 or fewer players dominating over 70% of the market.

Value Adding

In the United States

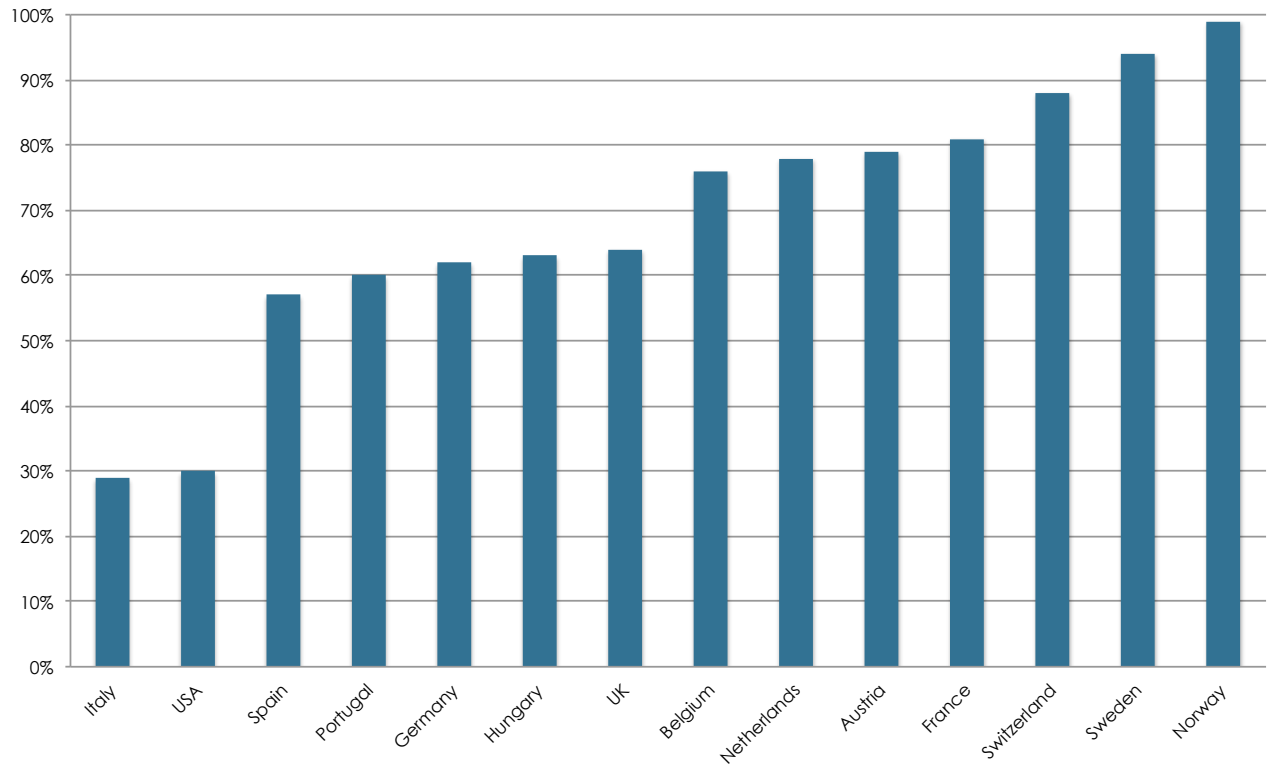
> *The share of branded produce increased from 7 percent in 1987 to 19 per cent in 1997, while fresh-cut produce and packaged salads rose from 1 per cent to 15 percent of total sales* (Dimitri, Tegene, & Kaufman, 2003).

Similar stories abound in most developed economies, Australia included. However, in recent years, especially the past 5 years, Private Label (or own brand) has been a significant area of growth.

> *While a popular range of off-label foods has already helped propel the category to account for 23 per cent of Australia's $70 billion grocery market, a similar trend in liquor is developing as the supermarket chains put out a growing portfolio of private-label wines, beers and spirits* (Greenblat, Private labels prove big winner for supermarkets, 2010).

Other sources estimate that the Australian Private Label market "account[s] for 24 per cent of grocery sales, up from 9 per cent in 2005" (Mitchell, Heinz cans Australian retail market, 2011). Whilst others suggest that it only accounts for 14 per cent (Langley, 2013). Which ever number is correct, Australians like Private Label; they bought approximately $5 billion alone, from ALDI, in 2012-13.

Figure 28: Market share of the top 5 Retail Chains (selected countries)



Between January 2007 and December 2008 Private Label share in the U.S. rose from 21.2 per cent to 22.6 per cent of the total share of Consumer Packaged Goods (CPG) (Information Resources, Inc, 2009). Given that "the food, beverage and CPG industry in the United States generates sales of $2.1 trillion annually (PwC, 2011), private label sales are in the vicinity of US$475 billion.

Supermarkets like Private Label:

> *A Food Marketing Institute study in the U.S. found that retailers earn a 35 percent gross margin on Private Label store-branded products compared to 25.9 percent on comparable nationally advertised brands* (Great Western Products Company, nd).

The massive growth in Private Label brands has made it extremely difficult for owners of national brands. This is evidenced by this description of the Australian food market, attributed to the chairman and chief executive of HJ Heinz:

> *There is no doubt that in terms of retail environment, the Australian market is the worst market, and ultimately the people will pay the price over there* (Mitchell, Heinz cans Australian retail market, 2011).

Given that value adding requires innovation and that innovation usually requires capital, the rise of Private Label can only be bad news for small businesses in Australia. Both the major supermarket chains have a publicly stated strategy of further development of their Private Label – the margin is too good to ignore.

Fresh produce is arguably the least brand intensive sector in the Australian supermarket. Taking a lead from the US, where in 2008, the bagged salad category was valued at sales of $2.7 billion (Cook, Trends in the Marketing of Fresh Produce and Fresh-cut Products, 2008). Australian supermarkets began to stock bagged salad approximately 10 years ago. Initially, the product was branded, now it is less likely that a consumer will find branded bagged salad in either Coles or Woolworths. The online channels for both Coles and Woolworths offered only Private Label bagged salad.

At one point Woolworths did offer "Houston Farms" and "Harvest Freshcut" brands; however, it is interesting to note that the address on the packaging of both products is the same as Woolworths head office. The design of the packs is such that they a very similar to the Woolworths own brand. The Coles stores visited during the course of this project only stocked Coles brand bagged salads.

It is becoming increasingly difficult to successfully launch branded product, especially fresh branded product, in the Australian supermarket channel.

Trade spending

Traditionally, there is a range of common trade practices that producers of Fast Moving Consumer Goods (FMCG) or Consumer Packaged Goods (CPG) have had to factor into the cost of doing business with supermarket chains.

The practices are commonly referred to as Trade Spending:

> *"… the financial deals that manufacturers offer retailers to market their products - stands at an all-time high for consumer goods companies, despite their lack of satisfaction with its effectiveness"* (BCG, 2004).

These practices include, but are not limited to, the following:

- Slotting Fees;
  - A fee required by retailers to allocate shelf space.
- Volume Rebates;
  - Discounts required as sales volumes increase.
- Promotional Fees;
  - Promotional Support/Fees (promotional material preparation, allowances, advertorials).
- E-commerce fees;
  - Fees charged for software that enables electronic communication with the retailers information systems, etc.
- Private Labels;
  - Requests to produce "generic" products – usually at a lower cost to branded product.
- Returnable Containers;
  - Charges (similar to pallet rental fees).
- Merchandising Support;
  - Provision of shelf packers, Point-of-sale/purchase displays, banners, recipe cards etc.
- Special Packs;
  - BOGOF (buy-one-get-one-free) and 2FER (two-for-one) campaigns.
- In-store promotion fees;
  - A fee required by retailers to allow in-store promotion, tasting, etc.
- Non Volume rebates;
  - A special rebate for nothing at all – referred to by one organisation as "up to 12% off all warranty purchases with our 'Mates Rates' Loyalty Program - with no volume requirements." (National Warranty Services, 2012)
- Food Safety Certification;
  - HACCP, Quality Assurance Systems; Produce Specifications; etc
- Payment Discounts;
  - Discounts (as high as 8.5%) for early payment (Scott, 2005).

Historically, suppliers of fresh produce were not subject to many trade-spending initiatives, but by 2005 change was well underway (Supply Chain STO P/L, 2005). It should be noted that this *innovation*, like most others in Australian retail, was not a local development, but yet another example of the plagiarism of overseas ideas that has become the hallmark of Australian retail.

The most recent example of this behaviour is Woolworths' decision to fix the price of some fresh produce lines for a one-year period (AAP, 2011). This has been established practice in the fresh produce category for many years in other markets, especially in the US where it was noted as recently as 2008 that:

> *"Despite differences between fresh produce and CPG's, produce is being asked to conform to the protocols of CPG's:*

- *Fresh-cut shows the way, including brands*
- *Channel captains, category champions emerge*
- *Contract pricing between shippers and buyers (both foodservice and retail)*
- *Longer-term relationships less focused on short- term price instability*
- *Slotting and other fees, rebates – cost to play grows – Services - data-based sales and marketing support*
- *As well as food safety gatekeeper function"* (Cook, Trends in the Marketing of Fresh Produce and Fresh-cut Products, 2008).

Given the general distrust that the production and manufacturing sector has of the retail sector, the reaction to this fixed-price *innovation* was and remains, somewhat sceptical. As Ausveg noted:

> *What Woolworths has implemented is an artificial market mechanism to handle this new initiative and it causes AUSVEG some concern for vegetable and potato growers across the country"* (Ausveg, 2011).

No doubt, the introduction of "Producer Clubs" (see below) will appear in the not too distant future.

Transnational Procurement

Evidence of transnational purchasing of fresh produce has been growing over the past number of years. It was noted that Sainsbury, a major UK retailer changed strategy:

> *To secure long-term supplies of guaranteed non-GM food ingredients. A process which is involving visits to a number of countries, such as Brazil, which could produce sufficient quantities of non-GM foods …* [and] … *To support the development of an international 'consortium' for sourcing non-GM foods that could provide more significant buying power from the aggregate demand, and sustainable supplies of appropriately priced produce* (Thompson, 2001).

The "GM" issue in this statement should not be a distraction; this is about global sourcing. There are many examples of transnational procurement, but it has been noted:

> *The existence of global retailers has not yet meant true global sourcing (joint ordering of stores belonging to the same chain). This is changing—especially for key products with more consolidated supply. Expect moves in bananas, citrus and melons by Ahold, maybe Carrefour-Promodes and others. Ahold has already done global promotions for mangoes and some other items, using shippers in one country as a source for all of its stores around the world* (Cook, Globalization of Food Retailing Presents Challenges and Opportunities to Ag Suppliers, 2003).

The prediction regarding Carrefour, the French-based grocer, did not take long to materialise:

Carrefour, the world's largest supermarket chain, has set up its own, huge distribution centre in São Paulo, Brazil, serving a market of more than 50 million consumers. Carrefour buys melons from just three growers in northeast Brazil to supply all its Brazilian stores and to ship to distribution centres in 21 countries (FAOUN, 2004).

Figure 29 illustrates the value of Imports and Exports of Fruit and Vegetables between 2007 and 2014 (ABS, 2014). Total exports during the period were valued at almost $273 billion. Total exports for All Fruit and Vegetables reached $2.4 billion during 2013-14 – less than 1 per cent of exports.

The export figure is the FOB value. So FOB is equal to GVP plus the administrative and transport cost to get the product on board the ship or plane.

The ABS also makes a forecast out to 2015 of imports and exports; these are shown in Figure 30. These forecast suggest that Australia will become, on average, a nett importer of fruit and vegetables, to the tune of about $6 million per month.

These data should not be taken to indicate anything sinister regarding the state of horticulture in Australia. After all, the first rule of forecasting is that the forecast is always wrong (Simchi-Levi, Kaminsky, & Simchi-Levi, 2003). It may simply be an indicator of the increase in transnational trade of fresh produce.

Figure 29: Imports and Exports of Fresh Fruit & Vegetables 2007-2014 ($m)

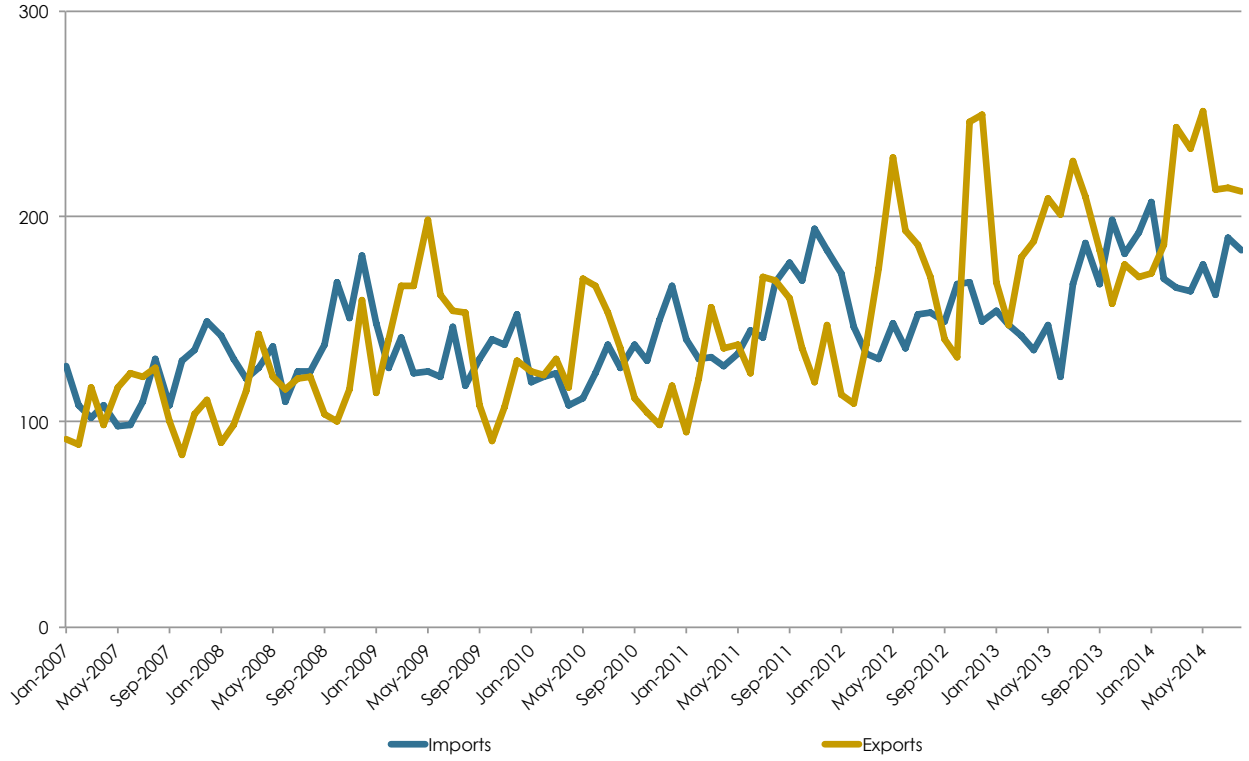
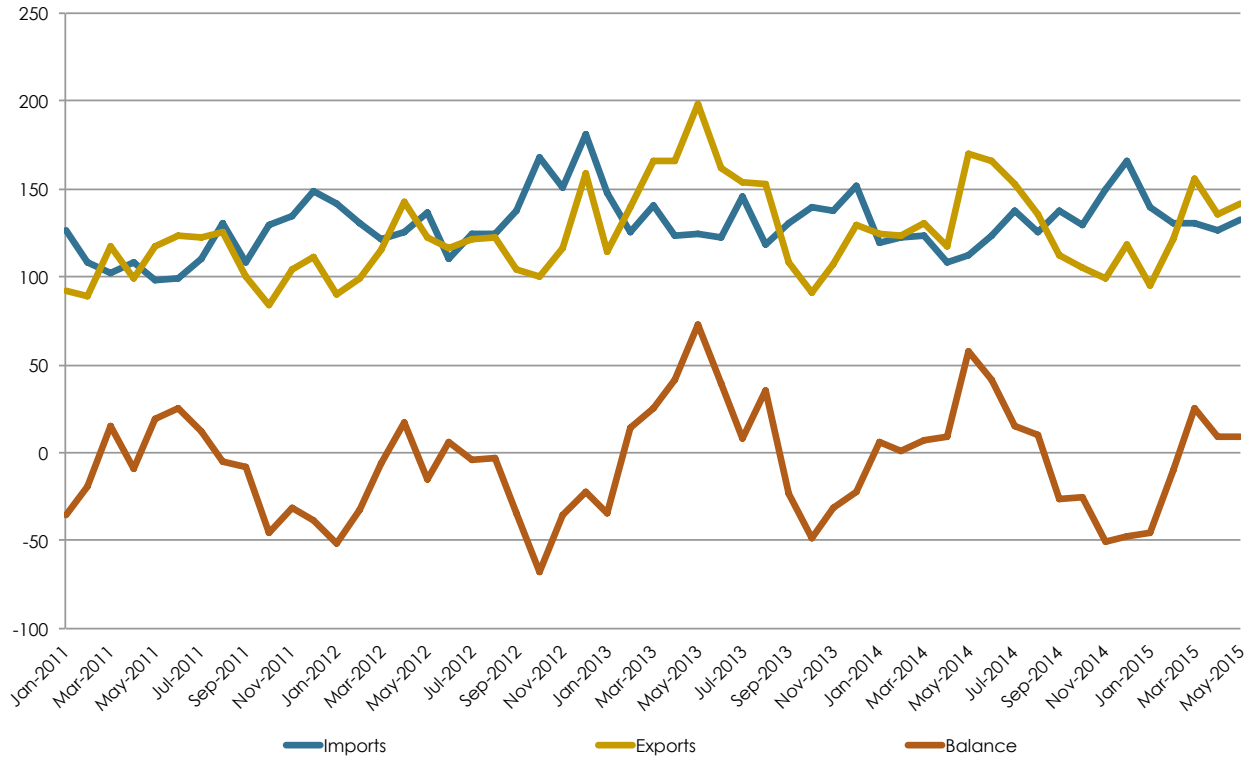


Figure 30: Forecast Imports and Exports of Fresh Fruit & Vegetables 2011-2015



Producer Clubs

In 1986 the first case of an animal falling ill with Bovine Spongiform Encephalopathy (BSE) was confirmed. A new form of Creutzfeldt-Jakob disease (vCJD) was later identified, "These cases appear to represent a new variant of CJD, which may be unique to the UK. This raises the possibility that they are causally linked to BSE" (Will, et al., 1996). By 1996 there were 13 confirmed cases of vCJD and the EU (along with Australian and a number of other countries) subsequently banned the import of British beef.

Producer Clubs emerged as a result of the profound problems in the British beef industry.

> *Tesco's Producer Group was launched in 1996. The group enables Tesco to ensure that all of the meat it sells comes from animals which can be traced back to the farm where they were born and which have been reared to the highest possible standards* (Fearne, 2009).

Producer clubs were a reaction to, and solution for, consumers changed attitudes to purchasing beef products; the vCJD scare; the rigours of the Food Safety Act 1990 and an attempt to gain a source of competitive advantage.

It was also noted that:

> *Perhaps ironically, the supermarkets are also finding they have little choice but to develop longer term sustainable partnerships with their suppliers, without whom their ability to consistently provide safe, high quality and innovative fresh meat products would become seriously threatened* (Fearne, 2009).

Members of a supermarkets' Producers Club should, in theory, enjoy improved market access. Along with this improved access, it has been suggested that communications with the supermarket are much improved, profit margins are higher, and that potential competitors face higher barriers to entry.

> *Farmers who join one of Tesco's Producer Clubs are not under contract. However, Tesco offers highly competitive prices and Club members are assured an outlet for their stock. In return, farmers are required to commit at least 50% of their stock. Prices are set in relation to the competition in the region. Tesco will match prevailing prices and offer premiums for good quality carcasses* (Fearne, 2009).

Of more interest is a recent announcement by Tesco

> *Tesco has revealed it is planning to launch a series of 'Producer Clubs' to strengthen its relationships with farmers and producers across the globe. The clubs will be developed through its four regional sourcing hubs located in Europe, Asia and Australia, Sub-Saharan Africa and the Americas"* (IGD, 2011).

Wholesale

The trend toward increased business activities between large supermarket chains and large growers has been evident for many years. Over twenty years ago it was noted:

> *A recent trend in Western Europe and the USA is to by-pass the wholesale market system. Direct links are created between producers and supermarket chains, usually by means of contract farming arrangements* (Tracey-White, 1991).

Towards the end of that decade it was observed in Brazil that:

> *The traditional distribution system of imported foods by which specialty importers, wholesalers, trading companies and brokers played a major role is breaking up rapidly. Today food manufacturers, supermarkets, and large food retailers are also buying directly from foreign suppliers* (FAS, 1999).

By 2000 it was apparent that a significant shift had occurred in many markets:

> *Most produce today still moves from grower-shippers through merchant wholesalers to retail outlets (food stores and foodservice establishments). But, between 1987 and 1997, the share of produce moving through merchant wholesalers, including wholesale produce markets, declined while the share of shipments to large self-distributing grocery retailers increased. Merchant wholesalers have survived by becoming larger, performing more functions and consumer services, and handling a larger array of specialty produce items* (Kaufman, Handy, McLaughlin, Kristen, & Green, 2000).

Within four years, a report from the Food and Agriculture Organization of the United Nations (FAOUN) had examined the effects of changing food systems on small farmers. In developing countries, especially in Latin American and Asia there had been considerable investment growth by transnational food corporations and an increased proportion of food sold through supermarkets.

> *The rapid growth and increasing concentration of supermarkets are among the most visible causes and consequences of the transformation and consolidation of global food systems – the entire chain from agricultural production through trade, processing, retail and consumption* (FAOUN, 2004).

By July 2008, the ACCC inquiry into the competitiveness of retail prices for standard groceries was completed and it contained considerable references and thirteen recommendations regarding the Horticultural Code of Conduct (the Code). Amongst those recommendations, the following indicate that the Code was not performing as intended and should be amended to:

- Regulate first point of sale transactions of produce between a grower and a retailer, exporter or processor.
- Require a merchant to provide a grower, before delivery, with either a firm price or a formula for calculating price. Any agreed method used to calculate price must be by reference to the amount received by the merchant from the sale of the produce to a third-party purchaser.
- Require that if a merchant does not reject the produce within 24 hours of physical delivery, the produce is deemed to be accepted (ACCC, 2008).

Surprisingly, reactions to these recommendations seem to be somewhat muted. The NSW Farmers' Association stated in a press release, "If these recommendations were implemented the entire industry, and in turn the consumer, will benefit in the long term from improved efficiencies and transparency" (NSW Farmers' Federation, 2009).

A committee that consulted with industry reviewed the recommendations (Growcom, 2008). The results and response were published in August 2009 (Horticulture Code of Conduct Committee, 2009). Although this review process was reported on both the DAFF (DAFF, nd) and ACCC (ACCC, nd) websites (the document is no longer available on the ACCC website), there is no indication that the recommended amendments to the Code will be implemented.

Recent interesting developments in Australia wholesale include:

- An increase in vertically integrating into farm ownership;
    - Securing supply for major contracts with supermarket chains
    - In the case of one smaller retail group, to secure supply of key lines.
- Contract growing;
    - The Wholesaler contracts a grower then packs and distributes from the farm to DC.
- Category management;
    - Providing value-added services to supermarkets (packaging, distribution, inventory management).
- Ownership of Plant Breeding Rights;
- Increase in Joint-ventures;
    - To supply counter seasonal commodities as exports or imports;
    - In cold storage facilities;
- Introduction of overseas investment capital into wholesale organisations.

Growing

In most western economies there is a long-standing trend toward consolidation in farming. A brief outline of trends in the USA and European Union follows.

In the USA, farming has become largely corporatised. Research in 2004 suggested that in any given year, only 20 per cent of US farms generate a profit (Jackson, 2004).

Table 17 compares the number of farms and their value of production at three points between 2000 and 2009 (USDA ERS, nd). These data strongly reflect the trend towards consolidation in the US.

Table 17: Relative No. Farms and Value of Production (US 2000 - 2009)

	2000		2005		2009	
Production Range	No Farms (%)	Val Prod (%)	No Farms (%)	Val Prod (%)	No Farms (%)	Val Prod (%)
>$500k	**3.1%**	**48.3%**	4.3%	59.5%	**6.0%**	**69.0%**
< $500k	4.1%	18.0%	4.4%	16.3%	4.6%	14.9%
< $250k	19.7%	28.0%	18.6%	20.3%	16.1%	13.8%
< $50k	**73.0%**	**5.7%**	72.7%	3.9%	**73.3%**	**2.3%**

It is interesting to note that in 2000 just over 3 per cent of farms had a value of production in excess of US$½ million, yet accounted for 48 per cent of total farm production. By 2009, the percentage of farms had doubled to 6 per cent of the total, but now controlled almost 70 per cent of total farm production.

Conversely, small farms – those with a value of production below US$20,000 per annum - made up 73 per cent of all farming operations. However, they accounted for less than 6 per cent of the total value of production. By 2009 the relative number of small farms had changed little, but their share of production had dropped to just over 2 per cent.

Table 18: No. Farms and Value of Production (US 2000 - 2009)

	2000		2005		2009	
Production Range	No Farms	Val Prod (US$m)	No Farms	Val Prod (US$m)	No Farms	Val Prod (US$m)
>$500k	67,941	$45,888	90,664	$68,091	131,853	$116,667
< $500k	89,523	$17,089	92,055	$18,622	101,130	$25,102
< $250k	427,469	$26,584	390,074	$23,221	352,089	$23,328
< $50k	1,581,850	$5,395	1,525,897	$4,512	1,606,781	$3,931

Table 18 shows the same data in absolute terms. The trends, in a period when the US experienced inflation of 24.8 per cent (US Inflation Calculator, nd) for small farms are negative; they have failed to keep pace with inflation.

Those farms with a value of production below US$½ million (but more than US$¼ million) have grown in number and have outpaced the inflation rate by approximately 15 per cent. The farms that enjoy a value of production in excess of US$½ million have been very successful. They increased in number by 95 per cent and their value of production has increased by, on average 4.7 per cent per year. The inflation rate during

this period in the US was 3.1 per cent, per year, on average.

Data from Eurostat, the statistical office of the European Union shows a strong move toward consolidation in most countries, or indicates that consolidation has already well underway.

Of the eleven countries listed in Table 19 (Eurostat, nd) seven (Belgium, Germany, Ireland, Italy, Luxembourg, Netherlands and Portugal) have shown a steady decline in the number of farms (Agricultural Holdings) in each year the data has been published. These seven countries show an average decline in the number of farms of approximately 34 per cent between 1993 and 2007.

Table 19: No of Agricultural holdings[8] ('000) selected EU members 1993 - 2007

Country	1993	1995	1997	2000	2003	2005	2007
Belgium	76.3	71.0	67.2	61.7	54.9	51.5	48.0
Denmark	73.8	68.8	63.2	57.8	48.6	51.7	44.6
Germany	606.1	566.9	534.4	472.0	412.3	389.9	370.5
Ireland	159.4	153.4	147.8	141.5	135.6	132.7	128.2
Greece	819.2	802.4	821.4	817.1	824.5	833.6	860.2
Spain	1,383.9	1,277.6	1,208.3	1,287.4	1,140.7	1,079.4	1,043.9
Italy	2,488.4	2,482.1	2,315.2	2,153.7	1,963.8	1,728.5	1,679.4
Luxembourg	3.4	3.2	3.0	2.8	2.5	2.5	2.3
Netherlands	119.7	113.2	107.9	101.6	85.5	81.8	76.7
Portugal	489.0	450.6	416.7	416.0	359.3	323.9	275.1
UK	243.5	234.5	233.2	233.3	280.6	286.8	299.8

Denmark showed an increase in 2005 but decreased below 2003 levels by 2007; Spain increased in 2000 but decreased below 1997 levels in 2003; then both continued to decline. Denmark's overall rate of decline in the number of farms was about 40 per cent between 1993 and 2007 whilst Spain's was closer to 25 per cent, in both cases, despite one increase, which may be a statistical "blip"

The anomalies are Greece and the UK. Both countries have seen an increase in the number of farms - in Greece by 5 per cent and the UK by 23 per cent. Data from the UK suggests that the number of farms there was 247,500 farms in 2005 (well below the EU figure) and that this figure dropped to 222,400 in 2010 (DEFRA, 2011).

When the EU data set is expanded to include 27 EU countries where data exists for the period 2003 to 2007, Greece and the UK are joined by Malta, Poland and Sweden in showing growth in the number of farms (Table 20).

During the period, the EU has lost 1.3 million farms, or almost 9 per cent of the total. One third of the farms are in Poland and Romania.

In Poland, 'the average private farm size is 7.2 hectares, compared with the EU average of 17 hectares" (USDA, 2003). Whilst "64% of Romanian farms produced mainly for own consumption … the family labour force represents 86 % of the total labour force" (Eurostat, 2008).

The picture in Australia is similar and has been canvassed earlier in this report. The graph in

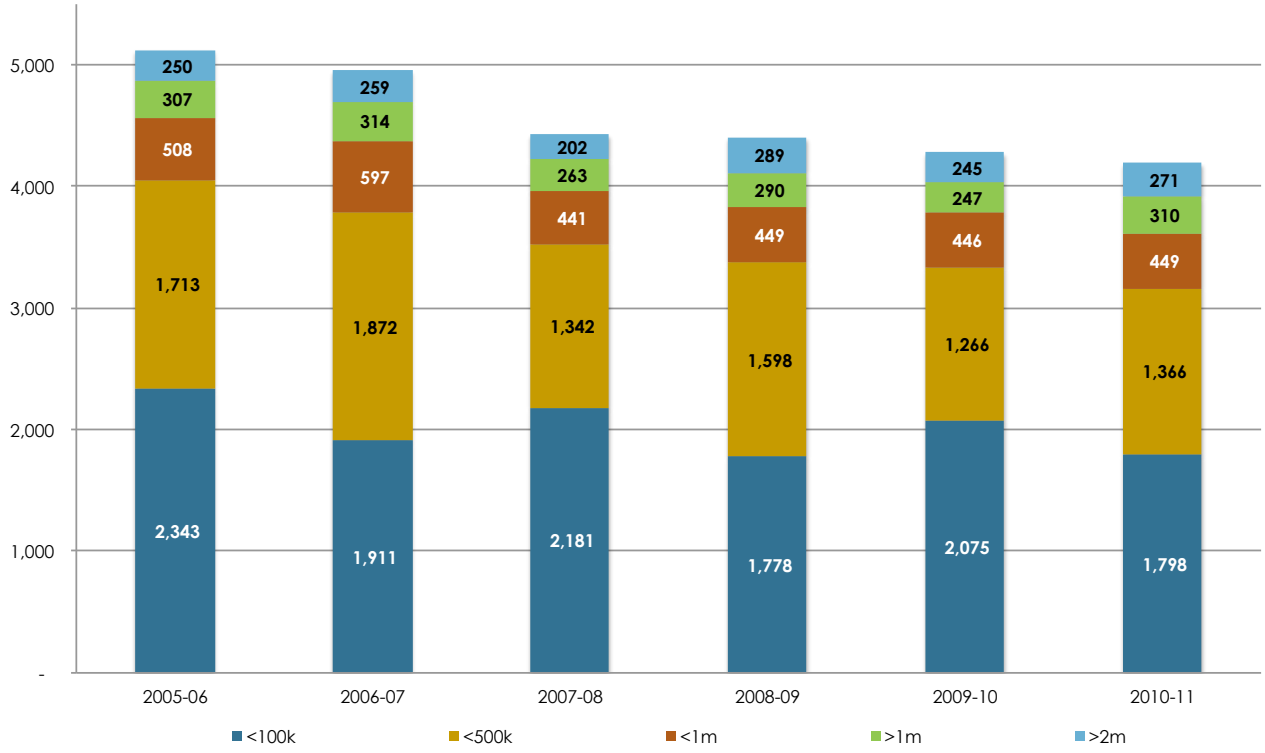
[8] An Agricultural Holding is defined as a single unit both technically and economically, which has single management and which produces agricultural products.

Figure 31 shows the number of vegetable farms dropped from about 5,121 to around 4,194 – a reduction of about 18 per cent. Similar to the US data, the number of larger farms increased whilst the number of smaller farms decreased.

Table 20: No of Agricultural holdings ('000) EU 2003 to 2007

Country	2003	2005	2007
Belgium	54.94	51.54	48.01
Bulgaria	665.55	534.61	493.13
Czech Republic	45.77	42.25	39.40
Denmark	48.61	51.68	44.62
Germany	412.30	389.88	370.48
Estonia	36.86	27.75	23.34
Ireland	135.62	132.67	128.24
Greece	824.46	833.59	860.15
Spain	1,140.73	1,079.42	1,043.91
France	614.00	567.14	527.35
Italy	1,963.82	1,728.53	1,679.44
Cyprus	45.20	45.17	40.12
Latvia	126.61	128.67	107.75
Lithuania	272.11	252.95	230.27
Luxembourg	2.45	2.45	2.30
Hungary	773.38	714.79	626.32
Malta	10.99	11.07	11.02
Netherlands	85.50	81.83	76.74
Austria	173.77	170.64	165.42
Poland	2,172.21	2,476.47	2,390.96
Portugal	359.28	323.92	275.08
Romania	4,484.89	4,256.15	3,931.35
Slovenia	77.15	77.17	75.34
Slovakia	71.74	68.49	68.99
Finland	74.95	70.62	68.23
Sweden	67.89	75.81	72.61
UK	280.63	286.75	299.83
Total	**15,021.41**	**14,482.01**	**13,700.40**

Figure 31: No Farms by Estimated Value of Operations 2005-06 to 2010-11



Recommendations

1. Develop extension material that addresses basic economics.

The tender brief and subsequent correspondence indicates a misunderstanding of supply and demand, economic utility and price elasticity. These concepts are vital to understanding drivers of price and behaviour in the market for vegetables. A misunderstanding of theses concepts (e.g. assuming that increased quality will lead to increased profits) could prove to be financially harmful to individual growers and the wider industry.

2. Develop extension material that explains basic supply chain structures.

Vegetable supply chains are complex. Growers have little control at either a physical or strategic level. If they continue to lose what little control they have, they run the risk of being further disconnect from the market. This cannot be good in the long term.

A workshop that addresses both recommendation 1 and 2 should be developed, with support materials. These workshops could then tour the major growing regions to educate levy payers.

3. Develop a data requirements statement

The paucity of data for most vegetable commodities must hamper decision making at an industry level and also at the individual enterprise level.

The ABS, Australian Customs and Border Protection Service and Australian Taxation Office all collect relevant data. It is vital to describe and understand what data the industry needs, how it intends to use it and where it can get it.

This issue needs to be addressed with a degree of urgency. We suggest that Ausveg and HAL develop an initial statement of requirements with a view to developing a formal tender for a project. This project would ascertain the information needs of the industry and develop a series of recommendations to obtain the data.

4. Investigate marketing costs

If, as our initial analysis implies, that marketing costs are moving independently of GVP, further investigation to ascertain the cause is warranted. A detailed study of marketing costs should be carried out. It may be viable to develop a cost model that growers could apply to their business to enable greater understanding and management of theses costs.

5. Monitor the Tasmanian Freight Equalisation Scheme

The Federal Government has yet to respond to the PC Report on the TFES. The PC does not believe that it is an effective mechanism and believes it should be replaced. It is vital that Ausveg stay abreast of developments and ensure that whatever happens, Tasmanian growers should not be disadvantaged.

6. Monitor changes to airfreight security.

The Federal Government is considering its approach to air cargo security. The last discussion paper made it clear that exports of vegetables would be disadvantaged by the plan as outlined. Ausveg may wish to work with other peak industry bodies (e.g. Australian Horticultural Exporters Association) to strengthen the approach to government. At a minimum, Ausveg must stay abreast of developments emanating from OTS and DITR.

7. Develop industry extension plans and training on transport regulations.

We do not believe that regulations around driving hours, FM and CoR are going to be eased. All levels of government, peak transport and logistics bodies and the major transport companies are "on the program".

The regulators are using very large fines as a blunt instrument to change behaviour. It may only be a matter of time before a grower gets entangled. We strongly recommend that Ausveg develop extension material for growers to keep them informed of their responsibilities under CoR.

Furthermore, we suggest that it is in the interest of the industry to be regarded as good corporate citizens rather than to seek special treatment.

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Darwin
Derby
Broome
Port Hedland
Learmonth
Carnarvon
Geraldton
Perth
Albany
Western Australia
Northern Territory
Tennant Creek
Alice Springs
South Australia
Port Augusta
Port Lincoln
Adelaide
Cairns
Townsville
Mount Isa
Mackay
Rockhampton
Gladstone
Bundaberg
Brisbane
Queensland
Bourke
Broken Hill
New South Wales
Newcastle
Sydney
Wollongong
Canberra
Victoria
Melbourne
Geelong
Tasmania
Hobart

0 1000 Km

Estimated Number of Agricultural Businesses

- 200 - 300
- 100 - 200
- 50 - 100
- 25 - 50
- 10 - 25
- 0 - 10

SUPPLY CHAIN STO
STRATEGY TACTICS OPERATIONS

Source: ABS 7121.0 DO 004 Agricultural Commodities (Statistical Area 4), Australia, 2012-13