

summary

Well managed extensive dryland pasture, including native pastures are likely to increase in yield capability under a changing climate.

Graziers can maximise this opportunity by improved pasture management practices and the use of a variety of pasture grasses with different climatic tolerances in sown pastures.

In recent years, Tasmania has experienced some of the warmest years on record. It is highly likely that average minimum and maximum temperatures will continue to increase in the future.

What does this mean for Tasmania's graziers?

Dealing with climate

Over the past decade Tasmanian farmers have experienced extremely wet years, and some of the warmest and driest years on record. Scientists suggest that climate will be even more variable in the future.

Farmers will need to continue to respond to immediate and short-medium term climate variability, as well as start preparing for longer term changes in climate.

This information sheet provides management actions that are available to graziers to maximise pasture production for extensive dryland pastures (sown and native) in response to changes in climate.

Extensive pastures and changing temperature

Projections from [Climate Futures for Tasmania](#) indicate minimal change in annual rainfall in the future. However, temperatures across Tasmania are projected to increase by approximately 2.9 °C by 2100.

This projected change in temperature could have varying impacts on pasture production across all regions including:

- changes in pasture yield and quality,

- changes in the timing of farm operations such as calving and lambing,
- changes in the timing of pasture planting and harvesting,
- seasonal changes in pasture production,
- change in productivity within regions over time, eg an increase in productivity in regions that are currently too cold for maximum pasture production.

Modelling impacts of the Tasmanian climate

Ross is a typical extensive grazing region of Tasmania, where extensive sown and native pastures are utilised for fine wool production. The potential changes to future production were modelled for sown and native pasture types.

An historical baseline (1971-2000) and three future climate periods: 2025 (2011-2040), 2055 (2041-2070) and 2085 (2071-2100), were selected to assess the projected climate change for each pasture type (Figure 1).

The modelling is based on enterprises that are currently operating at their optimum through 'best practice' management eg maximising ground cover and controlled grazing.

Effects of changing temperature on pasture production

Native pastures consist of cool temperate species such as spear grass and wallaby grass, and the summer-active species kangaroo grass.

In addition to native species, extensive pastures include sown pasture species such as cocksfoot, phalaris, ryegrass and clover. Pasture growth for sown pasture species is currently highest in spring. Modelling of phalaris and cocksfoot indicates that this peak spring growth will continue under projected climate change.

As temperatures are projected to rise in the future, the production of dryland pastures is projected to increase throughout the 21st century. Seasonal changes to production are likely, particularly during the summer months toward the end of the century, when pasture production may decrease slightly due to higher temperatures and the limitation of available soil moisture. Locations which are currently limited by lower temperatures, particularly during winter and spring will benefit most from increasing temperatures for pasture production.

At Ross, the greater phalaris growth projected during late winter and spring (Figure 2), results in an increase in mean annual yield* of 1.3 t/ha to 5 t/ha by 2085.

Native pasture yields are much lower than sown pastures (Figure 2), but require no inputs to sustain them. Well managed fine-wool production in native pastures delivers economic and biodiversity benefits. By 2085, yields* are projected to increase by 1.8 t/ha to 3.4 t/ha.

Potential management options

The first step in preparing to maximise returns under a changing climate is to change pasture management to reach current industry best practice recommendations. Farmers can also draw on their recent experiences managing for drought and floods to assess which pasture types persist in the long term on their properties.

Although pasture modelling results suggest that the annual production of phalaris will increase with higher temperatures, some loss of production may occur due to hotter days in summer.

Native pasture production is projected to increase over time, with some loss of production in autumn towards the end of the century. Kangaroo grass is a summer-active species often preferentially grazed in native pastures by sheep.



Potential management options cont.,

The growth of kangaroo grass is projected to increase due to warmer temperatures in the future especially as it is likely to be less impacted by frost events. Careful grazing management is required to maintain kangaroo grass in the system. Resting pastures in late spring/summer assists in recovery post-grazing.

Modelled Changes in Climate and Pasture Production

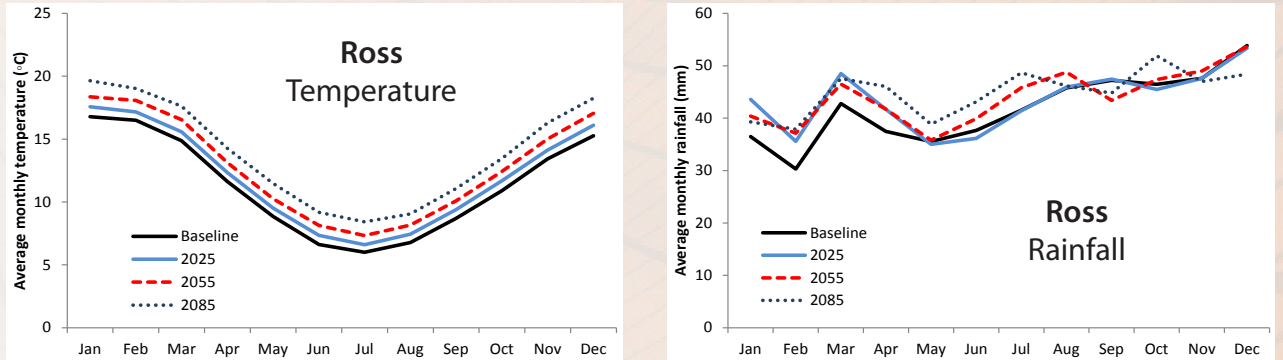


Figure 1 Projected Climate Change at Ross

Projected average temperature (°C) (left) and rainfall (mm) (right) at Ross for the baseline period (1971-2000) and three future climate periods: 2025 (2011-2040), 2055 (2041-2070), 2085 (2071-2100).

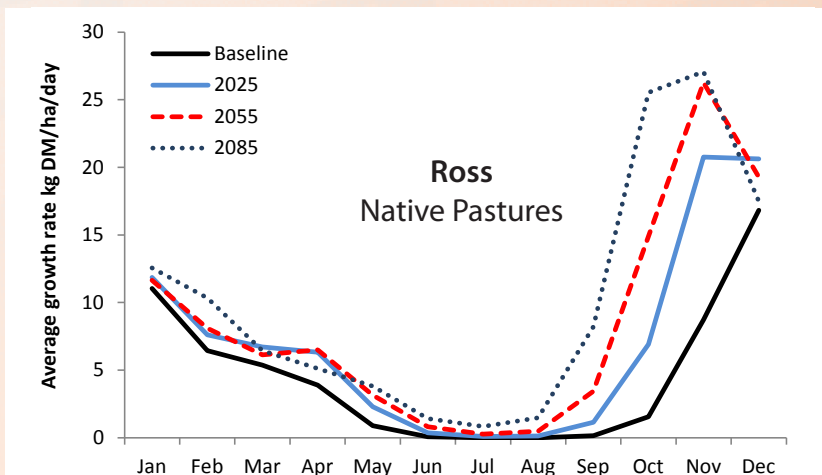
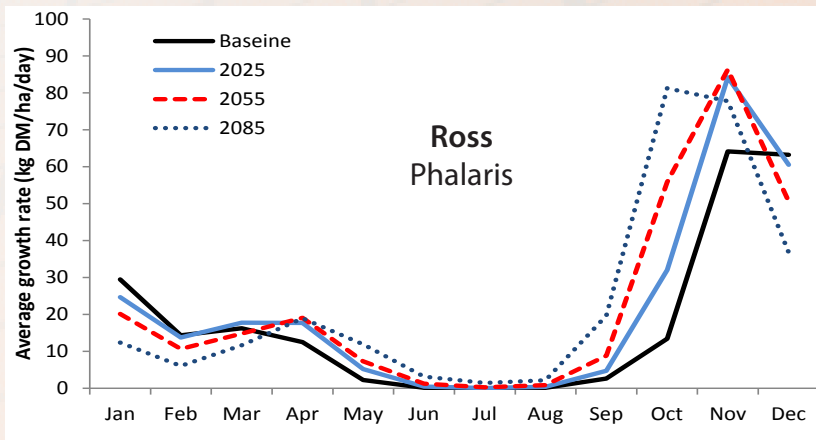


Figure 2

Projected Pasture yields at Ross

Modelled average monthly dryland phalaris yields (kg DM/ha/day) (top) and native pasture (right) for Ross for the baseline period (1971-2000) and three future climate periods: 2025 (2011-2040), 2055 (2041-2070), 2085 (2071-2100). Note different scale used on y-axes for graphs at top and right.



* **About the data:** Yield estimates are based on maximum and minimum yields (t DM/ha/year) using six climate models.

Short to medium-term

Short to medium-term adaptation options will vary in suitability for different enterprises and regions, but may include the following:

- sown pastures - sow a variety of pasture grasses with different climatic tolerances,
- native pastures - managing grazing regimes may be required to promote desirable species,
- managing woody weed growth in native pastures - but allowing for tree regeneration.

Long-term

There are a number of strategies that farmers may want to consider adopting. These include:

- introducing summer active species into sown pastures,
- using alternative feed sources to meet summer feed demands, eg changing fodder conservation strategies,
- changing calving/lambing times based on an earlier winter/spring break.



About Climate Futures for Tasmania
The material in this information sheet was developed from outputs from the Climate Futures for Tasmania project. In particular, from the Impacts on Agriculture Technical Report (Holz et al 2010).

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The Climate Futures for Tasmania project was managed by the Antarctic Climate & Ecosystems Cooperative Research Centre (ACE CRC). For more information about the project go to:

www.acecrc.org.au



This information sheet is a joint production of the Tasmanian Government and the Tasmanian Institute of Agriculture.

Further information

This information sheet is part of a series produced by TIA on the impacts of climate change in agriculture. The full suite of information sheets is available at:

www.dpipwe.tas.gov.au/climatechange

The Tasmanian Government's Tasmanian Climate Change Office (TCCO) provides information on climate change mitigation, and adaptation programs and options:

www.climatechange.tas.gov.au

Climate Futures for Tasmania reports provide information on the impacts of climate change in Tasmania on general climate, water and catchments, impacts on agriculture and extreme events:

www.climatechange.tas.gov.au

The Bureau of Meteorology provides data on weather forecasts and climate variability:

www.bom.gov.au/

Information on native pasture management can be found in the document Managing Tasmanian Native Pastures: A grazier's guide.

www.dpipwe.tas.gov.au/nativepastures

For further information to assist farmers and potential investors to allow comparisons to be made between enterprises including cash crop and livestock enterprise tools visit

www.dpipwe.tas.gov.au/wealthfromwater

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