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Soil to Oil: Improving the Value Chain for Australian Extra Virgin Olive Oil Producers

Michael Esposito

Postgraduate student, Centre for Global Food and Resources, University of Adelaide.



Abstract

In recent years many small-scale Australian olive oil growers have neglected plantations due to the high cost of inputs relative to prices, while other growers have sought to add value and ultimately profitability by marketing their own private label oil. In this paper the major constraints to olive oil value chain performance are identified, and some possible improvements are suggested. These include more widespread adoption of technology that results in efficient functions and cost-effective production processes; a focus on quality and responsiveness which may be verified by technologies such as blockchain; structural adjustment of the value chain to enable co-operative models that allow growers to pool resources across logistical and cross-functional drivers; and a focus on specialised niche olive products such as organic certification and beauty products.

Key words: EVOO, value chain, responsiveness, information technology, certification.

Introduction

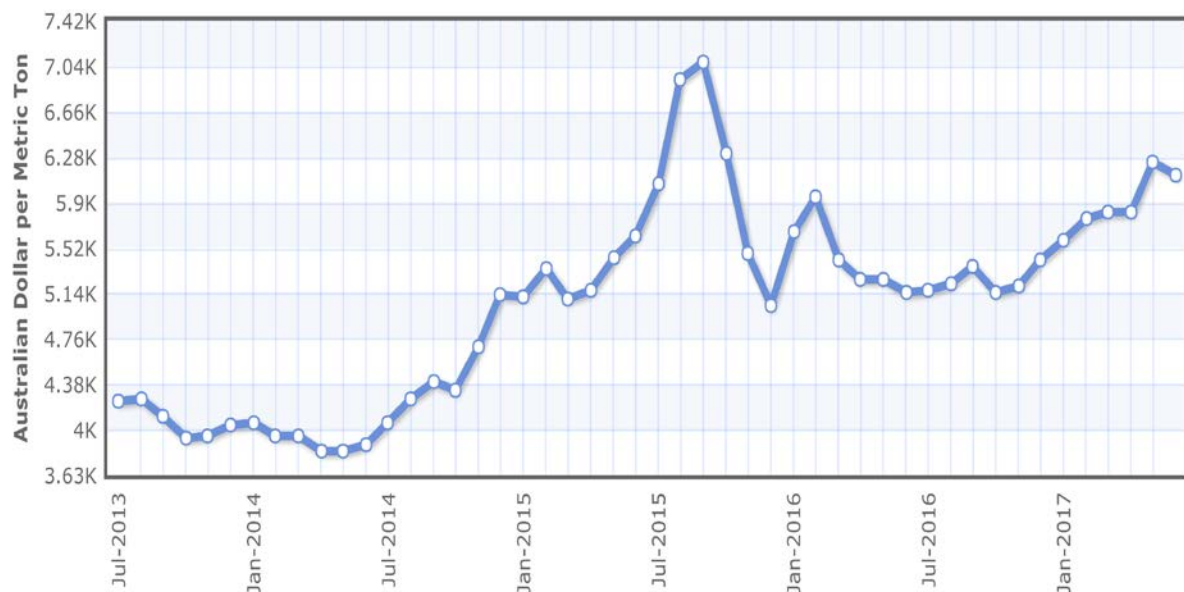
The purpose of this study is to analyse the Australian Extra Virgin Olive Oil (EVOO) value chain from a grower's perspective. Oil prices are high but so are costs, so profitability for small-to-medium size growers is an issue. In recent years many small-scale growers have neglected plantations as a direct result of the high cost of production. Other growers seek to add value further along the value chain by marketing their own private label EVOO (much like the boutique wine industry) to increase profitability. In this paper the aim is to identify major constraints to value chain performance across the industry, and propose possible improvements.

The Olive Oil Market

World situation

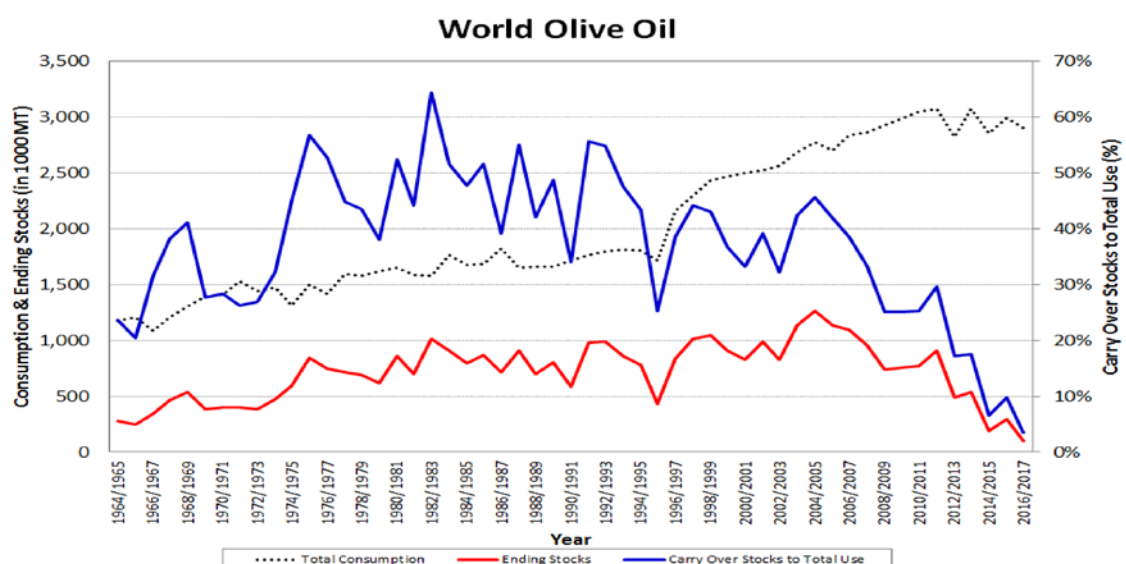
In recent times, olive oil shortages in the Mediterranean region have caused the world price of olive oil to rise (Figure 1). The consumption of olive oil has continued to rise simultaneously with oil shortages. With an increase in demand, pressure is building on the supply side. Reserves in stock have declined sharply since 2013 (Figure 2).

Figure 1. World price of extra virgin olive oil per metric tonne, July 2013 - June 2017



Source: Index Mundi (2018)

Figure 2. World olive oil consumption vs carryover stocks, 1964 – 2017



Source: Boundary Bend Limited (2017, p. 39)

Carryover stocks from year-to-year are trending towards zero, which suggests that global demand for olive oil will exceed supply in the near future. The emergence of new markets such as China is putting further pressure on the value chain's capacity to supply real, high quality EVOO.

Australian situation

The Australian EVOO industry consists of olive producing areas throughout the country. Victoria is the largest producing state (63 per cent of the area planted), followed by South Australia (11 per cent), Western Australia (10 per cent) and New South Wales (9 per cent). Queensland and Tasmania each have less than one per cent (Hort Innovation, 2016/17, p. 230). The total production area in Australia is 20,568 hectares (Table 1).

Table 1. Australian olive oil data, 2015-2017

Year Ending June	2015	2016		2017	
	Value	Value	% YoY	Value	% YoY
Production (t)	107,711	90,323	-16%	130,000	+44%
Production (\$m)	\$ 122.4	\$ 112.1	-8%	\$ 125.1	+12%
Production area (Ha)	20,568	20,568	-	20,568	-
Olive Oil Export Volume (t)	4,410	4,827	+9%	3,800	-21%
Olive Oil Export Value (\$m)	\$ 23.2	\$ 29.5	+27%	\$ 21.9	-26%
Olive Oil Import Volume (t)	25,783	24,992	-3%	30,164	+21%
Olive Oil Import Value (\$m)	\$ 113.3	\$ 140.5	+24%	\$ 163.7	+17%
Olive Oil Supply (t)	40,815	36,423	-11%	43,931	+21%
Olive Oil Wholesale Value (\$m)	\$ 247.3	\$ 255.7	+3%	\$ 290.7	+14%
Oil Consumption per Capita (kg)	1.72	1.51	-12%	1.79	+19%

Sources: AOA; GTA; MP & DD (Freshlogic Analysis)

Source: Hort Innovation (2017). Note that olive oil has a density relative to water of 0.916kg (FAO, 2015).

For the year ending June 2017, Australia produced around 130,000t of olive fruit, the vast majority of which is processed into olive oil. Some 17,568t (19.2M litres) of olive oil was produced in 2016/17.

Australia exported 3,800t (4.15M litres) of olive oil with an export value of \$21.9M. This represents a unit export price of \$5.76/Kg, equivalent to \$6.29/litre. The export destinations for Australian olive oil exports are shown in Table 2. An opportunity exists for small and medium size growers to pool resources and grow this market significantly via a co-operative model. Australia imported 30,164t (32.97M litres) of olive oil with an import value of \$163.7M for the year ending June 2017. This represents a unit price of \$5.43/Kg, equivalent to \$5.93/litre.

The total gross wholesale value of supply to the domestic market was \$291M. Australian olive oil makes up 33 per cent or 13,768t (15.05M litres) of the domestic market. This represents a wholesale value of \$127M (\$9.22/kg, equivalent to \$10.08/litre). Australians consumed a total of 43,931t (48.01M litres) of olive oil for the year ending June 2017. Based on this volume, consumption per capita is 1.79kg (1.96 litres). This represents an average wholesale price of \$6.62/kg, equivalent to \$7.23/litre.

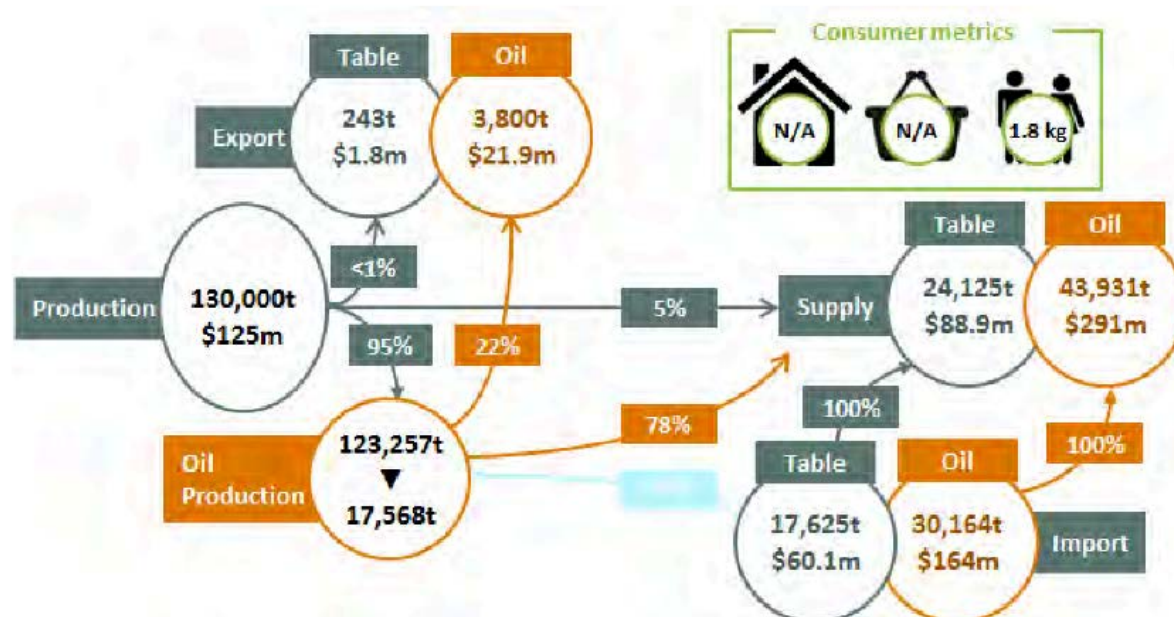
Another way of reporting these data is shown in Figure 3.

Table 2. Australian olive oil exports by volume, value and price, 12 months to June 2016

Country -	Volume Tonnes (season to date)			Annual Total		Value \$ Million AUD (season to date)			Annual Total		Average price per KG (FOB)		
	July to Jun-15	July to Jun-16	Change to LY	Jul-15 Jun-16	Share %	July to Jun-15	July to Jun-16	Change to LY	Jul-15 Jun-16	Share %	July to Jun-15	July to Jun-16	Jul-15 Jun-16
ALL MARKETS	4,410	4,827	9%	4,827	100%	23.24	29.47	27%	29.47	100%	5.27	6.10	6.10
Spain	1,036	1,879	81%	1,879	39%	3.53	10.50	197%	10.50	36%	3.41	5.59	5.59
China	639	626	-2%	626	13%	3.96	4.38	10%	4.38	15%	6.20	6.99	6.99
Italy	1,423	704	-51%	704	15%	6.37	3.94	-38%	3.94	13%	4.48	5.59	5.59
New Zealand	561	644	15%	644	13%	2.93	3.25	11%	3.25	11%	5.21	5.04	5.04
United States	263	375	43%	375	8%	1.67	2.91	74%	2.91	10%	6.35	7.75	7.75
Japan	122	141	15%	141	3%	1.53	1.59	4%	1.59	5%	12.56	11.30	11.30
Hong Kong	21	31	48%	31	1%	0.98	0.44	-55%	0.44	1%	47.13	14.26	14.26
Taiwan	37	59	61%	59	1%	0.32	0.42	30%	0.42	1%	8.76	7.08	7.08
Canada	109	81	-26%	81	2%	0.73	0.39	-47%	0.39	1%	6.72	4.76	4.76
Indonesia	8	67	761%	67	1%	0.04	0.24	515%	0.24	1%	4.91	3.51	3.51
Malaysia	41	23	-43%	23	0%	0.20	0.19	-4%	0.19	1%	4.87	8.25	8.25
United Kingdom	13	17	24%	17	0%	0.26	0.19	-28%	0.19	1%	19.48	11.20	11.20
Korea, South	14	15	12%	15	0%	0.19	0.18	-1%	0.18	1%	13.54	11.96	11.96
Fiji	28	27	-4%	27	1%	0.13	0.15	21%	0.15	1%	4.51	5.71	5.71
Mexico	0	22		22	0%	-	0.13		0.13	0%		5.80	5.80
all other	95	117	23%	117	2%	0.40	0.59	50%	0.59	2%	4.19	5.10	5.10
TOTAL OLIVE OIL	4,410	4,827	9.5%	4,827	100%	23.24	29.47	26.8%	29.47	100%	5.27	6.10	6.10

source : ABS data, Fresh Intelligence analysis

Source: Hort Innovation (2016, p. 10)

Figure 3. Australian olive oil supply chain, 2016/17**Olive Oil/Table Olive Supply Chain—Year Ending June 2017**

Sources: Australian Olive Association (AOA); GTA; MP & DD (Freshlogic Analysis)

Source: Hort Innovation (2017)

Qualities of olive oil

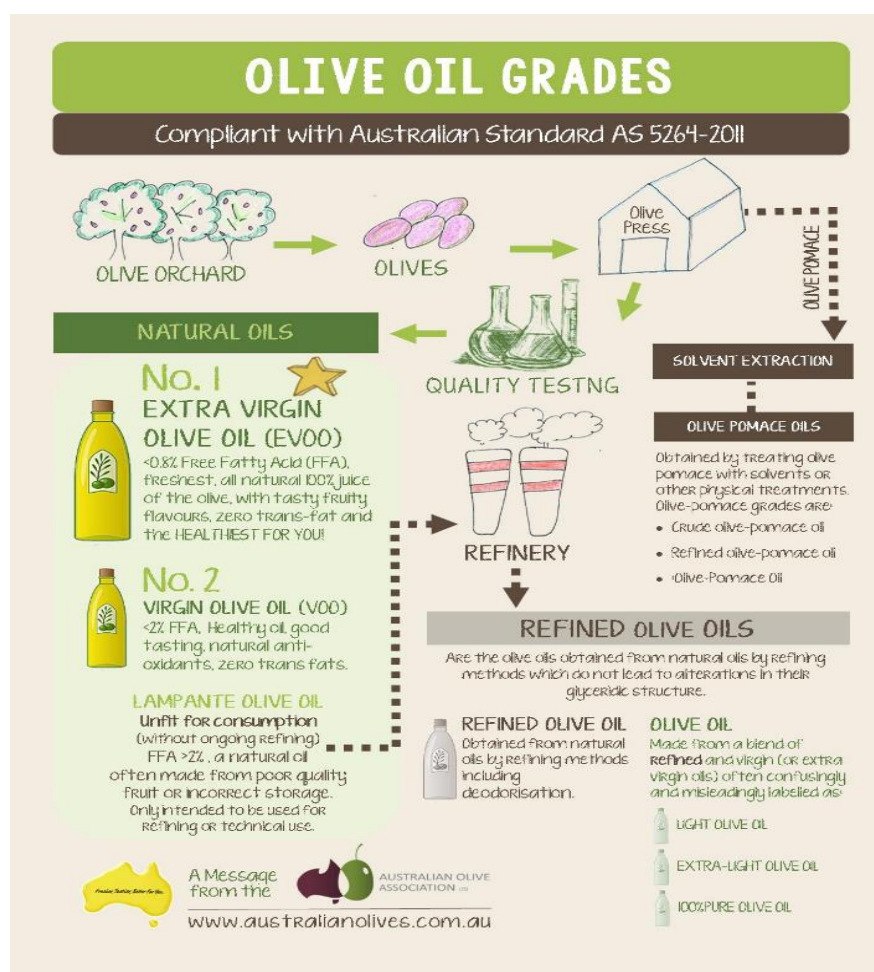
Grades of olive oil are shown in Figure 4. Extra virgin olive oil is the highest value derivative of the olive species (*Olea Europaea* L.). Domestically, Australian EVOO in comparison to Mediterranean olive oil commands a 56 per cent price premium (Figure 5). As a result, demand for olives is expected to encourage industry participation over the next five years (Ibis World, 2017). Internationally, demand for Australian EVOO can be demonstrated in Table 2, which shows the value of exports in 2016 increased by 26.8 per cent compared to the previous year.

Imported olive oil clearly has a comparative advantage over Australian olive oil with regard to price given that imported oil is \$3.79/kg cheaper. However, Australian EVOO has a comparative advantage over imported olive oil with regard to quality. Consumers are showing a willingness to pay for Australian branded EVOO based on taste, quality and a general preference to support Australian-grown products. According to an EVOO market survey conducted in South Australia during July 2017 (McFarlane, 2017), the average purchase price for imported products was \$13.50/L, and for Australian products was \$20.00/L, indicating Australian EVOO receives a premium of \$6.50/L over imported EVOO. Comparative advantage can be demonstrated in Figure 6 which shows the quality of Australian EVOO compared to imported EVOO.

The Australian Olive Oil Value Chain

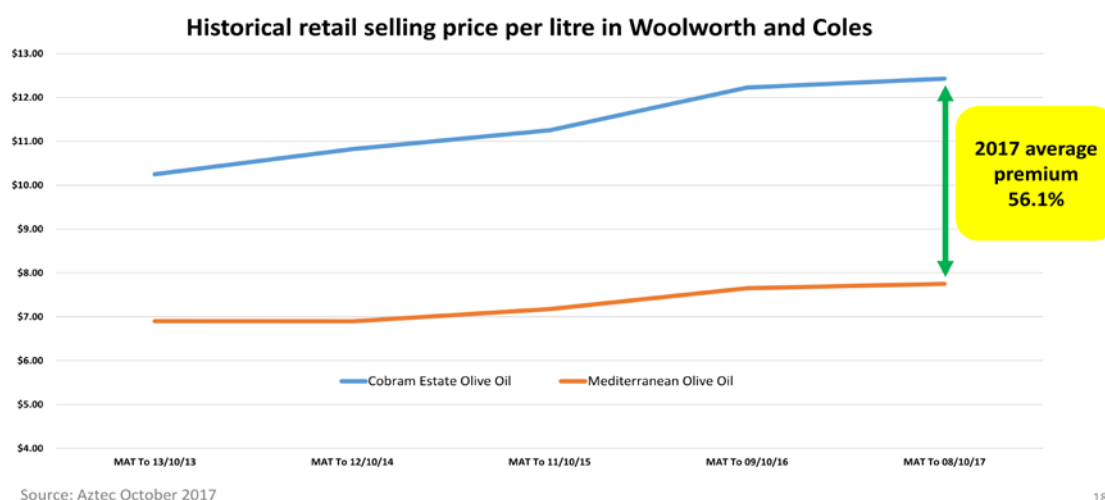
There are no data that specifically identify EVOO as the end product to the consumer, thus the following analysis refers to all grades of olive oil including extra virgin, virgin and refined. The value chain is shown in Figure 7. According to the most reliable source, retail prices of 23 EVOO brands found in major supermarkets range from \$0.80/100mL to \$6.40/100mL (McFarlane, 2017).

Figure 4. Australian olive oil grades

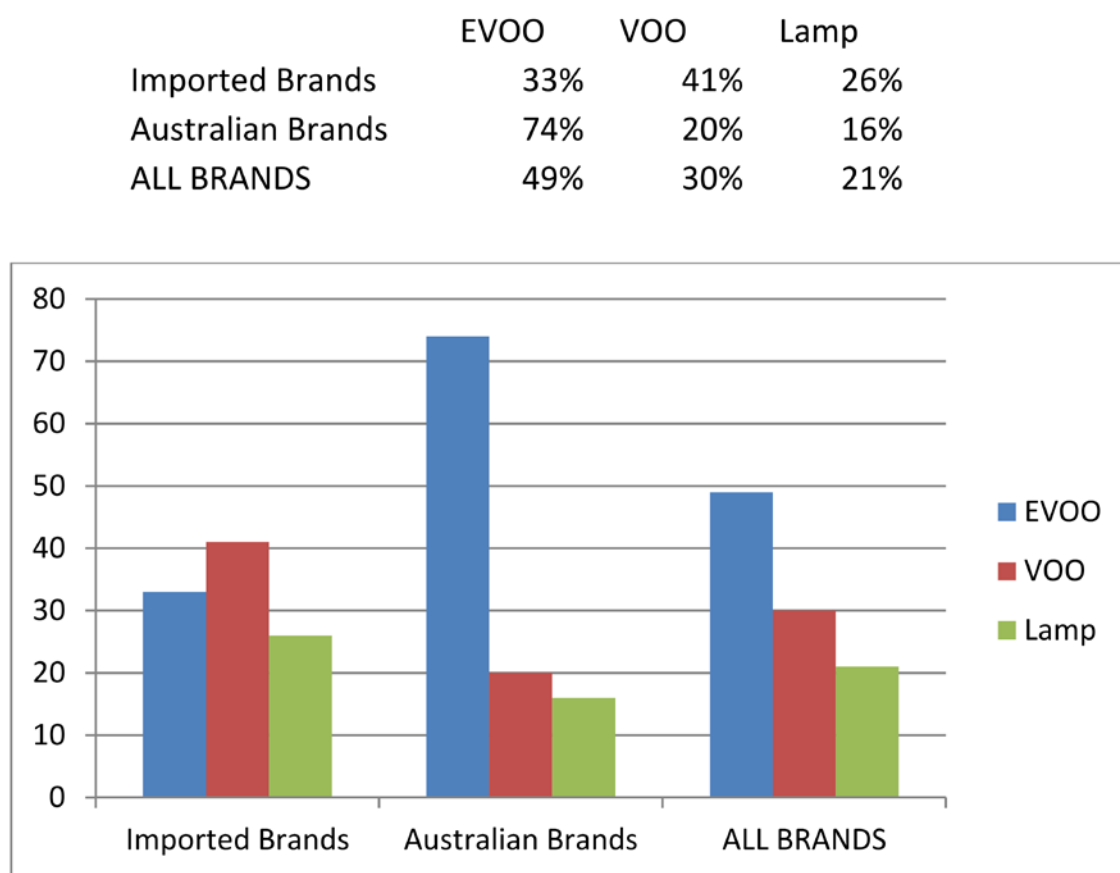


Source: Australian Olive Association (2017)

Figure 5. Average price per litre of Australian EVOO brand Cobram Estate in comparison to imported Mediterranean olive oil, 2013 - 2017



Source: Boundary Bend Limited (2017, p. 18)

Figure 6. Quality comparison of Australian EVOO brands compared to imported brands

Source: McFarlane (2017)

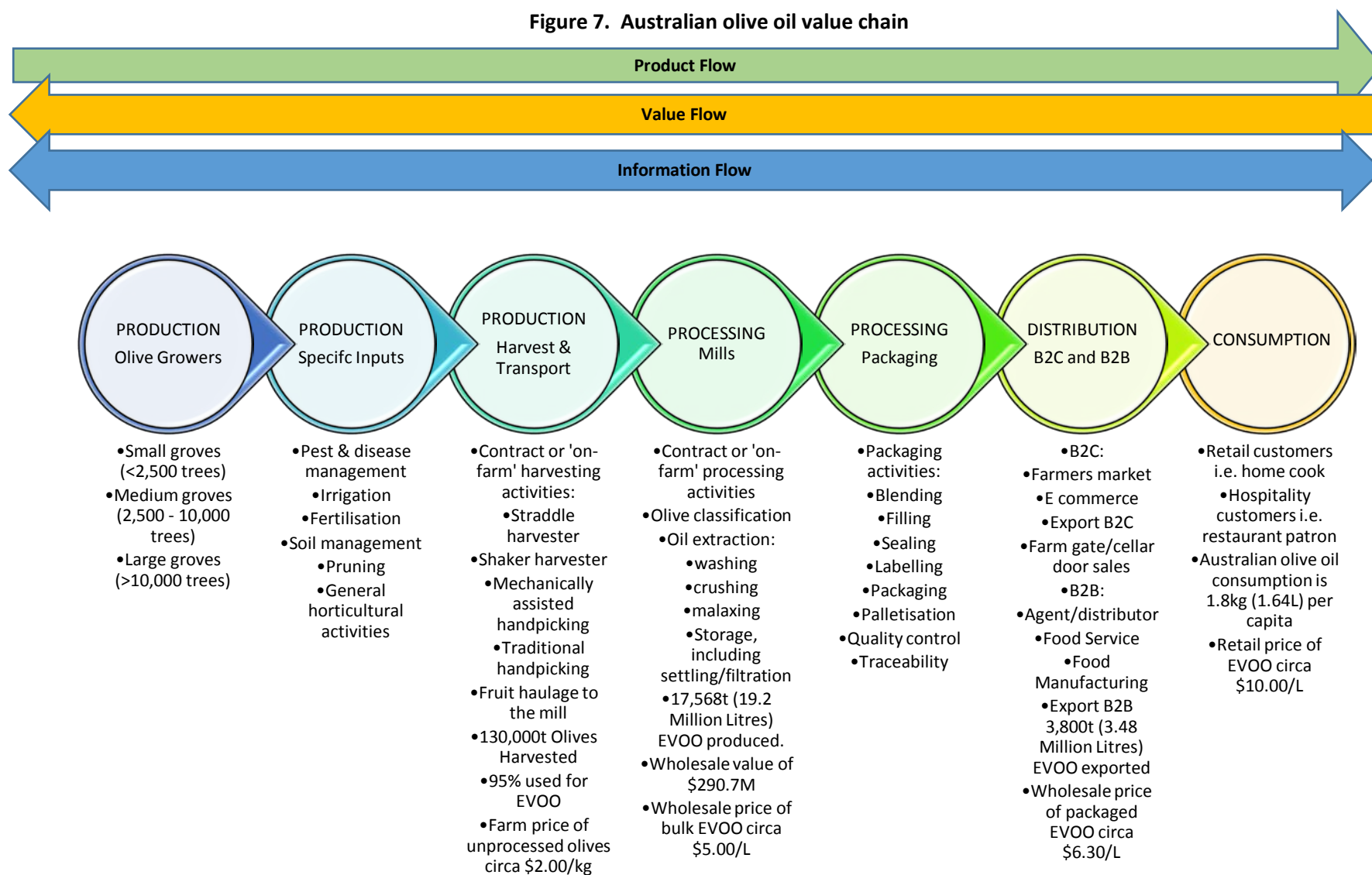
Strategic fit

The health benefits of EVOO are becoming more recognised both domestically and internationally, and this is driving demand. Olives and EVOO as the main source of healthy fat, with additional bioactive compounds, are central to the Mediterranean Diet (Olive Wellness Institute, 2018).

Supply and demand variability greatly effect strategic fit. On the supply side, price of inputs (fertilizers), technological changes (harvesting and pressing), price of substitutes in production (types of oils), number of firms in the market and expected future prices all must be considered when developing the competitive strategy. On the demand side, disposable incomes, prices of related goods/substitutes (other edible oils), tastes and preferences (eg, for coconut oil), population and demographics and expected future prices will all influence strategic fit (Garnett et al., 2016).

Responsive value chains respond quickly to demand, generate higher margins because price is not a prime customer driver, maintain a level of capacity to buffer against demand/supply uncertainty and select suppliers based on speed, flexibility, reliability and quality (Chopra and Meindl, 2016). Economic sustainability is a key principal of developing sustainable value chains (FAO, 2014). Focusing on major drivers such as harvesting, processing and logistics will ensure growers receive a premium return.

Figure 7. Australian olive oil value chain



Major Constraints for the Industry

The challenges for olive producers relate not just to productivity; they also include many that relate to value chain responsiveness and efficiency. Competitive product selection, consumer marketing, financial structuring for growers, and economies-of-scale are major challenges for small and medium growers.

Food fraud

Truth in labelling is a prevalent issue which damages Australian EVOO (Butler, 2013). EVOO is one of the most adulterated products in the world; it can be blended with cheaper and less healthy seed or vegetable oils (Anon, 2018). Provenance can also be falsified. This significantly disadvantages growers who do the right thing. Without truth in labeling, not only is there an incentive for adulterators to use (unjustifiably high) price as a quality cue, but it is extremely difficult for the value chain to compete against fraudulent olive oils.

Misleading product descriptors

The primary challenge concerning food fraud, lends itself to a secondary issue surrounding product descriptions. Confusing the customer is a tactic which some brands have adopted (Thring, 2012). For example, in the current market consumers have the choice of: extra virgin olive oil, virgin olive oil, olive oil, refined olive oil, light olive oil, extra light olive oil, pure olive oil, “100% pure” olive oil, and flavored olive oil, etc. The consumer’s ability to separate extra virgin from other inferior grades of olive oil becomes challenging, often leading to frustration and, ultimately, a decision based on price rather than product quality and knowledge.

Competition amongst the small players

To capture increased value, growers have shortened the value chain in an attempt to sell their own brand of EVOO. The emergence of many private labels has led to increased competition for market share within the niche markets. During a time when there is strong competition from imported brands who can offer cheaper prices, it is not sustainable for smaller growers to compete against each other, especially when there are little to no economic efficiencies within the value chain. Too much choice for consumers is not always a good outcome from a supplier’s perspective. Firstly, a low exchange rate makes imported brands more competitive and may be eroding the premium for ‘Australian grown’ as discussed above. Secondly, competition from other edible oils (such as coconut oil and canola oil) further diminishes market share for growers. The challenge for Australian producers is more difficult when one considers the fragmentation of the industry in geographical, agri-political and production terms. Thus, there are limited ‘scale economies’ in lobbying as well as generally low levels of integration along the value chain (RIRDC, 2002).

Production costs

There is a lack of reliable, comprehensive olive statistics available on production costs in Australia (Hort Innovation, 2017). The cost of producing olive oil is under investigation by the Olive Fund of Hort Innovation through the development of an industrywide system to collect and analyse production data over the period 2017–2021 (Hort Innovation, 2017). Given that the relationship between oil quality and production is so close, growers need to adopt the best quality production systems in the most economically efficient manner. Growers need to evaluate the following factors: the olives must have the maximum weight of oil; the quality of the oil must be optimal; fruit and tree damage must be

minimal; and next year's crop must not be adversely affected by this year's decisions, all the while making sure that harvesting is as cheap as possible.

RIRDC (2008) describes estimated improvements in oil quality and reduction of biannual bearing while increasing the efficiency of mechanical harvesting. Figure 8 provides an overview of the impact of harvesting inefficiencies on the potential crop of the following season based on current Australian data and overseas research.

Figure 8. Potential crop losses due to harvesting inefficiencies

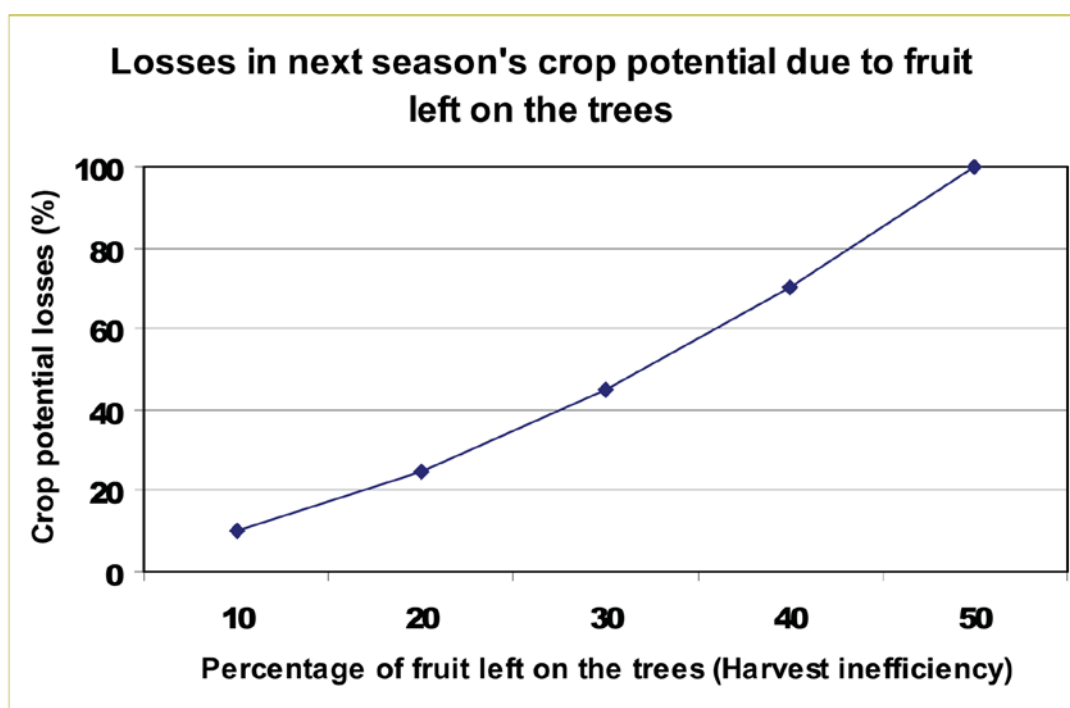


Figure 1. Estimated crop potential losses due to fruit left on the trees

Source: RIRDC (2008)

Proposed Interventions and Improvements

The co-operative model

A co-operative is an association that is united voluntarily to meet common economic, social, environmental and cultural goals through a jointly-owned and democratically controlled enterprise. Co-operatives are based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity. The core purpose of a co-operative is to create and return value to members (Wikipedia, 2018). Cooperatives have the power to return value to the growers by developing two key areas of the value chain: more resourceful and cost-effective production systems; and responsive marketing and sales efficiencies.

The olive-growing industry in Australia is highly fragmented. The industry includes numerous small hobby farmers and small-to-medium scale olive producers without a strong brand for fruit for the bulk olive oil market (IBIS World, 2017). Yet there seems little inclination to move to a co-operative model.

Growers must consider improving the coordination across the entire value chain if they are to reduce costs and increase returns. Strategically, this cannot be achieved through solo efforts. Small- and medium-size growers must work together collectively, as well as with other actors across the value chain. Two areas of co-operation seem particularly important.

First, a collaborative approach towards agronomy and processing is a key driver of performance. Improvements in farm productivity and olive quality will result in economic sustainability for growers. Growers must implement world-best practice in grove management to increase productivity and quality. This extends to world-best practice in olive oil production, storage and packaging.

Second, collaboration through the pooling of resources will help drive logistical and cross-functional drivers, leading to improvements in efficiencies and economies of scale. Resources such as business administration, horticultural services, marketing, transportation and facility management can be shared amongst growers via a co-operative model, much like the wine growers' co-operative in South Australia (CCW-Cooperative Limited). This co-operative model can achieve a more sustainable value chain compared to individual growers acting on their own behalf (CCW Co-operative Limited, 2018).

Blockchain

Solving the issues of fraud, provenance and food safety can be achieved through the application of blockchain. Many consumers around the world lack trust in food value chains, which is equated to a need to know more about how, where, when and by whom food is grown, harvested, made and/or sold. Consumers require complete and total transparency from the value chain. For example, 29 per cent of Australians do not trust the food and drink industry as a whole to ensure food and drink is safe for consumption (Mintel, 2018).

Cryptography is the underlying technology behind blockchain (Wikipedia, 2019). Blockchain can be used for decentralising transactional data across a large value chain that can be shared with all the actors. It captures transactions permanently, without relying on a central authority. Each transaction forms a 'block' of information. Each block is joined together to form a 'chain'. Data can be used to: match product to processing demands; enable traceability; verify provenance and origin; verify inputs and ingredients; and monitor quality and safety. By adapting blockchain, a consumer in Shanghai can verify that a 500ml bottle of EVOO originated from a particular olive grove in McLaren Vale. Blockchain can give consumers real visibility into the value chain. This is something very few people outside the industry have.

Value chains will have the ability to improve demand forecasting and assist in value chain coordination. Brands will be able to escape the trap of commodity production, where EVOO does not attract premium prices. Farmers will have the ability to put their EVOO into niche markets by allowing verification of provenance and other attributes. Especially in markets where food safety, integrity and point of origin are highly valued, blockchain can potentially remove these barriers via a transparent open ledger of transactions.

Blockchain technologies are being adopted quickly in the rest of the world if not in Australia. For example, Alibaba and JD are investing large sums into blockchain (Stimolo, 2018) and Chinese President Xi Jinping calls it a breakthrough technology. About 41 per cent of Chinese startups who received funding in the first quarter of 2017 were blockchain related. Shanghai, Guangzhou, Shanxi, Henan, Guiyang and Hangzhou all have policies actively encouraging blockchain development, with Hangzhou pledging investments of \$1.5 billion (10 billion yuan) in the technology. It was one of the most talked about topics at the 2017 World Economic Forum, where it was estimated that 10 per cent

of global GDP will be stored on blockchain by 2027 (Tanner, 2018). Costs to the olive oil industry of any involvement in this field remain very uncertain, in spite of the rapid developments in the technology.

Innovation

Innovation and product differentiation play a critical role in driving long-term, sustainable value chain improvements. Knowing the customers' needs, wants, tastes and preferences, which are measured through the flow of information (up and down the value chain), will have a positive effect throughout the entire chain.

Cosmetics and pharmaceuticals (skin care products) are a prime example of innovation that can return greater value to the grower. Research is being conducted into the squalene levels of EVOO. Squalene is fat soluble and concentrates in the skin surface lipid film that acts to protect human skin from the external environment. A high concentration of squalene seems to not just affect skin integrity but lower the risk of a skin cancer forming (McMillan, 2018). Functional and luxury innovations can have a significant economic and social effect for the value chain.

Coordinated marketing

Coordinated, effective and efficient marketing efforts will increase demand for Australian olive products within domestic and key overseas markets. A coordinated campaign highlighting the fact that Australian EVOO is pure and high quality will justify the premium prices growers need to get a profitable return.

Domestically, key messages that differentiate Australian EVOO from European brands (which may be chemically refined) need to be delivered at a national level. The use of an industry-endorsed certification scheme, coupled with education on the varying levels of quality, can inevitably increase market share for Australian producers.

Internationally, organic certification is highly valued. Packaging must be very appealing to the consumer. Traits such as 'family' or 'community owned' also resonate highly among surveyed groups of olive oil consumers (Schuricht, 2018). Taste, aroma and flavors are specific for each market; therefore a market analysis should be undertaken before entering new markets.

With China showing a growing interest in Australian wine for example, researchers at the ARC Training Centre for Innovative Wine Production are tailoring wine and its packaging specifically for the China market. This research has resulted in a definition of wine compositions and bottle and label designs that are expected to appeal to a significant proportion of Chinese consumers buying wine for celebrations (University of Adelaide, 2017). EVOO exporters can leverage from this research and apply learnings to the packaging and presentation of their products.

Top brands of Australian EVOO can also be perceived as luxury items that command high premiums, especially in Asian markets. Product development, for example EVOO/truffle oil mixtures can enable Australian producers to access very high value markets in Asia, with these products selling for over \$100/l. Hence, encouragement of product development initiatives across the broader luxury food ecosystem in Australia can help producers to access value-added opportunities downstream (PIRSA, 2015).

The perception of Australian EVOO as a genuine, trustworthy product must be fostered and marketed towards medium-to-high-end consumers. Customer needs must be clearly defined and built around responsiveness. Australia cannot follow Europe, whereby competitive advantage is based on

efficiency, high volumes and low cost. Australia must follow a different path, a strategy that puts a greater emphasis on quality and responsiveness than on cost.

Conclusion

To improve the value chain in a manner that is beneficial to Australian olive growers, several opportunities for improvement have been described at an intermediate level. While it is important to note that value added can be assessed in different ways, this review has focused mainly on economic returns to asset owners.

For growers to be economically, socially and environmentally sustainable, the following recommendations are proposed: more widespread adoption of technology that results in efficient functions and cost-effective production processes; quality and responsiveness must take priority before pricing and efficiency - Australian EVOO must consistently be of the highest standard and meet consumer expectations, which may be verified by technologies such as blockchain; a structural adjustment of the value chain to enable co-operative models that allow growers to pool resources across logistical and cross-functional drivers; and a focus on more specialized niche olive products such as organic certification and beauty products. As always, investment in any of these areas requires solid benefit cost analysis of the expected net returns to the industry.

Growth in the Asian economies can give Australia a competitive advantage but only if it is proved to be a reliable, cost-competitive supplier of quality EVOO. Broadly speaking, there is a shift in customer attitudes away from heavily processed foods to green, fresh and healthy foods. Greater value will likely emerge from high quality unprocessed foods with no or minimal transformation. The Australian olive industry is perfectly positioned to capitalise on this opportunity.

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