Life Cycle Assessment and the New Zealand Wine Industry: A tool to support continuous environmental improvement

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"If we want things to stay as they are,
things will have to change"

Giuseppe di Lampedusa, 1896 - 1957

ABSTRACT

As the marketplace becomes increasingly environmentally conscious, demonstration of environmental credentials and evidence of continuous improvement will likely become of increasing strategic and economic importance to New Zealand wine exporters. Keeping pace with such market changes will ensure local exporters remain competitive against other wine producing countries, and help secure their share in important foreign markets such as the UK.

This thesis uses Life Cycle Assessment (LCA) to identify how the New Zealand wine industry can improve its standard of environmental management and inform its practice of environmental labelling. Through the identification of environmental hotspots, use of sensitivity analysis, and normalisation of results, all using a product life cycle framework, this research provides the industry with some direction as to how to better measure, manage and reduce its environmental impact, and identifies various ways of improving the quality of information being conveyed to the consumer through environmental labelling.

This research shows environmental improvement opportunities lie particularly in the areas of packaging systems, frost protection, agrichemical application, waste management, energy efficiency in the winery, and crop regulation. It provides some evidence to indicate that the carbon footprint is not the most significant environmental impact in the wine life cycle, and that other environmental impacts should be considered in development of improved environmental management systems. It also highlights the importance of using a standardised methodology in environmental labelling programmes.

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LIST OF ABBREVIATIONS USED

ADP Abiotic Depletion Potential

AP Acidification Potential

CF Characterisation factor

EP Eutrophication Potential

EPD Environmental Product Declaration

FAETP Freshwater Aquatic Ecotoxicity Potential

GHG Greenhouse Gas

GWP Global Warming Potential

HTP Human Toxicity Potential

IPCC Intergovernmental Panel on Climate Change

IWCC International Wine Carbon Calculator

LCA Life Cycle Assessment

LCI Life Cycle Inventory

LCIA Life Cycle Impact Assessment

MAETP Marine Aquatic Ecotoxicity Potential

MAF New Zealand Ministry of Agriculture and Forestry

NI North Island (case study) winery

ODP Ozone Depletion Potential

PAG Product-at-gate

PCF Product Carbon Footprint

POCP Photochemical Ozone Creation Potential

SI South Island (case study) winery

TETP Terrestric Ecotoxicity Potential

WRAP The British Waste and Resources Action Programme