Horticulture & viticulture

Climate Vulnerability Assessment
Macadamia Factsheet

Growing macadamias in New South Wales: preparing for a changing climate

Macadamia growing regions in NSW will likely continue to experience high to very high climate suitability under a changing climate by 2050.

Developing industry-informed climate planning information

Climate change is altering the growing conditions for many agricultural commodities across NSW. Primary producers need evidence-based information about the changing climate, and the risks and opportunities it may bring.

Through its Vulnerability Assessment Project, the NSW Department of Primary Industries is enhancing the resilience of our primary industries by providing information and data to help the sector better plan for, and respond to, climate change. The project has assessed climate change impacts for extensive livestock, broadacre cropping, marine fisheries, forestry, horticulture and viticulture, and important biosecurity risks associated with these industries to inform sound planning, risk management and adaptation decisions.

Macadamias in NSW

Macadamias are a significant Australian horticultural export and the first Australian native plant to have been developed as an international food crop.

In 2021-22, the NSW macadamia harvest produced over 22,000 tonnes of nuts worth $135 million (Source: NSW DPI).

In NSW, macadamias are predominantly grown around the Northern Rivers and mid-north coast regions (Figure 1). Macadamias in NSW are not irrigated, except in Dareton in southwest NSW.

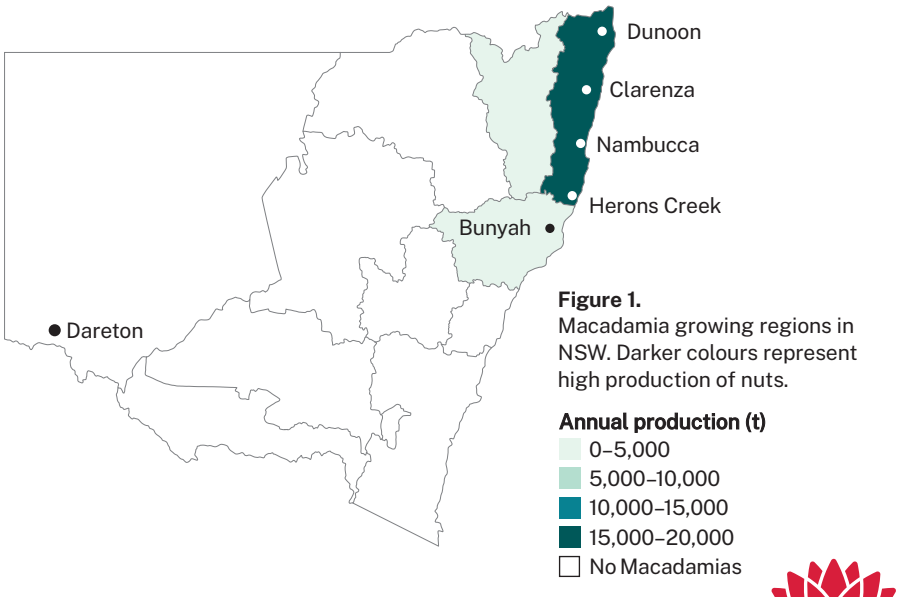

Figure 1.
Macadamia growing regions in NSW. Darker colours represent high production of nuts.

Climate and the macadamia industry

Macadamia growing regions in NSW are expected to continue to have high to very high climate suitability for growing macadamias by 2050 under a changing climate. Climate risks to the NSW macadamia industry affect the phenophases of the macadamia lifecycle in different ways.

Climate change risks to the NSW macadamia industry include:

Extreme heat: Increased temperatures and a high frequency of hot heat days may affect nut set, sizing, flowering and quality.

Frost: Fewer days below 0°C will likely decrease frost damage to flowering.

Climate impacts: what to expect

Flower bud initiation is expected to maintain very high climate suitability in all North Coast growing regions (*high confidence*). Dareton is projected to maintain high climate suitability (*high confidence*).

Flowering may be protected from frost damage under a warmer climate. All sites will likely maintain the historical very high climate suitability (*high confidence*).

Nut set and size may be adversely affected by an increase in days above 35°C and 40°C (*moderate to high confidence*). However, fewer days below 10°C are expected to improve climate suitability, with the potential to expand growing further south (*moderate to high confidence*).

Oil accumulation commences when nuts are fully hardened, and is vulnerable to extreme heat. Dareton is projected to decrease in climate suitability due to increased high heat days (*moderate to high confidence*). However, all sites in the North Coast growing regions are expected to maintain very high climate suitability (*moderate to high confidence*).

Harvest (maturity) is expected to maintain high to very high climate suitability across all sites (*moderate confidence*). However, Dareton will likely decrease in climate suitability due to more extreme heat events (*moderate confidence*).

Macadamia quality

Quality is expected to remain at very high climate suitability across all growing regions under a warmer climate.

Mould is often a problem when there are high moisture levels, particularly at harvest when high levels of rainfall and high heat days combine. The climate suitability for mould across the harvest period is expected to remain similar to what has been historically experienced.

Macadamia rainfall

The macadamia model also considered potential impacts due to changes in rainfall. Seasonal rainfall for current growing sites will likely remain similar to what has been experienced historically (*moderate confidence*).

How to adapt

Adapting to extreme heat

Increased high heat days are expected to affect nut set and size and increase water demand. Implementing supplementary irrigation systems and increasing soil organic matter through the regular application of compost and mulch may help to alleviate the impacts during drier periods. A transition to growing macadamias as an irrigated crop in NSW should be considered.

A changing climate may bring opportunities for expanding the NSW macadamia growing region in the south of the state.

Methodology and data

Climate projections were sourced from Climate Change in Australia's 'Application Ready Data'. This dataset is comprised of projections from an ensemble of 8 global climate models, each presenting a plausible future climate. The models differ in their projections, giving rise to uncertainty in our modelling which is reflected in the confidence statements given in brackets in the text. Care should be taken when interpreting these results.

The Vulnerability Assessment Project is intended to highlight potential industry- or regional-level changes. Intermediate and high emissions scenarios were used in the assessments (RCP4.5 and RCP8.5), but these are not the only future scenarios possible. The inclusion of climate variables important to the commodities production was based on published research, expert knowledge and data quality and availability.

FOR MORE INFORMATION

Please get in touch with vulnerability.assessment@dpi.nsw.gov.au

This work has been produced by the NSW Primary Industries Climate Change Research Strategy funded by the NSW Climate Change Fund.