Broadacre cropping

Climate Vulnerability Assessment
Chickpea Factsheet

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

The overall climate suitability for growing chickpeas in NSW is likely to remain similar to that which has been historically experienced, although changes to summer rainfall could impact production.

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.

Chickpeas in NSW

Chickpeas were first grown in Australia as a commercial crop in Queensland during the early 1970s. It is now an important crop in northern farming systems in NSW and Queensland. There are two types of chickpeas – desi and kabuli – which are distinguished by seed size, shape and colour. Most Australian chickpea (mainly desi) production is in northern Australia; most kabuli production is in the south.

As pulses, chickpeas fix nitrogen and provide weed and disease breaks for winter and summer cereal crops. Chickpeas can tolerate relatively high temperatures during the flowering-grain fill period. They require deep soils and annual rainfall of over 350 mm.

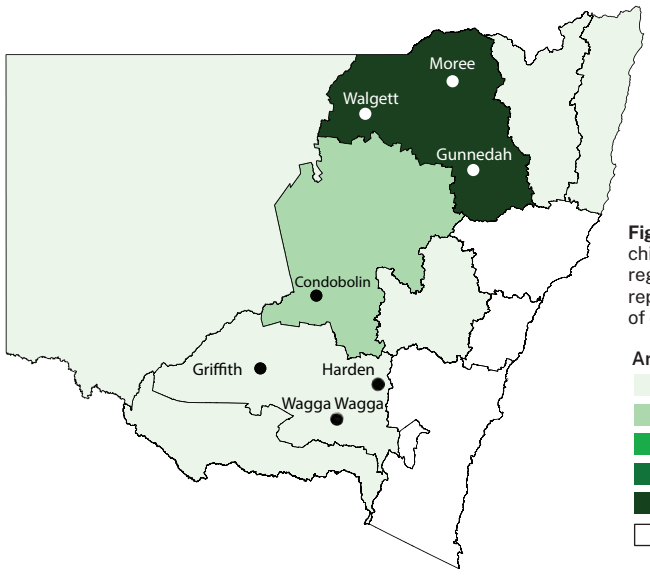


Figure 1. Major NSW chickpea growing regions. Darker colours represent larger areas of chickpea grown.

Climate and the chickpea industry

Dryland chickpea growing regions are likely to continue to have moderate to high climate suitability for dryland chickpea production by 2050 under a changing climate.

Climate risks and opportunities include:

Changes in rainfall during the summer fallow period are likely to impact climate suitability for chickpea production, particularly in the north of the state. However, it is uncertain whether climate suitability will increase or decrease. Germination reliability could also be impacted due to reduced cool season rainfall in the north of the growing region (*moderate confidence*).

Increased mean temperatures especially during winter, are less likely to halt plant growth in cooler regions of the state (*high confidence*).

Climate impacts: what to expect

Vegetative growth may benefit from reduced frost risk (*high confidence*) and accelerated crop development (*high confidence*).

Establishment and pod fill may experience similar to historical climate suitability in the future (*moderate to high confidence*).

Germination reliability is likely to remain high or very high across most of the state, with no significant change likely apart from areas of the northwest and central west regions, leading to lower reliability of chickpea production in these areas (*low to moderate confidence*).

Length of growing season

The chickpea growing season is likely to be shorter in future, particularly under the high emissions scenario (*high confidence*).

FOR MORE INFORMATION

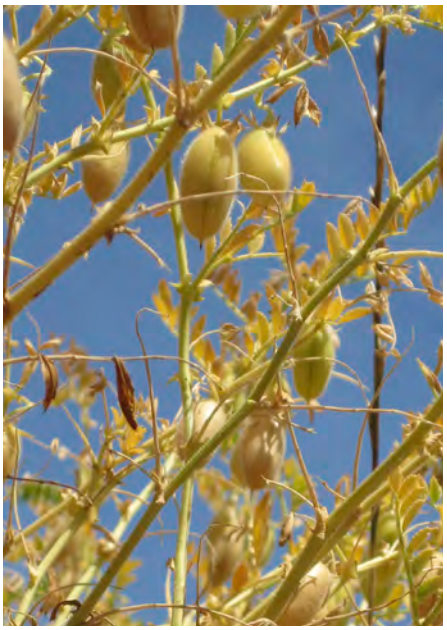
Please get in touch with vulnerability.assessment@dpi.nsw.gov.au

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

Adapting to the changing climate

The changing climate may bring opportunities for the expansion of chickpea production in the south and to the east of the current growing area as temperatures during vegetative growth become more favourable.

Sowing summer crops in years when low rainfall precludes autumn sowing may help the industry to adapt to these climate conditions, although this is only possible in regions where summer rainfall is adequate.



Methodology and data

The model describes the desi chickpea variety. A dynamic phenology was used to model this crop, with a fixed sowing date of May 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.