

## Estimating the Impact of Climate Change on Temperate, Subtropical and Tropical Grape Growing Regions in Brazil

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Viticulture for table grape or wine production in Brazil was historically established in the extreme South of the country, in temperate climate. More recently, new producer regions appeared in South, Southeast and Northeast of the country, including subtropical and tropical type of climate in the production scenario. Some studies characterized the Brazilian climate of production regions in all types of climates. The potential impact of climate change on different grape growing regions of Brazil needs to be evaluated to project investments, considering challenges and mitigation actions, for the development of table grape and wine production in Brazil.

This work had the goal to estimate the potential impact of climate change related to viticulture potential on different producing regions of Brazil that concerns temperate, subtropical and tropical types of climates.

Thirteen producing regions in Brazil were studied: Campos de Clima da Serra, Serra Gaúcha, Serra do Sudeste and Campanha in the state of Rio Grande do Sul; São Joaquim and Rio do Peixe Valley in Santa Catarina state; Northwest region of Paraná state; Northwest region, Jundiá and São Miguel Arcanjo in São Paulo state; North and South regions of Minas Gerais state; and, São Francisco Valley in Bahia and Pernambuco states. The methodology used a climatic database series 1961-1990 as baseline period (Conceição et al., 2012). PRECIS (Low and High) and ETA (Low, Midi and High) models of climate change were run for scenarios in 2025 and 2055. The Heliothermal Index (HI), Cold Night Index (CI) and Dryness Index (DI) of the Geoviticulture MCC System and the Zuluaga Index, were calculated. Indices for regions with viticultural potential to produce more than one cycle/harvest per year were calculated also for autumn-winter period of the year. The indices values, mapped in GIS for the total area of each region, corresponds to the average of the region.

The results quantified an important climate change in all producing regions. Some will change MCC climatic groups. Concerning classes of viticultural climate for CI, cool/temperate nights tend to become temperate/warm nights. Regions with Cool class for HI will tend to disappear in a long-term period in Brazil. Concerning Dryness Index, the study detected particular scenarios in each region, consequence of the water balance in the climate change context. The Zuluaga index showed that, in some regions, the potential for viticulture phytosanitary problems would rise with climate change.

This climatic zoning will help to understand how to work on actions to mitigate the potential impact of climate change on a medium and long-term period, in different scenarios for grape growing and winemaking in Brazil.

### Reference

Conceição, M.A.F. et al., 2012. Viticultural climatic zoning in temperate, subtropical and tropical zones, Brazil: bases for estimating the impact of climate change. Proceedings of the IX International Terroirs Congress, Dijon, v.3, 54-57.