CLIMATE CHANGE ADAPTATION AND THE NATURAL SCIENCES: A CASE-STUDY OF THE ONTARIO GRAPE AND WINE INDUSTRY

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Abstract- The scientific consensus is that the current and predicted impacts from climate change may represent humanity's greatest existential threat, yet to date both climate mitigation and adaptation responses have been very inadequate. Agricultural systems are particularly vulnerable to climate change, yet surprisingly within the Canadian context there has only been limited federal government planning and programming to address these challenges. Grape and wine are economically important components of Canada's agri-food sector, with the Ontario wine industry - Canada's largest - generating $3.3 billion in economic impact per year. However, current and pending climatic conditions threaten the industry. These threats are numerous, and include the unpredictability of extreme weather events such as early freezes, mid-winter thaws and spring frosts which impact on the industry's ability to produce quality wines. Additionally, increased pest pressure, including from Coccinellidae, and a relatively limited portfolio of established wine styles further reduce the resilience of the industry. We highlight how the natural sciences can assist in meeting these several challenges with examples of both viticultural and oenological responses and initiatives from our research network (the Ontario Grapevine and Wine Research Network). These include the use of molecular techniques to confer increased winter hardiness to vines and assist in sparkling wine production, and the application of chemical engineering to remediate Coccinellidae-tainted wines. We conclude that strategic and integrated natural science research can assist the agri-food sector to meet the challenges and realize the opportunities afforded by climate change.

Keywords- Climate Change Adaptation, Grape, Wine, Interdisciplinary, Natural Sciences