Broadacre cropping

Climate Vulnerability Assessment
Dryland Barley Factsheet

Growing dryland barley in New South Wales: preparing for a changing climate

NSW dryland barley growing regions are likely to maintain moderate climate suitability for barley production under a changing climate.

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.

Barley in NSW

Barley was first grown in Australia in 1788 in the Sydney region. Production increased dramatically when land west of the Great Dividing Range was opened to agriculture. Originally used to make unleavened bread, barley is now primarily used as animal feed and fermentable grain for alcoholic beverages such as beer and whisky.

Barley is the second most widely grown cereal crop after wheat in NSW, with approximately 800,000 hectares of barley sown annually and an average yield of 2.2 tonnes per hectare during 2010–20.

The major barley-growing regions in NSW are shown in Figure 1. In NSW, the crop is rainfed without irrigation.

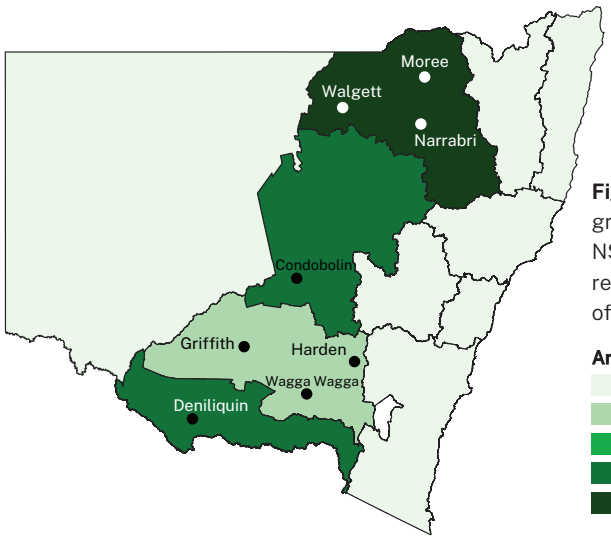


Figure 1. Major barley-growing regions in NSW. Darker colours represent larger areas of barley grown.

NSW GOVERNMENT

Climate and the barley industry

NSW dryland barley growing regions are expected to maintain moderate climate suitability for barley production under a changing climate, with some minimal increases in climate suitability likely in northern growing regions.

Climate risks and opportunities include:

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

Decreased frosts are likely to make the northwest of the state more reliable for growing barley (*high confidence*).

Climate impacts: what to expect

Germination reliability is likely to remain high or very high across most of the state, with no change likely except in parts of the of northwest and central west regions, potentially leading to reduced barley production in these areas (*low to moderate confidence*).

Vegetative growth may experience a minimal increase in suitability across the state's centre due to a warmer climate (*high confidence*).

Reproductive growth is unlikely to change overall (*moderate to high confidence*), although reduced incidence of frost may minimally increase climate suitability in the northwest region of the state.

Length of growing season

Accelerated plant development due to warmer temperatures is likely to lead to shorter phenophases and a shorter overall length in the growing season (*high confidence*). Germination and tillering will likely occur more quickly in southern and central growing regions *(high confidence*). The northern regions will likely experience quicker vegetative growth and late stem elongation during reproduction (*high confidence*).

FOR MORE INFORMATION

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

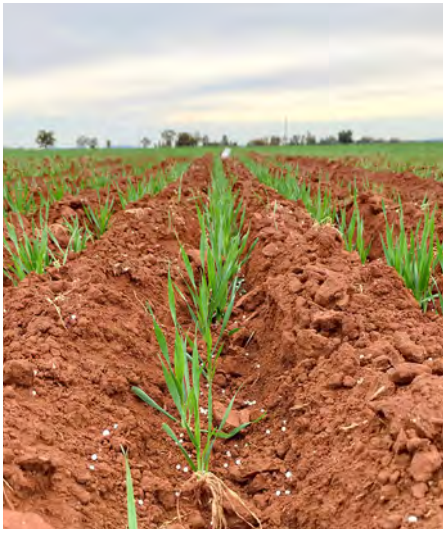
This work has been produced by the NSW Primary Industries Climate Change Research Strategy funded by the NSW Climate Change Fund.

Adapting to the changing climate

A changing climate will likely result in accelerated dryland barley growth in NSW. Less frost will likely reduce the risk of mild and moderate crop damage. Expected increases in climate suitability are likely to lead to greater barley yields, with larger increases expected in the southern growing regions.

As a result, adaptation is unlikely to be required to maintain a high quality and yield of barley. The projected lower frost damage may reduce the importance of sowing strategies to avoid frosts and the need to develop frost-resistant barley.

A changing climate may support increased NSW barley production, especially in the south.



Methodology and data

The model describes a 'LaTrobe' type spring barely with no vernalisation requirement. 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.