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Certification Schemes in the Australian Organic Wine Industry

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Abstract

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Certification Schemes in the Australian Organic Wine Industry*

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**** The argument and data set out in this paper is provisional and requires further analysis. Please do not cite this paper without permission. Comments are very welcome and should be sent to Fred.Gale@utas.edu.au.***

ABSTRACT

Organic production is booming worldwide including in the wine industry, where going organic is less costly and more rewarding than many other sectors. Yet, while the popular media contrasts conventional produce with organics, insiders know that several competing organic standards exist from which suppliers and consumers may choose. In Australia, these include *Australian Certified Organic* (ACO), *National Association for Sustainable Agriculture, Australia* (NAASA) and *Bio-Dynamic Research Institute* (BRDI/Demeter) as well as several smaller schemes. In this paper, we first outline the background to the emergence of Australia's organic wine industry and then review the implications of going organic for soil health, greenhouse gas emissions, biodiversity protection, wine quality and employment among other factors. We then present data extracted from a recently compiled database of Australian organic wineries, drawing attention to the large number of uncertified wineries making organic claims, identifying the major organic wine certification bodies and the wine regions with the largest number of organic wineries, and tentatively identifying a potential demonstration effect with a local decision to 'go organic' diffusing through the local wine producing community.

INTRODUCTION

Organic production is growing rapidly around the world with some product sectors achieving significant market penetration: organic coffee, for example, currently accounts for over 10% of total world coffee production. Australia has a significant organic industry when measured by land area and organic production is developing apace. Increasingly interested in demonstrating sustainability, many conventional farmers are converting farms from high-input businesses focused solely on the earning of exchange value to lower-input, organic and biodynamic operations that better balance the pursuit of exchange value with employment creation, community development and environmental protection.

While the growth in organic production has been matched by an increase in research into the organic sector, most studies have focused at either the production or consumption end of the organic food chain. A large number of studies has compared the technical features of conventional and organic production with a heavy focus on the impact on yields; while on the consumption side, there are a plethora of studies that examine consumer attitudes and preferences as well as the much-remarked on 'attitude-behaviour gap' between the intention to purchase organic food and actual buying behaviour. There is surprisingly little research on the middle of the supply chain—that is, on the structure and operation of organic certification itself and on the decision-making processes involved in deciding whether to go organic or biodynamic and on which certification body to select.

Our research aims to bridge this gap by investigating why producers choose one form of organic production over another and what influences their choice of certification body. In most countries, there are several alternative organic and biodynamic schemes under which an operation can be certified and it is not clear why producers choose one certifier over another. Reasons may range from the relatively benign such as a certifying body having an established presence in a region to the less benign as in a certifying body cutting corners and costs in order to gain market share. With six different schemes to choose from in Australia, we investigate why an organic producer chooses one scheme over another and what implications this has for their organic production experience.

Given the huge variety of products now certified organic, we focus our research on the wine industry—both grape growing and wine making. This is a sector experiencing rapid growth globally and in Australia, is understudied compared to other forms of organic production, and has many new entrants as a consequence of the relatively moderate differences in conventional and organic production systems in grape growing compared to other fruit and crop production. While our larger project investigates producers' decisions to go organic using a comparative, qualitative methodology from a large, purposive sample of Australian organic wine producers supplemented by the views of wine industry experts, in this paper we present an overview of the organic wine industry, the issues involved for wineries in 'going organic' and for consumers in 'buying organic', and provide a preliminary analysis of the structure and operation of Australia's organic certification systems.

The paper is structured as follows: in the next section, we outline the growth of the organic industry worldwide with a focus on grape growing for wine production in Australia. In Section 3, we provide an overview of issues in organic wine production and the reasons why producers decide to 'go organic'. In Section 4, we identify and describe Australia's six wine certification schemes and, drawing on a preliminary database of Australian organic wineries, provide information on the relative popularity of these schemes across the organic wine industry. The paper concludes by observing that a significant minority of wine producers making organic claims remain uncertified creating a danger of 'green washing'; while those that are, are certified to one of the two 'big two' certification schemes with some evidence of a demonstration effect.

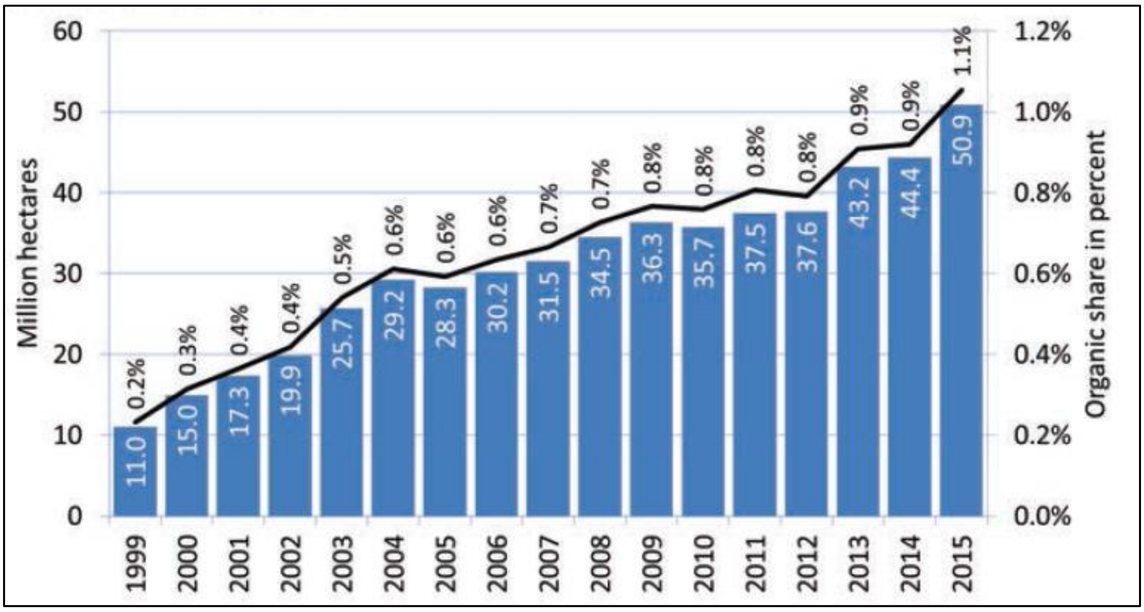
THE GROWTH OF ORGANIC PRODUCTION

Data from the Swiss-based Research Institute of Organic Agriculture (FiBL)[1] indicates that conversion to organic production continues apace in developed and developing countries. Evidence of such growth is the fact that since 1999, organic agricultural land has grown from around 11 million hectares to almost 51 million ha today (Figure 1), the number of producers has risen from 200,000 to about 2.4 million and the value of the organic market has increased from under US$18 billion to almost US$82

[1] FiBL stands for Forschungsintitut für Biologischen Landau, one of three institutes of the same name based in Switzerland, Austria and France. See FiBL 2016 for further details.

billion. Surprisingly, perhaps, Oceania is the region with the largest area under organic production (45%) primarily due to large tracts of land in Australia devoted to extensive grazing; it is followed by Europe (25%, Latin America (13%) and Asia (8%). The global organic image shifts, however, if the focus is put on numbers of organic producers, where the majority are in Asia (35%) and Latin America (19%) with India alone counting for over half-a-million of the 2.4 million total. However, replacing this image with one that focuses on market structure brings North America and Europe into relief as it is those regions that generate the vast majority of organic sales. For example, 47% of total organic sales occur in the United States, followed by Europe (35% of sales). Finally, if one chooses to focus instead on per capita organic consumption, then the top countries are all European with Denmark in the lead at 8.4%, followed by Switzerland (7.7%) and Luxembourg (7.5%).

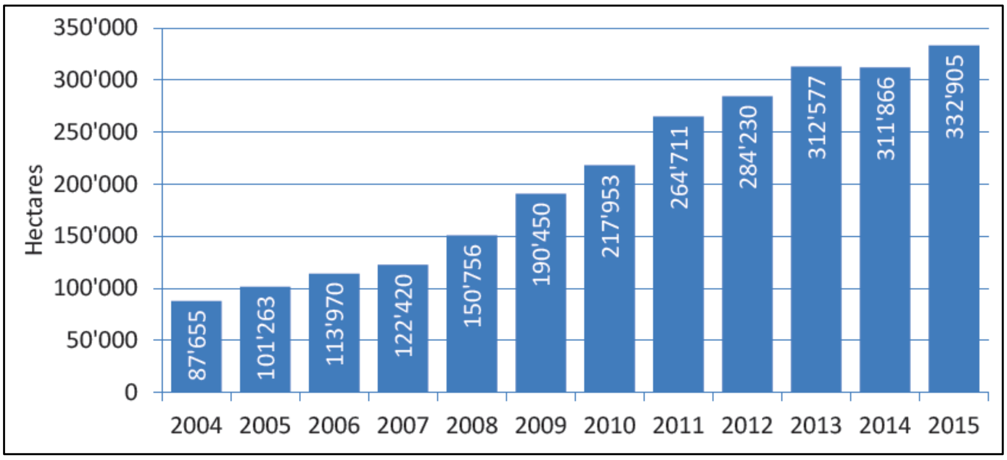
Figure 1: World Wide Growth in Organic Agricultural Land and Organic Share of Total



Source: FiBL 2017, p. 49.

Growth in organic production is uneven across different produce types, however, with FiBL data outlining differences across the three broad sectors of permanent grassland (65%), arable land crops (20%) and permanent land crops (8%) with an 'unknown' category making up the balance of 7%. In the arable crops sector, cereals constitute the largest category while in the permanent crops sector it is coffee. Grape production also falls in the permanent crops sector with almost 330,000 hectares under organic production worldwide. Land area under organic grape production, which grew quickly after 2004 but stabilised around 2013, is 4.7% of total land under grape production, placing the sector above the world average of 1.1% for all land area under organic production (Figure 2).

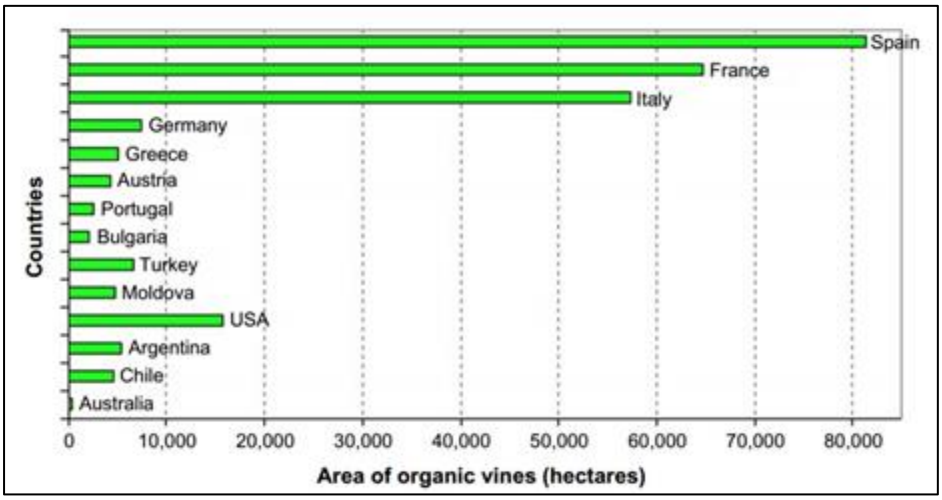
Figure 2: Increase in global organic area under grape production 2004-2015



Source: FiBL 2017, p. 118.

Interestingly, the FiBL data for organic grape production appears to be an underestimate since it lacks data for Australia, which has a burgeoning organic wine industry. Country-specific data from other sources does recognise Australia as an organic grape growing country, although its overall area is small compared to other countries. Europe is the world leader with more than 80% of the world's organic grape area (Nancarrow 2016). The three most important organic grape producing countries are Spain, France and Italy (Fig 3) each with more than 60,000 Ha (FiBL and IFOAM 2016). Outside Europe, production of organic grapes occurs in Asia, North America, Latin America, and Australia and New Zealand. Some new entries into organic viticulture include Turkey (Provost and Pedneault 2016), China (Dong et al. 2011; Liu et al. 2011) and Chile (Cederberg et al. 2009).

Figure 3: Organic Grape Production by Country in 2012



Source: Mariani and Vastola 2015.

Wine grape production is Australia's third-fastest-growing organic sector (Australian Organic 2014), and in particular, biodynamic wine production (Allen 2010). Organic wine grape production in Australia increased 120% between 2011 and 2014, with organic grapes reaching a value of $117m. Consumer demand is strong and has encouraged large companies, such as Yalumba, to launch organic lines (Agribusiness View 2016). Growing consumer concern over some agricultural production methods and a demand for products that are perceived to be cleaner and greener have led to an increased demand for organic products in Australia (Wheeler and Crisp 2011). More Australian wine growers are reportedly moving towards organic viticulture and organic and biodynamic viticulture is forecast to grow at over 11% per annum. However, until recently little information was available on the benefits or otherwise that can be attributed to organic systems of grape production (Penfold 2015).

Farms with certification across the whole farm (greater than 95% of land) produced organic wine grapes to the value of just over two million dollars in 2014. South Australia represented most of this production with 85% overall of estimated value of production nationally. Grapes are also produced in Victoria, New South Wales, Western Australia and Tasmania (Australian Organic 2014). The Australian and New Zealand Wine Industry Directory 2009 listed 115 Australian producers of certified organic wine (Dickey 2009).[2] However, many producers choose not to be certified, despite adopting organic and biodynamic practices. Allen (2010) estimated that there were approximately 100 viticulture biodynamic producers in Australia, with only about 30 of these certified. However, our own more recent data shows that there are around 120 organic wine grape producers and the majority of these are certified by OGA, NASAA or Demeter.

The New Zealand organic wine industry is also growing, with over 50 wineries producing certified organic wines. Organic Winegrowers New Zealand have launched a website celebrating organic wines (www.organicwinenz.com) and New Zealand's first major Organic and Biodynamic Winegrowing Conference was held in Marlborough in July 2015. Sustainability and organics has also been highlighted as one of the five key focus areas of the New Zealand Wine industry. Extension and research continue to be top priorities to support growers in making the organic transition (New Zealand Winegrowers 2016).

[2] 2016 edition available for a fee at http://www.winetitlesbookstore.com.au/shop/2016wid/

ISSUES IN ORGANIC WINE PRODUCTION

Research into organic and biodynamic grape production and wine making have focused on a range of issues including soil properties, wine properties, pest and disease management, yield effects, human health impacts, environmental impacts, markets and marketing, and consumer awareness. In this section we provide a brief overview of some of the major effects that arise in the shift from conventional to organic and biodynamic wine production and consumption.

Soil properties

Agricultural research comparing organic and biodynamic with conventional viticulture practices has primarily focused on soil properties (Coll et al. 2011; Gehlen et al. 1988; Okur et al. 2009; Probst et al. 2008; Reinecke et al. 2008; Stamatiadis et al. 1996). Studies have found significant improvements in the physical, chemical and biological properties of soils when organic and biodynamic management strategies are used in the vineyard. For example, Angelopoulou et al. (2013) investigated the soil quality on neighbouring organic, biodynamic and conventionally managed vineyards and apple orchards finding that the organic system displayed better soil structural stability than the conventional, and both organic and biodynamic displayed greater mycorrhizal infection levels. In contrast, there were no differences in soil pH, electrical conductivity (EC), total organic carbon or earthworm populations, although the biodynamic system had higher total N than the conventional. A second comparative trial of organic and biodynamic viticultural systems in California (Reeve et al. 2005) found no differences in soil quality following the application of BD preparations; while a third by (Probst et al. 2008) also found no differences between organic and conventional management for organic carbon, total N, phosphorus or sulphur. However, this study, in stark contrast to several others studies, found negative impacts from organic and biodynamic production from the increased tillage used for weed control in the form of higher levels of soil compaction and decreased earthworm populations.

Wine properties

Studies have looked at several wine properties including levels of antioxidant activity, polyphenols, ethanol, sugar and acid. Mulero et al. (2011) investigated the effect of different vinification techniques on the antioxidant activity and on the phenolic compounds of red wine made from the variety of Monastrell grapes obtained by organic culture, confirming previous research (Mulero et al. 2010) that phenolic compounds and antioxidant activity were slightly higher in organic wine than in conventional wine, although the differences were not significant. Forbes et al (2009) reported that quality parameters such as ethanol, sugar and acid levels were not significantly different in wines produced using organic and conventional viticultural, while Korenovska and Suhaj (2012) found lower contents of elements present in organic wines by atomic absorption spectroscopy (AAS) compared to conventional ones.

Pest and weed management

Increasing pest and disease resistance to agricultural chemicals, such as Botrytis fungicides on vines, and disruption of biological control systems (e.g. increasing secondary pest mite problems on vines due to use of broad-spectrum insecticides) has encouraged farmers to move towards different farming techniques such as organics (Madge 2005; Crisp et al. 2006). However, the vast majority of organic wine is made from *Vitis vinifera* varieties that are highly susceptible to fungal diseases and pests, making organic management difficult for growers. Partly as a result, California organic standards allow grapes to be treated with sulphur dust to control fungus, sparking a shift by conventional growers, packers and wine makers towards organic production (Guthman 2004). In Australia, organic and biodynamic growers are permitted to use wettable sulphur and copper hydroxide in the vineyard, enabling them to adopt similar disease management programs to conventional growers in the continent's warm and dry region (Penfold et al. 2015).

Weed management is a critical issue during the establishment of an organic vineyard. Olmstead et al. (2012) evaluated the effectiveness of five cover crop treatments and cultivation regimes for weed control in a newly established organic vineyard in Washington State. They found the most effective weed management regime included a vegetative-free zone around the vines (e.g., in-row) maintained by hand weeding and a cultivated alleyway, although this regime was also the most time consuming. Studies indicate that one of greatest differences between organic and biodynamic and conventional viticulture management in Australia is under-vine weed control (Penfold et al. 2015). Conventional growers generally use herbicides, while organic and biodynamic growers either cultivate (using a knife, plough or disk) or slash the under-vine area.

Yield effects

Although wine-grape production is reportedly one of the easiest forms of primary production to manage organically or biodynamically, yields achieved are often less than a conventional system (Penfold et al. 2015) and several studies have reported a reduction in the harvest yield of organic and biodynamic vineyards (Malusa et al. 2002; White 1995; Hassall et al. 2005; Badgley et al. 2007; Seufert et al. 2012). Crop yields are reportedly reduced by between 8% and 16% compared to conventional grapevines (Mariani and Vastola 2015). In a survey of 23 growers, Santiago (2010) reported a general yield reduction of 8.6%, but noted some variability due to the amount of time since conversion and the scale of operations. Madge (2005) in an Australian grower survey found the yield of organic grapes to be in the range of 6.5-14.2 t/ha, significantly lower than conventional yields of between 9.1 – 25.3 t/ha. Some authors have reported an increase in yield with the addition of compost in vineyards in Europe (Neilsen et al. 2000) and Australia (Buckerfield and Webster 1996), while others have reported that the growth and yield of grapevines differed strongly under organic and biodynamic management systems (Döring et al. 2015).

Wheeler and Crisp (2009) conducted a study at Penfolds Clare Valley Estate, South Australia, from the 1990s to the late 2000s comparing and contrasting yields, grape quality, grape prices, variable costs, worker benefits, soil carbon and biodiversity of organic and conventional viticultural production. They used a commercial vineyard running parallel production of organic and conventional grapes. Results showed an overall yield penalty per hectare for organic blocks of around 10% and an overall cost penalty per hectare of 10% for organic blocks, owing to higher costs in areas such as soil management and pest and disease; and an overall higher grade quality (and higher prices paid) for organic red grape varieties but a lower overall grade quality (and lower prices paid) for white grape varieties.

Impacts on human health

Organic wines are thought to be healthier and to contain lower amounts of pesticide than conventional wine (Rojas-Méndez et al. 2015), however, several studies have also examined potential negative impacts. Sulphur dust, for example, is an allowable input in organic viticulture because it is mined from natural sources, although it reportedly causes more farm worker sickness than any other input in California (Pease et al. 1993 quoted in Guthman 2004). Plahuta and Raspoor (2007) compared the hazards to human health from six wines which had been produced by different viticulture and winemaking practices. They found no statistically significant differences between groups. A series of tests for copper content was carried out on organic wine in two cellars located in central Italy. Results show copper concentrations were under the limit of 1000 mu g/dm^3 (Cecchini et al. 2015). In a study into the occurrence of Ochratoxin A, one of the most abundant food-contaminating mycotoxins in wines produced according organic farming and winemaking, Gentile et al. (2016) found levels from organic farming to be comparable with those of conventionally produced commercial wines. In a study of one thousand wines from organic viticulture from different European countries Comuzzo et al. (2013) found total sulphur dioxide was lower than 110-120 mg/L in most of the samples and no significant correlation was found between sulphite levels and other parameters. Ochratoxin A concentrations were below the European legal limit in the 95% of the samples analysed; nevertheless, the risk of Ochratoxin A pollution seemed higher in certain southern European regions. Biogenic amines appeared a serious problem for organic winemaking and high concentrations were found in many of the analysed wines (Yildirim et al. 2007; Garvia-Marino et al. 2010; Tassoni et al. 2013).

Environmental impacts

In an environmental evaluation using life cycle assessment for three different viticulture techniques (biodynamic cultivation sites, conventional vineyards and an intermediate biodynamic-conventional wine-growing plantation (i.e. biodynamic site lacking certification), Villanueva-Rey et al. (2014) found that biodynamic production resulted in the lowest environmental burdens. The highest environmental impacts were linked to conventional agricultural practices. The main reasons for the decrease in environmental impacts for the biodynamic site was related to an 80% decrease in diesel inputs, due to a lower application of plant protection products and fertilisers, and the introduction of manual work rather than mechanised activities in the vineyards. In a separate life cycle assessment of an organic wine-making firm, copper used for pest control in grape production was identified as the main contributor to both marine and freshwater aquatic ecotoxicity indicators, while glass production for bottles was identified as one of the major environmental hot-spots of the entire life-cycle (Petti et al. 2006).

A six-year trial (2008-14) was conducted at McLaren Vale in South Australia to investigate the changes in soil health, fruit production and wine quality (Penfold et al. 2015). A 20 year-old, Cabernet Sauvignon (*Vitis vinifera L.)* vineyard was converted to an experimental trial assessing four management systems: organic (ORG), biodynamic (BD), low-input conventional (LCON) and high-input conventional (HCON). A compost treatment was also added to each of the management systems studied to separate compost effects. The trial results showed that organic and biodynamic production led to improved soil quality, with more soil organisms including much greater earthworm populations. Wine quality was also improved, but in the absence of price premiums, this was achieved at a financial penalty to the grower through reduced yields and increased production costs (Penfold et al. 2015).

Markets and marketing

A number of studies have examined marketing issues in the organic wine sector. In a study of the organic wine sector in the Veneto Region of Italy, Rossetto (2007) identified two main types of organic wine enterprise: small wine growers who specialised in producing organic grapes and large-scale wineries that specialised in grape cultivation and wine processing. While large wineries focused on price and product variety, small vine growers followed a wine quality strategy. In terms of differentiating organic wine at the market level, Szolnoki (2013) analysed the similarities between sustainable, organic and biodynamic to determine how wineries differentiate sustainability from other management systems. Results showed considerable ambiguity since many of the interviewees confused the terms organic, biodynamic and sustainable. Using choice experiments, Janssen and Zander (2014) found that participants preferred organic wine over conventional wine although preferences for organic wine were lower among people with a high interest in wine; that is, people who place high importance upon vintage, grape variety and winery. These authors concluded that targeted marketing activities are needed to convince these people about the quality of organic wine. They also found that medium-priced wine was preferred over low-priced wine, leading them to recommend against a low-price strategy for organic wine.

Consumer awareness

Several studies have examined consumer attitudes to, and preferences for, organic wines. Kim and Bonn (2015) examined the relationship between consumer perceptions of organic wine attributes and behavioural intentions with their overall organic wine knowledge acting as the moderating variable. Results showed that factors associated with trust and taste affect consumer behavioural intentions. In particular, the trust factor, along with overall organic wine knowledge, had a significant influence on purchase intentions. 'Environment' was also an important predictor in consumer behavioural intentions when combined with organic wine knowledge. Bonn et al (2016) focused on consumer perceptions about sustainable practices used by organic wine suppliers along with consumer attitudes pertaining to organic wine attributes. Results suggest that consumer perceptions of sustainable practices by wine producers affect the outcomes of consumers' decision making relative to organic wine.

Pomaici and Vecchio (2013) reviewed over 20 scientific and professional articles (and reports) on consumers' attitude and behaviour towards sustainable wines, analysing both organic and environmental-friendly products. They found that the motives which trigger sustainable wine buying behaviour have not been deeply analysed by academics and professionals, and that consumer awareness of sustainable winegrowing and winemaking is low. In a study on the perception of the quality of organic and biodynamic wines, Delmas and Grant (2014) found 55% respondents who had had knowledge that they tasted organic wine had a positive to very positive opinion of the quality of the wine. Among the respondents who had not tasted organic wine, only 31% had a positive opinion of the quality of organic wine. However, in another study (Wiedmann et al 2014) it was found that, regardless of their knowledge and attitude towards organic products in general, all respondents rated the so-called organic wine higher in all given attributes. Troiano et al (2016) studied people's preferences concerning five different extrinsic characteristics of wine including organic production with denomination of origin labelling proving to be the most important factor considered by all respondents. In Australia, Remaud et al. (2008) found that the attribute 'organic' has little value for the 'average' Australian wine consumer. Eco-friendly claims (carbon neutral or environmentally friendly) accounted for 5% of consumers' decision to choose a wine, while organic accounted for only

0.2%. Mueller and Remaud (2010) found that the influence of environmental and organic claims on wine choice Australia had increased slightly over time, from a negligible basis of 0.2% in 2007 to 2% in 2009 over all consumers. They found consumers purchasing red wine from the Barossa region particularly valued organic wine.

Finally, Sirieix and Remaud (2010) compared consumer perceptions of conventional and different eco-friendly wines in Australia. They found organic wine was seen as 'Good for my health', 'More expensive', 'Good to give as a gift', although they were not viewed as 'Good value for money', 'For a family dinner / lunch', or with a 'Genuine taste'. Bio-dynamic wine was associated with 'For my daily consumption' and to a lower extent with 'Good to give as a gift', 'Innovative', 'Need education to appreciate', 'More expensive'. It was not seen as 'good value for money', 'Harmless for the environment', 'Genuine taste', or 'To share with friends'. The authors described the results for biodynamic wine as 'surprising' and explained them by the fact that most consumers do not know what bio-dynamic wine is and based their answers just on the words.

DRIVERS OF ORGANIC AND BIODYNAMIC WINE PRODUCTION

The production of winegrapes is recognised as one of the forms of primary production best suited to organic production (Penfold et al 2015) due to the relative hardiness of winegrapes and the low nutrient requirement. Disease control primarily relies on sulphur and copper fungicides, while grazing, mowing and cultivation are used for weed control. Each of these practices is not foreign to conventional producers, making conversion to an organic production system less onerous than many other high input crops (Penfold et al 2015). Given this, it is perhaps not surprising that farmer surveys indicate that around a quarter of respondents would like to learn more about organic viticulture and feel that they do not have enough information (Madge 2005).

In particular, a lack of clarity on the value added by wine certification and labelling has resulted in some wineries following organic and biodynamic practices without being certified or putting a logo on their bottles. Others become certified but still decide to not provide that information on bottle labels. One reason given for this behaviour is that growers want to have the flexibility to change their inputs if it becomes necessary to save a crop during bad weather conditions or outbreaks of disease. Another reason given is that many wineries believe there is a negative image associated with organic wine (Delmas and Grant 2014). In addition, growers who use organic and biodynamic methods of winemaking, but do not seek certification, often believe these methods lead to better wine and that it is the superior quality of their wine that will secure sales (The Wine Idealist 2014).

Some negative perceptions exist concerning organic certification including commercial risk, lack of flexibility and sustainability, inconsistent policies, and high costs. Kallas et al. (2009) analysed the adoption of organic practices in the vineyard sector in the Spanish region of Catalonia. The determinants of organic farming adoption were classified into two broad groups: non-economic and economic factors. The former group includes farmer's attitudes, opinions and objectives as relevant elements; the latter relates mainly to market prices, profit making and public support. The results also identified employed generation as an important factor for conversion, highlighting the social role that organic vineyards played in Catalonian agriculture.

One of the reasons growers convert to organic and biodynamic viticulture is economic, the expectation of obtaining a premium price for their fruit and/or a decrease in the cost of production (Penfold et al 2015). Curiously, Waldrop and McCluskey (2016) found that non-certified organic and biodynamic practices have higher premiums than their certified counterparts, with a difference of 3.5% for organic and 10.5% for biodynamic, perhaps reflecting a noted negative consumer perception. However, there is reportedly an increasing trend in consumers' positive evaluation of organic wine, and consumer valuation of organic claims is consistently higher than for claims to practice corporate social responsibility (Mueller Loose et al. 2013).

ORGANIC CERTIFICATION: THE AUSTRALIAN CONTEXT

In some jurisdictions, organic certification is co-regulated by the state, industry and civil society. For example in the United States, organic production is regulated under *the Organic Foods Production Act 1990*. Under the Act, the US Department of Agriculture established the National Organic Program (NOP) that sets the national organic standard on advice from the National Organic Standards Board (NOSB). NOSB consists of 15 members drawn from diverse groups with an interest in organic production. In the US too, organic production for both domestic and foreign consumption must meet the provisions of the NOP to qualify for organic certification, with producers obtain certification from one of USDA's 80 accredited certification bodies. In Australia, in contrast, the Commonwealth Government only regulates organic production for export with domestic production unregulated. A producer wishing to export organic produce must meet Department of Agriculture, Fisheries and Forestry (DAFF) requirements set out in the National Standard for Organic and Biodynamic Produce as certified by one of six DAFF-accredited certification bodies. However, if producing domestically, no certification requirement is necessary although producers are subject to the provisions of the 'truth in advertising' provisions of the *Competition and Consumer Act 2010* and may be sanctioned by the Australian Competition and Consumer Commission in response to complaints.

Australia's six different certification organisations, set out in Table 1 below, are the ones officially accredited by DAFF to certify organic produce for export. Five of the organisations are non-state bodies; only Safe Food Production Queensland (SFPQ) is public, a statutory body constituted under Queensland's *Food Production (Safety) Act, 2000*. SFPQ's official role is to regulate 'primary production and processing of meat, eggs, dairy and seafood' in the State, reporting any infractions to Queensland's Minister of Agriculture and Fisheries. It also has responsibility for establishing food inspection and for training and accrediting auditors. Approved auditors are listed on a register and these may, but need not be, be approved to audit organic operations. Very little information is publicly available on SFPQ's website about how it operationalises the organic certification component: it is unclear for example whether many auditors are approved to certify companies to the organic standard and how widely used is the SFPQ organic logo.[3]

The remaining five certification bodies have emerged from a background in industry. For example, AUS-QUAL is a subsidiary of AUS-MEAT, which in turn is a wholly owned company of Meat & Livestock Australia (MLA) and the Australian Meat Processor Corporation (AMPC). While AUS-MEAT continues to service the livestock industry via its AUS-MEAT National Accreditation Standards (which is mandatory for Export Abattoirs) and associated Quality Management Systems Guidelines & Checklist, AUS-QUAL has enabled it to branch out to other industry sectors in agriculture, horticulture and food processing. While AUS-QUAL provides a list of organic certified operations on its website, only one operator, (Paradiso of Toolamba, Victoria), is listed as certified to produce grapes, and these are for direct consumption not wine making. It does thus not appear to be actively engaged in certifying wineries or wine grape production.

[3] SPFQ had not responded to an email inquiry regarding its role in organic certification by the time this paper was being finalised for the IPCC conference. The authors are continuing to follow up with SPFQ to obtain a better understanding of SPFQ's role in organic certification.

*Table 1: **Organic and Biodynamic Certification Schemes and Standards in Australia***

Organisation	Established	Relevant standard	Logo
National Association for Sustainable Agriculture, Australia (NASAA)	1987	NASAA Organic & Biodynamic Standard 2016	
ŧ Australian Organic	1988	Australian Certified Organic Standard (ACOS) 2016	
Organic Food Chain	1997	National Standard for Organic and Biodynamic Produce	
* AUS-QUAL Pty Ltd;	1987	National Standard for Organic and Biodynamic Produce	
# Bio-Dynamic Research Institute	1957	Australian DEMETER Biodynamic Standard	
Safe Food Production Queensland	2000	Safe Food Production Queensland Certified Organic	

ŧ Formerly known as Biological Farmers of Australia, BFA changed its name to Australian Organic in 2012. It absorbed the Organic Growers of Australia in 2006 and Tasmanian Organic-dynamic Producers (TOPs) in 2015.
* AUS-QUAL is a wholly-owned subsidiary of AUS-MEAT that undertakes certification and labelling for the broader non-meat market sector that includes cereals and horticulture.
# The Bio-Dynamic Research Institute was formed in 1957 and is vested with the rights to the DEMETER trade mark.

Organic Food Chain (OFG), based in Toowoomba, Queensland, certifies organic operations mainly in Queensland and New South Wales and also plays a niche role with regard to organic wine grape and winery certification. OFG's website states that it promotes 'commonsense' organic certification to the National Standard, which is reinforced on its Facebook page where it states it is committed to a 'fast and friendly service'. OFC is not accredited to the international organic association IFOAM (International Federation of Organic Agricultural Movements). According to one certified organic cosmetic company, Certified Organic skincare:

> OFC are a little more lenient than ACO and NASAA [in terms of allowable inputs] which is unfortunate and they therefore have certified as organic some cosmetic and food products which would have been rejected by both ACO and NASAA. On the positive side though, they are Australian and running on a 95/5 standard which is far better than what you will find from an overseas certifier (Certified Organic skincare 2017).

Notably, however, OFC is the certifier of the 2016 NASAA-sponsored Organic Wine of the Year.[4]

Bio-Dynamic Research Institute (BDRI) is another niche certification body in the organic wine grape and winery certification field, certifying biodynamically produced wines to its own company standard. As one of the six bodies recognised by DAFF to certify organic and biodynamic produce in Australia, certification against its *Australian Demeter Biodynamic Standard* is recognised as being equivalent to certification against DAFF's *National Standard for Organic and Biodynamic Produce* enabling BDRI-certified operations to export produce overseas. BDRI is also directly accredited as an organic certification body by IFOAM. From our preliminary analysis, BDRI has certified 8 wineries in total to its Demeter standard, the vast majority based in Victoria, but constituting only 6% of all organic wineries in our database.

Australia's two major certification bodies—ACO and NASAA—are both accredited with DAFF and IFOAM and together certify almost all Australia's organic and biodynamic wines. Of the two, ACO is the largest having absorbed two independent certifiers in the past decade: Organic Growers of Australia (OGA) in 2007 and Tasmanian Organic-Dynamic Producers Inc. (TOPs) in 2015. The OGA label continues in use, however, as a simpler and cost-effective approach for operations with a gross annual income of less than $75,000 selling only into the domestic market.[5] ACO and NASAA employ their own proprietary standards to certify organic operations and a recent study comparing organic sustainability claims (Ascui et al forthcoming) found some differences with regard to the principles used, for example concerning greenhouse gas emissions, water efficiency and social justice.

Our provisional database of 130 organic and biodynamic wineries is summarised in Table 2 and, by inspection, we can note several interesting features of the Australian organic winery certification landscape. Firstly, it is evident that a very substantial minority of wineries making claims to be organic and biodynamic are not certified under any scheme. Reasons may include the costs of certification, the smallness and localness of the market being served, the 'lifestyle' nature of organic and biodynamic production, and a desire for flexibility should it prove difficult to always adhere to a certified organic standard.

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[4] Rosnay Organic Wine's 2014 Garage No. 1 Cabernet Sauvignon. See https://rosnay.com.au/organic-wine-of-the-year/

[5] Some wines are listed on the Organic Vignerons Australia website as organic but OVA is not a certification system. According to its website, it was formed in 2002 'with the object of processing certified organic grapes for wine for both export and domestic markets' and it appears to be mainly a cooperative marketing arm for a small number of South Australian producers. See http://www.winecompanion.com.au/wineries/south-australia/south-australia/organic-vignerons-australia.

Table 2: ***Australian Organic/Biodynamic Wineries: Summary Data***

	South Australia	Victoria	New South Wales	Western Australia	Tasmania	Queensland	Totals	% of Total
ACO	17	3	13	7	2	0	42	32%
NASAA	12	7	4	2	0	0	25	19%
BDRI	0	7	0	1	0	0	8	6%
OFC	0	0	1	0	0	0	1	1%
Certified	29	17	18	10	2	0	76	58%
Certified (% of total)	22%	13%	13%	8%	2%	0%	58%	
Uncertified	19	16	6	11	1	1	54	42%
Totals	48	33	24	21	3	1	130	
% of Total	37%	25%	19%	16%	2%	1%		100%

Sources: ACO, NASAA, Demeter and OFC databases, winery websites and email contacts. Other is a residual category and consists of those wineries making claims to be organic/biodynamic but which are not listed in the various certifiers' databases. Percentages are rounded.

Secondly, the data indicate that ACO and NASAA are the two major certification schemes being used, collectively accounting for over 50% of all certified wineries in our sample and 88% of all certified wineries. ACO is more popular in South Australia than NASAA although both have the majority of their certified operations in that state; and ACO is considerably more popular in New South Wales, Western Australian and Tasmania than NASAA while NASAA appears to be the certifier of choice in Victoria. This pattern does not seem to reflect a regional allegiance, at least in terms of head office location, with NASAA based in Stirling, South Australia and ACO in Nundah, Queensland. On the other hand, certifications by BDRI are concentrated in Victoria, the same state in which that certification is based (Powelltown Victoria).

Another feature of the distribution of organic and biodynamic wineries is their relative concentration in the states of South Australia, New South Wales and Victoria, with fewer in Western Australia and virtually none in Tasmania and Queensland. Almost two fifths of all organic and biodynamic wineries are located in South Australia (37%), with only 16% in Western Australia and virtually none in Tasmania (2%) and Queensland (1%), a distribution that broadly reflects the relative importance of wine production to different Australian states although Victoria appears to be producing more organic wines than NSW based on its share of the total grape wine crush.[6] However, another reason the data

[6] For example, the total grape crush for 2012 is reported to be 1.75 million tonnes, broken down as follows: SA (740,000), NSW (592,000), VIC (345,000), WA (60,000), TAS (9,000) and QLD (1,000). See Australian Bureau of Statistics 1329.0 - Australian Wine and Grape Industry, 2012-13, 05 December 2013.

is especially skewed towards South Australia is that of its many important Australian wine regions, one of them—McLaren Vale—appears to be self-consciously positioning itself as a leader in organic and biodynamic wine production. According to the data in Table 3, McLaren Vale hosts 15 organic and biodynamic wineries compared to Western Australia's Margaret River region (11), Barossa Valley (8, also South Australia), and the Hunter Value (8, New South Wales). It is notable that the Penfold study referenced earlier in this paper undertook its comparative research into conventional, organic and biodynamic practices in an estate in McLaren Vale. The wine industry's research and development corporation, Wine Australia, also supports this observation noting that McLaren Vale 'is also one of the more environmentally conscious regions in Australia with a large percentage of producers farming organically, biodynamically or employing sustainable farming methods' (Wine Australia 2017).

CONCLUSION

Organic wine production is developing apace in Australia in part because the requirements of organic production in this industry do not depart in a major way from those of conventional agriculture and because producers of organic wine are able to earn a compensatory price premium—at least with red varieties. Lower yields in the region of 8 to 15 percent are offset by higher prices of 5 to 10 percent. The evidence indicates a range of benefits in 'going organic' in wine production including fewer greenhouse emissions, decreased downstream water pollution, higher biodiversity counts, better soil structure, more employment and high quality grapes. Costs are decreased yields and human health concerns regarding the use of copper and sulphur sprays. Across both organic and conventional wine production, bottling is a major contributor to greenhouse gas emissions; and disposal of wine crush remains an issue.

Table 3: ***Australia's Major Organic and Biodynamic Wine Regions and Wineries***

	South Australia			Western Australian	New South Wales			Victoria
	McLaren Vale	**Barossa Valley**	**Adelaide Hills**	**Margaret River**	**Hunter Valley**	**Mudgee**	**Cowra**	**Beechworth**
1	Angove Family Winemakers	Burge Family	Burra Creek Wines	24 Karat	Ascella Organic Wine	Bill Byron Wines	Gardners Ground	Barry & John Morey
2	Battle of Bosworth	Hart of the Barossa	Five Views Vineyard	Blind Corner	Ben's Run	Botobolar	M. Chapoutier	Castagna Vineyards
3	Brackenwood Vineyard	Kalleske Wines	Macaw Creek Wines	Burnside Organic Farm	First Creek Wines	Broombee Organic Wines	Pig in the house	Fred and Stephen Morris
4	d'Arenberg	Loan Wines	Ngeringa	Corawmup Wines	Greenway Wines	Lowe Wine	Rosnay Organic Wines	Pennyweight
5	Gemtree Wines	Maverick Wines	Shaw and Smith	Cullen	Horner Wines	Martins Hill	Wallington	Savaterre
6	Grancari	Mill About Vineyard	Switch Organic Wine	Happs	Krinklewood Biodynamic Vineyard	Thistle Hill	Windowrie Wine Co	Sorrenberg
7	Hedonist	Radford Wines	Wild Fox Organic wines	Julian Wright	Macquarie-dale Organic Wines			
8	J & J Wines	Smallfry wines		Marchand & Burch	Tamburlaine			
9	Kangarilla Road			Mountford Winery				
10	Maximus Wines Australia			Settlers Ridge				
11	Noon Winery			Wildstone				
12	Paxton Wines							
13	Spring Seed							
14	Wirra Wirra Vineyards							
15	Yangarra Estate Vineyard							
Totals	**15**	**8**	**7**	**11**	**8**	**6**	**6**	**6**

Sources: ACO, NASAA, Demeter and OFC databases and winery websites.

A substantial minority of Australian wineries claiming to practice organic and biodynamic production methods remain uncertified. From a database of 130 wineries, we estimate that 54 of them (42%) are not certified under one of the six officially recognised certification bodies. While in many cases this may reflect a simple calculation to save on the costs incurred from obtaining formal certification, it is also possible that in some cases the public is being duped by false claims and 'green washing' (Gale and Haward 2011). More research is required on the direct and indirect costs of becoming organic certified and the nature of the barrier these pose to small, medium and large operators in different wine regions and sectors.

Our research suggests that there may be an organic 'demonstration effect' with producers of organic wine becoming clustered in specific locations. Notably, the McLaren Vale wine region has innovated with regard to organic wine with some large regional wineries—Battle of Bosworth, d'Arenberg and Wirra Wirra—now producing organically. Another region where there appears to be a cluster of organic wine production is Beechworth, Victoria. The literature suggests the possibility of such a demonstration effect as conventional growers observe from organic growers the feasibility of producing organic wine grapes and recognise the superiority of the product. If a demonstration effect is in operation, it could provide a very practical mechanism for expanding organic wine growing around Australia. Such a demonstration effect could also be operating with regard to choice of certification body. It is notably, for example, that of the six organic wineries in Beechworth, Victoria, four are certified by BDRI/Demeter. The preference of wineries in New South Wales for ACO organic certification may reflect a similar demonstration effect through local producer networks. These and other factors lying behind the choice of organic wine certifier will be subject of further research based on our emerging organic wine database.

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