Abstract ~The influence of climate change on winemaking in Stellenbosch, South-Africa: the potential for quality wines now and in the future.

This thesis explores how climate change is affecting winemaking practices in Stellenbosch, South Africa, with a particular focus on how winemakers are responding through decisions made in the cellar. While vineyard-level adaptations such as canopy management, site selection and choice of cultivar have been widely researched, this study explores adaptions made in the cellar. It investigates how shifts in grape composition due to climate change influence vinification strategies and what this means for the future of wine quality and style in the region.

The motivation for this research is both academic and personal. During the 2025 harvest season, the author had the opportunity to work hands-on in the vineyards of Stellenbosch and conduct in-depth interviews with local winemakers. This experience not only provided practical insights but also deepened the understanding of the region's specific climate-related challenges and the winemaking responses they required.

Interestingly, most winemakers interviewed do not describe a clear, consistent rise in temperature or a major shift in climate. Instead, they emphasize increased variability between vintages – some marked by heatwaves, others by heavy rain. This contrasts with much of the literature, which does point to a general warming trend and longer-term climatic changes already underway in the region. These weather shifts affect both the timing of harvest and the uniformity of grape quality. A recurring concern is the sugar accumulation and differences in phenolic and flavour development. Grapes reach high sugar levels much faster, which, when left unaddressed, results in wines with higher alcohol levels and lower acidity. This shift presents challenges to maintaining balance in the final product and adds complexity to decision-making in the cellar.

Although adaptation in the vineyard is considered primary, many winemakers are incorporating subtle but meaningful changes in the cellar. Common measures include earlier-picking, acidification, early pressing, careful yeast selection, and blending across different vineyard parcels or even across vintages. However, these measures are generally regarded not as long-term solutions, but as corrective tools. Most winemakers in Stellenbosch do not see the cellar as the place to lead adaptation.

Instead, it is more of a support system, used to make adjustments when vineyard efforts are not enough. In that sense, winemaking is not seen as a way to solve climate change, but rather as a way to maintain quality and preserve identity when growing conditions become challenging.

Interestingly, some cellar practices adopted in response to climate challenges also align with broader trends in consumer preferences. For example, efforts to reduce alcohol levels, or the use of spontaneous fermentation, align with a growing market for low-intervention and “authentic” wines. Although most winemakers do not see their climate adaptations as marketing strategies, these overlaps may become more prominent as both climate awareness and demand for sustainable products increase.

Ethical and sustainability considerations were also mentioned during the interviews. Winemakers expressed concern that climate change disproportionately affects producers in warmer regions like Stellenbosch, where increased cooling requirements and the need for specialized equipment raise both costs and energy use. While not the central focus of this thesis, the need for accessible and energy-efficient solutions, such as low-input vinification or the adoption of energy-efficient mash coolers, was recognized as a growing priority. Future research could explore long-term strategies like multi-vintage blending, the use of non-Saccharomyces yeast strains, or even a more radical shift in wine style and grape varieties. These are mostly cellar-related approaches, but ultimately, most of the adaptations still lies in the vineyard, through choices like grape variety, site selection, and canopy management.

Consumer preferences, particularly the growing interest in lower-alcohol wines and sustainable production, provide some market-driven incentives for adaptation. However, in South Africa’s domestic market, affordability often outweighs environmental concerns.

In short, the future of quality wine production in Stellenbosch will depend on a balance between proactive vineyard strategies and careful, restrained winemaking. Long-term adaptation must begin in the vineyard, with winemaking serving as a supporting—rather than leading—element. This approach respects both environmental limitations and evolving consumer expectations while preserving the natural character and integrity of Stellenbosch wines.