

**Decanting values of the environment: A comparative case study in the Willamette Valley's
wine industry**

by

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ABSTRACT

The Oregon wine industry is growing and becoming increasingly valuable to the regional economy. As with many production industries, the wine industry has faced concerns around its environmental practices and community impact. The use of synthetic pesticides, herbicides, fertilizers, and associated wastewater run-off are a few issues vineyard managers experience. However, the sustainability movement is increasingly gaining traction and, according to the Willamette Valley Wineries Association, as of 2015 around 52% of the planted vineyard acreage in Oregon held some form of sustainable certification. This paper explores how vineyard estates value the environment, and how vineyard owners', winemakers', and managers' beliefs about the environment influence land management. The research found that personal beliefs and normative beliefs about the outcomes from sustainable and organic certified management, including environment and human health outcomes, are important influences for the intention to pursue certification. The study also highlights numerous policy issues vineyard estates face, alongside controls influencing their land management choices. A matched comparison study was conducted with three different cases: certified organic, Low-Input Viticulture and Enology (LIVE), and uncertified. The qualitative research was conducted through semi-structured interviews with vineyard owners, winemakers, and managers. Fishbein and Ajzen's (2010) version of The Theory of Planned Behavior/Reasoned Action Approach was used to assess the interview findings.

INTRODUCTION

Oregon values its farming communities; they make up a large part of Oregon's identity and its economy. The wine industry is a part of this identity and Oregon's reputation as wine country is continually growing. The modern wine industry has a history in the Willamette Valley dating back to the late 1960s, and has since grown into Oregon's largest American Viticultural Area (Kaufmann, 2016). In 2016, Wine Enthusiast Magazine named the Willamette Valley its Region of the Year. During 2011-2014 the number of planted acres, wineries, and sales volumes in Oregon all show a marked increase, and as of 2013, the total economic activity related to wine in Oregon was \$3.35 billion, up from \$2.7 billion in 2010 (Miller, 2011, 2015). In recent years the Willamette Valley has seen investment from large wine producers from other regions (OPB, 2016; Wine Enthusiast Magazine, 2016). While outside investment may be positive for Oregon's wine industry, it may also impact the culture of wine growing in the region (OPB, 2016). The growth of Oregon's wine industry and its marketing is a topical issue as Oregon Senate Bill 316 proposes to annually allocate \$1.5 million of general funds, which in the 2015-2017 budget totaled \$18.1 billion, to increasing wine market access and promotion (Oregon Secretary of State, 2017; Oregon State Legislature, 2017). While still in its early stages, the Bill has the potential to affect the state and local economies, as well as community life, in a myriad of ways. While a burgeoning wine industry is a boon for the local economy, one must also consider how the industry might impact the Willamette Valley's environment and communities.

How agricultural production is managed impacts the natural environment and the communities that live in and around these operations. The wine industry, like many agricultural production industries, faces concerns around its environmental practices. The use of pesticides, herbicides,

and synthetic fertilizers, along with wastewater run-off and contamination of water sources are all issues that vineyards face in managing their land (Christ & Burritt, 2013; Marshall, Cordano, & Silverman, 2005). These practices have the potential to lead to localized pollution and biodiversity loss (Christ & Burritt, 2013). As the wine industry grows in Oregon, and thus land devoted to growing grapes expands, issues related to how vineyards are managed have the potential to become increasingly important for a locality. The wine industry is aware of these impacts and sustainable practices in the wine industry are becoming increasingly commonplace. In Oregon, around 52% of the planted vineyard acreage in 2015 held some form of sustainable management certification (Low Input Viticulture and Enology, organic, biodynamic, and salmon safe), with further acres sustainably managed but not holding certification (Willamette Valley Wineries, n.d.). Understanding barriers to the adoption of more sustainable management practices is essential in understanding how the industry can limit its impact on the surrounding communities and environment.

The environment provides the wine industry with more than just nutrients and water. It also helps support other wine related activities, such as wine tourism, which are also important to the Oregon wine industry. Traditionally, when valuing the economic contribution nature provides, estimates focus on those aspects that a monetary price can be easily attributed to, such as timber or fish (Gómez-Baggethun et al., 2010). There are, however, more difficult to measure attributes of the environment, such as cultural services, that are non-material benefits, which can be valuable to an area's wine industry. Cultural services are based on the relationship between humans and the environment, and can include activities, experiences, social and cultural bonds, related to nature (Chan, Satterfield, & Goldstein, 2012; Millennium Ecosystem Assessment,

2005). These may contribute to the wine industry through brand or regional marketing, the development of cultural heritage, or through wine tourism, which in 2013 was calculated to contribute \$207.5 million in revenue to Oregon's economy (Miller, 2015). It is therefore important to understand how wine producers value all attributes of the environment, and ensure that we do not underestimate the contribution nature makes to our agricultural industries (Sandhu, Crossman, & Smith, 2012).

This study examines some of the factors that contribute to land use management decisions in the wine industry. Previous studies have found internal values, as opposed to financial or market factors, to be one of the primary drivers for decisions regarding the adoption of sustainable and organic management practices, though external factors may also contribute to decisions (Gabzdylova, Raffensperger, & Castka, 2009; Mariani & Vastola, 2015). Past studies looking at values held by farmers and vineyard owners relating to the environment and their place in it have predominantly, though not exclusively, been conducted through quantitative research methods. This research aims to complement the existing literature, adding to our knowledge base of wine producers' values and their intentions. A qualitative assessment looking at vineyards allows a greater depth in understanding of the relationship between values and management choices in the industry. This study is a first look at the subject in relation to the Willamette Valley, and focuses on telling the story between values and actions, as well as identifying other factors that shape management decisions. By understanding which specific aspects of the environment wine producers hold valuable, and how beliefs and policies influence wine producers' actions, we can better appreciate how the wider landscape is managed, and what impact change might have on a valuable piece of Oregon's economy. Qualitative interviews were conducted with vineyard

estates to form case studies looking at certified organic, certified Low-Input Viticulture and Enology (LIVE), and uncertified vineyards, which were then compared in order to draw out potential differences in values and beliefs. The report also highlights potential challenges individual vineyard estates face, alongside issues relating to policy.

Research questions

The research questions posed by this study within each individual case study are:

- 1) How do vineyard estate owners, winemakers, and the vineyard managers value the environment?
- 2) What are the participants' beliefs about how the vineyard should be managed?
 - a. Are there any policy barriers for adopting more sustainable, or organic, management practices?
 - b. Does this impact how they manage their vineyard?
- 3) What are the policy issues vineyard estates currently face?

The cross-case comparison aims to look at whether it is the values and beliefs of the participants that result in the differences in management behaviors. This study aims to tell a story about this relationship, and describe in what way vineyard estates value nature, or incorporate the value of nature into their marketing.

LITERATURE REVIEW

Certification Policy & Paradigms

Organic agricultural production is linked to a specific management philosophy based around respecting nature (Conford, 2001). The organic agricultural movement can be traced to 1920s Britain during a period of social injustice, economic pressure on farmers, and the industrialization of the countryside (Conford, 2001). It is a social movement that recognizes

humanity's place within the context of the natural world, and that human society is bound by ecological limits (Conford, 2001). At the organic movement's core, human health is linked to the health of the environment and, in particular, the soil (Conford, 2001). This belief in the link between human and environmental health results in organic methods that do not use any synthetic fertilizers, pesticides, herbicides or sprays, steroids, or genetically modified ingredients (Conford, 2001). Since its inception, it has grown into a global, social, and cultural movement, and has evolved through time and space, but the heart of its philosophy remains one of human and environmental health, and the balance between them (Conford, 2001; Reed, 2010).

In the United States the US Department of Agriculture oversees the National Organic Program. This program establishes standards that must be complied with before a product can become certified as organic. These standards require farms to “preserve natural resources and biodiversity”, “only use approved materials”, to “not use genetically modified ingredients”, “receive annual onsite inspections”, and “separate organic food from non-organic food” (Organic Agriculture | USDA, 2015). To gain USDA organic certification a three year transition period must be undertaken during which only approved substances may be used, after which certification must be renewed each year (Organic Agriculture | USDA, 2015).

In addition to organic practices, other sustainable certification schemes are becoming increasingly popular in the wine industry. In 1999, Oregon's LIVE program was established with the thought of viewing vineyards as holistic systems (Hellman, 2003). Originally founded by a collection of winegrowers in the Willamette Valley, the certification scheme has expanded to cover the states of Oregon, Washington, and Idaho (LIVE, 2016). At the heart of the LIVE

program there is a desire to be responsible environmental stewards, and maintain both an environmentally and economically viable business over time (Hellman, 2003). Recognition of the wider social impacts, the positive or negative externalities of land management actions, is of importance to individual's undertaking sustainable practices (Hellman, 2003; Zucca, Smith, & Mitry, 2009). LIVE certified wine production holds similarities and differences to organic practices. It recognizes ecological boundaries, and that human actions may impact the environment, however it does allow, while aiming to minimize, off-site inputs like chemicals and fertilizers (Hellman, 2003; Mesiti & Vanclay, 2006). The standards developed by the LIVE program are based upon those produced by the International Organization for the Biological and Integrated Control of Noxious Animals and Plants (LIVE, 2016). Reporting of compliance is carried out each year, but after the first two years onsite inspections are only carried out every three years (LIVE, 2016). Both the organic and LIVE certification programs demonstrate values in line with those expressed in Dunlap and Catton's New Ecological Paradigm (Dunlap, 2002).

Social paradigms are a collection of beliefs, or attitudes, about the social and physical world (Beus & Dunlap, 1994). The New Ecological Paradigm was proposed by Dunlap and Catton as a worldview that contrasts with the Human Exemptionalist Paradigm, and takes into account the biophysical world when looking at sociological problems. Traditional Western cultural values have often influenced how sociologists view problems. Dunlap and Catton called this the Human Exemptionalist Paradigm (Dunlap, 2002). Since traditional Western values see the biophysical world as largely irrelevant when considering social problems, they can contribute to a failure to consider environmental problems as pertinent to social problems (Dunlap, 2002). The New Ecological Paradigm was therefore proposed as a new way of thinking that recognized

that modern human society is intricately linked with the health of the environment (Dunlap, 2002). When looking at the agricultural industry two paradigms have been proposed along similar lines to the New Ecological Paradigm and Human Exemptionalist Paradigm. In the case of agriculture they have been termed the ‘conventional agricultural paradigm’ and the ‘alternative agricultural paradigm’ (Beus & Dunlap, 1990). The conventional agricultural paradigm is associated with high yield farming systems emphasizing productivity and profit, and often using synthetic fertilizers and herbicides (Beus & Dunlap, 1990, 1994). The alternative agricultural paradigm is associated with beliefs around the need for environmental protection and conservation alongside farming, and is allied with sustainable or organic practices (Beus & Dunlap, 1994). While individual farmers may not fall squarely into one paradigm or the other, ‘conventional’ farmers are likely to have a range of beliefs as are ‘alternative’ farmers (Beus & Dunlap, 1990; Fairweather, Rosin, Hunt, & Campbell, 2009). Farmers’ attitudes and beliefs about agriculture and the environment will impact how they choose to manage the land and their agricultural practices (Beus & Dunlap, 1994).

Beliefs and values

Numerous factors contribute to the formation of an individual’s beliefs and attitudes regarding land management and how they view the environment. These variables contribute to the individual’s beliefs about the positive and negative outcomes of particular agricultural practices. One such factor is education, with increased education linked to greater awareness and concern for environmental issues (Kings & Ilbery, 2010). Age has been characterized as another important factor in identifying an individual’s views around nature and its conservation. A study of almond growers and wine producers in California found younger generations tended to have more environmentally minded perspectives than older generations, who tended to hold

perspectives that valued maximizing production (Brodt, Klonsky, & Tourte, 2006). Length of time in agricultural production similarly appears to be a factor in, or be an indicator of, an individual's orientation towards nature conservation, with newer producers mindful of environmental concerns (Brodt et al., 2006; Kings & Ilbery, 2010). A relationship has been observed between the size and diversity of a farming operation and the management practice employed. A study in England comparing conventional and organic farms found organic farmers typically own small, diverse operations, though this was highly variable and the driver of this relationship was not clear (Kings & Ilbery, 2010).

A number of factors contribute to social and cultural values associated with the land and how it is used. As the wine industry in a region becomes established, the appreciation of the importance of that wine heritage and tradition for the region increases (Winkler & Nicholas, 2016). The symbolic nature of the landscape therefore takes time to develop. This symbolism, and the tradition of the region, can provide an individual with sense of place and prompt an aversion to change in the land or how it is managed (Winkler & Nicholas, 2016). The length of time an individual has lived in a region contributes to their attachment to the landscape, with the longer an individual having lived in an area the more attached they are to it (Winkler & Nicholas, 2016). Environmental values such as heritage, sense of place, or landscape aesthetic are part of the intrinsic value of the environment, which can often be overlooked, and have been described as Cultural Ecosystem Services.

Cultural Ecosystem Services are defined in the Millennium Ecosystem Assessment (2005) as “Nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive

development, reflection, recreation, and aesthetic experiences.” These benefits can include the value found in the beauty of the landscape or natural diversity; the sense of place associated with the landscape or environmental characteristics; value in the conservation or development of heritage; and recreational or tourism derived from the landscape (Millennium Ecosystem Assessment, 2005). As a wine producer, these cultural ecosystem services can be valuable through the marketing of an image, the development of a regional wine growing heritage, and the establishment of alternative streams of income from related tourism and recreation.

Provisioning, regulating, and supporting services are the other three types of ecosystem services the Millennium Ecosystem Assessment (2005) classifies. Provisioning services are the products humans gain from the natural world, including food and water. Regulating services are the “benefits obtained from regulation of ecosystem services” such as pollination or water regulation (Millennium Ecosystem Assessment, 2005). Supporting services are those services required for the “production of all other ecosystem services”, and include nutrient cycling and the formation of soil (Millennium Ecosystem Assessment, 2005). How producers value the different aspects of the environment may be important to how they manage the land (Brodt et al., 2006; Winkler & Nicholas, 2016).

The constructed ideals, regarding the environment and the production of wine, of both the surrounding society and the product market impact an individual’s value system (Kings & Ilbery, 2010). What is deemed as responsible management of the land may differ according to who one talks to. What is deemed aesthetically beautiful depends on one’s point of view. Wider society’s views of the environment, and the strength of these views, influence a wine producers’ values (Brodt et al., 2006). Societal pressures may also influence management decisions. Perceptions

around expectations for improved environmental management practices, from both fellow vineyard managers and society, have been found to be significant in influencing vineyard managers to adopt environmental management practices (Cordano, Marshall, & Silverman, 2010; Hattam & others, 2006; Wheeler, 2008). Not only does society help shape how vineyard estates value nature, but also their choice of management practice.

There are several reasons why a wine producer may consider adopting sustainable or organic management practices, but internal values seem to be one of the primary drivers behind the final decision to pursue them (Atkin, Gilinsky Jr, & Newton, 2011; Dodds, Graci, Ko, & Walker, 2013; Fairweather, 2004; Gabzdyllova et al., 2009; Gilinsky et al., 2015; Silverman, Marshall, & Cordano, 2005). Wine producers may contemplate sustainable or organic management in order to differentiate themselves in the market, or to tap into green consumerism and the attraction of consumers to sustainable and organic products (Atkin et al., 2011). However, past research indicates that firms do not gain advantage from sustainable management practices in retail settings, but may potentially gain some advantage through direct sales at wineries (Atkin et al., 2011). This benefit may be due to the ability to create a relationship with consumers, enhancing trust between consumer and producer, and increasing the reputation of the business by telling the story of the wine and its sustainable roots (Atkin et al., 2011; Gilinsky et al., 2015). It has also been seen that individuals who convert to organic production later in a region's timeline, tend to be motivated more by profit than internal values (Lohr & Salomonsson, 2000). Another motivation may be a concern for the health impacts of synthetic chemicals on farm workers (Fairweather, 2004). One of the most frequently occurring drivers for adopting, and successfully implementing sustainable and organic practices, however, is a producer's desire to be a good

steward of the environment and an upstanding member of the community (Atkin et al., 2011; Dodds et al., 2013; Gabzdylova et al., 2009; Gilinsky et al., 2015; Silverman et al., 2005).

Barriers

An individual's decisions must also factor in considerations such as the cost of an action, the market forces, or the current policies in place. Cost is frequently cited as a barrier to adoption of organic or sustainable certification (T. J. Hall, Lopez, Marshall, & Dennis, 2010; Wheeler, 2008). Cost barriers can be broken down into the cost for the initial certification, and the increased cost of inputs, including a potential need for increased labor (T. J. Hall et al., 2010; Miller, 2015; Wheeler, 2008). Ideally, this cost can be offset through charging a price premium on certified products, but vineyards can also see savings through a reduction in costs due to employee protection, environmental protection, and reduced applicable regulations on chemical usage (Constance & Choi, 2010; Miller, 2015). Some of the sustainable practices also lead to more waste materials being recycled, contributing to further cost savings (Miller, 2015). The cost of certification is amplified during the transition years when firms cannot label their products as being sustainable or organic, and thus cannot gain a price premium, but must still use more sustainable but expensive inputs. Steps have recently been taken to try and ease this burden. As of January 11, 2017, the United States Department of Agriculture (USDA) started the process of developing certification for "transitional" products (NPR, 2017; USDA AMS, 2017). However, the effectiveness of this action in promoting uptake of organic certification is still unknown. The USDA already has several programs under the 2014 Agricultural Act that aim to assist agricultural producers with the cost of transitioning to organic or undertaking conservation management on their land. These programs include the Environmental Quality Incentives Program, the Conservation Stewardship Program, and the Organic Certification

Program (USDA ERS, 2016). However, it may be that these programs, while offsetting cost, may not tackle producers' perceptions regarding organic practices, or some of the other barriers to adopting sustainable or organic management and pursuing certification (Lohr & Salomonsson, 2000).

While upfront and ongoing costs can be an initial barrier to adopting sustainable or organic practices, there are other factors that discourage farmers from moving in this direction. Lack of information and educational resources, social pressures, productivity, and the ability to deal with increased pressure from pests and diseases are all factors described as barriers to adopting sustainable or organic practices (Constance & Choi, 2010; T. J. Hall et al., 2010; Wheeler, 2008). A perceived lack of readily available information regarding organic practices, and an individual's lack of knowledge regarding organic practices have both been cited as barriers to taking up organic practices (Constance & Choi, 2010; Wheeler, 2008). Concern regarding a reduction in productivity under organic practices, or an inability to respond to increases in pressures from pests and diseases, have been cited as reasons producers have not pursued organic certification (Constance & Choi, 2010; Wheeler, 2008). While costs are a clear barrier to pursuing sustainable and organic management practices, other barriers persist including public perceptions and the availability of information.

Policy

There is a range of policies that influences the wine industry, including the financial incentives mentioned earlier regarding conservation management practices or transitioning to organic. In 1973, Oregon passed Senate Bill 100, creating the Land Conservation and Development Commission (LCDC) that sought to create a new program for statewide land use planning. This

legislation was followed shortly by Senate Bill 101, which enhanced the protection of Oregon's farmland. These bills brought about Oregon's Statewide Planning Goals and Guidelines, including the third goal, the aim of which was "To preserve and maintain agricultural lands". The Senate Bills resulted in farms being zoned as Exclusive Farm Use, which aims to maintain farm parcel size and limit the operations that can take place on the land. The protection of farmland through Exclusive Farm Use zoning was primarily designed to protect these lands from urban sprawl, thus maintaining an agricultural economy; however, it does allow a variety of non-farming activities to occur.

Permitted non-farming uses include activities such as the creation of wetlands, or of buildings used in conjunction with farming. Wineries are also included in the allowed practices on Exclusive Farm Use zones under a number of conditions relating to the annual production of the winery, as well as the size of the vineyard. For a winery to be sited on land zoned for exclusive farm use, it must have a minimum 15 acres vineyard on-site, be contiguous to acres of vineyard, contract grapes from a minimum of 15 acres of vineyard, which is contiguous to the site with the winery, or a combination of these requirements. Other permitted activities include, but are not limited to, utility facilities, oil and mineral exploration, and model aircraft takeoff and landing sites. Changes in how the land is used could significantly affect the ecosystem services of an area.

Senate Bill 316 was introduced in committees in the Oregon Legislature during the 2017 session; it raises the topic of wine industry and wine tourism as a form of economic development. This Bill is seeking to gain State funding from existing taxes on wine production and distribution to

enhance the promotion of Oregon wine and increase its market access. Wine tourism is the iconic industry discussed when talking about culinary tourism, a form of cultural tourism that offers communities, or regions, an avenue through which they can merge tourism with food production to promote economic development (Green & Dougherty, 2008). The idea of culinary tourism can be very attractive for rural areas looking to boost their economies (C. M. Hall, 2007). In order to successfully implement such a strategy there are typically a number of key factors which need to be coordinated. Often a region's culture, and the expression of it through food and drink, does not conform to modern bureaucratic boundaries (Green & Dougherty, 2008). Therefore, coordination and collaboration amongst multiple jurisdictions (cities and counties) is often required in order to successfully promote a region as a tourist destination (Green & Dougherty, 2008). This allows regions to pool together their collective assets, drawing in a larger number of food and drink producers, which can be beneficial in the marketing of the region and the development of a regional identity (Green & Dougherty, 2008). Having a critical mass of firms related to culinary tourism, including producers, local restaurants, retail establishments, and processors is beneficial for the marketing of a region (Green & Dougherty, 2008). As in traditional cluster based economic development strategies, there are potential synergies present in culinary tourism (C. M. Hall, 2007; Leigh & Blakely, 2013). These synergies include shared access to markets, development of mutual supply and distribution chains, as well as collaborative networking opportunities (C. M. Hall, 2007). This networking is important in terms of marketing and sharing of knowledge, which can help increase the efficiency of firms and enhance product quality (C. M. Hall, 2007). Networking has also been associated with the development of social capital, which reflects the connections between individuals within, and between, communities (Emery & Flora, 2006; C. M. Hall, 2007).

When implementing a strategy for culinary tourism in a region, there are a variety of actions that can help increase the effectiveness and sustainability of the strategy. As with many economic development strategies that rely on exporting a portion of their goods and services, economic leakages from a region should be minimized to increase the impact of culinary tourism on the local economy (C. M. Hall, 2007; Leigh & Blakely, 2013). Economic leakages in culinary tourism can be minimized by using local and renewable inputs, thus reducing money leaving the region (C. M. Hall, 2007). Similarly, when exporting goods from a region, value can be added to those raw goods through packaging and branding, which can increase income brought into the local economy (C. M. Hall, 2007). In culinary tourism, connecting local stakeholders and businesses is important. By increasing the number of businesses that use the locally produced goods or services, as well as the number of local businesses that are frequented, you can increase the recycling of the financial resources within the local economy (C. M. Hall, 2007). This networking between businesses also has the potential to build social bridges between sections of industries that do not usually interact, adding value and potentially efficiencies to both (C. M. Hall, 2007). The final step to maximize the impact of culinary tourism is to sell direct to consumers through venues such as farm shops, farmers' markets, or in the case of the wine industry, wineries. Selling direct to consumers has the benefit of building relationships and trust with consumers, while providing opportunities for producers to tell the story of the product (C. M. Hall, 2007). Increasing connections, minimizing leakages, recycling finances in the economy, and enhancing relationships can all aid in the successful implementation of culinary tourism as an economic development strategy.

Culinary tourism, and so wine tourism, is not a sure fire strategy to successful rural economic development, and there are some potential drawbacks if not managed carefully. The growth of the wine industry in a region can raise conflicts within a community, as traditional agricultural practices are put under pressure, land management practices change, and non-farming tourist activities increase (Williams, Graham, & Mathias, 2006). It is therefore important that in implementing wine tourism strategies the cultural and natural assets of a region are maintained (Williams et al., 2006). However, if managed appropriately, wine tourism can provide a boost to rural economies in a variety of industries, as well as the region as a whole.

Conceptual framework

The Theory of Planned Behavior is a model aimed at explaining individual decision making and behavior change, which has been expanded into the Reasoned Action Approach (Fishbein & Ajzen, 2010). The starting point of this model lies in an individual's background, since demographic factors and characteristics influence how an individual processes and interprets information, along with life events they have experienced (Fishbein & Ajzen, 2010). This aligns with the findings of Brodt et al. (2006), Kings & Ilbery (2010), and Winkler & Nicholas (2016), all of whom found differences in the values and beliefs of wine producers or farmers based on their backgrounds. The theory, as shown in Figure 1, has these background factors influencing three types of belief (Beedell & Rehman, 1999). The first belief is about undertaking the behavior, and what the individual perceives to be the outcome and consequence from this behavior (Beedell & Rehman, 1999; Fishbein & Ajzen, 2010). The second belief, concerns an individual's normative belief about what society and their community thinks about a behavior (Beedell & Rehman, 1999; Fishbein & Ajzen, 2010). The third revolves around the individual's belief regarding constraints or controls on carrying out the behavior (Beedell & Rehman, 1999;

Fishbein & Ajzen, 2010). These beliefs in turn influence the individual's attitudes towards a behavior, the perceived societal norm for the behavior, and the perceived behavioral controls, which in turn influences the intention to perform a behavior, and which in turn influences the behavioral act (Beedell & Rehman, 1999; Fishbein & Ajzen, 2010; Reimer, Weinkauff, & Prokopy, 2012).

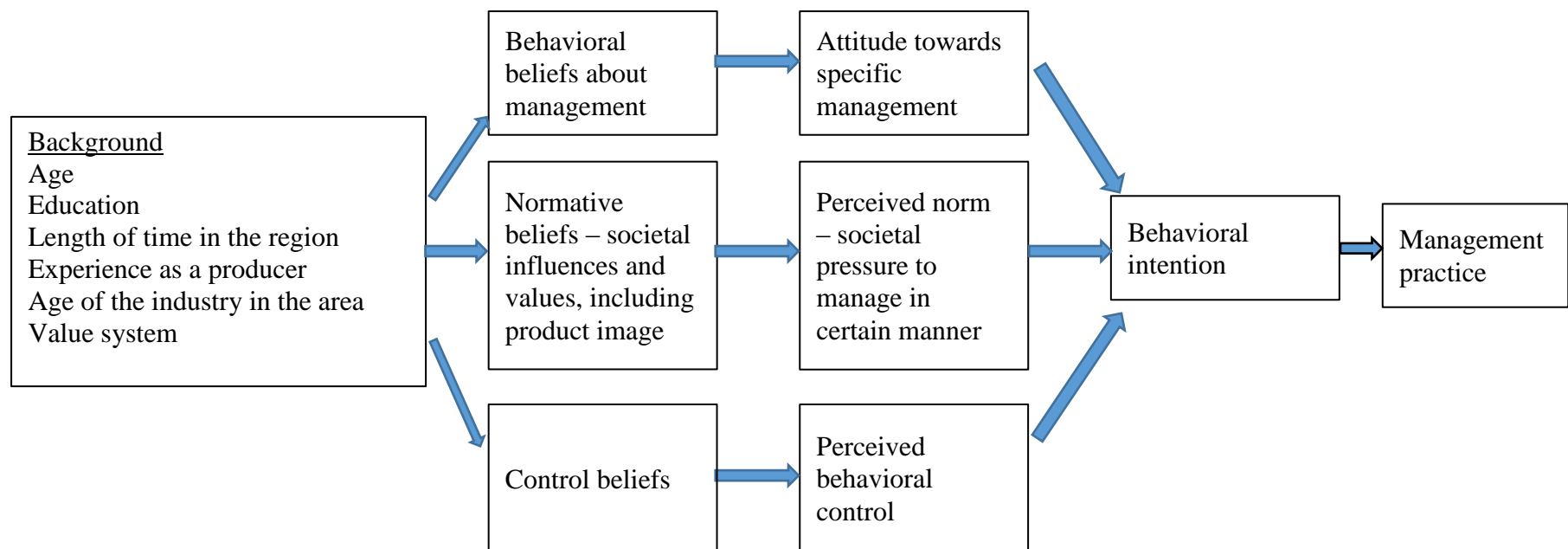


Figure 1: Concept map adopting the lens of Fishbein and Ajzen's, 2010, Theory of Planned Behavior/Reasoned Action Approach

EXPECTATIONS

Based upon the existing literature and the chosen conceptual framework a number of hypotheses regarding how vineyards value the environment are proposed. It is expected that a range of different values will be expressed by vineyards; however, as an individual's values play into their decision regarding management, there should be a greater appreciation of all ecosystem services at vineyards that employ sustainable or organic management practices, including a greater appreciation for the intrinsic value of nature. Individuals at vineyards not practicing sustainable or organic practices might be expected to be more focused on ecosystem services directly related to production and maximizing their effectiveness as a business.

POSITIONALITY & PERSONAL INTEREST

Relationships with the participants were established solely for the purposes of the research. As a non-US citizen with little experience in winemaking, I am a relative outsider to the community. Despite being an outsider in terms of nationality and industry experience, I do have a connection in terms of rural experiences. I spent my youth in rural North Yorkshire, England, surrounded by a landscape dominated by agricultural production of various kinds, where human manipulation of the land is the norm, and where public access to private land is common and facilitated through public rights of way. Much of my academic and work experience has revolved around the environment, be it in terms of science, management, or policy. I have worked on policies with the Scottish Government related to environmental issues and land use, during which I developed a greater understanding of the value that nature has to communities and industry that rely upon it. I hold a desire to ensure that the true value of the environment is accounted for in decision-making. While I have endeavored to remain impartial and view the

subject neutrally, it is important to state my positionality regarding the subject to inform the interpretation of the findings.

METHODS

Site and participant selection

A comparative study of three cases was conducted in the Willamette Valley, Oregon (Creswell, 2007). The Willamette Valley was selected because it is Oregon's largest American Viticultural Area; figure 2 indicates the different American Viticultural Areas in Oregon (Kaufmann, 2016). American Viticultural Areas are grape growing regions that correspond to a specific geographic area and are associated with the area's climate, topography, and soil. Modern wine making in the Willamette Valley is a relatively young industry dating back to the mid 1960's, but has shown significant growth. In 2015, the wine industry in Oregon was estimated to make a net economic contribution of \$1.4 billion and, as of 2013, employed 17,099 people (Miller, 2015). The three case studies were differentiated by their certified management practices: certified organic, certified LIVE, and without sustainable management certification (uncertified). Two sites were initially targeted for each case study, with a total of six targeted for the project. The sites were chosen based upon geographic proximity to each other; size; and length of time under current ownership.

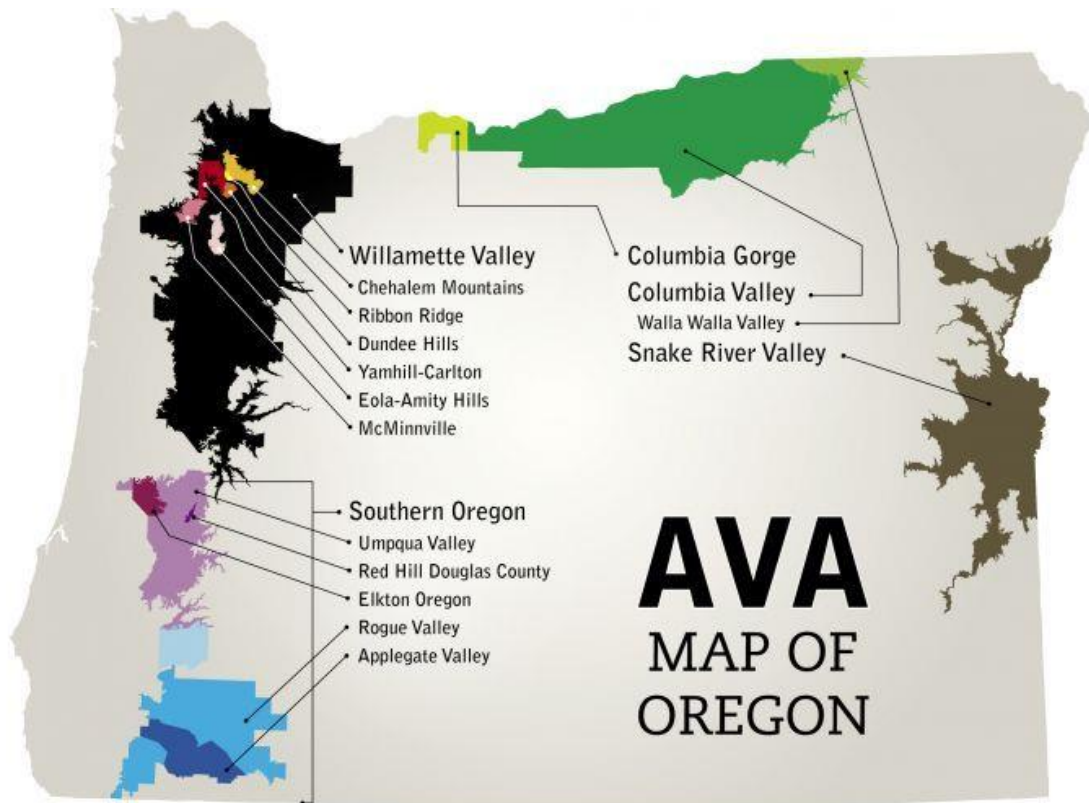


Figure 2: Map of Oregon’s American Viticultural Areas, image courtesy of Oregon Wine Press website (Helm, 2014)

Site selection was determined by identifying potential sites in the Willamette Valley American Viticultural Area based on certified management practices. Locations were also narrowed down by minimum size requirements, as vineyards must be greater than 15 acres in order to be able to have their winery on site, and thus be classified as an estate. This is important to ensure that the vineyards themselves are making the management decisions and are not influenced by an external winery. Sites were also narrowed down by a maximum size of 200 acres, as larger vineyards are assumed to market globally to a broader selection of consumers, introducing greater market influences. Organic sites were the least numerous in the Willamette Valley American Viticultural Area; therefore, the attributes of the two most similar sites certified as

organic were used to target the sites within the other two case studies. This was done by sampling a similar geographic area, in this case the Willamette Valley American Viticultural Area, but sites closest to the two most similar organic sites were targeted first. By sampling in a limited geographical area, background factors such as surrounding societal values and age of industry in the area, were anticipated to be consistent. When possible, sites were initially selected based on being similarly sized, and having a similar length of time the owners had been at the location, thus aiding in the control of these background factors. While experience as a producer may extend beyond the current employment, there was an attempt to keep the length of time in the area as a constant. Certification was assessed using the website of the vineyard estate. Vineyard estates without certification or express mention of sustainable or organic management practices on their website were targeted for the uncertified case study. If sites initially targeted were unavailable for study, the site with the next most similar characteristics was contacted. Within each site, efforts were made to interview the owners, winemaker, and vineyard manager, if they were different individuals. These roles may bring different values to the table, or be influenced by different societal values, and may still play a role in the land management decision making. By interviewing individuals in all roles, a more complete picture of decision making at a vineyard could be established.

Data collection

A number of past studies attempting to prioritize ecosystem service values in the wine industry have used Q-methodology, which are non-generalizable, and participants expressed feeling constrained by the statements and methodology (Kings & Ilbery, 2010; Winkler & Nicholas, 2016). Cordano et al. (2010) conducted a survey of wineries, looking at adoption of environmental management programs through the lens of the Theory of Planned Behavior. Both

of these methodologies limit the participant in their responses. Due to the complexity of individuals beliefs and attitudes, a more qualitative approach was adopted here in order to provide greater flexibility in both the responses and the line of inquiry (Robson, 2011). Face-to-face semi-structured interviews were conducted with the vineyard owners, winemakers, and vineyard managers where possible. In conducting interviews, the aim was to create a rich and detailed understanding of how vineyard owners, winemakers, and vineyard managers value the environment in order to provide a more detailed picture of the contribution nature makes to vineyards, their image, and their activities (Creswell, 2007; Robson, 2011). All interviews were recorded and transcribed to ensure accuracy, and allow for coding and analysis of the responses. The interview questions, included in Appendix A, were created to target the main research questions, exploring the themes of how vineyards value the environment; participants' beliefs about different vineyard management practices; and what policy barriers and issues vineyards face. Each interview question was derived to provide information needed to answer an aspect of a research question; these information requirements can be seen in the first column of table 1 (p33). A pilot interview was conducted with a vineyard estate owner in the Willamette Valley early in the study design process and not included the final study. Following this pilot, revisions were made to the interview protocol in an attempt to gain greater discussion from participants regarding the value the environment holds for the business, and to examine the advantages, disadvantages, and barriers of pursuing different certification schemes.

Background attributes of the participants was collected from a combination of the interviews and internet searches. Size of the vineyards was available online at the website or through interviews, with the acreage of planted vineyard used to define the size and allocate vineyards

into categories, 15-50 acres was termed small, and over 50-100 was termed mid-sized. A participants' age was estimated by the interviewer with categories outlined as less than 30 (early career), 30-50 (mid-career), and over 50 (late career). Length of time in the industry was initially estimated from web sources and later refined following interviews. Five or less years of experience in the wine industry was viewed as novice, 6-20 years as experienced, and over 20 as having extensive experience. Education level of the participant was collected during interviews as participants reflected on their experiences in the wine industry, or through subsequent internet searches, allocated to general education groupings with participants with any level of college degree termed college educated.

In order to gain an enhanced understanding of whether the values expressed through the interviews were purely personal values, or whether they hold greater value to the vineyard, artifacts relating to the vineyard were also collected. Vineyards maintain websites and produce marketing leaflets and brochures. These marketing materials were coded and analyzed in order to aid in the triangulation of the findings from the interviews (Maxwell, 2005).

A total of seven certified organic sites were contacted for the study, with one agreeing to take part. One interview was conducted at the site, as the owner was also the winemaker, and they contracted the vineyard management. While only one site agreed to take part, this accounts for all of the organic sites, except one, that were within the bounds of the study. The other site was excluded due to containing certification in more than one of the case study categories. The organic site was coded O1 during the analysis. Three LIVE certified vineyard estates were approached and two agreed to participate. Three interviews were conducted; one

owner/vineyard manager at one site (winemaker opted not to participate); and the winemaker, and owner/vineyard manager at the other. The two LIVE sites were coded L1 and L2 during the analysis. Eight sites without sustainable or organic certification were contacted, and three agreed to participate. Interviews of uncertified sites were carried out with the owner of one site; the owner/vineyard manager/winemaker of another site; and owner and the vineyard manager/winemaker at a third site. These sites were coded U1, U2, and U3 respectively. Communication with vineyards was carried out through publicly available correspondence measures. Emails were sent to the vineyard estates and followed up with telephone calls, at which point if the vineyard estate did not wish to take part, the next site was targeted. Interviews were conducted at the vineyard site, with the exception of one which was conducted via telephone.

Data analysis

Following an interview, the recording was transcribed and coded with the help of Dedoose, an electronic data management and analysis tool (Dedoose, n.d.). Codes were developed based upon theory and observations during the data collection and analysis. The final list of codes is included in Appendix B. Codes were also grouped into themes to aid in the recognition of patterns. After each interview a contact summary form was created to identify initial impressions, issues with the interview guide, and holes in the data collection in order to inform the analysis of the case (Miles & Huberman, 1994). In order to look at each case in full, the commonalities and themes of each case in terms of values, beliefs, and constraints were assessed. Following the completion of each case, a comparison of the cases was conducted in order to discern the differences and tease apart the connections laid out in the concept map, and the Theory of Planned Behavior (Maxwell, 2005). The goal was to provide a coherent narrative for

each individual case and make comparisons with the other case studies, highlighting the differences and similarities. Analysis of marketing materials was also conducted to assess what role, if any, the environment plays in the vineyard estates' promotional materials. This was used to compare how estates use the environment in their marketing, and how estates talk about societal influences.

Validity

To reinforce the validity of the research several strategies aimed at countering validity threats were undertaken. The strategies and how they addressed particular strands of the research are identified in table 1 (p33). Researcher bias was identified as a potential threat to the validity of the research. This may introduce bias into the interpretation of the participants' responses, calling into question the validity of the findings. By openly stating potential biases, readers and reviewers can understand the positionality of the interpreter (Maxwell, 2005). There is also the validity threat that participants respond to the questions by saying what they think the public want to hear. Saying something negative regarding how you value the environment or manage the land rarely reflects well upon a food industry. Therefore, participants may over-emphasize their responses with respect to how they value the environment, and may be less expansive regarding management practices that are less sustainable or socially acceptable. This concept of reactivity was mitigated using artifact analysis of the sites' websites and promotional materials, attempting to triangulate information. However, these promotional materials may tell the same story, as they aim to demonstrate the vineyard in the best light. To ensure that the findings and interpretations produced are coherent and are supported by the data collected, the research was reviewed by a committee, in the form of three academic faculty members at Oregon State

University (Creswell, 2007). Thus, ensuring that all findings are interrogated for validity and follow on from the data.

Table 1: Validity Matrix for comparative case study the Willamette Valley’s wine industry (Maxwell, 2013).

What do I need to know?	Why do I need to know this?	What kind of data will answer the questions?	Analysis plans	Validity threats	Possible strategies for dealing with threats	Rational for strategies
How does the participant feel the environment contributes towards vineyard?	Contributes to the understanding of rationale behind beliefs	Interviews - how they speak about the environment and what value they see in it, along with what it contributes to vineyard	Code for ideas central to this e.g. landscape, sense of place, soil, nutrients, water	May project what they think I/society want to hear. I may interpret what they say according to my values.	Triangulate using marketing materials and be aware of this potential bias. State personal bias. Peer review.	Increases the available data to interpret, as well as identifying positionality. Provides constructive criticism regarding findings.
What does the participant believe about sustainable management?	Aids understand factors that contribute to management decisions	Interviews - how they speak about sustainable management practices and value it provides	Code for ideas central to this e.g. stewardship, positive/negative impacts	May project what they think I/society want to hear.	Triangulate using marketing materials and be aware of this potential bias.	Increases the available data, as well as identifying positionality.

What does the participant believe about organic management practices?	Aids understand factors that contribute to management decisions	Interviews - how they speak about organic management practices and value it provides	Code for ideas central to this e.g. stewardship, positive/negative impacts	May project what they think I/society want to hear.	Triangulate using marketing materials and be aware of this potential bias.	Increases the available data, as well as identifying positionality.
Does the vineyard use environmental sustainability in marketing?	Aids understand of societal influences in terms of how they market themselves	Artifact analysis	Codes for ideas central to this e.g. sustainable, stewardship, environment,	May project what they think I/society want to hear.	Triangulate with information from interviews, and be aware of potential bias	Increases the available data, as well as identifying positionality.
Are there any barriers to adopting more sustainable management?	Aids understand factors that contribute to management decisions	Interviews	Codes for ideas e.g. policy, constraints	May not have contemplated this and may reach for a topic in order to answer the question.	Be aware of this during interpretation of data, and discuss with reviewers.	Ensures that rational conclusions are reached in context of wider policy area.
What policy issues/challenges /threats are currently a major issue for vineyard?	Identifies largest threats to industry	Interviews	Codes for ideas e.g. threats, constraints, changes	May not have contemplated this and may reach for a topic in order to answer the question	Be aware of this during interpretation of data, and discuss with reviewers.	Ensures that rational conclusions are reached in context of wider policy area.

ANALYSIS

Analysis of the data is organized by case study. Each case study begins with a discussion of the participants' values of the environment. This is followed by an analysis of their beliefs, starting with personal beliefs about management or particular management practices; then normative beliefs; and finally control beliefs. Following the three case studies, a comparison of all three cases concludes the analysis.

Organic vineyards

As expected, the owner of the organic site in the study discussed all aspects of ecosystem services when asked to talk about how they value the environment, the area, and the benefits of their management choice. The owner was college educated, late career, had extensive experience in the wine industry, and currently farmed a small vineyard in the Willamette Valley. Provisioning, regulating, cultural, and supporting services are all discussed as being valuable to the individual and the business.

...not only is it beautiful, and not only do we get to look at this wonderful vista that we have, but also it is productive land, and the land is really very, very, suitable for the type of grapes that we grow and you know we are fortunate in that on these hillsides we have pretty good air drainage...- organic vineyard owner
(O1)

...you know fresh air, unpolluted air, sunshine abundant rain, especially during the fall and the winter at times when we need to recharge the aquifer, recharge our wells. - organic vineyard owner (O1)

...you know soil microbial life is so important it is actually the microbes that do so much of the work...- organic vineyard owner (O1)

How an individual values the environment will influence their personal beliefs about management outcomes, but so too will a person's beliefs about the relationship between nature and society. In the case of the organic site, ideas were expressed by the participant corresponding with a position further towards the 'alternative agricultural paradigm' or New Ecological Paradigm, with the participant recognizing that there is a relationship between humans and nature (Beus & Dunlap, 1990). There was the acceptance that humans are impacted by the environment, and that how humans treat the environment is important for its health and ours.

“...the environment is why we are here and it is what we obviously live in day by day, 24 hours a day, and we treasure it, that is our whole purpose is to take good care of this place, its environment, and all aspects, everything from, like I say, the microbes in the soil on up to our own selves and the people that work here, we consider that all to be one thing... - organic vineyard owner (O1)

Transferring values and ideology to action, the Theory of Planned Behavior predicts how beliefs regarding certain actions can become drivers for action. This interview illustrates personal beliefs about the outcome from organic management in terms of environmental impact. In the organic case study, it is clear that environmental outcomes play a role in the perceived benefits of different management practices, and so it is an important aspect in the personal beliefs about management decisions. Below, the participant expresses a desire to limit their impact on the environment, and take responsibility for how they influence the health of the environment.

...as a kid, I was always in the river and we were, my buddies and I, were river rats, we were fishing and swimming, [...] we had boats and it was a very, very, polluted river. I mean we saw first-hand some really awful pollution, and so I figured, when I made the determination that we would be farming in that same watershed I wanted to, from an environmentalist point of view, do as little pollution, as little damage as possible. - organic vineyard owner (O1)

Human health outcomes also are a part of the perceived benefit from managing the land the way they do.

...we approach the soil with the same seriousness as we approach our employees and taking care of them as well. - organic vineyard owner (O1)

The organic case study shows a strong personal belief regarding organic management practices and that the outcome of organic management has clear advantages for the quality of the wine produced.

I'm really convinced that it produces better wine, that we have healthy plants, and I think healthier plants make healthier wine, make healthier fruit, and healthier wine - organic vineyard owner (O1)

This all indicates that the personal beliefs about management in the organic case study involve beliefs about beneficial outcomes related to human health, environmental, and wine quality. These beneficial outcomes for the individual outweigh the time and effort, and thus money, it took to transition to organic. The organic site that agreed to participate was also certified biodynamic. Biodynamic farming aims to treat the farm in a holistic manner, operating where

possible in a self-contained way, with attention given to the biological aspects and energy/life forces of the farm (Biodynamic Association, n.d., Demeter USA, n.d.). While organic is compatible with biodynamic and both are able to be attained at the same time, one of the main differences is the use of homeopathic preparations in biodynamic management (Demeter USA, n.d.). Holding both organic and biodynamic certification, and practicing biodynamic management, may alter possible factors that contribute to the personal beliefs about beneficial management outcomes. Due to the limited response from organic sites it is uncertain whether these are consistent in the organic community, or whether some aspect is related to the decision to pursue biodynamic certification.

Normative beliefs regarding management were not expressed in the organic interview, though evidence of information flow between wine growing colleagues was exhibited.

...we have a culture of collaboration here, and I think some of that is well, certainly in the early years it was born of the fact that it was a new business, a new industry, a new way of farming, that everybody had a lot to learn, and so to learn people started sharing information and giving advice and consulting and helping, that I think continues today...

- organic vineyard owner (O1)

While this comment does not indicate that input from colleagues in the industry necessarily influenced beliefs about outcomes, it does show a presence of a community, and that the knowledge of that community is shared. The participant did not express any perceived societal influences; however, an analysis of the site's website showed descriptions of the vineyard being organic and biodynamic, of particular management types, and the history of farming on the land. Images corresponding with the natural and farmed landscapes, along with biodynamic practices

are also incorporated. This use of imagery and language indicates that maintaining a public reputation as stewards of the land, and as organic and biodynamic, is important to this vineyard, which may indicate normative beliefs that this brings benefits.

No clear control beliefs were identified by the organic site; though emergent policy issues did arise. The participant in the organic case study highlighted potential changes in the climate being a possible future issue for the industry. Also highlighted were changes in how neighboring land is used. This was brought up by the participant in relation to recent logging in the area, carried out to create space for new vineyards, which they felt may affect the drainage on their land. The issue was not of more vineyards being put in, but how they were created and the fact that changing how land is used can impact neighboring land and the ecosystem services they use. The final policy issue highlighted was the action of local government. In this case the local government had paved a road alongside the vineyard, which had caused damage to drainage on the participant's land.

LIVE vineyards

In a similar manner to the organic vineyard, the LIVE participants discussed the environment and its value in a variety of different ways. One participant (L1), a late career couple, college educated, with extensive experience, and farming a small vineyard, stated “Well, what don't we appreciate about the environment?” when asked what they value about the environment. There is an indication that they value, or see value for the business, in a range of different ecosystem services. The following quotes show participants expressing a value for the aesthetics of the landscape, as well as for the production of grapes.

...vineyards are manicured, they're beautiful, and this perception of being romantic and all these things. – LIVE vineyard owner (L1)

Our soil grows wonderful grapes. – LIVE vineyard owner (L1)

Participants also talked about the soils at their vineyard and the valuable functions they provide, as illustrated in the following quote.

The soils here are considerably different, they are marine sedimentary soils and they have excellent water holding capacity, they're a kind of a mixture of clay and silt that enables us to dry farm. – LIVE winemaker (L2), experienced, college educated, mid-career, and working on a mid-sized vineyard.

There is a strong indication that producers practicing LIVE appreciate the relationship between the environment and human society and health.

The environment is what supports us. – LIVE vineyard owner (L1)

The owner of L2, a mid-sized vineyard, was college educated, late career and had extensive experience in the wine industry. They held similar values to L1 linking the environment to human health.

I don't want to negatively impact the environment, which would negatively impact me or my grandchildren down the line. – LIVE vineyard owner (L2)

The values expressed about the environment and human health transfer into their personal beliefs about the outcomes associated with sustainable management. There is a desire to limit the harm

done to the environment because of the acknowledged detrimental effects it can have on human and environmental health.

...and so by doing what you can to keep species viable, and avoid polluting activities, keep the water clean, you got to drink, someone has got to drink that. – LIVE vineyard owner (L1)

We are in this for the long haul, we want a sustainable, a sustained vineyard, we want it to sustain us, so taking care of it seems the smart thing to do. – LIVE vineyard owner (L1)

Looking at the personal beliefs about the land and the outcomes from its management, there is a desire to cause the least negative impact on the environment. Quotes related to this came through when discussing the value of the environment, “Why would we want to hurt this land? [...] I can't see anything we are doing that is having a negative [affect].” – LIVE winemaker (L2). This also arose when discussing why the participant decided to employ sustainable management, “We wanted to respect the soil [...], we wanted to use the least amount of intervention, that includes chemicals, and tilling, and all of that.” – LIVE vineyard owner (L2).

The desire to do the least harm to the environment also plays into the decision between organic and sustainable for those undertaking LIVE certified management practices. The decision to pursue LIVE certification rather than organic certification is an intentional decision.

We are LIVE certified, we are not Organic, we made that decision consciously. – LIVE vineyard owner (L1)

This choice appears to be due to personal beliefs regarding the outcomes of organic management. Participants perceived organic management to be a philosophy, and partly because of this, the management practices allowed under the organic standards were perceived to be worse for certain aspects of the environment.

The organic protocol seems to be, to me, too much of [...] an ideology.- LIVE
vineyard owner (L1)

The sentiment that organic is too rigid a regime was commonly expressed, and that this inflexibility can actually lead to harmful impacts on the environment.

If you are organic you are pretty much dependent upon sulfur for mildew and its true, sulfur is organic, but you can get too much of it in your soil. - LIVE
vineyard owner (L1)

...now with organic you are limited, very limited in what you can use to control powdery mildew, one of them that they allow is copper, the spray, and you'd see that if you've been to Europe into a vineyard, and you see a blue vineyard, that's called a Bordeaux mix, and it's a combination of copper and sulfur it is very effective however copper is metal, and it builds up in the soil and can get into the water sources and copper is deadly to fish, it kills fish, so when I say we get a salmon safe certification through LIVE you cannot get it if you use copper, so we're prohibited from using copper...- LIVE vineyard owner (L2)

There is the belief among participants in the LIVE case study, that LIVE certified management practices are actually more environmentally friendly in some respects than organic practices.

...you are also talking to someone who is really devoted to the sustainable practices of LIVE, which actually gives us greater flexibility and I think we treat the soil better. - LIVE vineyard owner (L2)

One of the drawbacks is if you use sulfur you have to spray in 7-10 days. Well, if I use Quintec [Fungicide], I can go 2-3 weeks so I don't have a tractor running through the vineyard every three weeks with Quintec and if I spray sulfur I have gone through three times, all the diesel I'm burning up there, so there are some pluses and minuses to it, organic is not a panacea nor is it non-impact on your soil [...], it might kill fish, I think we have to look at the big picture. - LIVE vineyard owner (L2)

Participants in the LIVE case study hold a strong desire to limit their impact on the environment, to manage the land sustainably for the environment's sake and for the sake of human health. Personal beliefs about the outcomes of sustainable management, however, are not the only motivators behind adoption of those practices. An individual's normative beliefs about societal influences were also expressed in the LIVE case study. Some participants in the LIVE case study expressed beliefs that consumers want vineyards to be sustainable, or for the land to be managed sustainably. We see owners and winemakers expressing normative beliefs about society's values, and the potential beneficial outcomes of pursuing sustainable management due to those values.

I believe that those [LIVE and Salmon Safe certification logos] symbols and understanding on the part of the consumer influences and helps us sell wine, I also think it builds a brand that we are sustainable... – LIVE vineyard owner (L2)

People want to know that you are a good steward of the land and it is not enough for them to just know that you have been just farming the land for so many years.

– LIVE winemaker (L2)

These comments indicate that while sustainable branding might not be the sole driver behind management decisions, it is at least a consideration. This is supported by an analysis of the sites' websites where descriptions of sustainable practices and certification are present alongside descriptions of the natural environment, topography, and the history of farming at the location. As with the case of the organic producer, participants mentioned that the wine growing community in the Willamette Valley is one that shares knowledge about management.

The wine making culture in the valley began [as], and still is, a collaborative one.

– LIVE vineyard owner (L1)

This observation along with the perception that there was an established regional culture of sustainability, provides a further societal influence.

Well, like I say, the culture in the industry is to not have a huge impact on the environment, negative impact, and it is to adopt practices that have a small impact. – LIVE vineyard owner (L2)

Normative beliefs about the lack of competitive advantage between organic and LIVE certified wines also contributes to the choice between organic and LIVE.

...there is no evidence that if we were selling organic wine then we would sell a lot more wine, and [...] I feel like we are acceptable stewards of the property and

so by not being organic I don't feel like I am hurting the environment. – LIVE
winemaker (L2)

As in the organic case study, financial cost and bureaucracy, were challenges to be overcome, but they were not thought of as barriers to adoption. The combination of beneficial outcomes for the environment, human health, and selling wine outweigh the downside of any financial cost due to certification or the bureaucracy that accompanies the certification process.

No controls or constraints on the adoption of LIVE management practices were explicitly mentioned by the participants in the LIVE case study, though a number of policy issues faced by wine producers in the Willamette Valley were highlighted. Some of these were geographically specific, while others are more general. One issue is that cultural services experienced at wineries can be damaged through activities carried out external to the site. In this case a participant raised the concern that helicopter tours of the wine region actually damage the wineries through noise pollution. Labor availability was also a concern, which for more sustainable, labor intensive, practices has the potential to impact behavior. In this case, there was concern about future decreases in available labor sources, and the possible need to explore more mechanized management practices. Another issue common throughout the LIVE case study was that of increased planting of vineyards in the region, and the concern this would have for the ability for new entries into the market in the Willamette Valley. External investors from outside Oregon have been planting or purchasing vineyards, which may cause an increase in land values, and thus increase the cost of entry to the market. There was also the concern that this external investment could change the existing culture of the wine industry in the Willamette Valley. Government action was also raised in the LIVE case study; one participant was

concerned with the attitudes of, and the use of discretionary authority by, local governments in relation to land use control and permitted activities on vineyards and wineries. They noted that there are differences in political attitudes towards land use control at the local level. This was important to the participant because there was a concern that increased pressure for wineries to expand the activities they offer may eventually have a detrimental impact on the industry.

Another participant expressed concern regarding the growing inequality in rural areas compared to urban areas and the need for government to invest in rural development. This participant highlighted the failure to pave roads leading to the community the vineyard was situated in as potentially damaging to the success of businesses in the region. The frustration over the lack of road paving in this situation contrasts with the organic case study experience, where the paving of a road by the local government, because of how it was carried out, actually negatively impacted the vineyard. Paving of rural roads was provided as an example, by the participant, of possible investment opportunities in rural infrastructure that could boost the local economy.

Uncertified vineyards

When discussing the environment and its value, a variety of beliefs was expressed by participants within the uncertified case study. Some study participants showed they valued a variety of environmental functions.

Well I think just the aesthetics of the environment is really valuable to this business... – uncertified vineyard owner (U2), college educated, late career, with extensive experience in wine industry, farming a small vineyard.

...investing in soil health, for example, making sure that you have an active, alive soil full of organic matter to increase the soil microbiota. This not only helps limit erosion, but more selfishly, can limit the amount of chemical inputs based

on synergistic relationships between the plant rhizomes and microbes that make nutrients, like phosphorus, more available. – uncertified vineyard manager (U3), college educated, experienced, mid-career, managing a small vineyard.

I mean, trees are great for holding water in the ground, I mean, I kind of winced when we cut trees down here to plant the vineyard because I know how valuable trees are... – uncertified vineyard owner (U3), college educated, experienced, late career, farming a small vineyard.

However, one participant expressed values focused more towards provisioning services, the production of grapes. This supports the idea that producers may be positioned along a spectrum of worldviews, and value systems (Beus & Dunlap, 1990; Fairweather et al., 2009).

Well if it doesn't get ripe early you are out of business fast, so that is why it is important.- uncertified vineyard owner (U1), college educated, extensive experience in industry, late career, farming a small vineyard.

Differences in how participants in the uncertified case study spoke about the relationship between humans and the environment were also observed. The majority of uncertified participants identified the need to be good stewards of the land. When asked what they valued about the environment, some participants responded with statements like, “I mean I consider humans to be stewards of this planet” (owner (U3)) and “It is life” (vineyard manager (U3)). At a different point in the interview, another participant expressed similar views about needing to be responsible stewards of the land.

We want to be good stewards just for ourselves, for our customers, people who come here, and especially for our neighbors because we are in a community. –
uncertified vineyard owner (U2)

However, not all participants from uncertified sites used language demonstrating this view, one (U1) did not use language around stewardship, or the environment influencing humans.

This idea of humans needing to care for the land, and the values people hold for the environment, are born out in participants' personal beliefs about management outcomes. With regard to organic management practices, participants in the uncertified case study held views ranging from organic being good for the environment and an important way of managing the land, to not being viable as a management practice due to being unable to respond to pressures.

Well, it is good for the environment, it is probably the most important thing, in my mind the certification is less important than the process... – uncertified vineyard owner (U3)

I tried that once, third year I had the worst mildew, the worst weed problems ever, it took forever to get out of it, so I don't do that anymore. – uncertified vineyard owner (U1)

The belief that organic practices are unable to deal with increased pressures from diseases or pests meant that there was a perceived detrimental impact on the quality of the wine.

Well, that is the biggest barrier, well, I think you tie yourself to a particular set of farming practices and some years require a different set of farming practices and

our goal in the end here is to really make great wine and I think it makes it more difficult if you certify organic to do that sometimes.- uncertified vineyard owner (U2)

We are limited to [herbicide as] weed control for our under-vine area. We have to use herbicide, under vine cultivation which is the other method, the other main method, is something we will never be able to do. Some of the other techniques such as flame burners, and some of the organic herbicides, just haven't proven to be as effective, so, that is kind of the biggest obstacle for our specific vineyard going organic. – uncertified vineyard manager (U3)

There is also the belief that the management practices themselves will be more financially costly due to increases in labor, which corresponds with findings in the literature (T. J. Hall et al., 2010; Miller, 2015; Wheeler, 2008).

...for us it has been having a tractor operator on our beck and call so that when anything goes awry, or we just need to be spraying more days of the week, we can do that. Therefore, it is labor, if you are choosing to be more hands-on with monitoring and integrated pest management, instead of the more “spray it and forget it” mentality; where you know you are protected for 21 days, because you just put on a synthetic ag chemical. – uncertified vineyard manager (U3)

Some uncertified wine producers expressed concerns about the ability of organic management to consistently produce quality wine and provide effective management of pressures such as pests and diseases.

Participants in the uncertified case study demonstrated a range of personal beliefs about the merits and outcomes of managing the land according to the LIVE protocol. One owner (U1) expressed the belief that LIVE certification offered no particular benefits over the management they currently employed, which was described as “standard issue.” Whilst at the other end of the spectrum, participants who were talking of pursuing LIVE certification in the future held more positive beliefs about the outcomes of managing to LIVE standards.

I want to make sure that, one we are not contributing any run-off that could be potentially harmful to aquatic animals. I also want to make sure that aside from inputs, that we are managing the soil, and the cover crops, and the actual land appropriately so we are not [...] increasing run-off, so it really, I think, from my point of view hits on all of those levels of why it is important. – uncertified vineyard manager (U3)

They also expressed a concern for the environment and how the environment can affect human health.

I think it is our responsibility to pass this environment on to our future generations, I have kids, I have a grand-daughter, I don't want her to live on a world that is not healthy. – uncertified vineyard owner (U3)

Participants also discussed their reasoning behind their management and a likely future move towards LIVE certification in terms of being a good neighbor.

We really don't want to have any impact on not only ourselves but we don't want to have impact on our neighbors. – uncertified vineyard owner (U2)

With this we see beliefs about human health outcomes beginning to be expressed, which became an increasingly common theme in the uncertified case study. Owners and managers, possibly because they have more recent experience with synthetic chemical application, express greater sentiments regarding the need to protect worker health through shifting towards more sustainable practices and possibly pursuing LIVE certification.

I think it is not only better for overall vineyard health, but it is better for worker safety to be lowering inputs... - uncertified vineyard manager (U3)

...I used to basically do all the spraying and so, I think, that to me the impact is more about the people applying the fungicides and even if it is sulfur, the impact is still about who is applying it, that is where I worry... – uncertified vineyard owner (U2)

This concern for human health as a driver towards sustainable or organic management practices is consistent with the literature (Fairweather, 2004). However, personal beliefs are not the only beliefs influencing management decisions.

Normative beliefs about the societal perceptions of different management styles and possible marketing advantage of more environmentally friendly management is also expressed by some of the uncertified case study participants. Some, though not all, participants see “a big marketing advantage” (U2), including a perception that it could expand market appeal.

Wholesalers and distributors [...] may be more inclined to take on our brand because we are certified sustainable - uncertified vineyard manager (U3).

This indicates that there is a belief that more sustainable management and the ability to label wine as sustainable offers a competitive advantage, which could influence management decisions. This corresponds with the literature, which has actually found competitive advantage to be a major driver for late adopters to change their management practices (Atkin et al., 2011; Lohr & Salomonsson, 2000). An analysis of the sites' websites shows descriptions of the natural landscape, the topography of the region, and a history of farming, with minimal description of farming practices. This indicates that producers believe there are advantages to being associated with the natural landscape, and that descriptions of conventional management practices do not supply the same benefits that descriptions of sustainable or organic practices do. As with the LIVE case study, some participants in the uncertified case study expressed the belief that there was, in general, a regional culture of sustainability, with one participant stating that "sustainability is the mindset" (U3). Common barriers to adopting organic or LIVE certification were the cost of certification, and the bureaucracy involved, including the ability to fully comply with the standards, which supports findings in the literature (T. J. Hall et al., 2010; Wheeler, 2008). In general, the feeling amongst the vineyards that expressed overall positive beliefs about sustainable management was that they provided numerous benefits:

You know it kind of runs the gamut of marketing, sales, all the way to health and safety of employees, and then of course there is the earth. – uncertified vineyard manager (U3)

Overall these benefits were thought to outweigh the costs associated with certification, and that the only control belief that may prevent them gaining certification was the ability to comply fully with all the standards. However, not all uncertified participants held this view, with one participant (U1) stating "you pay dues, you fill out forms, somebody else looks at your land, do I

need that, no” when discussing potential advantages of LIVE certification, highlighting that, for them, cost and bureaucracy are barriers to adoption of LIVE certification.

The uncertified case study had numerous similar policy related concerns as the LIVE and organic case studies. Climate change was again raised as a potential issue for the wine industry in the Willamette Valley, though its exact impact is still uncertain. One of the participants in the case study again highlighted concerns regarding the continued availability of labor sources, which could become a control on sites managing sustainably or organically if labor is unavailable or costs increase due to scarcity. The discretionary authority of local governments was underscored with regard to a perceived disparity in how easy it is to receive permits for wineries in different counties. Some counties were perceived to be supportive of applications, or present fewer obstacles in their permitting process, while in other counties it was felt to be a more painful process. This may impact a wine producers normative beliefs, since the competitive advantage of sustainable or organic labelling is thought to be most advantageous at the cellar door or at the winery (Gilinsky et al., 2015). Since perceived competitive advantage has been seen as a major driver for late adopters it could impact farming practices in a county (Atkin et al., 2011; Lohr & Salomonsson, 2000). Whilst a lack of information regarding sustainable or organic management practices was not an issue, one participant did express a desire to see vineyard regulations summarized in one location, which indicates a cost in terms of time and energy for new entries to the vineyard market.

Comparison

When comparing the background attributes and associated values and beliefs of the participants across all three management practices, no patterns emerged based upon background

characteristics. The absence of a pattern may be due to how the sites were selected, since a number of background attributes (size of vineyard, length of time owner has been in place) were controlled for. These vineyard estates are also relatively small businesses with few, if any, permanent staff and some of which are family employees. A comparison of the case studies shows common consensus in how the environment is valued by vineyard estates, and that the cultural functions less easily quantified, such as the aesthetics of the landscape, hold value to the wine industry. We also see insights into how individuals view the relationship between the natural world and humans. In general, ideas were expressed by participants corresponding with a position further towards the 'alternative agricultural paradigm' or New Ecological Paradigm, with participants recognizing that there is a relationship between humans and nature (Beus & Dunlap, 1990). Across all the case studies there was a general acceptance that humans are impacted by the environment, and that how humans treat the environment is important for its health and ours. Those individuals in the uncertified case study who leaned further towards valuing all aspects of the environment and who held more environmentally minded worldviews also talked about taking steps towards sustainable or organic certification. In fact, two out of the three vineyards and three of the four participants included in the uncertified case study stated an intention to pursue LIVE or organic certification in the future. One site was waiting to complete changes to their site before they could attempt to comply with standards, the other stated they had been transitioning following adjustments in personnel and management practices. While the interviews do not reveal the expected correlation between values and certification, they do show that how the environment is valued influences personal beliefs about management.

When looking at this information using the Theory of Planned Behavior we see that how an individual values the environment plays a role in decisions regarding management. Personal beliefs about the environmental and social benefits, and the value placed on these benefits, were found to be important to all participants who had gained, or stated they were planning on pursuing, organic or sustainable certification. The choice between organic and LIVE appears to be ideological, based upon the individual's beliefs about what provides the best environmental and social outcomes.

Normative beliefs about the marketing benefits, and cultural expectations of the Willamette Valley, were also seen to influence management decisions. Normative beliefs were notable in the LIVE and uncertified case studies. As mentioned, market advantages of certification were not expressed in the organic case study or by all participants in the uncertified. However, there was a perception amongst numerous participants that organic and LIVE labelling, or the consumers' perception of 'green' practices, can be advantageous in the market place. This was highlighted numerous times as an advantage of LIVE or organic certification, and the belief reinforced by an analysis of producers' websites. There was a perception expressed by a number of participants in the LIVE and uncertified case studies that there is a growing culture of sustainability amongst the region's wine producers. This culture contributes to the normative beliefs expressed about different management practices. These normative beliefs are likely to be enhanced through the collaborative nature of the wine industry in the Willamette Valley. The sentiment that the industry is collaborative and shares best practices regarding management and the production of high quality wine was common in all case studies. This collaboration was, in

part, linked to a desire to grow the reputation of the industry, since bad wine from one vineyard would damage the reputation of a region.

Outside of the organic case study, the general belief about organic was that it does not offer enough flexibility to counter increased pressure from pests and diseases, and that the wine quality could suffer. This perceived lack of flexibility in organic management practices corresponds with the current literature (Constance & Choi, 2010; Wheeler, 2008). Other barriers to adoption of organic or sustainable practices found in the literature were not consistently present in the study. Cost and the bureaucracy involved in certification were present but not seen as barriers to adoption except for one participant. Lack of information regarding organic or sustainable management, a common barrier in the literature, was not mentioned by the wine producers in the study (Constance & Choi, 2010; T. J. Hall et al., 2010; Wheeler, 2008).

CONCLUSION

Using the Theory of Planned Behavior to look at the values and beliefs expressed during the study, areas can be identified where action could be taken to promote adoption of sustainable or organic certification. Behavioral intentions can only be changed by altering one of either personal attitudes, perceived norms, or perceived behavioral controls (Fishbein & Ajzen, 2010). These attitudes and perceptions can only be changed by altering an individual's personal, normative, or control beliefs (Fishbein & Ajzen, 2010). To effectively change the behavioral intention an intervention is best targeted at the belief that is most important to that individual (Fishbein & Ajzen, 2010). For the uncertified wine producer not intending to pursue LIVE or organic, cost, bureaucracy, and the unsuitability of organic practices were highlighted as controls. Since the associated financial cost and effect on production was important to this wine

producer it is suggested that the normative beliefs of uncertified wine producers be targeted to promote greater adoption of LIVE or organic certification. In particular, the normative belief about how society values sustainable or organic management practices. This is reinforced by the findings in the literature that competitive advantage has been seen to be important for late adopters changing management practices (Atkin et al., 2011; Lohr & Salomonsson, 2000). It is recommended therefore, that further research be carried out into consumer preferences and purchasing patterns within the Willamette Valley, at wineries and retail stores, as well as export markets for Willamette Valley wineries. This research would provide information about whether, and to what level, LIVE or organic labelling provides a competitive advantage compared to uncertified wines, and in what situations it does so. This information could then be distributed to vineyards and wineries through bodies such as the Oregon Wine Board, the Oregon Wine Growers Association, or through recognized LIVE or organic certifiers. This research could also be of interest to local governments when considering permitting of activities on land zoned for Exclusive Farm Use and the application of land use controls. Wineries have been shown to be able to maximize the competitive advantage of sustainable or organic labelling when they are able to explain the sustainable roots of the wine and build a relationship with the consumer through direct sales (Gilinsky et al., 2015). If this, through the suggested research, is found to be true in the Willamette Valley, how land use controls are applied by local authorities, and thus the ease with which vineyards can sell direct to consumers, may influence adoption of sustainable or organic practices. It is not just with regard to land use controls that local authorities could consider future research findings, but also in their economic development strategies and actions taken to support them. Wine tourism contributes to people being at wineries and on vineyard sites, and thus may contribute to the level of competitive advantage

attained through labelling and certification. This is pertinent as the Oregon Senate deliberates on funding further promotion of the Oregon wine industry.

Another aspect of the normative beliefs expressed by those individuals either with LIVE or organic certification, or who stated they intended to pursue certification, was the collaborative culture of sustainability in the Willamette Valley. A potential threat to this culture identified in the study was the growth of the industry and more particularly the influx of external investors to the Willamette Valley. If the industry, through large scale growth, developed a more competitive culture, or if external investors brought a less sustainable culture, this could remove an aspect of normative beliefs currently displayed. As with targeting an intervention according to the Theory of Planned Behavior, if a belief is altered and this leads to attitudes or norms being modified, it could impact the behavioral intention. Therefore, it is recommended that further research be carried out looking at the values regarding the environment of new owners, vineyard managers, and winemakers, along with views on industry collaboration. This should be carried out at a variety of scales to understand whether the size of an investment, in terms of land, corresponds with any change in values. This may be particularly important as smaller-scale vineyards and vineyard estates, are focused more towards farm operations as opposed to larger industrialized operations (Williams et al., 2006).

Labor was raised as a future issue relating to how the land is managed that could influence the industry. This is particularly pertinent in terms of sustainable or organic management as these have the potential to be more labor intensive (T. J. Hall et al., 2010; Miller, 2015; Wheeler, 2008). If labor availability decreases and costs increase this has the potential to change wine

growers' beliefs about behavioral controls, and thus alter the perceived behavioral control, which could affect their behavioral intention. This was becoming a very real issue, and some producers were already looking into greater mechanization of their operations. As some of this concern stems from uncertainty regarding national immigration policies, further research is needed to know what the financial costs to wine growers, and other agricultural producers, nationwide might be under different immigration policy scenarios. This economic cost and the potential effect it could have on agricultural practices and rural communities should be taken into consideration when making future policy decisions regarding immigration. On a local level, communities, in their economic and community development planning, could also consider the merits of investing in training programs that are targeted at these potential labor shortages.

A number of further research suggestions have been proposed in the report along with associated policy recommendations that could help support the growth of sustainable or organic certification adoption in the region. These were based on the Theory of Planned Behavior, which provided useful insights into the drivers of individuals actions and helped demonstrate how all aspects of the environment play into vineyard estate decision making. The structure of the interview protocol used in the investigation meant that rating the importance of values and beliefs was not discovered. Identifying the most important driver behind behavioral intentions can aid in targeting the correct intervention when using the Theory of Planned Behavior. A combination of qualitative interviews and a more quantitative survey methodology could improve this determination in the future.

The wine industry in the Willamette Valley continues to grow and enhance its reputation for being sustainable. This research contributes to our understanding of why wine producers choose to manage the land the way they do, and points to ways in which we can continue to support different land management choices in the future.

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Appendix A – Interview protocol

Questions for vineyard owners whose vineyard is not certified LIVE or organic

1. Let us begin by talking about your life as a wine producer. Tell me about your vineyard?
 - a. Why did you decide to open a vineyard?
 - b. What would you say is the best part of farming?
2. I would like to concentrate more closely on how you manage your land. Could you describe what management practices you employ at the vineyard?
 - a. How did you come to decide to adopt these practices?
 - b. Where do you receive advice, or information, regarding management from?
 - c. Are there management practices that you would like to implement in the future?
 - d. What, if any, would you consider are the advantages of pursuing LIVE certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing you pursuing LIVE certification?
 - e. What, if any, would you consider are the advantages of pursuing Organic certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing you pursuing Organic certification?
3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?

- a. What do you value about this area?
 - b. In what ways do you consider the environment to be valuable to the business, if at all?
 - c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?
4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
- a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that you are facing as a vineyard owner?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
6. What questions, if any, do you have for me?

Questions for winemakers at vineyards not certified LIVE or organic

1. Let us begin by talking about your life as a winemaker.
 - a. Tell me about the vineyard?
 - b. Why did you decide to pursue winemaking?
 - c. What would you say is the best part of your work?
2. I would like to concentrate more closely on how the land is managed. Could you describe what management practices are employed at the vineyard?

- a. How did these come to be adopted?
 - b. Where do you receive advice, or information, regarding management from?
 - c. Are there management practices that you would like to implement in the future?
 - d. What, if any, would you consider are the advantages of pursuing LIVE certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing LIVE certification being pursued?
 - e. What, if any, would you consider are the advantages of pursuing Organic certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing Organic certification being pursued?
3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
- a. What do you value about this area?
 - b. In what ways do you consider the environment to be valuable to the business, if at all?
 - c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?

4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
 - a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that the vineyard is facing?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
6. What questions, if any, do you have for me?

Questions for vineyard managers who manage vineyards not certified LIVE or organic

1. Let us begin by talking about your life as managing the land. Describe the vineyard
 - a. Why did you pursue a career as a vineyard manager?
 - b. What would you say is the best part of your work?
2. I would like to concentrate more closely on how the land is managed. Could you describe what management practices are employed at the vineyard?
 - a. How did these come to be adopted?
 - b. Where do you receive advice, or information, regarding management from?
 - c. Are there management practices that you would like to implement in the future?
 - d. What, if any, would you consider are the advantages of pursuing LIVE certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing LIVE certification being pursued?

- e. What, if any, would you consider are the advantages of pursuing Organic certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing Organic certification being pursued?
- 3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
 - a. What do you value about this area?
 - b. In what ways do you consider the environment to be valuable to the business, if at all?
 - c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?
- 4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
 - a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that the vineyard is facing?
 - i. What future challenges do you fore-see?
- 5. Is there anything you would like to add?

6. What questions, if any, do you have for me?

Questions for vineyard owners whose vineyard is certified LIVE

1. Let us begin by talking about your life as a wine producer. Tell me about your vineyard?

- a. Why did you decide to open a vineyard?
- b. What would you say is the best part of farming?

2. I would like to concentrate more closely on how you manage your land. Could you describe what management practices you employ at the vineyard?

- a. How did you come to decide to adopt these practices?
- b. Why did you decide to pursue LIVE certification?
- c. What issues did you face becoming certified LIVE?
- d. What benefits have you seen since becoming certified?
- e. Where do you receive advice, or information, regarding management from?
- f. Are there management practices that you would like to implement in the future?
- g. What, if any, would you consider are the advantages of pursuing Organic certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing you pursuing Organic certification?

3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?

- a. What do you value about this area?

- b. In what ways do you consider the environment to be valuable to the business, if at all?
 - c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?
4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
- a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that you are facing as a vineyard owner?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
6. What questions, if any, do you have for me?

Questions for winemakers at vineyards certified LIVE

- 1. Let us begin by talking about your life as a winemaker.
 - a. Tell me about the vineyard?
 - b. Why did you decide to pursue winemaking?
 - c. What would you say is the best part of your work?
- 2. I would like to concentrate more closely on how the land is managed. Could you describe what management practices are employed at the vineyard?
 - a. How did these come to be adopted?

- b. Why did you decide to pursue LIVE certification?
 - c. What issues did you face becoming certified LIVE?
 - d. What benefits have you seen since becoming certified?
 - e. Where do you receive advice, or information, regarding management from?
 - f. Are there management practices that you would like to implement in the future?
 - g. What, if any, would you consider are the advantages of pursuing Organic certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing Organic certification being pursued?
3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
- a. What do you value about this area?
 - b. In what ways do you consider the environment to be valuable to the business, if at all?
 - c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?
4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?

- a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that the vineyard is facing?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
 6. What questions, if any, do you have for me?

Questions for vineyard managers who manage vineyards certified LIVE

1. Let us begin by talking about your life as managing the land.
 - a. Describe the vineyard
 - b. Why did you pursue a career as a vineyard manager?
 - c. What would you say is the best part of your work?
2. I would like to concentrate more closely on how the land is managed. Could you describe what management practices are employed at the vineyard?
 - a. How did these come to be adopted?
 - b. Why did you decide to pursue LIVE certification?
 - c. What issues did you face becoming certified LIVE?
 - d. What benefits have you seen since becoming certified?
 - e. Where do you receive advice, or information, regarding management from?
 - f. Are there management practices that you would like to implement in the future?
 - g. What, if any, would you consider are the advantages of pursuing Organic certification?
 - i. Do you see disadvantages?

- ii. What barriers, if any, are there preventing Organic certification being pursued?
3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
 - a. What do you value about this area?
 - b. In what ways do you consider the environment to be valuable to the business, if at all?
 - c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?
4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
 - a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that the vineyard is facing?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
6. What questions, if any, do you have for me?

Questions for vineyard owners whose vineyard is certified organic

1. Let us begin by talking about your life as a wine producer. Tell me about your vineyard?
 - a. Why did you decide to open a vineyard?
 - b. What would you say is the best part of farming?
2. I would like to concentrate more closely on how you manage your land. Could you describe what management practices you employ at the vineyard?
 - a. How did you come to decide to adopt these practices?
 - b. Why did you decide to pursue Organic certification?
 - c. What issues did you face becoming certified Organic?
 - d. What benefits have you seen since becoming certified?
 - e. Where do you receive advice, or information, regarding management from?
 - f. Are there management practices that you would like to implement in the future?
 - g. What, if any, would you consider are the advantages of pursuing LIVE certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing you pursuing Organic certification?
3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
 - a. What do you value about this area?
 - b. In what ways do you consider the environment to be valuable to the business, if at all?

- c. In what ways, if any, do you consider the environmental characteristics of the area important?
 - d. In what way, if at all, is the wine growing culture of the Willamette Valley important to your vineyard?
4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
- a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that you are facing as a vineyard owner?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
6. What questions, if any, do you have for me?

Questions for winemakers at vineyards certified Organic

1. Let us begin by talking about your life as a winemaker.
- a. Tell me about the vineyard?
 - b. Why did you decide to pursue winemaking?
 - c. What would you say is the best part of your work?
2. I would like to concentrate more closely on how the land is managed. Could you describe what management practices are employed at the vineyard?
- a. How did these come to be adopted?
 - b. Why did you decide to pursue Organic certification?
 - c. What issues did you face becoming certified Organic?

- d. What benefits have you seen since becoming certified?
 - e. Where do you receive advice, or information, regarding management from?
 - f. Are there management practices that you would like to implement in the future?
 - g. What, if any, would you consider are the advantages of pursuing LIVE certification?
 - i. Do you see disadvantages?
 - ii. What barriers, if any, are there preventing LIVE certification being pursued?
3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
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4. Moving on to policy issues, what are the main policy issues, relating to how the land is used, that you are currently facing?
- a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?

- b. What are the major challenges, relating to land use and management, that the vineyard is facing?
 - i. What future challenges do you fore-see?
- 5. Is there anything you would like to add?
- 6. What questions, if any, do you have for me?

Questions for vineyard managers who manage vineyards certified organic

- 1. Let us begin by talking about your life as managing the land.
 - a. Describe the vineyard
 - b. Why did you pursue a career as a vineyard manager?
 - c. What would you say is the best part of your work?
- 2. I would like to concentrate more closely on how the land is managed. Could you describe what management practices are employed at the vineyard?
 - a. How did these come to be adopted?
 - b. Why did you decide to pursue Organic certification?
 - c. What issues did you face becoming certified Organic?
 - d. What benefits have you seen since becoming certified?
 - e. Where do you receive advice, or information, regarding management from?
 - f. Are there management practices that you would like to implement in the future?
 - g. What, if any, would you consider are the advantages of pursuing LIVE certification?
 - i. Do you see disadvantages?
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3. I would like to move on to discuss the environment the vineyard sits in, and how it contributes to the vineyard. Could you describe what you value, if anything, about the environment?
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 - a. What do you consider are the future policy issues, related to how the land is used, that will impact the vineyard?
 - b. What are the major challenges, relating to land use and management, that the vineyard is facing?
 - i. What future challenges do you fore-see?
5. Is there anything you would like to add?
6. What questions, if any, do you have for me?

Appendix B – Table of codes

Id	Parent Id	Title	Description
1		Barrier	Description of a barrier preventing the adoption of a management practice or certification scheme
2	1	Red tape	Description of bureaucracy as a barrier to adoption of a management practice or certification scheme
3	1	Cost	Description of cost as a barrier
4	1	Time	Description of time as a barrier
5		Cultural Services	Description of a cultural ecosystem service
6		Provisioning Service	Description of a provisioning ecosystem service
7		Regulating Services	Description of a regulating ecosystem service
8		Supporting Services	Description of a supporting ecosystem service
9		Wine Culture	Description of an aspect of the wine culture in the Willamette Valley
10	9	History	Description of the history of the region or of the industry/wineries/vineyards in the Willamette Valley
11	9	Community	Description of a culture of a community, sharing knowledge or helping each other amongst producers in the region
12		Issue	Description of an issue facing the vineyard
13		Great Quote	Great quote!
14		Management	Description of management practice
15	14	Organic	Description of management practice participant believes is organic
16	14	Sustainable	Description of management practice participant believes is sustainable
17	14	Justification	Description of justification of management
18		Belief	Description about a personal belief about a management action or certification scheme
19	18	Positive	Description of positive belief about topic

20	19	Quality	Improves quality of product
21	19	Production	Increases level of production
22	19	Profit	Description of belief that action will produce more profit
23	18	Negative	Description of negative belief about topic
24		Normative	Description regarding normative belief about a management action
25	24	Positive	Positive normative belief
26	24	Negative	Negative normative belief
27		Environment	Description of the environment
28	27	Natural	Description of natural habitat or wildlife
29	27	Farmland	Description of vines or agricultural land
30	27	Topography	Description of geographical or topological features
31		Advice	Description of source of advice
32		Activity	Description of activity related to the wine industry
33		Policy	Description of a specific policy
34		Control	Description of belief about controls on actions
35		Worldview	Description of language relating to individuals worldview