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CHANGE TO BUSINESS: EVIDENCE  
FROM THE MARGARET RIVER WINE  
REGION OF AUSTRALIA**

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# **ON THE RELEVANCY OF CLIMATE CHANGE TO BUSINESS: EVIDENCE FROM THE MARGARET RIVER WINE REGION OF AUSTRALIA**

Abstract: This study explores the relevancy of climate change to business using a sample of wine firms operating in Margaret River, Western Australia, one of the premier wine regions of the world. Using a qualitative approach based on thematic analysis, the results challenge the extent to which climate change is a salient stakeholder, while demonstrating that the phenomenon may, in fact, be beneficial. Response actions towards climate change demonstrate both mitigative and adaptive actions, although differences in their level and rate of implementation appear to be attributable to a mix of normative and instrumental trade-offs. Implications of the findings are discussed, with a particular focus on location theory and economic barriers as a key driver of trade-offs between the choice of mitigative or adaptive response to climate change.

Keywords: Australia, adaptation, business, climate change, mitigation, stakeholder theory, wine

## **Introduction**

An argument is emerging that climate change is a salient stakeholder and that, therefore, a response from businesses is required. More specifically, building on Starik's (1995) and Driscoll and Starik's (2004) work on the natural environment, advocates of stakeholder theory posit that a response to climate change is required of managers because climate change has power, legitimacy, and urgency (Haigh and Griffiths, 2009). In other words, climate change is a *primary* stakeholder (Clarkson, 1995) and managers that do not commit resources to address the issue put their businesses at a competitive disadvantage, and risk the withdrawal of support from key constituencies. Yet, there is mixed evidence on businesses' acceptance that a response to climate change is necessary or even important (cf. Alonso and O'Neill, 2011).

The first aim of this study, therefore, is to explore business perceptions about climate change in order to further clarify the relevance and legitimacy of the claim that climate change is a primary stakeholder. According to Battaglini et al. (2009), research that expands insight into assessment of climate change perceptions is needed. Second, assuming climate change is a primary stakeholder, businesses' responses consist of both mitigative and adaptive actions (Galbreath, 2011). However, what has not been systematically explored is the extent to which decision-makers address trade-offs in seeking to respond to climate change. That is, in trade-off situations it is difficult—if not impossible—to successfully achieve two or more desirable objectives simultaneously. Of interest then is exploring what drives managers to invest in mitigative and adaptive actions, and whether or not there are underlying mechanisms by which trade-offs are made in arriving at each type of response.

## **Previous Research**

There is research demonstrating that businesses are responding to climate change due to the perceived risks and volatility that are associated with it. There is also research demonstrating that businesses are not responding or enjoying positive benefits from climate change. Typical of this is management literature, much of which consists of studies of large firms, multinational firms, high carbon emitters, and regulated industries. For example, Okereke (2007) studied UK FTSE 100 firms, which account for nearly 75 percent of the UK's total greenhouse gas (GHG) emissions (CDP, 2006). Other studies have examined carbon intensive industries such as oil and gas, energy/utilities, and industrials (Kolk and Levy, 2001; Levy and Kolk, 2002; Jeswani *et al.*, 2008; Weinhofer and Hoffmann, 2010; Boiral *et al.*, 2011). As with Okereke (2007), these studies suggest that corporate attention to climate change focuses on attempts to reduce GHG emissions and the challenges of meeting regulatory requirements.

Other literature, however, gives alternative views and new insight into the challenges businesses face with respect to climate change and how they are responding to these. In their study, Nicholas and Durham (2012) find that wine producers in Northern California face heat and frost stress, and stresses from pests and diseases, due to climate change. In response, adaptive actions are being taken, including shading exposed fruit, use of wind machines, delayed pruning, and UV spray protectants. In another study, Hoffmann *et al.* (2009) studied ski lift operators in Switzerland. The results of their study demonstrate that firms in winter tourism industries face increases in winter temperatures as well as increased rainfall. They are adapting through actions such as making more artificial snow, new slope strategies (to reduce required snow cover), and movement of sports activities to higher terrains, among others.

Lastly, other studies present a more positive perspective with respect to climate change—or, at least, a lack of concern about climate change impacts. For example, in their research,

Battaglini et al. (2009) find that German wine producers have noticed climate change over the last 10-20 years; however, these changes have had a mainly positive impact on the quality of harvested grapes, due to bolder flavors, more sugar, and higher alcohol content. Similarly, in the La Mancha, La Rioja, and Penedès wine regions of Spain, out of the noted challenges facing wine producers, climate change barely registered a concern. Furthermore, respondents noted that any affects of climate change on the quality of grapes were more positive than negative (Alonso and O'Neill, 2011).

### **Implications of Previous Findings**

Based on the results of the cited studies and the broader research on businesses' response to climate change, some tentative implications can be put forth. First, climate change is not universally accepted as a critical issue, rather it appears to be a contested issue amongst businesses (and even the public at large) (Lorenzoni *et al.*, 2007; Pew Research Center, 2008; Nordberg, 2010; Hoffman, 2011; Poortinga *et al.*, 2011). That climate change appears to be contested questions the extent to which it is a primary stakeholder, or in the words of Haigh and Griffiths (2009, p. 347), that climate change is “an *easily* identifiable primary stakeholder” (emphasis added). If “climate change is arguably one of the greatest challenges the world is facing in the 21st century” (Poortinga *et al.*, 2011, p. 1015) and businesses represent the productive resources that will have significant impact on a planet that is sustainable into the future (Bansal, 2002), then further research is needed to explore the mechanisms that might limit—or encourage—a proactive response from businesses.

Second, climate change is impacted by the economic activities of businesses while at the same time it impacts on these economic activities. Hence, according to Winn et al. (2011) businesses' responses to climate change include both mitigative and adaptive approaches. Mitigative approaches include actions designed to curtail or reverse climate change.

Alternatively, adaptive approaches include actions that seek to take advantage of new opportunities resulting from climate change or to adjust to any detrimental impacts. The literature demonstrates that businesses are engaging in both types of responses although in many instances, only one type of response is demonstrated or one type of response takes priority over the other. To combat climate change, scholars argue that both mitigative and adaptive actions are required equally (Winn and Kirchgeorg, 2005; Hätel and Pearman, 2010; Winn *et al.*, 2011). Yet businesses operate with scarce resources and face difficult trade-offs in their investment decisions. A larger question therefore might be to what extent do businesses make trade-offs in responding to climate change, and what are the underlying mechanisms that lead to these trade-offs.

## **Method**

### **Study Setting**

The Australian wine industry is the setting for this study. Once a sleepy, cottage-style New World producer focused mainly on domestic markets, Australian wine production has become an increasingly important contributor to the country's economy (Spencer, 2003). Australia is now one of the largest producers of wine in the world, generates billions in overall sales, and directly employs tens of thousands of people (Australian Wine and Brandy Corporation, 2007). Although the GFC and years of overproduction have threatened economic viability, according to the Winemakers' Federation of Australia (Winemakers' Federation of Australia, 2007), climate change has now emerged as one of the most serious threats facing the industry today. For this reason, the wine industry was chosen for this study.

More specifically, the Margaret River wine region in south-western Western Australia is situated close to the researcher's university and is acknowledged as a region that produces premium quality wines; the region therefore has significant impact on the reputation of Australian

wines in both domestic and international markets. Thus, Margaret River, Western Australia, was considered, *prima facie*, as a potential site for this study.

Historically, the region developed in large measure due to the scientific investigations of Dr John Gladstones, who drew comparisons between its soil-type and climatic conditions and those of the Bordeaux region in France (Gladstones, 1965, 1966). Following the publication of this research the first vines in the region were planted at Vasse Felix in 1967. With a steady increase in the planted area of vineyards since the late 1990s, the Margaret River wine region has around 5,300 hectares under vine and approximately 360 firms participating in wine production. Most recent figures (2008) indicate that the region crushed 36,600 tonnes of grapes, while the economic output for the production of grapes in the region was \$AU37.8 million and from wine manufacturing \$AU183.1 million. Together, this equated to 13 percent of the gross regional product (AECgroup, 2009).

### **Sample**

Following Lincoln and Guba's (1985) guidelines for purposeful sampling, I chose participants who would be most able to provide insight on the research aims. Selection was thus based on firms in Margaret River who participated in a training and certification exercise for the EntWine program in 2009-2010. EntWine is an environmental management program established for the wine industry by the Winemakers' Federation of Australia and firms participating in the program have *prima facie* motivation to address matters pertaining to the natural environment, including climate change. In total, 15 firms voluntarily responded to an email asking them to take part in the study, with 12 participants (representing 12 firms) accepting the invitation (Table 1). As can be seen from Table 1 (firm and participant names withheld to protect anonymity), there is a mix of firm sizes, varieties produced, and export markets served. The largest grape grower has an annual crush of around 1500 tonnes, while the smallest grape crush is 60 tonnes. Annual cases

sold range from 4,000 to 120,000. There is a mix of varieties produced, with many firms producing both red and white varieties. Lastly, China (mainland), Hong Kong, Japan, Singapore, and the United Kingdom are popular export markets.

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### **Data Collection**

To assess the research questions, I relied on semi-structured, open-ended interviews. Semi-structured interviews involve gathering rich and multi-layered information, allowing a few prepared questions to form the skeleton of the interview, with additional questions emerging during the interview process (Hoggart *et al.*, 2002). By pre-determining some questions, the comparability of responses is increased and the interviewer's effects and biases reduced (Kitchin and Tate, 2000). To supplement interview data, information about the firms' approach to climate change was collected from their websites, where available. Although the data from websites were not extensively used, the information gave additional perspectives on key issues.

To collect data, interviews were conducted at a time and place that suited participants' work commitments. Prior to the interview, the participants were given a brief description of the research objectives and questions, and all participants gave written or verbal permission for the session to be recorded using a digital recorder. Interviews were carried out between November 2009 and March 2010 and were conducted with a range of personnel, including managing directors, general managers, vineyard managers, viticulturalists, and winemakers. Thus, while the number of participants involved was relatively small, a good mix of roles and responsibilities ensured different viewpoints and perspectives were obtained. All participants demonstrated a high level of professionalism in their understanding of the broader implications of climate change on society, its specific impacts on the wine industry, and their firm's responses to the issue. Most

interviews lasted 45 minutes, although some were considerably longer. A careful orthographic transcription was made of the interviews to accurately reproduce the semantic content of what each participant said. Once transcribed, interviews were imported into QSR NVivo for data management during the analysis process.

**Data Analysis**

As this study sought to analyse the nature and dynamics of climate change based on the perceptions of different participants, thematic analysis was conducted using an interpretive approach (Braun and Clarke, 2006). Themes are developed through the careful iterative and reflexive examination and re-examination of the raw interview data (Braun and Clarke, 2006). The interpretive approach to thematic analysis attempts to determine the significance of the themes and their broader meanings and implications (Patton, 1990).

Following the inductive coding process (Bryman and Burgess, 1994), a close reading of the transcripts was undertaken to become familiar with the content and to gain an understanding of the details in the text. I also read documentary evidence (i.e., website information) to seek additional insight into a firm’s approach to climate change. After the initial reading, each participant transcript was entered into NVivo software to assist with content analysis. Initial codes were generated across the corpus of interview data, based on the actual words or terms used by the participants, using a system of *in vivo* coding, or coding taken directly from the participants’ discourse. In this step, first-order codes were derived and I reflected on the coded files by re-reading the interview transcripts, coding for more *in vivo* words. By the end of the first step, there were 381 coded passages.

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INSERT FIGURE 1 HERE  
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In the second step of the process, first-order codes were examined for relationships between and within the passages, which facilitated assembling them into first-order themes (Sharma and Vredenburg, 1998). As displayed in Figure 1, several first-order themes emerged. In the third step, analysis was undertaken to look for links and relationships among first-order themes so that they could be collapsed into distinct clusters (Platt, 1981), or second-order themes. Here, a recursive approach rather than a linear one was employed, namely iteration between first-order categories and emerging patterns in the data until conceptual themes emerged (Eisenhardt, 1989). Lastly, second-order themes were organized into final themes that reflected the overarching dimensions that emerged from the data.

### **Rigour and Trustworthiness of the Data**

Statistical representativeness was not a requirement for this study. The purposeful sample precluded a statistical approach and the key aim of the study was to understand a complex social phenomenon through an exploratory inquiry. Nonetheless, overall data robustness was ascertained through the corroboration of interview data with information derived from firm websites. Also, in terms of validity, member checks were used to ensure that both the interview transcripts and the research findings yielded a “faithful” depiction of participants’ experiences (Miles and Huberman, 1993). That is, participants were permitted to examine the transcripts and write-up of the results to ensure they accurately reflected their views about climate change. Lastly, during the data analysis, feedback was also sought from the author’s colleagues, who were asked to “play devil’s advocate” (Marshall and Rossman, 1995), that is to critically question the approach adopted in this study and the conclusions reached. This feedback was particularly enhanced by the scrutiny of an academic with expertise in the fields of viticulture and oenology who has spent several years exploring the impacts of climate change in the wine industry. Select findings of this study were also presented at a university research seminar and at international

conferences, and the findings were the subject of an Australian government inquiry into the effects of climate change on tourism in Margaret River (Jones *et al.*, 2010). The feedback provided through these forums helped the study to remain theory-focused (Patton, 1990) and aided critical reflection on the assumptions and inferences made.

## **Findings**

Two key themes emerged from the data (Figure 1). First, while participants acknowledged that climate change is a societal and industry issue, the first theme suggests a perspective that climate change is likely to be beneficial in the Margaret River wine region. The second theme demonstrates that actions in response to climate change tend to be broad, and that there appears to be trade-offs that underpin which actions get implemented.

### **Theme 1: Climate Change is Likely to be Beneficial**

Some participants acknowledged a general perception that climate change is an issue of societal importance, and one that could have an impact on the wine industry in Australia.

*I guess everyone's a bit apprehensive about climate change. (Participant I)*

*I think...in regard to climate change [it is] something that we have to look at. (Participant B)*

*I think from a broader Australian industry perspective [climate change is] certainly a significant issue. (Participant A)*

However, a contrasting and, indeed stronger pattern emerged with respect to the impacts of climate change on participants' businesses and the Margaret River wine region, one where much less concern was expressed. This lesser concern could be seen in three ways. First, rising temperatures as a result of climate change did not seem be of particular concern.

*Well technically, [hotter temperatures] make wine-making easier, to be perfectly honest. If you've got a moderate amount of water available, growing grapes and making wine to a certain level of quality in warm to hot conditions is very easy. Everything grows, it grows fast, fruit ripens, sugar accumulates. You get it off when you want to get it off, well before*

*winter rains start, disease pressure is low. So a slight increase in temperature, technically, makes for probably easier management, better planning, less likely impact of disease. (Participant F)*

One participant took the issue of rising temperatures even further, relying on his knowledge of the International Panel on Climate Change (IPCC) to draw this conclusion:

*So if the overall climate changes by .2° to 1° [C] over the next century—or sorry, the temperature changes—I can't really see a very significant issue for viticulture whatsoever in this region. And because it's going up, I see that as mostly positive. So I'm not terribly concerned, even if the IPCC forecast proves to be correct. I'm happy to assume that viticulture will be viable for at least the next hundred years, based on that data. So I don't see the climate change issue as a threat. (Participant H)*

Second, climate change has varying impacts on ecosystems, including mean temperature increases, altered precipitation patterns, changes in the variability of climatic conditions, and the increased occurrence of extreme weather conditions (IPCC, 2007). In the case of precipitation, participants acknowledged that a key effect of climate change in Margaret River is the possibility of less rainfall.

*...from the studies that I've seen, the climate change influence [in Margaret River] is going to be more a rainfall-related issue than a temperature-related issue. (Participant A)*

Yet, in the event of climate change, little concern was expressed about a decrease in available water for the production of wine.

*Yeah, the other thing that's probably not such a big issue is water. (Participant C)*

*...there could be an advantageous impact from climate change in this region, and if that means that there's less rainfall during the harvest period, and potentially a more regular high quality vintage, then it could be an advantage for us. (Participant A)*

Third, as noted, climate change impacts weather variability while increasing the likelihood of extreme weather events. However, participants did not seem to be concerned that weather variability or extreme events could marginalize the production of wine in Margaret River.

*We would perhaps suffer the extremes a bit more. So we might have a 2006 vintage again, which was really cool, and then we could have a 2007, which was really warm. Overall,*

*those extremes would have to get much worse for it still to drive [Margaret River] into a marginal status. (Participant H)*

*I suppose we haven't really seen too many indicators that climate change is occurring. The last four or five vintages have been completely different, from 2006 being the coldest season we've ever had, through to '07 was quite dry. Last year was cold up until January, and then we had that Indian summer. We don't see any pattern emerging to indicate that climate change is occurring. (Participant C)*

On a lesser note, an increase in CO<sub>2</sub> emissions is widely acknowledged as a leading contributor to climate change (IPCC, 2007; National Academy of Sciences, 2008; Australian Academy of Science, 2010; The Royal Society, 2010). However, one participant suggested that increases of CO<sub>2</sub> in the atmosphere would be beneficial to wine production:

*The other side of it is...I'm not really sure that a higher concentration of carbon dioxide in the atmosphere isn't of significant benefit to us for productivity and other reasons. (Participant H)*

In an effort to further understand the above mentioned reservations about the effects of climate change, I undertook additional research on climate science in the Margaret River wine region. A study conducted by Lyons and Considine (2007) shows that there is lack of definitive scientific evidence of temperature increases in Margaret River since 1950. Further, one participant (Participant H) showed me detailed records of harvest dates from the previous 30 years, explaining that he has found little variation in these dates over time. This is confirmed by the research of Webb and colleagues (2012), who, using time series temperature data of up to 64 years, found that in five regions in Australia, only the Margaret River wine region demonstrated a lack of early ripening in the harvest period. If climate change were occurring in a given location, variation in harvest dates would be apparent (Keller, 2010).

## **Theme 2: Response Actions both Mitigate and Adapt**

Participants demonstrated that their businesses are engaging in (or are considering engaging in) a variety of actions that would be considered appropriate responses to climate change. These

include actions that reduce GHG emissions and those that demonstrate some level of adaptation to climate change.

### **Mitigative Actions**

As for reductions in GHG emissions (mitigative actions), several participants discussed reducing or eliminating the use of agrichemicals, which is a leading contributor to the carbon footprint in the wine industry (Colman and Paster, 2009).

*From a fertiliser perspective, we tend to do yearly tests to really look at what the plant is telling us as far as its nutrient mix and requirement. Then we'll develop a program around that. We're sort of looking at base replacement, that might be every two or three years, just working on a blended fertiliser. (Participant A)*

*We would really only fertilise based on petiole analysis, from the vines...We would not actually fertilise our vineyard at all, probably two years out of three, and then it might get a light application. (Participant F)*

Other participants reported that they had planted shrubs and trees, which act as a means of carbon sequestering.

*I think people underestimate trees and the effect that they have on keeping the planet cool... Planting trees [is] part of our carbon neutral program. (Participant D)*

*We've done a lot of planting. We would have planted 5,000-10,000 trees in the last four years. (Participant J)*

*Planted thousands of trees on the property, thousands. (Participant L)*

Participants were also aware of emissions produced by energy use, and some were putting in place alternative energy strategies. Participant D noted, “We also have our power supplied by the...Albany Wind Farm”, while Participant J stated, “Well, we buy 100% green power from Synergy [the Western Australia supplier of electricity].”

Other means of reducing GHG emissions in the wine industry is choice of packaging. For example, so-called “green” wine bottles are lighter weight, use less glass in production, and

reduce GHG emissions more significantly than standard glass bottles (Mohan, 2010). Participants indicated that they are using these “green” bottles.

*Yeah, probably 80% of our production will be under these new Lean Green bottles. I'm not sure how much lighter they are, but it's significant. (Participant C)*

*Definitely moving into the lighter weight glass, the thinner glass bottles, particularly for our large production wines. (Participant F)*

There were several other actions that participants discussed that reduce GHG emissions, including biodynamic production, fewer tractor passes in the vineyard (less fuel use), and the use of insulation in the winery, all of which reduce carbon emissions.<sup>1</sup> One participant pointed out that they are attempting to engage all employees in carbon management, stating that “we make an effort to make sure that everyone is aware of ways to reduce our emissions.” (Participant D)

### **Adaptive Actions**

Participants adaptive actions mainly centered on water conservation. As noted, there was an acknowledgment that the Margaret River wine region is likely to be affected by less rainfall rather than by rising temperatures due to climate change (cf. Timbal *et al.*, 2006). Participants discussed various ways in which their businesses were attempting to take advantage of rainfall received, while implementing various practices and techniques to effectively manage water use.

*We're looking at the longer term, trying to build levels of soil carbon, no cultivation, so that we're getting a naturally more retentive soil, higher infiltration rate. So what rainfall we do get, we're able to take advantage of. (Participant A)*

*We have soil moisture probes throughout the vineyard, and we respond to that rather than just chucking on water whenever we think. We closely monitor our irrigations. (Participant B)*

*Instead of treating [waste water] to a certain point, and then letting it go back into the water courses, after cleaning the water, we're actually circulating the water. Treating it,*

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<sup>1</sup> Biodynamics is a regenerative and holistic approach to agriculture. It harnesses the substances and forces of nature to produce quality products in a sustainable manner.

*and putting it back in our holding dam, and using it back for general cleaning purposes. So we've reduced our water use—we would estimate over the vintage period—by perhaps 50 percent. (Participant F)*

*We're using drip irrigation. We monitor our water usage. We monitor our soil moisture... if we don't need to water, we don't water. (Participant I)*

Significantly, despite participants' implementation of some adaptive actions, which were mainly water-related, many potential adaptive actions were discussed yet *are not* being implemented. Of note is purchasing land in cooler climates or planting hotter temperature varieties, both of which are important adaptive responses to climate change in the wine industry (Jones and Webb, 2010). The participant from Firm B stated that there would not be “purchasing of land in [cooler climates in] the foreseeable future.” With respect to planting new varieties that perform better in hotter temperatures, the participant from Firm J stated, “So in terms of what we are we doing, I would have to say, nothing. Not for lack of thinking about it, but because there isn't a push for it. Part of it is because I'm not pushing it any harder, but that's also because there's too much uncertainty about climate change.”

### **Further Examination of Theme 2**

Based on the data, there are two points that require further examination with respect to climate change actions. First, in what appears to be contradictory to the lack of concern expressed by participants about climate change in Margaret River, many were engaging in actions that would be considered appropriate mitigative actions to reduce or minimize their effects on the climate. Similarly, adaptive actions were in place that are appropriate responses to climate change, particularly with respect to the management of a scarce resource such as water. However, there was not a clear sense that these actions were for the express purpose of addressing *climate change*. For example, the participant from Firm A expressed that he is trying to demonstrate “good corporate behavior” with respect to how the business treats the natural environment and

manages their natural resources. This philosophy is evident in other participants' comments as well. The participant from Firm J, in describing the reason for planting trees and shrubs, states:

*Although yes, they're a carbon sink, that's not the primary reason for doing it. It's actually for restoring that land to its natural state, and that helps keep water, and wildlife, and beneficial insects, and keeps this little ecosystem a lot happier. Carbon sinking is just a bonus.*

Another firm is certified biodynamic and the participant stated that “[we strive] to keep nature in balance, and to work with nature” (Participant D). Lastly, with respect to water, the participant from Firm B noted, “We don’t currently have a problem,” while the participant from Firm C stated, “Our dam holds a lot of water, and that’s full by the end of June every year. I don’t see we’re going to be short of water.” Although many participants expressed little concern over water shortages, they are nonetheless taking steps to conserve water. What the data suggests is that actions undertaken by the participants’ firms cannot necessarily be ascribed to a *specific* response to climate change. Rather, a second-order theme (Figure 1) emerged from the data, suggesting that many participants’ firms are engaging in a stewardship approach to the natural environment (Sharma and Henriques, 2005) and that a driver to implement actions solely based on climate change was not clearly evident in all cases.

The second point reflected that economic merits strongly influence whether or not a specific action is implemented. The participant from Firm E summed up the sentiment by stating, “Economics is not everyone’s cup of tea, but it rules our lives. That’s the way to approach this climate change stuff.” More specifically, discussions about climate change actions such as energy use, packaging, planting of different varieties, and production inputs were often in terms of economic realities.

*A lot of this stuff is driven by economics eventually. Can we justify doubling our power bills by purchasing expensive green energy? What benefit would we get from it? We're not going to be going down a full life-cycle analysis and calling our products carbon neutral,*

*and hoping that we can get a premium in the marketplace for it. So in the end, it's a profit/loss driven exercise I think. (Participant A)*

*It's taken Margaret River 30-40 years to just get its handle on Cabernet and Chardonnay, really, and where it's growing very well, the areas it's growing well. So I think new varieties that will ripen later if the heat starts coming on, we just have to take a punt, and there won't be too many making those experiments given the cost, I can assure you. (Participant F)*

*At the end of the day, wine businesses need to make money like everyone else, and if you can lower your fuel usage, you can lower some of your input costs. We might use less fertilizer if we can get our balance right. So they're the sort of things that we're looking at. (Participant I)*

In contrast to previous studies that have found regulatory and institutional pressure to be the driving forces behind businesses' response to climate change, most participants in this study related climate change response to an economic imperative. That is, they felt that responding to climate change required the examination of the ability to return a profit or achieve some market-based gains. Conversely, there was clearly an attitude of caring for and protecting the natural environment, which appeared to be a motivating factor for engagement in many of the discussed actions, particularly mitigative actions.

## **Discussion**

Is climate change a primary stakeholder? The results of this study suggest that given the context, climate change does not appear to be a primary stakeholder, or at least an easily identifiable primary stakeholder as specified by Haigh and Griffiths (2009, p. 347). Nevertheless, I find that firms are not only committing resources to mitigative actions, but also to adaptive actions (although to a much lesser extent). What is not clear, however, is the extent to which mitigative and adaptive actions are targeted specifically at climate change, and there is evidence to suggest that normative and instrumental trade-offs exist with respect to which actions get implemented. These findings lead to two key implications: 1) climate change as a primary stakeholder is questioned and requires further examination (location may subsume all other salience attributes

and is of specific further research interest) and 2) economic barriers may be a key driver of trade-offs between choice of mitigative or adaptive response to climate change (this has potential flow-on policy effects).

Firstly, Haigh and Griffiths (2009) argue that the case for the natural environment as primary stakeholder is theoretically justified *because of climate change*. They base their arguments on the concept of stakeholder salience (Mitchell *et al.*, 1997). Stakeholder salience—defined by power, legitimacy, and urgency—determines how managers prioritize stakeholder claims. That is, stakeholders will be perceived by managers as increasingly salient as they accumulate a combination of the three attributes.

Following the concept of stakeholder salience, Haigh and Griffiths (2009) posit that climate change has *power* because of the physical force it imposes, thereby disrupting firms' operations; *legitimacy* because the world's leading climate change body, the IPCC, has recognized the phenomenon as a scientific reality; and *urgency* because climatic events (e.g., prolonged droughts, flooding) associated with climate change are affecting business operations and are predicted to increase in the future. Lastly, climate change has a new salience attribute, *proximity*, because some stakeholders in a firm's network (and, in fact, the focal firm itself) are closer than others to locations that are susceptible to extreme climatic events resulting from climate change. Proximate stakeholders are spatially dependent, and are vulnerable to negative impacts caused by climate change.

The findings of the present study appear to question some of Haigh and Griffiths' assumptions. First, with the exception of a few reported extreme heat days, none of the participants are directly observing adverse climatic conditions in the region—conditions that are marginalizing or adversely affecting production. Hence, climate change does not appear to have power for this sample. Second, major concerns about the real impact of climate change on the

Margaret River wine region were not found in this sample. With the exception of less documented rainfall in the south-west of Western Australia (Timbal *et al.*, 2006)—which is not currently effecting wine production in Margaret River—scientific evidence does not seem to demonstrate any significant negative climatic change effects for the production of wine in the Margaret River wine region. In fact, some participants argued that an increase in CO<sub>2</sub> would benefit grape production, a point which is confirmed by a leading scholar in viticulture and climate change (Gladstones, 2011). Hence, in this sample, climate change does not appear to have legitimacy in the Haigh and Griffiths’ (2009) sense, because of a lack of demonstrable scientific evidence in the location of interest.

As for the third attribute, there was little evidence that climate change is having any immediate impact on the wine industry in Margaret River. This was emphasized by the fact that several participants believe that predicted increases in temperature for Margaret River will benefit the quality of wine in the region, confirming scientific findings on the link between temperature and wine quality (Jones *et al.*, 2005). Further, not one participant expressed that production has been negatively affected by climate change. Climate change therefore does not appear to have urgency. Lastly, the Margaret River wine region is predicted to be impacted by future climate change in the form of very moderate increases in temperature in the next 50 years (Webb, 2010). Based on current projections, none of the participants expressed concern that the region will be dramatically effected; that is, that effects over the next several decades will be extreme enough to marginalize wine production or limit access to natural resources. Hence, proximity does not appear to be a salient factor in this study.

That climate change appears to lack any relevant salient attributes in this study may challenge current thinking on the natural environment as a primary stakeholder, particularly given Haigh and Griffiths’ statement that the natural environment is “an *easily* identifiable primary

stakeholder when climate change is brought into the debate” (2009, p. 347; emphasis added). Further, while media and academic discourse tend to isolate climate change as a disruptive or negative force on business, the results of this study suggest the opposite, or at least point to some *benefits*. But these benefits are likely isolated to location. Hence, I argue that the findings of this study imply that, in the context of stakeholder theory, location (or proximity) may be the single important salience attribute of climate change. This is the first key implication.

Location theory addresses the optimal location of producing goods given the cost of factors of production and transport cost to consumers (Isard and Peck, 1954; Krugman, 1993). More recently, researchers have turned their attention to the effects of spillovers and agglomeration economies, as firms that are geographically concentrated or “clustered” tend to demonstrate higher levels of innovation and economic productivity than more isolated firms (Porter, 2000). Including climate change in location theories might be timely. For example, recent evidence suggests that individuals tend to perceive areas that are vulnerable to climate change impacts as geographically distant (Lorenzoni and Pidgeon, 2006). This relates to research within the domain of embodied social cognition that links distance, and in particular spatial distance, with the dampening of reactions and judgments (Williams and Bargh, 2008). In short, location matters.

The data of the present research suggests that location is a primary concern in the extent to which firms address climate change. For example, contrary to the present study, Galbreath (2011) finds that wine firms in the south and eastern parts of Australia are more readily committing resources to adaptive actions in response to climate change. It is noteworthy that these southern and eastern parts of Australia have been more prone to the negative effects of climate change (e.g., prolonged droughts, increased temperatures) than those in the Margaret River wine region (Webb *et al.*, 2010). Further evidence is found in the Napa Valley (California)

and the United Kingdom, where over the last 10–30 plus years wine producers have noticed climate change, having a mainly positive impact for harvested quality, due to bolder flavors, more sugar, and higher alcohol content (McQuaid, 2011; Rossi, 2012).

Regarding location, it is important to acknowledge that the current climate change effects and the longer-term predictions highlight the increasing risk of particular weather patterns and events (Pidgeon and Butler, 2009). Yet these effects are heterogeneously distributed around the world: Northern and Southern Hemispheres are expected to experience different effects (IPCC, 2007; Winn *et al.*, 2011). If the wine industry is considered an early-warning barometer or leading indicator of climate change, then anecdotally, regional and/or meso-location seem to be a major contributing factor to firm response. However, the weather-related specifics of climate change are not the only consideration for location. Clearly, depending on location in the world, the regulatory environment affects the degree to which firms are required to expend resources on reducing GHG emissions. For example, in Europe and in the UK, reduction targets are in place through EU-ETS and UK-ETS schemes, while in the US, they are not. Such location-based regulatory policy has implications for mitigative actions. Other location-based implications may include *actual experience* with climate change.

Personal experience is thought to be a key driver of risk perceptions, and the perceived likelihood of a risk is found to increase if it has recently been experienced (Tversky and Kahneman, 1973). Existing research demonstrates that people who inhabit places recognized as being vulnerable to climate change impacts in physically overt ways (e.g., living in low-lying coastal areas) have a heightened sense of personal risk (Brody *et al.*, 2008; Whitmarsh, 2008). Furthermore, there is evidence suggesting that the experience of an ecological disaster (e.g., an oil spill) or an environmental problem (e.g., drought) can shape the effected community's views on climate change (Dessai and Sims, 2010), as well as the business practices within that

community (Busch, 2011). That, relative to previous findings (Galbreath, 2011), the firms in this study do not appear to be engaging in a broader set of initiatives targeted at climate change could, in part, be attributed to the fact that they have experienced little to no effects of climate change. The scientific evidence demonstrates minimal impact of climate change in the Margaret River wine region, which supports the work of Weber (2006) suggesting that firms who have not experienced direct climate impacts are less likely to perceive climate change as a risk, and therefore commit fewer resources to address the matter.

Appropriately, as the evidence in my study and that of emerging studies from around the world suggests, location cannot be generalized and specific locations should be accounted for when assessing how and why firms respond to climate change. Although industry context continues to be of major interest in studies of business's environmental responses, the findings here suggest that future research might need to pay far more attention to location-based considerations, including weather-related variables, existing experience with environmental problems (or ecosystem/ecosystem service disruptions), regulation, and regional and/or meso-level geography.

The second implication focuses on the trade-offs firms make in response to climate change and the potential effects these trade-offs have for policy. Although the data were not quantified, in this study there seemed to be more of a commitment to mitigative than to adaptive actions. These findings may, in part, be explained by the fact that the production of wine is highly dependent on the natural environment. The data suggest that the participants in this study recognize this fact. Hence, whether directly aimed at climate change or not, the sense was that taking action to protect the natural environment was standard practice in the firms studied, which may reflect that a respect for nature is a widely held value in this industry (cf. Bansal, 2003).

On the other hand, what clearly emerged from the data was a *lack* of engagement in many adaptive actions. A key underlying reason for not implementing adaptive actions appeared to be an economic one. For example, in the absence of market demand, participants seemed hesitant to expend scarce resources to adapt to climate change, particularly on actions such as planting varieties better suited to hotter temperatures. Further, there was a strong indication that firms in the sample were not interested in purchasing land in cooler climates, not only because of their uncertainty about climate change and lack of experiences of climate change effects, but because they did not see clear economic benefits in doing so given an established strategic trajectory and brand image.

This second key finding may inform policy. For example, to avoid any negative effects of climate change will likely involve a mix of both mitigative and adaptive actions (United Nations, 1992; IPCC, 2007). Unfortunately, current policy tends to emphasize mitigation only. Consider recent evidence from Australia. At the time of writing this paper, Australia's carbon tax had recently become law, establishing the world's most broadly based carbon-pricing scheme. In effect, the carbon tax is designed to reduce GHG emissions (a mitigative action), yet it does not clearly address adaptive actions. This may be problematic.

More specifically, inertia in the climate system is likely to create continued climate change even after GHG stabilization (Meehl *et al.*, 2005). Further, policy negotiations are focused on GHG levels that guarantee further global warming (Meehl *et al.*, 2005). The findings of Meehl and colleagues suggest that adaptive actions towards climate change should be considered part of good risk management; yet, as identified in the present research, there may be greater economic barriers—or lack of normative motivation—to their implementation than there are to the implementation of mitigative actions. Whereas reductions in GHG emissions can be (and are being) managed through regulation or enacted as a result of firms' normative motivations to

protect the natural environment, adaptive actions may require very explicit *economic* incentives, particularly given that adaptive actions can require considerable investment and a long-term payback (Rossi, 2012). One way that governments might achieve this is through dynamic and flexible policies (Prins and Rayner, 2007) that target specific regions, or even industries, that are vulnerable to climate change (see, for example, Winn *et al.*, 2011). Incentives could come, for example, in the form of tax *relief* or subsidies for investment in adaptive actions.

## **Conclusion**

Although climate change is contentious, it already affects the business environment in many parts of the world (Esty, 2007; Kolk and Hoffmann, 2007). Therefore, following the issues perspective (Ansoff, 1980; Mahon and Waddock, 1992), firms might run a risk by not responding to it. However, how firms approach and respond to climate change has yet to be thoroughly analyzed or quantified in the literature (Goodall, 2008; Hoffmann *et al.*, 2009; Ansari *et al.*, 2011).

The current research on businesses and climate change associates response to climate change with GHG reductions, and, increasingly, with adaptive responses. Yet, one fundamental question to be addressed is the extent to which climate change requires immediate management attention, due to its primary stakeholder status (Haigh and Griffiths, 2009). The present study questions the extent to which climate change has salience (power, legitimacy, urgency, proximity). However, proximity (location) appears to require much closer attention. When combined with emerging research from around the world, a key implication of the findings here suggests that location may be one of the most important determinants of why and how firms respond—or refrain from responding—to climate change.

As for the findings, concern of this study's participants for the natural environment, and a desire to act as good stewards in order to maintain viable production practices, were found among

participants. These were demonstrated in the many mitigative actions that participants' firms have implemented. On the other hand, while there was evidence of some adaptive actions, many were not undertaken. This may in part be a result of the high uncertainties about the finer spatial and temporal scales at which participants' decisions are made and the lack of compelling climate science pointing to problematic impacts in the Margaret River wine region. However, the data suggest that many key adaptive actions were forsaken because they did not meet market demands or it seemed unlikely that they would deliver an economic return.

The results of this study need to be treated with caution. While there were findings that diverge from current rhetoric on climate change, the ability of these findings to be generalized should not be assumed. For example, other locations in Australia do appear to be suffering more of the ill-effects of climate change than Margaret River (Webb *et al.*, 2010; Galbreath, 2011). Perspectives and responses have therefore been found in the wine industry that stands in contrast to the present research; i.e., there is much more concern expressed about climate change depending on location and evidence of higher incidences of the implementation of adaptive actions. Yet even these point to the need for more "location-based" research, to better understand and articulate management responses to one of most high profile issues in the world today.

## TABLES

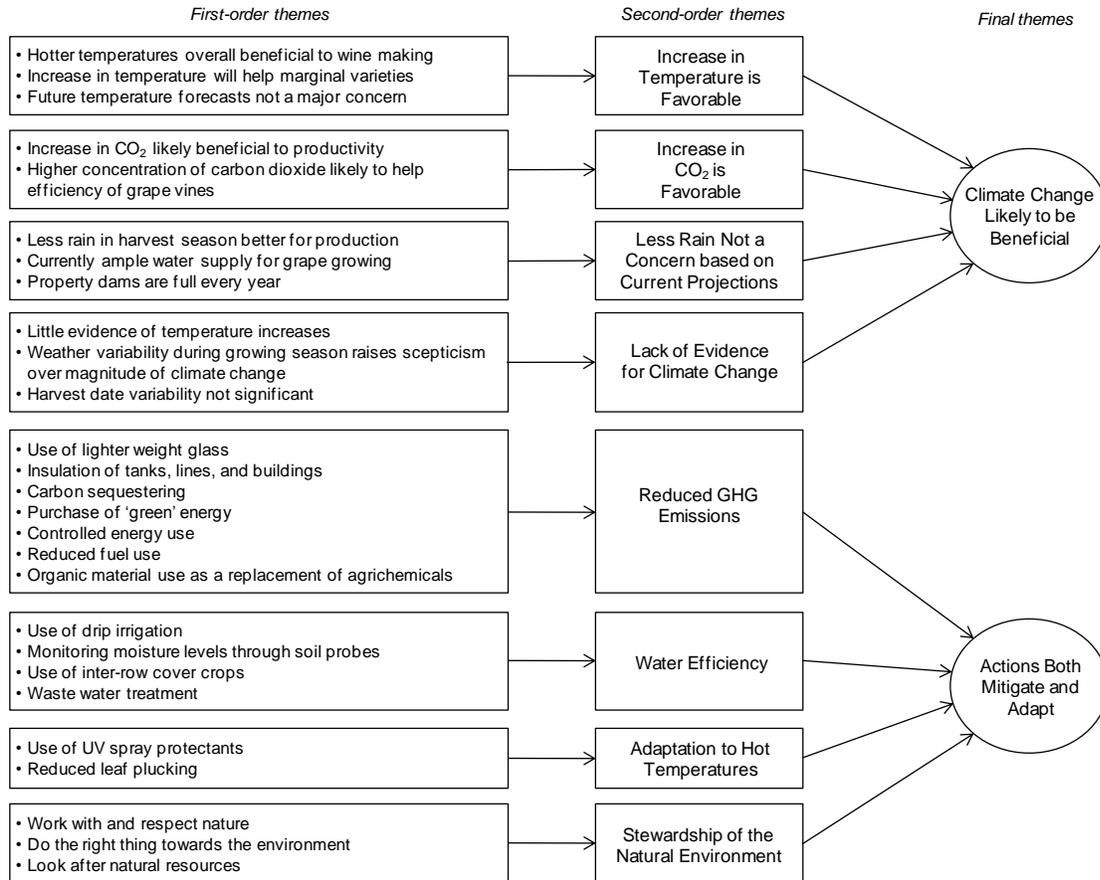
Table 1. Sample characteristics

Participant	Participant Role	Tonne Crush*	Cases Sold*	Key Wine Varieties	Key Export Markets
A	Viticulturist	1300	120K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Shiraz, Zinfandel	Hong Kong, Japan, Singapore, UK, US
B	Vineyard Manager	980-1000	40K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Semillon, Shiraz	Hong Kong, Mainland China, Singapore, UK,
C	Winemaker	350-550	30K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Semillon, Shiraz, Zinfandel	Hong Kong, Mainland China, Singapore
D	Managing Director	250-499	20-50K	Cabernet Sauvignon, Chardonnay, Merlot, Pinot Noir, Sauvignon Blanc, Semillon	Canada, France, Germany, Hong Kong, Portugal, Singapore, UK, US
E	Viticulturist	300	20K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Semillon, Shiraz	Hong Kong, Mainland China
F	Winemaker	650-700	18K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Semillon, Shiraz	Hong Kong, Japan, Mainland China
G	Managing Director	(not disclosed)	(not disclosed)	Cabernet Sauvignon, Chardonnay, Merlot, Pinot Noir, Riesling, Sauvignon Blanc, Semillon, Shiraz	Canada, Mainland China, New Zealand, UK, US
H	Managing Director	200	15K	Cabernet Sauvignon, Chardonnay, Merlot, Pinot Noir, Sauvignon Blanc, Semillon	Canada, Hong Kong, Japan, Mainland China, New Zealand, Scandinavia, Singapore, UK, US
I	Vineyard Manager	800-1500	100-120K	Cabernet Sauvignon, Chardonnay, Merlot, Riesling, Sauvignon Blanc, Semillon, Shiraz	Canada, Dubai, Middle East, Sri Lanka
J	General Manager	600-700	38-40K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Semillon, Shiraz	Hong Kong, UK
K	Vineyard Manager	1200	100K	Cabernet Sauvignon, Chardonnay, Merlot, Sauvignon Blanc, Semillon, Shiraz, Zinfandel	Canada, Mainland China, Germany, Hong Kong, Singapore, UK, US
L	Marketing Manager	60	4K	Cabernet Sauvignon, Chardonnay, Sauvignon Blanc, Semillon, Shiraz	Hong Kong, Mainland China

\* Some wine firms reported an exact figure based on 2009 results; others provided a general, historical range.

## FIGURES

Figure 1. Data structure and emergent themes



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