High rainfall zone grazing systems in New South Wales: preparing for a changing climate

Climate change is likely to offer both opportunities and challenges for high rainfall zone grazing systems in NSW in 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.

High rainfall zone grazing systems in NSW

High rainfall zone (HRZ) grazing systems cover a region across the Northern, Central and Southern Tablelands of NSW, where rainfall typically exceeds 600mm per annum on fertile soils (Figure 1). HRZ grazing systems are important to agriculture in NSW as they provide favourable conditions for livestock grazing and pasture development. High rainfall zone pastures are characterised by a diverse range of species including sown grasses and annual legumes, and native grass pastures.
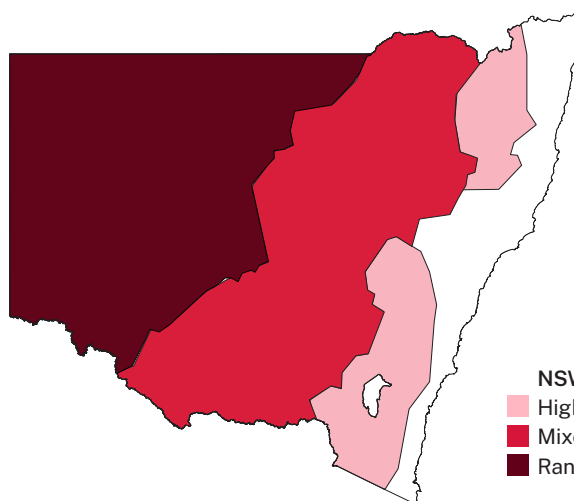
Figure 1. Map of NSW grazing systems areas used in the Vulnerability Assessment Project.

NSW Grazing Systems
- High Rainfall Zone
- Mixed Cropping Zone
- Rangelands

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Climate and high rainfall zone grazing systems

Climate suitability across HRZ grazing systems is likely to remain high to very high, with no significant change expected in these regions by 2050.

Climate change risks to the high rainfall zone grazing systems include:

Changes in temperature and rainfall are likely to decrease suitability for sown pastures in summer and autumn.

Climate impacts: what to expect

Autumn is likely to experience a minimal to moderate decrease in sown pastures ability to meet animal requirements (*moderate to high confidence*). This is expected to be driven by increased temperatures and more variable rainfall. Native pastures are likely to maintain similar suitability to what has been historically experienced (*moderate to high confidence*).

Winter ability to meet animal requirements is likely to remain similar to what has been historically experienced in high rainfall zone grazing systems (*moderate confidence*)

Spring ability to meet animal feed requirements is likely to remain similar to what has been historically experienced in high rainfall zone grazing systems (*moderate confidence*).

Summer is likely to have a minimal to moderate decrease in sown pastures ability to meet animal requirements under both emission scenarios due to increased temperatures and more variable rainfall (*moderate to high confidence*). Native pastures are likely to maintain similar suitability to what has been historically experienced (*moderate confidence*).

Adapting to Climate Change

Adapting to increased temperatures and variable rainfall

- Increasing soil fertility improves the pasture growth response when there is available water, and has been identified as a key adaptation strategy.
- Changing stocking rates and joining times may better align peak feed demand and feed supply periods, which could help mitigate decreases in feed production.
- Using tropical pasture species, particularly in the north, may be an appropriate adaptation due to their greater resilience to climate change and increased production under variable rainfall.
- Selecting hard-seeded legumes, which exhibit longer dormancy until suitable rainfall and temperature conditions are met for germination, may increase seed bank resilience.

Methodology and data

The ability of these grazing systems to meet the feed intake requirements of livestock and the persistence of sown species (perrenial grasses and annual legumes) was analysed using a spring lambing/calving system with a stocking rate of 19 DSE/ha for sown pastures and 10 DSE/ha for native pastures, considered representative of livestock enterprises employing HRZ grazing.

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. 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.