Finding a State of Sustainable Wine: Implications for Sustainable Viticulture and Oenology in New Jersey, USA.

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Introduction

New Jersey’s 40+ vineyards combine to rank the state fifth in production of wine in the United States (NJ Dept of Ag, 2013). Could the most urbanized state in the country be positioned as one of the most sustainable wine growing and producing regions in the world and not know it? By first discussing what sustainability is, then understanding implications within viticulture and oenology, and finally applying it to the New Jersey case study there is an opportunity to develop better industry standards and make recommendations for the state of New Jersey (NJ) and other growing wine regions.

This paper seeks to analyze the literature of sustainability, and sustainable wine. Then, utilizing both a quantitative and qualitative case study approach, make proactive recommendations to expand on the literature and practices for already developed and burgeoning wine regions in the United States and around the world. An analysis of current New Jersey viticulture and oenology sustainable practices will give way to the opportunities and threats that new laws and industry expansion plans will have on future sustainability of wine in the state.

What is Sustainability?

Understanding sustainability is essential to the study of sustainable grape growing and wine making. As the industry transcends the triple bottom line with implications in economics, environment and society wellbeing – finding the balance would be the ultimate goal (Elkington, 1998). The idea of sustainability is no longer debatable; it was discussed at first covertly, but now openly for half a century and is now a common term driving environmental policy, economic development and social equity worldwide.

In 1987, the Bruntland Report, or Our Common Future, the term sustainability was identified and defined by the World Commission on Environment and Development: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The report characterized the tragedy of the commons, which Hardin discussed in 1968, on a global scale. Perceptions had changed once humans saw the earth from outer space and began to question individual impacts and global ramifications. The commission stressed that this was no longer a single government or individual challenge, but one that affected all nations – frequently in an inequitable manner based on wealth and poverty. Seminal in timing and content, the report began a new movement towards environmentalism, particularly towards ratification of the Kyoto protocol on climate change, and also regarding the interplay between environmental protection, economic growth, and social equity as the components of sustainable development (Bruntland, 1987).

This principle is echoed within the field of land use. Timothy Beatley and Kristy Manning, in their book The Ecology of Place: Planning for Environment, Economy, and Community, contend that in order to prosper sustainably we must recognize and accept our
ecological limits. They suggest that small actions for change, while commendable are not enough – we require a complete paradigm shift in terms of the social, physical and political-economic landscape. They make many suggestions for achieving this through a myriad of specific recommendations, but primarily by creating compact urban form and the protection of natural and undeveloped land (Beatley, 1997). Preserving land is an essential tool for our natural and working landscapes (Lapping, 1982).

Twenty years after the Bruntland Report was published, the Worldwatch Institute published the 25th anniversary edition of their State of the World Report. Their most recent annual report is entitled 2008 – Innovations for a Sustainable Economy. We are no longer just thinking about the balance between economics, society and the environment. Solutions already exist and the goal is a paradigm shift towards new models of sustainability. New discourses around carbon as a detriment to our society are in the forefront. Partnerships between agriculture and renewable resources are possible solutions. Wind power, solar plants, geothermal, hydropower and especially biomass are opportune secondary industries for vineyards. In addition, the idea of a carbon market lends the idea that financial resources in the coming decades will be available for large vineyards that can act as carbon sinks and oxygen producing regions. This and other techniques for creating financial markets to supplement the regional economy, without environmental degradation, could create a sustainable future that the region (Starke, 2008).

Sustainability and Wine
Given that consumers are increasingly expecting wine to be produced in a sustainable manner (Bisson et. al, 2002) and the complexity in defining sustainability, the applied research and discourse specifically within viticulture, oenology, and consumption of wine results in a multi-disciplinary literature base. Certification, water use and quality, soil, air and climatic impacts, energy, chemicals, wildlife, materials, waste, and globalization are all important topics within the discussion of sustainable wine. No factor is more important, but rather when combined there is a great possibility to have the lowest environmental footprint.

Water is one of the most important inputs to successful production of wine. Before planting grapes, the appropriate varietal must be chosen for that region. With the creation of appellations in Europe (established in 1935) and American Viticultural Areas (AVAs) in the United States (established in 1978), information is available to the vineyard owner. Often differentiated by the growing conditions, the distinct regions have unique physical characteristics; topography, climate, hydrology, and thermal properties combine for the physical aspect of terroir, which leads to the designation, and often dictates the ideal types of grape that might be grown there (Pogue, 2009).

The amount of rain water, the depth of the water table, and local aquifers are essential components for growing the proper varietal. This water supply is a major determinant of wine characteristics (Jackson and Lombard, 1993; Deloire et. al, 2004). The smallest droplets of water can have a great influence and research has been conducted to analyze the effects from the evapotranspiration of cover crops (Centinari et. al, 2011). This notion of water scarcity in some viticultural areas (Chaves et. al., 2007) is leading to new technologies and tools, such as infrared thermometry (Grant et. al., 2007) and biotechnological or genetic engineering improvements (Flexas et. al., 2009).
In some areas new creative solutions to water scarcity have led to consideration of wastewater use. While some vineyards are constructing wetlands to treat their own winery wastewater on site (Serrano, et. al., 2010; Mulidzi, A.R., 2007), others are using their own wastewater as irrigation of grapevines (Kumar and Christen, 2009), and some are growing grapes using dry farming techniques – relying only on natural rainfall for moisture (Palmer, 2010). However, new opportunities for sustainability may lie with an alternative use for municipal recycled wastewater as an irrigation source for grapevines (Laurenson, S. et. al., 2011). In addition, other creative ideas for water must be considered as climate change beings impacting many of the grape producing regions of the world.

Wine production occurs in a very limited geographical and climate region on the planet. This makes the industry extremely vulnerable to future climate change. Changes will not be consistent as some parts of the world will get warmer, colder, dryer and wetter according to the IPCC (IPCC, 2007), resulting in different impacts for vitis vinerafa growing ranges (Kenny, 1992). Aside from the change that will come from global impacts, the wine industry must recognize that their undertakings have environmental consequences and need to become aware of their own carbon footprints. Regionally, appellations and AVAs must look at these footprints. Some work is already commencing in France with the creation of the Association des Climats du Vignoble de Bourgogne (Jones, 2010).

While carbon budgeting already exists in many wine exporting regions, the analysis tends to be mostly post-processing and does not include the full life cycle analysis beginning with absorption in the leaves to waste/recycling of bottles. Some calculators are however available from the Winemakers Federation of Australia and the Wine Institute of New Zealand (Smart, 2010; Koga et. al, 2006) and other independent researchers (Colman and Paster, 2009). In the US, California has recognized that while vineyards have a lower carbon footprint than many other crops, vineyards need to quantify and model their own emissions reliably. The passage of the 2006 California Global Warming Solutions Act (AB32), encourage grape growers to monitor and develop mitigations strategies for their impacts (Carlisle et. al, 2010). The industry will need to adapt what varietals can be planted given potential freezing in some regions (Aney, 1974), deal with changing ranges of pests and infections (Tate, 2001) or come up with management strategies (Desjardins et. al, 2005) and creative solutions to mitigate small changes in temperature (Pacale, 2004). Newer technologies include potential to use wind machines to create thermal inversions to protect against freeze and extend the range of varieties in some regions (Shaw, 2002). So a sustainable product can be created, but is that what consumers are demanding?

Sustainability is no longer for the vineyard owner or astute environmental citizen to consider. All consumers now have the ability to choose wine based on their environmental preferences. However, there is still ambiguity in the industry. While eighty percent of vineyard representatives surveyed in California use sustainable practices in some way in 2008, forty-six percent plan on labeling sustainable or organic, and confusion still exists surrounding what consumers want and a general lack of clarity on the sustainable wine niche (Smiley, 2010).

Traction on proper labeling is gaining in California; third party certification through the Certified California Sustainable Winegrowing Program (CCSW) managed by the California Sustainable Winegrowing Alliance can verify the vineyard or wineries self-assessment scores (Brodt and Thrupp, 2009). In Oregon, certification has existed since 1997 with LIVE (Low Input
Viticulture & Enology), and has evolved in 2009 to a statewide program called Oregon Certified Sustainable Wine (OCSW) (Nigro, 2010). There are many certifications that consumers can choose from if they want to choose organic product; such as the National Organic Program (NOP), through the United States Department of Agriculture (USDA), the Canada Organic Products Regulation, and the ACB EU Equivalency Standard which handles compliance for European Union (EU) organic standards. However, other designations such as those having a Food Alliance Certified seal, or deemed a biodynamic farm and product through their party certification by Demeter Association, Inc. (OCSW, 2012).

While all aspects of wine production have some impact on the environment, the most recent debate stems from the great transportation impact and the impact of ‘food miles’. Tesco, the British retailer, has announced it will have a carbon rating on all of its product labels, including wine (Rigby et. al, 2007). To reduce wine miles, wine will be shipped by barge on canals, sailboats, and ships (Allen, 2008); this will require higher stacking of pallets to maximize utilization and more sustainable packaging when this transition transpires (Anonymous, 2008). However, it may be wisest to buy wine from a local merchant in a Community Supported Wine (CSW) initiative which operates like Community Supported Agriculture programs at many farmers markets (Newberry, 2010).

Other sustainable wine factors include waste, recycling, chemical use, energy and building design. Some vineyards are combining a variety of proactive environmental practices including: minimized chemical application, building wildlife habitat for pest management, composting pomace, reduced sulfites, reducing energy to keep wine cool and at a constant temperature, building into hillslopes utilizing natural geothermal and others (Tammemagi, 2011), and embracing renewable energy (Collins, 2001). Others are implementing the US Green Building Council’s LEED (Leadership in Energy & Environmental Design) standards to achieve sustainability through building design with varying degrees, platinum being the highest (Peters, 2011). There are also alternative bottle stoppers made of plastic, composite material (Fundazioa, 2010) and even screw caps and glass stoppers (Taylor, 2010). And of course waste is extremely important. Resourceful disposal and recycling is required for the mix-materials plastics used at the vineyard – however they are often contaminated. More than 50 groups of plastics are used including: pesticide containers, irrigation lines, netting, vine guards and recycling them can be expensive, but possible (True & Creasy, 2006). Many vineyards that insist their costs will increase are being converted as many of these environmental practices yield environmental returns (Ellison, 2008).

New Jersey Vineyards and Sustainability
The majority of wineries in New Jersey have been identified, visited, and surveyed. The methodology & results will be compiled in this section. The data collection is 50% complete.

REFERENCES


