



## ADAPTING TO A CHANGING CLIMATE: FACT SHEET 1

# Winegrowing in a changing climate

### WHAT IS THE FUTURE OF WINEGROWING IN NEW ZEALAND?

- Changing climatic conditions.
- Water rationing and efficiency needed.
- A need for vigorous canopies and yield.
- Stronger and new pests and diseases.
- A need for residue-free, late season disease control.
- New varieties and wine styles.
- Changes to the geographical spread of varieties.

### WINEGROWERS WILL NEED TO ADAPT THEIR PRACTICES

- Efficient water use and irrigation systems.
- Soil moisture monitoring.
- Boost the water holding capacity of soils.
- Pest and disease forecasting and risk prediction.
- Pest and disease control with nil or ultra low residue.
- Introduce new varieties and wine styles to meet consumer preferences and changing climatic conditions.

*By the end of the century, New Zealand is expected to be warmer overall, drier in the east, wetter in the west, and with more severe weather events. The wine industry is working hard to adapt to, and benefit from, the effects of expected climate change.*

New Zealand's major wine growing regions are on the eastern coast – Gisborne, Hawkes Bay and Marlborough. These regions are expected to become warmer and drier and experience more extreme weather events.

Alongside these changes, temperate maritime conditions have a strong influence on coastal vineyards.

### WATER MUST BE USED EFFICIENTLY

Water is essential to grow high quality wine, yet it is already in limited supply in some regions. Water supply challenges will be heightened by the drier conditions expected on the east coast, particularly Hawkes Bay, Gisborne and Marlborough.

Droughts will become more frequent, so growers need to adopt ways to use water more efficiently, such as:

- › add organic matter to the soil to improve its water holding capacity;
- › install efficient irrigation systems and water meters;
- › monitor soil moisture and schedule irrigation as its needed.

### EXPECT MORE EXTREME WEATHER CHALLENGES

Extreme weather events create significant challenges to winegrowers.

The number of frosts will drop as the climate becomes warmer, but there will still be late spring frosts that will be particularly damaging to vines due to the likelihood of earlier budbursts.

Higher winds and temperatures are also expected to occur more often and would cause additional vine damage and stress.

### INSECT POPULATIONS WILL INCREASE

Insect development is directly dependant on temperature. The warmer the conditions, the faster insects develop and the more generations they produce.

Therefore, warmer conditions will bring greater challenges in vineyard pest control and serious implications for the spread of grapevine leafroll virus, which is carried by mealybugs.



*“As our climate warms, we are much more vulnerable to pest incursions and survival.” Dr Jim Walker, Plant & Food Research*

# Key points

- 1 Climatic conditions in the country's major winegrowing regions are expected to become warmer and drier, with more extreme weather events.**
- 2 Winegrowers must adapt to drier conditions and use water efficiently.**
- 3 Warmer conditions will increase insect populations.**
- 4 Milder winters may increase disease over-wintering risk, while more summer rain may heighten late season disease.**
- 5 A changing climate will impact vine growth, yields and the fruit compounds that influence wine style.**
- 6 New Zealand's cool climate means it could adapt well to future climatic conditions.**

Consider the following example that shows how rapidly insect populations could multiply. Today, mealybugs produce two or three generations per season – one mealybug in spring leads to 10 000 by harvest. In just 30 years, mealybugs are likely to produce another two generations per season. This means one mealybug in spring leads to 100 million by harvest.

A warmer climate is also likely to affect secondary pests such as the Argentine ant that feeds on honeydew-producing insects such as mealybug, scale insect, leaf hopper and aphid. By 2040, the risk factor for secondary pests, for Marlborough vineyards is expected to climb substantially and Gisborne and Hawkes Bay will almost certainly have a problem.

## INSECT PESTS WILL SPREAD FARTHER

As winegrowing regions become warmer, they will be more susceptible to infection from insects that favour warm climates.

This is already started to occur. The vine mealybug *planococcus ficus*, a debilitating species of mealybug native to the Mediterranean Basin, has spread rapidly through California.

## MORE SEVERE DISEASE EXPECTED

Vineyard disease control may be different by the end of the century. Dr Phillip Elmer from Plant & Food Research says methods used in warmer and more humid winegrowing regions will become more common in other areas.

Cool spring temperatures presently restrict growth of powdery mildew but a warmer and drier climate would bring more severe infections that spread quickly and are more resistant to sulphur sprays.

While the milder winters expected could increase the amount of over-wintering botrytis inoculum, warmer and drier spring conditions would help reduce flowering infection events. However, higher summer and

autumn rain would increase late season botrytis and create a need for more residue-free control products.

More growers may need fungicides, or other management alternatives, to control fungal diseases such as downy mildew and sour rots which have typically been constrained to humid climates. Good canopy management will be crucial.

## GRAPE FLAVOUR MAY CHANGE

Warmer temperatures and the effect of CO<sub>2</sub> fertilisation could bring more vigorous vine canopies, greater yields, earlier ripening, and affect grape flavour and aroma.

While it is possible to define the climate that produces premium production for each variety, it is not yet known how changing climate conditions will affect cool climate wine styles, particularly the distinctive Marlborough sauvignon blanc.

Plant & Food Senior Scientist Dr Mike Trought believes the expected changes in temperature and CO<sub>2</sub> will shift the suitable growing area for sauvignon blanc southwards from Marlborough to central and north Canterbury. Nevertheless, New Zealand is in a fortunate position because its regions with cool temperatures are likely to become suitable for the wine styles that the country is already renowned for.

Winegrowers may also need to adapt new winemaking techniques, new varieties and meet changing consumer preferences for wine styles.

## FOR MORE INFORMATION

- Read the articles *Climate change: observations, projections and general implications for viticulture and wine production* and *Climate change and the global wine industry* by research climatologist Prof Gregory V Jones of Southern Oregon University. Both articles are available on the University's website: [www.sou.edu](http://www.sou.edu) (search 'Gregory V Jones').
- Read the AgScience article *Hope for the best, plan for the worst – the possible future for the New Zealand wine industry under climate change*. The article is published in issue 31, and can be downloaded or ordered from: [www.agscience.org.nz](http://www.agscience.org.nz)
- Find out the expected climate conditions for your region at [www.niwa.co.nz/ncc](http://www.niwa.co.nz/ncc)
- Find out how agriculture is likely to be affected by changing climatic conditions in *The EcoClimate Report: Climate change and agricultural production* published by the Ministry of Agriculture and Forestry: [www.maf.govt.nz](http://www.maf.govt.nz)

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