Broadacre cropping

Climate Vulnerability Assessment
Irrigated Maize Factsheet

Growing irrigated maize in New South Wales: preparing for a changing climate

NSW irrigated maize growing regions are likely to maintain current levels of climate suitability by 2050 under a changing climate. However, there may be considerable increases in climate suitability along the Great Dividing Range and south coast.

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 cross-cutting biosecurity risks associated with these industries to inform sound planning, risk management and adaptation decisions.

Irrigated maize in NSW

Irrigated maize or 'corn' supplies breakfast cereals, popcorn, cornflour and stock feed in the central and southern grain-growing regions (Murray, Riverina and Lachlan) and on the Liverpool and Moree plains of northern NSW. Maize often grows close to major dairy production areas of coastal NSW and beef cattle feedlots, where it is used as a bulk energy source.

The NSW growing season for maize is from mid-September to April, depending on the start of warmer temperatures. Yields for rain-fed maize are usually lower than for irrigated maize, as rainfall rarely completely aligns with crop water demand.

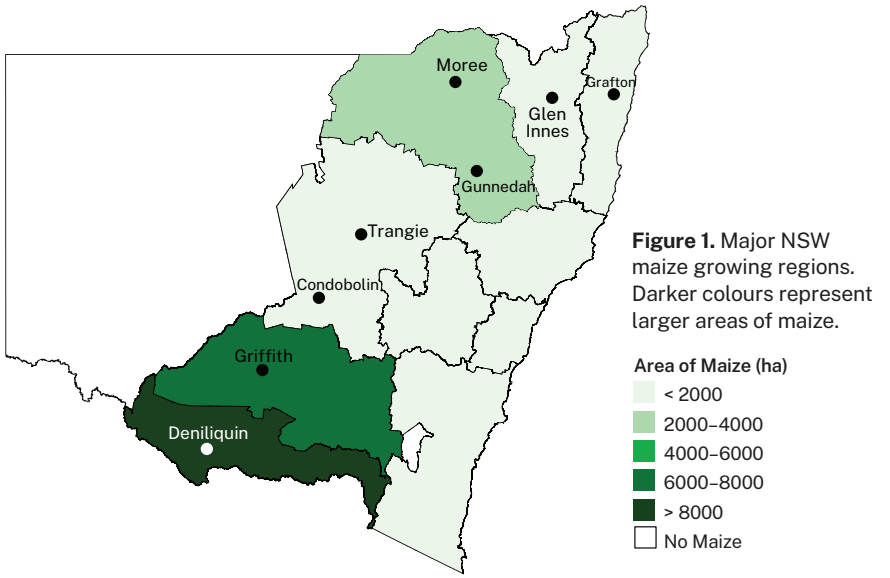

Figure 1. Major NSW maize growing regions. Darker colours represent larger areas of maize.

Climate and the irrigated maize industry

Maize growing regions in NSW are likely to remain suitable for irrigated maize production, although some minimal declines in climate suitability are likely in parts of the western growing regions.

Climate risks and opportunities for maize include:

Increased temperatures are likely to allow large areas of the Great Dividing Range, previously too cool for maize crops to reach maturity, to become suitable for irrigated maize production (*high confidence*). The risk of heat damage during all stages of growth is likely to increase during future climatic conditions, particularly west of the Great Dividing Range (*moderate to high confidence*).

Climate impacts: what to expect

Germination reliability will likely remain very high across key growing regions (*high confidence* in northeast NSW, *moderate confidence* elsewhere).

Sowing to tassel initiation will likely experience a moderate increase in climate suitability along the Great Dividing Range due to projected warmer temperatures (*high confidence*).

Tassel-to-silk and silk-to-dough phenophases will likely experience a minimal reduction in climate suitability to the west of the Great Dividing Range (tassel to silk) and across the north of the state (silk to dough) due to warmer climate conditions (*moderate to high confidence*).

Dough to maturity will likely experience minimal to moderate increases in climate suitability along the Divide and the South Coast (*high confidence*). Suitability may decrease in the west of the state due to shifts in mean temperatures (*moderate confidence* under the intermediate emissions scenario, *high confidence* under the high emissions scenario).

Irrigation water requirements

Irrigation water requirements are unlikely to change in future as greater plant water use due to warmer temperatures is likely to be counteracted by a shorter growing season (modelling confidence varies substantially across the state). A decrease in fallow rainfall in the northern growing region (*low confidence*) could reduce crops grown unless soil water is supplemented by irrigation.

Length of growing season

Plant development may accelerate under future climate, with all phenophases likely to shorten (*high confidence*). This may allow the maize growing region to expand, especially in the northern tablelands and the state's southeast.

Adapting to the changing climate

Slower-growing varieties may be required to restore yield under future climate, but this would increase water demand.

Water-efficient systems that allow irrigation to be continued in the future may be required, especially if season length is restored through the use of slower-developing varieties. Expansion of irrigated maize to the upland parts of NSW and the Central Tablelands may be possible, but may be limited by the availability of irrigation.

Methodology and data

This model describes a fully irrigated maize crop. A dynamic phenology was used to model this crop, with a fixed sowing date of October 1st, after which germination is initiated when 15 mm or more of rain falls in any period of 14 consecutive days. Following germination, the model applies thermal time thresholds to define the start and end dates of each phenological stage of plant development. As a result, these dates varied across the state, with crops maturing faster in warmer areas.

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.