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Responding to Climate Challenges in the Northern Downs, Queensland

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The Northern Downs region in Queensland consists of open and undulating grasslands, and is characterised by a hot and dry climate, with a distinct wet season but high variability in inter-annual (year to year) rainfall. Long term projections for this region indicate that beef producers will be impacted by higher average temperatures in all seasons, increased atmospheric CO₂, and an increase in the frequency and intensity of extreme events such as heatwaves and cyclones (Moise *et al.* 2015). Changes to rainfall are unclear, but inter-year variation will remain high. The MLA-funded *Nexus* project aims to explore interactions between profitability, productivity, and sustainability of livestock businesses in a future climate, with this paper focusing on the identification of potential adaptation options.

Our analysis builds on a previous case study developed by the Queensland Department of Agriculture and Fisheries (Bowen *et al.* 2020). We used small-group discussions with local producers and extension staff ($n = 12$) to understand the most important climate challenges for the Northern Downs region and identify potential adaptation options. Adaptation options included approaches that are currently available to land managers, and those that may be developed in the future.

Key climate-related issues prioritised by the group were an increase in woody thickening/encroachment, changes in pasture production, and heat stress in livestock. Potential adaptation options are summarised in Table 1 and will be evaluated using bio-economic modelling in the next stage of the project. Other challenges identified that will need to be managed in conjunction with climate change include a perceived disconnect between government policy and the reality of livestock production, market anxiety, succession planning, digital connectivity, consumer attitudes, and availability of skilled labour. These socio-economic problems are part of a complex mix of factors that beef producers are contending with when operating and making decisions for their businesses.

Table 1. Key climate challenges and adaptation options identified by producer group

Problem	Details	Adaptation options	Challenges
Woody thickening and encroachment	Reduced grazing area, hinders property management, refuge for pest animals, reduced land value	<ul style="list-style-type: none"> New methods (e.g. biocontrol) Valuing woody vegetation as shade for livestock 	Lack of viable options – current methods are costly and labour intensive
Changes in pasture production	Difficulties in preparing feed budgets due to highly variable seasons	<ul style="list-style-type: none"> Improved forages to fill feed gaps Adaptive stocking rates Agistment or purchasing land in other regions 	Difficult to find pasture species that will persist in local environment; risky to trial new forages on a commercial scale; markets not always available to sell in to; cost of moving stock; increasing land values make it expensive to acquire additional land
Increased heat stress in livestock	Reduced animal survival, productivity & welfare	<ul style="list-style-type: none"> Genetics Extra water points & shade Change timing of calving 	New genetics not readily accessible; cost of infrastructure

Producers in the Northern Downs region of Queensland already experience many of the problems identified in Table 1, with climate change expected to exacerbate the challenges of beef production in this region. While producers were able to identify potential adaptation options, there are technical, financial, and social barriers to their implementation. Climate challenges need to be considered in the context of other social, economic, and regulatory pressures.

References

- Bowen M *et al.* (2020) ‘Northern Downs beef production systems – preparing for, responding to, and recovering from drought.’ Department of Agriculture and Fisheries, Queensland Government.
- Moise A *et al.* (2015) ‘Monsoonal North Cluster Report, Climate Change in Australia Projections for Australia’s Natural Resource Management Regions.’ CSIRO and Bureau of Meteorology, Australia.

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