



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

NSW irrigated cotton growing regions will likely maintain moderate to very high climate suitability for irrigated cotton production by 2050 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.



Cotton in NSW

Cotton is a perennial plant grown as an annual summer crop, so the growing season length is reasonably flexible. The growing season for irrigated cotton can be up to 180 days, usually between October and May in NSW.

Cotton was first commercially grown in northern NSW in the early 1960s. The mid-1980s saw an expansion of cotton growing further south and west, although cooler conditions and an associated shorter potential growing season were constraints on industry development in southern NSW.

Irrigated cotton growing resumed in the 1990s in the Murrumbidgee and Murray valleys, with increasing areas sown in recent years due to improved varieties of cotton, re-establishment of infrastructure such as cotton gins, and reduced water availability in the north of the state.

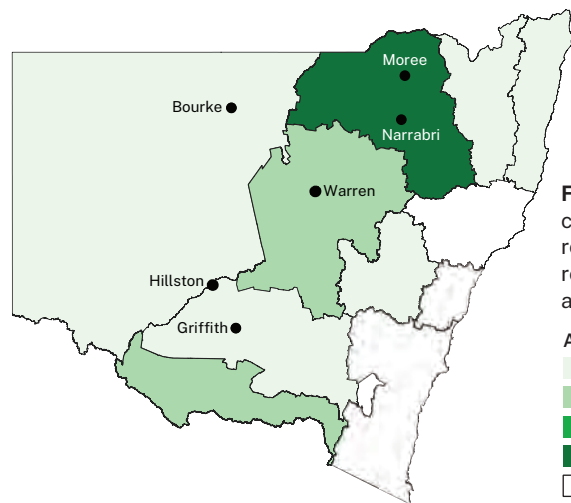


Figure 1. Major NSW cotton growing regions. Darker colours represent larger areas of cotton.

Climate and the cotton industry

Under future climate scenarios, climate suitability for cotton production in NSW's cotton growing regions is likely to be maintained, with increases in climate suitability in the southern areas.

Climate risks and opportunities include:



Increased irrigation water requirements are expected by 2050. The increase is likely to be greatest under the high emissions scenario and in southern NSW (*high confidence*).



Increased mean temperatures may increase climate suitability for cotton production in southern growing districts due to accelerated plant development (*high confidence*).

Climate impacts: what to expect

Establishment may experience a minimal to moderate increase in climate suitability across the growing regions (*high confidence*).

Vegetative growth may experience a minimal to moderate increase in climate suitability across the growing regions (*high confidence*).

Reproductive growth may experience a minimal to moderate increase in climate suitability across the southern growing areas and the east of Moree and Narrabri. Likely no significant change in the northwest region (*high confidence*).

Early and late boll growth is not expected to experience altered climate suitability under future climate conditions (*moderate to high confidence*).

Cotton quality

Cotton quality (colour and micronaire) is not expected to change under future climate conditions. Historically, cotton fibre thickness has been premium and is unlikely to change (*high confidence*). Cotton colour is also unlikely to change (*high confidence*).

Length of growing season

Higher temperatures may result in longer reproductive and plant growth phases, allowing more bolls to be set and increasing yield potential. These changes are likely to be greatest in southern NSW.

Adapting to the changing climate

Expanding the cotton growing regions into the lower Murray region of NSW may be possible due to improved growing conditions and increased climate suitability associated with higher temperatures. Higher temperatures may shorten the establishment and vegetative phases but allow for longer development of cotton bolls.

Developing water-efficient irrigation systems will benefit the entire NSW cotton industry but would be of greatest use in the south, where changes in climate suitability and irrigation water requirements are likely to be greatest.

Methodology and data

A dynamic phenology approach was used to model this crop, which used a set sowing date of October 1st, an induced end of the reproductive phenophase on March 15th and harvest on April 15th, with thermal time thresholds to set dates for the establishment, vegetative and reproductive phenophases. As a result, the calendar dates associated with each phenophase vary 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

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