Townsend, Christi and John P. Tiefenbacher. 2011. "Spatial Change in South American Viticulture: Static Factors and Dynamic Processes in Past, Present, and Future Chilean and Argentinean Land Use Patterns and Varietal Choices." *Proceedings – International Geographical Union 2011 Regional Geography Conference*, Santiago Chile.

Spatial Change in South American Viticulture: Static Factors and Dynamic Processes in Past, Present and Future Chilean and Argentinean Land Use Patterns and Varietal Choices

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Abstract

At least since the arrival of the Spanish to South America, grapes have been grown to varying degrees of success throughout the temperate perimeter of the continent. From Buenos Aires to coastal Peru, *bodegas* (wineries) have been producing wine since the sixteenth century. Today, the wine industries in Chile and Argentina reflect a long process of trial and error and on-going efforts to extract wealth from natural landscapes that seem to otherwise lack conditions conducive to production of other commodities. Today's global wine industry is premised upon the production of uniquely crafted and carefully constructed wines with a mélange of flavors and aromas captured from a location possessing a unique set of geological, hydrological, meteorological and climatological conditions (*terroir*). Moreover, grape varietals appropriate for each geographic setting must be carefully selected. Oenological expertise determines the capacity of vintners to understand all that influences the creation of the product and South American wine production has only recently achieved world-class status. The histories of wine production in these two states are significantly different. Of course, their locations on opposite sides of the Andes dictate distinctly different hydro-meteorological and ecological settings for human land uses. Although wine-growing regions in Argentina and Chile are similarly arid, similarly dependent upon orographically produced water supplies, and receive similar duration and intensity of sunlight, that is about where their similarity ends in terms of physical setting. Geology, relief, thermal regimes and other natural factors range widely from northern to southern appellations in both countries. Within these different geophysical settings native and immigrant winemakers developed methods to discover and exploit the best *terroirs*. More than four hundred years of dynamic socio-cultural, technological and economic contexts produced different outcomes for different times. Today's Argentinean and Chilean wines are very different in types and styles and have developed along very different paths. These paths are comprised of several factors that influence and dictate choices and this will be our focus. The goal of our study is to understand the factors that influence and dictate choices about the where, the what, and the how of wine production today in Argentina and Chile and the implications for these factors for the coming decades in the face of global economic and environmental changes.

To accomplish this task we will examine the historical development of viticulture , the changing spatial pattern of vineyards and bodegas, and the changing composition of wine varietal production in the contexts of changing social, political, economic and environmental circumstances in both countries.

Introduction

Since the arrival of the Spanish and Portuguese to South America, grapes have been grown for winemaking with varying success throughout the temperate perimeter of the continent. From Buenos Aires to coastal Peru, *bodegas* (wineries) in South America have been producing wine since the mid-sixteenth century. Today, South America is considered the second-most important wine-producing continent, after Europe (Johnson and Robinson 2007), but in contrast to the Old World, it was only very recently (in the last two decades) that South America's wines reached world-class status. Argentina and Chile have emerged as leaders in the global wine industry and today Santiago, Chile and Mendoza, Argentina are considered "wine capitals" in the world of premium wine production (Johnson and Robinson 2007, Knowles 2002). The wine industries in Chile and Argentina today reflect history of trial-and-error to extract wealth from landscapes that seem to otherwise lack productive conditions for other commodities. These two competitors have shared a long-standing pursuit to find the ideal balance of quantity versus quality in wine production.

The purpose of this paper is to explore the historical, political, and economic geographies of the wine industry in South America, focusing primarily on the wine-production leaders Argentina and Chile. A dynamic conceptual framework is developed to illustrate the interlinking factors that influence the where, the what, and the how of wine production today. We will also examine the changing geographies of activities related to wine production, export, and consumption. To achieve this, the different histories of wine production, the changing spatial patterns of viticulture, and the changing composition of wine varietal production in the contexts of changing political, economic and environmental circumstances will be discussed. The future development of South America's other wine-producing countries will be addressed in terms of the patterns of development observed in Argentina and Chile.

Terroir and Viticulture in South America

An irrefutable relationship exists between geography and viticulture (Townsend 2011) and the global wine industry provides copious unique opportunities to study a broad range of issues that are intrinsically geographic in nature. Studies exploring the historical geographic diffusion of wine, as well as the economic, physical, and cultural geographies of wine and viticulture are abundant in the literature (Sommers 2008; Schamel 2006; Crowley 2000; Sauer 1994; Dickenson 1992; Unwin 1991; DeBlij 1985; Hansis 1977).

Wine production can be undertaken anywhere climate and environmental conditions are generally favorable for viticulture (Winkler et. al. 1974). However, when growing grapes for the purpose of premium winemaking, geography plays a decisive role as "fine" wine is a product defined by its place of production (Orth et. al. 2007). A winemaker's skill is important in developing a good wine, but as important are the geographic attributes of a wine's location of origin. While taste is subjective, wine connoisseurs may claim to be able to taste a discernible difference in, for example, a Cabernet Sauvignon produced in Northern California versus one produced in Chile.

An examination of *terroir* (the idea or belief that a wine's taste reveals the physical and cultural ingredients of the vineyard site) and its complex relationship with viticulture is often at the center of studies related to geography and wine (Townsend 2011) and will be discussed briefly below in regards to Argentina and Chile. Understanding the cultural and geophysical morphology of a landscape is vital to the study of wine and viticulture (Sommers 2008). *Terroir* is a word from the French language for which there is no equivalent translation in the English language (Vaudor 2002), but may essentially be defined as the physical and cultural geographic attributes of a given location that may potentially influence the quality of a wine (Sommers 2008; Swinchatt & Howell 2004; Clarke 2002; Vaudor 2002; Wilson 1998; Bohmrich 1996). Local customs, political controls, economic influences, and whims of the market are some of the human geographical components of the *terroir* in a given location that have a strong impact on decision-making related to viticulture (Watkins 1997). Climate (macro-, meso-, and micro-climates), sunlight (duration and intensity), soils, geology, topography, and geomorphology are examples of the physical variables that together and independently influence the success and quality of wine-grape production.

In South America, countries that grow wine-grapes include, but are not limited to Brazil, Bolivia, Peru, Uruguay, Chile, and Argentina. From the introduction of European grapevines into Central America in 1521, it took only three decades for the practice of viticulture to diffuse across the South American continent and along the Pacific Coast of present-day Peru, to Bolivia and Chile (Pellechia 2006). European vines were grown in Peru as early as 1532 after Pizarro's conquest of the region (Johnson and Robinson 2007, Pellechia 2006). Peru experienced the first true viticultural successes in South America, where grapevines prospered in the oases of the coastal desert, when vines were established near Lima by 1550 (Sauer 1994). Given their proximity to the Equator, Peruvian and Bolivian vineyards tend to be located at higher elevations in the mountains (Unwin 1991). The Portuguese attempted viticulture in Brazil during the early 16th century, but their harvests were generally poor due to both unsuitable environmental conditions and losses to birds and insects (Sauer 1994). And commercial vineyards were not attempted in Uruguay until the 1870s (Carrau 1997).

The wine-growing regions of Chile and Argentina are similarly arid, similarly dependent upon orographically produced irrigation (augmented with water from Andean snowmelt-fed rivers and wells), and receive similar durations and intensities of sunlight, but that is where their environmental similarities end. Chile is characterized by a wide range of physical landscapes. Its population on the thin strip of land on the perimeter of the continent is separated from the bulk of South America by the Andes Mountains, which are both a dividing barrier and lifeblood for Chileans. In the basin between foothills of the Andes and the main Andes chain is the Central Valley of Chile, which is the country's oldest wine-producing region. The Central Valley has a Mediterranean climate (similar to southern California) and is favorable for viticulture (DeBlij 1985). The valleys to the north and south of Santiago have climatic conditions similar to northern California (Sommers 2008).

Grapevines are a unique agricultural plant because they thrive in soils often deemed to be unsuitable for most other crops. Soils in Chile are mostly alluvial, but are also fluvial, colluvial, and from other origins and they have composition and textures from fine to course that vary considerably. As with many other wine regions of the world, soils in Chile are generally agriculturally poor but are well drained (Wines of Chile 2011). Chile, generally speaking, is relatively dry throughout the year, but experiences hot, arid conditions in its north and cool, wet conditions in its south. The Humboldt Current along the coast cools the coastal communities,

similar to the California Current along the northern California coast. The Andes Cordillera creates a wide variation in diurnal temperature flux for viticultural areas, so vineyards nearer the mountains can have significantly different local climates than those nearer the coast. The diurnal fluctuation of temperature is important to the sugar and acidity levels in grapes (Stevenson 1997). From north to south, Chile's appellation system, or *Denominación de Origen*, is divided into four regions, thirteen sub-regions, and four zones (refer to Table 1). Chile's capital, Santiago, is located in the Maipo sub-region of the Central Valley and is where Chile's first vineyards were planted. Chile's wine industry and all of the largest wine corporations are headquartered in Santiago, however despite its importance for wine production in Chile; Santiago has lost many of its oldest vineyards due to urban sprawl (DeBlij 1985) which has forced vineyard development to migrate upslope into the Andes. Over 110,000 hectares in Chile are planted with vineyards.

Arguably the most devastating hazard for the international wine industry in history has been the phylloxera outbreak in the 19th century. Phylloxera, an aphid native to the United States, was responsible for the decimation of the wine industry in Europe in the 19th century, leading to significant social and economic disruption (Unwin 1991). Thanks to Chile's physical isolation, phylloxera never reached the country (Sommers 2008). Likewise, diseases related to rot and mildew have always been relatively rare (Johnson and Robinson 2007). Chile's regulation of the importation of foreign plant material is extensive (Molesworth 2011) and might be enough to protect Chilean vineyards from these and other biotic hazards. Because of the absence of these diseases, grapevines are planted on their own rootstock without needing grafts to resistant varieties of grapes, which is in contrast to vines grown in Europe and the U.S. Chile is not immune, however, to abiotic natural hazards. For example, the earthquake of 2010 destroyed 125 million liters of Chilean wine and resulted in a significantly smaller than normal crop, and increase price pressures on growers and consumers (Molesworth 2011).

The wine regions of Argentina have been established at similar latitudes as those in Chile, but their climates are very different as they lack the influence of the cold ocean currents off the Pacific coast. The high-desert vineyards of Argentina are at elevations ranging from 700 m to 1400 m and as high as 3000 m against the Andes along the western border. Like Chile, vineyards in Argentina are largely irrigated by gravity-fed Andean snowmelt, especially those located in higher elevations (Johnson and Robinson 2007, Morris 2000). However, Argentina's vineyards are located in the rain shadow of the Andes (Schrock et. al. 2001). The climate is temperate/continental semi-desert, and receives less rainfall than Chile (Stevenson 1997). The wine regions have cool winters and hot, dry summers (Winkler et. al. 1974). The premier wine region, Mendoza, on average receives only about 8 inches of rain per year.

The majority, approximately 70%, of the vineyards in Argentina are in the Mendoza region (Johnson and Robinson 2007, Schrock et. al. 2001). Other important wine regions include San Juan (ranked second), Rio Negro, and La Rioja. Argentina's wine region, Salta, claims the highest vineyards in the world, at 3005 m. Argentine soils range from sandy to clay and most are deep, well drained, and are alluvial or eolian in origin (Stevenson 1997). Vineyards cover an area of approximately 230,000 hectares. Unfortunately, Phylloxera is a threat to Argentine vineyards. Control of this and other biological threats was historically achieved through flooding of the vineyards to drown the pests (Schrock et. al. 2001). Hail and earthquakes are two other hazards that threaten vineyards in western Argentina.

Historical Context of Wine Production in Chile

The South American wine industries were established by immigrants, initially Spanish and Portuguese and later Italians, French, and Germans (Johnson and Robinson 2007). Spanish colonists originally brought viticulture with them as they settled in the 16th century (Schrock et. al. 2001). Though the consumption of wine at this time was primarily religious tradition, it was a major part of the Spanish lifestyle and it gave them a feeling of "home" in the New World (Sommers 2008).

The first vineyards in Chile were planted north of Santiago. Frey Carabantes is credited with bringing the first vines of the País grape into Chile in 1548 (Wines of Chile 2011). The non-*vinifera* País grape (also known as the Mission grape in North America and the Criolla grape in Argentina) remained the dominant variety in Chile through the 19th century. The first real competition with European wines came in late 17th century (Knowles 2002) when Chile was able to export their cheap, non-*vinifera* wine in large volumes.

The French began to influence Chilean viticulture in the middle of the 19th century (Crowley 2000). French-style wineries began to appear on the outskirts of Santiago when wealthy landowners and mining barons began to build wine estates modeled after French *Châteaux* (Wines of Chile 2011; MacNeil 2001). The French brought *vinifera* grapes with them and planted them extensively in their vineyards in what is now the Maipo Valley; the grape varieties included Cabernet Sauvignon and Merlot (Knowles 2002; MacNeil 2001; Crowley 2000). Chile was able to avoid the devastation of the Phylloxera outbreak that struck Old World vineyards. Many French winemakers moved to Chile in search of work (Knowles 2002; MacNeil 2001) and with them they brought new French winemaking technologies. Many of the Chilean wineries established at that time are still in operation. They include: Carmen, Concha y Toro, Cousiño-Macul, Santa Carolina, Santa Rita, Undurraga, and Errásuriz.

At the beginning of the 20th century the Chilean wine industry was relatively healthy compared to Europe, which was still in a state of recovery from phylloxera (Knowles 2002). Their wines, however, were generally cheap and were regarded to be of poor quality. Political instability, bureaucracy, and high taxes in Chile characterized much of the early part of the century and limited the scope and desire of Chilean winemakers to improve their products (MacNeil 2001).

Many Old World winemakers had used the same technologies for centuries, but the demands for capital in modern times began to force the revision of old techniques (Unwin 1991). In the 1980s, the wine industry in Chile experienced a major transformation to more capitalist modes of production. This "wine revolution" brought increased investment, new wine-making science, technology, and modernization, as well as better methods of quality assurance to Chile. These new innovations produced consistently better wines (Crowley 2000) and Chilean wine exports sky-rocketed after decades of stagnation (Egan 2002). The oldest and largest Chilean wine firms spent a great deal of money to modernize their facilities (MacNeil 2001), new premium varietals were planted and they replaced País grapes which were now used only to produce *Pisco*, a type of grape brandy. The new focus was now on production of quality wines rather than just producing a lot of wine.

Historical Context of Wine Production in Argentina

In general, the history of Argentine wine and viticulture is similar to Chile's history. The first vineyards in Argentina were also planted during the middle of the 16th century. The dominant grape variety was the Criolla, which was the foundation of wine production in Argentina until the 19th century (MacNeil 2001). Spanish colonial rule of Argentina ended in the

1820s and was followed by a migration of Italian immigrants to the Andean foothills. The immigration stimulated expansion of viticulture and wine production (Schrock et. al. 2001, Hancis 1977) and brought Swiss irrigation technology to the region, channeling snowmelt from the Andes to the vineyards. A railway was constructed to link Mendoza with the capital, Buenos Aires, in 1885 and enabled the establishment of a major new market for western Argentina's wines (MacNeil 2001). Argentina's wine industry, however, grew very slowly during the 20th century and was further stultified by isolationist economic policies of the 1950s and protectionist import policies.

The 1970s heralded in new private and government interest after the restricting policies of the 1950s had been rescinded and economic stabilization began to take shape (Pellugia 2006). Until being overtaken by the United States in the early 1990s, Argentina made more wine than any other country outside of Europe. The majority of the wine was produced from the prolific Criolla and Cereza grapes and the quality of the wines were considered unexportable (Robinson 2011). The industry began to modernize winemaking and viticulture in Argentina and began the process of replacement of the dominant Criolla and Cereza grapes with *vinifera* varieties that included Malbec, Cabernet, and Chardonnay (MacNeil 2001). By 2006, Argentina was exporting about 10 per cent of its annual production and was benefitting from strong U.S. demand because of the similarity of their wines to those produced in California at competitive prices relative to quality (Robinson 2011).

Politics and Wine Production in Chile and Argentina

Politics in the 20th century in Chile were wrought by instability and restrictive legislation. These factors were the primary forces that hindered progress in the Chilean wine industry. In 1938, the Second Organic Law on Alcohol was passed, regulating the establishment of new vineyards and limiting the amount of wine that the industry could produce. The spirit of the law was to reduce competition and growth, and to limit production to established family-owned wine producers (Crowley 2000). As a result, the number of hectares planted with vines changed little over the next 45 years. Since there was no competition, there was little incentive to improve their product. In that same year, the government adopted an agenda to stimulate local industrial growth by limiting imports. Wineries, therefore, could not purchase foreign machinery or new technology that was not manufactured in Chile (Crowley 2000). This further isolated Chile's wine industry until the "wine revolution" of the 1980s.

The most abrupt change in Chilean politics came in 1973 when Pinochet became the dictator after a successful *coup d'état*. Pinochet ruled until 1990 when he was voted out of office. Though an authoritarian despot, Pinochet promulgated new economic policies favoring free-enterprise and served to deregulate the wine industry, lifting the ban on new vineyards (Knowles 2002; Crowley 2000). Wine production gradually grew and hit historic highs during the early 1980s. Unfortunately, local consumption began to decline at the same time, prices fell, and vineyards disappeared (Crowley 2000). This change in consumption stimulated Chile to developed export agreements for their wine industry.

At one time, Argentina was one of the wealthiest countries in the world but suffered during most of the 20th century from recurring economic crises, high inflation, mounting debt, and capital flight. Laws passed during the middle part of the century dictated that a nationalized wine industry would monopolize Argentina's wine market. Imported wines were taxed substantially, making them too expensive. Innovation in the wine industry was low which resulted, similarly to Chile, in the overproduction of low quality wine. The ultimate passage of

new laws to remove taxes and eliminate protectionist trade policies enabled the wine industry to reform. The recent economic collapse of 2001-2002 not only left more than half of the population living under the poverty line, but also coincided with a significant decrease in wine production, however wine production rebounded fairly quickly (CIA World Factbook 2011, BBC News 2011, Wines of Argentina 2011).

Economic Factors Influencing the Wine Industry

History has shown that as economic factors change, so do the wine industry and the wine trade (Unwin 1991). The most significant economic changes to in Chile and Argentina came through increased foreign investment. Major foreign investors in the Argentine wine industry include the British firm Allied Domecq, Chandon and Pernod from France, Flichman from Chile, and Suter from Switzerland. Several well-established European wine companies, including Torres from Spain, the Rothschilds from Chateau Lafite-Rothschild, and Paul Pontallier from Chateau Margaux were the first to invest in the Chilean wine industry in the late 1970s and 1980s.

It is important to note the contrast of foreign investment in Argentina versus Chile. In Argentina there are fewer wineries with a strong international presence, whereas in Chile, international companies have established joint ventures with well established, domestic wine companies (Schrock et. al. 2001). Surprisingly, many of the principal foreign investors in Argentina's wineries are Chilean wine companies.

Foreign investors became interested in Chile not only because of favorable growing conditions, but also because of inexpensive land and labor (Egan 2002). The cost of labor in Argentina has historically been even less than in Chile (Schrock et. al. 2001). The low labor cost enabled Chile and Argentina to undercut international competitors' prices (Sommers 2008).

Historically, New World wine production tended toward modest-to-low quality wines that were consumed locally and reflected low investment levels (Dickenson 1992). With increased, large-scale investment comes modern technology to both vineyard and winery that improves production of quality, exportable wines. Advances in chemistry, microbiology, and engineering allowed winemakers to consistently produce quality wines, often regardless of their vintage (Dickenson 1992). New technologies included stainless-steel fermentation tanks, gravity-flow infrastructure, modern crushers/presses, and high-quality oak barrels. Changes to vineyards included installation of drip irrigation systems and vertical vine trellising (Wines of Chile 2011).

Marketing is vital to success of wine industries (Egan 2002). Traditionally a more product-driven than market-oriented industry (Orth et. al. 2007), winemakers in the New World, including Chile and Argentina, are shifting their focus to meeting the consumer's preferences. The creation a regional brand (i.e. becoming known for specific types and high qualities of one's wines) is an important achievement in the process of boosting exports (Schamel 2006). Both Chile and Argentina have successfully established themselves as regional brands. Chile has become internationally known for producing high quality Cabernet Sauvignon and Carmenere and Argentina has achieved notoriety for its Malbecs.

Generally speaking, countries that make lower quality products can overcome value by volume, selling their pedestrian products at low prices (Perrouty et. al. 2006). Chile and Argentina offer wines at lower prices than do many Old World producers, yet they have been recently improving their images among U.S. wine consumers, especially younger components of the market who enjoy relatively inexpensive yet high quality wines produced there (Egan 2002).

Value for the money is especially important to younger consumers as limited finances are often regarded to be the constraint against wine purchases (Treloar et. al. 2004).

Wine consumers' tastes and preferences are fickle and consumer desires can change quickly (Morris 2000). Shifts in fashion also greatly influence the wine trade, leading to benefits for some wine producing regions, often at the expensive of others as the character, style, and flavor of a wine is at least partially influenced by the environment in which it was produced (Unwin 1991). Egan (2002) suggests that Chilean wine corporations have learned the importance of label and packaging design in marketing their product to the less experienced wine consumer and improved packaging is one of the current foci for growth of the industry. Market conditions tend to affect smaller producers more significantly (Hansis 1977). It is harder for smaller producers to afford the cost of replacement of grape varieties in their vineyards to catch up to changing consumer demand.

But tourism is emerging as a valued source of additional income for wine producers in Chile and Argentina. Tourism is another major new economic strategy intended to promote industry growth (Treloar et. al. 2004). Smaller wineries in particular can benefit more significantly from wine tourists than their larger corporate competition. Wine tourism includes "visitation to vineyards, wineries, wine festivals, and wine shows for which grape wine tasting and/or experiencing the attributes of a grape wine region are the prime motivating factors for visitors" (Hall and Macionis 1998). Marketing the leisure of wine tourism, rather than the technical elements of a winery tour, to younger consumers may elicit growth in wine tourism in Chile and Argentina (Treloar et. al. 2004). Wine tourism is still developing and there is still a lot to be learned about the ways in which tourism can positively impact a region's wine industry.

Export versus Domestic Consumption

The Chilean wine industry's orientation in recent years has been toward export markets (Foster et. al. 2002). Chile is considered the most significant South American producer of wine for export (Sommers 2008). In 1999, Chile exported more than 80% of their production (Castaldi 2004). As of 2004, the country ranked fifth in exports (behind Italy, France, Spain, and the United States) and held a 3.5% volume share of the world export market (Castaldi 2004).

Argentina ranks as the world's fifth most productive country after France, Italy, and the United States, but is first in South America in terms of domestic wine consumption (BBC News 2011; Johnson and Robinson 2007). The majority of Argentineans drink wine with most meals, a custom brought by Europeans immigrants. Argentina does not compete directly with Chile for a place in export markets. Argentines know the quality of their wine and prefer to drink it, whereas Chileans enjoy other spirits. The United States is the primary importer of Argentine wine, receiving nearly 40% of Argentina's exported wine (Wines of Argentina 2011). Other significant importers of Argentina's wines include Canada, Brazil, the United Kingdom, and the Netherlands. Most of the exported wines, approximately 80 percent, are Malbecs (Schachner 2011).

Environmental Contexts

The production of Chilean wines seems to generally respect the environment. Because of their isolated location, growers in Chile have the unique ability to produce organic wines without much difficulty (Knowles 2002). Chile has made it a priority to achieve at least $3 billion in production of sustainably grown, premium wines by 2020 (Wines of Chile 2011). There is concern in the scientific community, however, that the increased demand for Chilean wine will

generate detrimental impacts on the environments of agricultural landscapes, in particular desertification (Abraham & Villalaba 2008).

Argentina, on the other hand, is a world leader in committing to reduction of their contribution to global warming. They have voluntarily set greenhouse gas emissions targets and are active signatories to a number of international environmental agreements, in particular the United Nations Framework Convention on Climate Change, and its amendment, the Kyoto Protocol of 1997 (CIA World Factbook 2011).

Implications for the future in the face of global economic and environmental changes

By the beginning of the 21st Century, Chile and Argentina have joined the pack of leaders of the global wine industry and they compete in many world markets (Castaldi 2004). Importantly though, relatively inexpensive bottles of high quality wine produced in either of these countries can be easily found domestically (Molesworth 2011). Exports from both countries have continued to grow. Only the local preferences for beer and spirits have been holding back growth in domestic premium wine markets in South America (Stevenson 1997). Brazil represents a huge potential market for South American wine and the younger generation in Brazil is showing a shift from beer- to wine-consumers, making Brazil one of the few countries in South America where wine consumption is actually growing (Stevenson 1997; Johnson and Robinson 2007).

Globalization is causing changes within South America, however. Smaller and family-owned *bodegas* are beginning to agglomerate, and more emphasis is building to establish corporate brand reputations (Schamel 2006). Regional differentiation is a corollary of the forces at work in global markets (Morris 2000); therefore marketing a regional brand can be a sensible business move for New World producers (Schamel 2006) and may also benefit the smaller regional producers.

The economies of Chile and Argentina today are relative sound. Chile's government forecasts 6.6 percent economic growth this year (Woods 2011). However, as the fifth largest economy in South America, Chile's economy is tied to the rest of the world and would feel the repercussions of an economic crisis elsewhere, particularly one that occurred in the United States. Argentina, though economically thriving at the moment, will have to confront the effects of high inflation on wine production. As the United States is the largest importer of wine from both Chile and Argentina, there is little doubt that a deepening economic crisis in the United States would have a negative impact on all of South America's wine industries.

The impact of global climate change on viticulture is difficult to determine as many variables not necessarily related to climate can also come into play, including soils, grape varieties, and cultivation techniques (Lough et. al. 1983). Recent research on the effects of climate change and viticulture, however, reveal that potential new viticulture regions may open up as a result of global warming trends (Jones et. al. 2005). Some of these new regions may be in latitudes north or south and at elevations that are higher than the current limits for viticulture. Some viticulturists in mountainous regions have already moved their vineyards to higher elevations in order to escape the anticipated warming effects of climate change (Franson 2008). Increased alcohol content of wines and earlier harvest dates are signaling the impacts of warming (Franson 2007). There is less snowfall in the Andes than normal (Johnson and Robinson 2007) and future warming can change the availability of snow melt for irrigation water in both Chile and Argentina. There are ample opportunities for further research into the effects of climate

change on wine quality as well as into the associated spatial shifts of viticulture in South America.

Discussion and Conclusions

As we have examined the changing historical and economic geographies of winemaking and viticulture in Chile and Argentina, several dynamic factors stand out as determinants of the paths that the industry took in both countries. One of these factors had to do with the change in the varietals planted. The País/Criolla grape varieties dominated the viticultural landscape in both Chile and Argentina for centuries. The economies and political establishments provided little incentive to change the traditional ways of viticulture and domestic populations were generally satisfied to drink the coarse wines made from these grapes. The focus for growers was on the production of quantity instead of quality, particularly given that they were guaranteed their domestic markets and export markets were virtually nonexistent.

However, when *vinifera* grapes were introduced and planted, they all but replaced Pais/Criolla grapes and the old styles of wine made from them. Eventually, international markets opened to Chile and Argentina, and the wine industries experienced unprecedented growth. A shift in the focus of production on quality versus quantity also accompanied changes in varieties. Today, new regional brands identify these countries as preeminent producers of Malbec (Argentina) and Carmenere and Cabernet (Chile) wines.

International investment is another factor of vital importance. The sharp increase in international investment that took place beginning in the late 1970s coincided with increased quality and, in turn, exportability. New investors helped modernize the industries. Wine corporations were able to fill niches in the global wine market, exporting quality wines to consumers who drink for pleasure and may not necessarily be connoisseurs. As the wine industries grew, tourism to wine producing parts of Chile and Argentina increased, benefiting not only the wine sector, but the local, regional and national economies of the wine producers as well.

Bibliography

Amerine, M.A., Wagner, Ph.M. 1984. The vine and its environments. In: Muscatine, D., Amerine, M.A., Thompson, B (eds.) *Book of California Wine*. Berkeley: University of California Press.

BBC News. 2011. Argentina country profile. Available from http://news.bbc.co.uk/2/hi/americas/country_profiles/1192478.stm. Accessed 23 August 2011.

Bohmrich, R. 1996. Terroir: competing perspectives on the roles of soil, climate, and people. *Journal of Wine Research* 7: 33-47.

Carrau, F. 1997. The emergence of a new Uruguayan wine industry. *Journal of Wine Research* 8(3): 179-193.

Castaldi, R. 2004. Globalization in the wine industry: Implications for export service providers. *International Journal of Wine Business Research* 16(2): 5-23.

CIA World Factbook. ARGENTINA. Available from https://www.cia.gov/library/publications/the-world-factbook/geos/ar.html. Accessed August 23, 2011.

Clarke, O. 2002. *New wine atlas*. New York: Harcourt.

Crowley, W. K. 2000. Chile's wine industry: historical character and changing geography. *Conference of Latin American Geographers Yearbook* 26 (1): 87-102.

DeBlij, H. 1985. *Wine regions of the southern hemisphere*. New Jersey: Rowman and Allanheld.

Dickenson, J. 1992. Changes in the geography of wine: New wine in new bottles. *Interdisciplinary Science Reviews* 17(2): 178-184.

Egan, D. 2002. Chilean wines: a successful image. *International Journal of Wine Business Research* 14(2): 33-42.

Foster, W., Beaujanot, A., and Zuniga, J. I. 2002. Marketing focus in the Chilean wine industry. *Journal of Wine Research* 13(1): 35-42.

Franson, P. 2007. Coping with climate change: International seminar suggests strategies. *Wines and Vines*. 2 August 2007.

Franson, P. 2008. Torres acting on climate change. *Wines and Vines*. 15 February 2008.

Hall, C.M. and Macionis, N., 1998. Wine Tourism in Australia and New Zealand", in Butler, R.W., Hall, C.M. and Jenkins, J.M. (Eds.), *Tourism and Recreation in Rural Areas*. Chichester: John Wiley and Sons. 267-298.

Hansis, R. A. 1977. Land tenure, hazards, and the economy: Viticulture in the Mendoza Oasis, Argentina. *Economic Geography* 53(4): 368-371.

Johnson, H. and Robinson, J. 2007. *The World Atlas of Wine*, 6th ed. London: Mitchell Beazley

Jones, G.V., White, M.A., Cooper, O.R., and Storchmann, K. 2005. Climate change and global wine quality. *Climatic Change* 73.

Knowles, T. 2002. The history and development of Chilean wines. International Journal of Wine Business Research 14(2): 7-16.

Lough, J.M., Wigley, T.M.L., Palutikof, J.P. 1983. Climate and climate impact scenarios for Europe in a warmer world. Journal of Climate and Applied Meteorology 22. 1673-1684

MacNeil, K. 2001. *The Wine Bible*. New York: Workman Publishing.

Molesworth, J. 2011. Chile expands its range. *Wine Spectator*. 31 March. 89-91.

Molesworth, J. 2011. Harvest report: the 2011 vintage down south. Chile. *Wine Spectator*. 31 August. 30

Morris, A. 2000. Globalisation and regional differentiation: the Mendoza wine region. *Journal of Wine Research* 11(2). 145-153.

Orth, U. R., Lockshin, L., d'Hauteville, F. 2007. The global wine business as a research field. *International Journal of Wine Business Research* 19(1): 5-13.

Pellechia, T. 2006. *Wine:the 2000 year old story of the wine trade*. Philadelphia, PA: Running Press.

Perrouty, J. P., d'Hauteville, F., Lockshin, L. 2006. The influence of wine attributes on region of origin equity: An analysis of the moderating effect of consumers' perceived expertise. *Agribusiness* 22(3): 323-341.

Robinson, Jancis. 2011. Chile v. Argentina - an old rivalry. Available from http://www.jancisrobinson.com/articles/20070708_1.html. Accessed 24 August 2011.

Sauer, J. D. 1994. *Historical geography of crop plants*. Boca Raton, FL: CRC Press

Schachner, M. 2011. Boomtime Argentina. *Wine Enthusiast*. March. 32-36.

Schachner, M. 2011. Maipo: Chile's cradle of cabernet sauvignon. *Wine Enthusiast*. June. 56-62.

Schamel, G. 2006. Geography versus brands in a global wine market. *Agribusiness* 22(3): 363-374.

Schrock, Jay R., Adams, Charlie R., Nicholson, Joel D., and Dodd, Tim H. 2001. Strategic initiatives in the Argentina wine industry. *International Journal of Wine Business Research* 13(2): 18-31.

Sommers, B. J. 2008. *The geography of wine*. New York, NY: Plume (The Penguin Group)

Stevenson, T. *The New Sotheby's Wine Encyclopedia*. New York: DK Publishing.

Swinchatt, J. and Howell, D.G. 2004. The Winemaker's Dance: Exploring terroir in the Napa valley. Berkeley: University of California Press.

Townsend, C. 2011. Viticulture and the role of geomorphology: General principles and case studies. *Geography Compass. In Press.*

Treloar, P., Hall, C.M., Mitchell, R. 2004. Wine tourism and the generation Y market: any possibilities? *Caute Conference* unpublished conference proceedings. Brisbane, Queensland, Australia. Available from http://hdl.handle.net/10523/687. Accessed 25 August 2011.

Unwin, T. 1991. *Wine and the vine: an historical geography of viticulture and the wine trade*. New York, NY: Routledge.

Vaudor, E. 2002. The quality of grapes and wine in relation to geography: notions of terroir at various scales. *Journal of Wine Research* 13: 117-141.

Watkins, R.L. 1997. Vineyard site suitability in Eastern California. *Geojournal* 23: 229-239.

Wilson, J. 1998. *Terroir*: *The Role of Geology, Climate, and Culture in the making of French Wines*. Berkeley: University of California Press.

Wines of Chile. 2011. Available from http://www.winesofchile.org/. Accessed August 6, 2011

Winkler, A.J.; James Cook, W.M. Kliewer, Lloyd A. Lider. 1974. *General Viticulture*. Berkeley: University of California Press.

Woods, R. 2011. Chile economy is sound, faces global threats, Larrain says. *Bloomberg*. Available from http://www.bloomber.com/news/2011-08-22/chile-economy-is-sound-faces-global-threats-larrain-says-1-.html. Accessed 23 August 2011.

Coquimbo	Aconcagua	Central Valley	Southern Regions
Sub-region: Elqui Sub-region: Limarí Sub-region: Choapa	Sub-region: Aconcagua Sub-region: Casablanca Sub-region: San Antonio Zones: Leyda, Lo Abarca	Sub-region: Maipo Sub-region: Rapel Zone: Cachapoal Zone: Colchagua Sub-region: Curicó Sub-region: Maule	Sub-region: Itata Sub-region: Bío Bío Sub-region: Malleco

Table 1: Chile's appellation system. Adapted from Wines of Chile 2011.

Country	Common Grapes Varieties
Chile	Red: Cabernet Sauvignon (ranked #1), Carmenere, Merlot, Malbec, Syrah White: Sauvignon Blanc, Chenin Blanc, Riesling, Semillon, Chardonnay, Gewürtztraminer
Argentina	Red: Malbec (ranked #1), Bonarda, Cabernet Sauvignon, Syrah, Merlot White: Pedro Gimenez, Torrontes Riojano, Chardonnay, Chenin Blanc

Table 2: Common Grape varieties in Chile and Argentina. Adapted from Wines of Chile 2011 and Wines of Argentina 2011.

Mendoza	San Juan	La Rioja	Salta	Catamarca	Nuequén	Río Negro
Northern Mendoza Eastern Mendoza	Tulum Valley Ullum-Zonda	Famatina Valley Nonogasta	Cafayate	Belén Santa María	San Patricio del Chañar	San Patricio del Chañar

Mendoza River	Calingasta	Chilecito	Tinogasta
Uco Valley	Iglesia	Antinaco	
Southern Mendoza	Fertil		

Table 3: Argentina's wine regions. Adapted from Wines of Argentina 2011