

**Towards greater drought preparedness in
Queensland grazing: Lessons from
qualitative interviews and discourse
analysis**

Drought and Climate Adaptation Program

DES, Social Sciences, July 2019

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Executive summary

Aim:

This report contains the findings of social scientific research conducted under the second phase of the Queensland government's Drought and Climate Adaptation Program (DCAP2). It explores the cultural factors influencing graziers' drought preparedness, a key part of the industry's adaptive capacity and resilience in the face of climate change. This knowledge will enhance the ability of policy, extension, science and technology to create 'cultural capital' in the practices and mindsets underlying drought preparedness and climate resilience.

Methods:

This research used two distinct methods:

- Analysis of the different discourses and messages about drought and drought preparation in over 1000 *Courier Mail*, *Queensland Country Life* and *ABC Rural* articles, as well as publicly available government communications; and
- Forty qualitative interviews (involving a total of 80 participants) with drought-affected grazing families to gain an understanding of their motivations and values, the taken-for-granted ways they understand drought risk and drought preparation, and their views on how the Queensland government might help them better prepare for drought.

Findings:

The research found a number of cultural factors that may potentially complicate and constrain drought preparedness in the Queensland grazing industry.

1. Competing messages about drought

The comparative analysis of media and government accounts demonstrated two different and potentially competing ways of framing drought and drought management.

The 'Battling adversity' frame, dominant in the media analysed, uses highly emotive and evocative discursive strategies to construct:

- **drought** as a discrete climatic event causing profound disadvantage and ultimately solved by rain;
- **graziers** as engaged in a battle against drought;
- **drought management** as a matter of fortification, fighting, enduring or gambling; and
- **drought support** found in rallying communities, charities and sympathetic politicians.

The 'Managing business risk' frame, found in government material and some media, uses relatively simplified discursive strategies to construct:

- **drought** as a business risk requiring ongoing management;

- **graziers** in a rational and 'professional' relationship with drought;
- **drought management** as a matter of strategic planning, preparation and decision making; and
- **drought support** found in knowledge, scientific expertise and information (but drought management ultimately an individual responsibility).

2. Complex motivations driving graziers' decision-making

Graziers value many things in addition to profit, including self-direction, creative freedom, connection to their land and livestock and the maintenance of grazing history. Increased cultural capital in drought preparedness may be possible through promoting its benefits to maintaining rural traditions, livelihoods and communities as well as the viability and profitability of individual grazing enterprises.

3. A perceived separation between drought and permanent climate change

Graziers interviewed often described drought as part of a natural, balanced and repetitive climate 'cycle' rather than part of permanent climate change. This belief is likely to be a significant constraint to the adaptive capacity of the grazing industry.

4. Reliance on traditional sources and 'closed' forms of knowledge

The relatively 'closed' information-sharing networks and reliance on subjective, heuristic knowledge observed in this research may be problematic in situations when change is occurring and complex decision-making is required.

5. Distrust of seasonal climate forecasting

While there was evidence that many graziers use and value seasonal climate forecasting information, there was also evidence of a continued perception that it is an unreliable basis for decision-making. This perception points to a need for further communication and knowledge building regarding how forecasting can be best integrated into grazing decisions.

6. Difficulty managing uncertainty

Drought and climate related decision-making creates considerable emotional difficulty for many graziers, especially in relation to destocking and indicates the continued need for extension and decision support tools to help graziers manage the complexity and uncertainty involved.

7. Social constraints on drought preparedness and innovation

Proactive graziers often reported constraints to the extent to which they could share their drought management views and practices, supporting the need for enhanced knowledge networks to facilitate drought-preparedness and adaptation.

8. Limited awareness of the full spectrum of drought preparation practices

Graziers' accounts of their own drought preparation practices primarily focused on a specific range of herd management, infrastructural fortifications, and financial conservatism, suggesting the need

to further promote the full suite of beneficial land, herd and business management practices that constitute drought preparedness.

9. Expectations for support

There were indications that infrastructural and freight subsidies available under drought declarations legitimized established practices and constrained the motivations to diversify and change practices.

Recommendations:

The recommendations arising from this research are broad. Following the finalisation of this report, the DES Social Science team will work closely with DCAP to develop a separate document contained a more detailed and specific set of actions to address the issues identified.

The five broad recommendations are:

1. The development and implementation of a communication-based strategy to enhance the cultural capital of drought preparedness.

A number of research findings indicate the need for enhanced communication around drought preparation and climate adaptation in Queensland grazing and related communities. It is recommended that DCAP develop a communication strategy that specifically aims to build the appeal of drought preparedness and climate adaptation. This strategy would:

- formulate effective, emotionally compelling and feasible messages that strengthen the idea of drought as a manageable business risk and drought preparation as an important grazing skill;
- seek to engage rural communities, community organisations and the broader Queensland population as well as individual grazing enterprises; and
- promote the benefits of drought preparedness in a range of contexts (e.g. at an individual, industry and community level) and appeal to a broad range of graziers' values and motivations.

2. Engage experts in climate risk communication to advise on the best pathways towards enhancing awareness of the climate risks facing Queensland grazing.

The findings suggest that Queensland graziers may not be fully aware of the nature and extent of the climate risks facing them. Any efforts towards promoting and encouraging greater drought preparedness and climate adaptation in the Queensland grazing industry must begin to address this. However, given the emotional and financial difficulties associated with drought and climate variability,

it is advised that any strategy to address these issues draw on specialized expertise in the area of climate risk communication.

3. Continue to foster knowledge networks and educational events through grazing extension

The findings of this research indicates the need for continued extension and open knowledge networks to facilitate drought preparedness and adaptation, especially those that allow the provision of both one-on-one interactions and on-farm discussions, as well as broader peer-based mentorship and collective knowledge-sharing. It also suggests a need to build the capacity for open knowledge-sharing at a more local, grass-roots level, by finding ways to challenge the unhelpful beliefs and attitudes and to build support for innovation and drought preparedness at a community and enterprise level.

4. Continue building the useability, accuracy and adoption of seasonal climate forecasting, as well as innovative decision support tools with specific and practical applications for end-users

There were several findings, including a distrust of seasonal climate forecasting and the emotional difficulties associated with drought-related decision making, that support the continued need for improved forecasting and innovative, user-focused decision support tools to support the grazing industry. As well as accuracy, improving graziers' understanding of these tools and their integration into decision-making is also very important.

5. Continue to reform and review drought assistance arrangements

The findings indicate that the need to help producers manage the difficulty of drought in the short term should not impact on their drought preparedness and longer-term economic, environmental and social resilience. A clear differentiation must be made between support intended to enable the financial and emotional endurance of grazing businesses in the short term (managing *current* drought), and the need to encourage practices that enable the capacity for adapting to climate variability in the long term (adapting to *future* droughts).

Glossary of terms

- Adaptive capacity:** A key part of resilience (see definition below). The skills and strategies that parts of a socio-ecological system draw upon to adapt to changes and disturbances. For individuals and groups this adaptive capacity can include a range of personal, cultural, social and technical skills and practices.
- Culture:** A broad term for the shared and taken-for-granted ways that particular social groups (including communities, organizations and industries) live and operate together. Culture comprises three elements - knowledge (shared beliefs, values and meanings), practices (shared ways of doing things) and material (physical) culture (things, tools and technologies).
- Cultural capital:** A new idea or a practice has 'cultural capital' when it fits easily with the way that members of the community see the world and themselves, what they value and take for granted, and what things they think are possible to change.
- Discourse analysis:** An established social research approach whereby forms of communication (e.g. texts, audio and visual media) are closely examined to understand how they both reflect and construct social and cultural life.
- Drought preparedness:** An important component of the adaptive capacity of grazing enterprises. For the purposes of this report, drought preparedness involves both the capacity and willingness to strategically plan for and manage drought ('mindset factors'), as well as the adoption of specific drought preparation practices.
- Heuristic knowledge:** A form of taken-for-granted knowledge usually gained through experience or 'trial and error' which then becomes applied as 'rules of thumb' to decisions on current or future problems. Specific rules of thumb or mental shortcuts can also be referred to as heuristics.
- Narrative:** A form of written or spoken language that constructs meaning by presenting a series of linked events or stories.
- Resilience:** The capacity of a socio-ecological system to retain its function and integrity in the face of disturbance and change.
- Rhetoric:** Written or spoken language that is intended to persuade or have some form of effect.
- Typology:** A way of communicating research through the classification of things according to a general or idealized type.
- Value** A culturally-mediated judgement of what is important in life.

Contents

Executive summary	i
Glossary of terms	v
1 Introduction	1
1.1 Clarifying our terms	1
1.1.1 Resilience	2
1.1.2 Adaptive capacity	2
1.1.3 Drought preparedness	3
1.2 Understanding cultures of drought preparedness: Research aims	4
2 Research approach	5
2.1 Discourse analysis	5
2.1.1 Data collection	5
2.1.2 Analysis	6
2.2 Qualitative interviews	6
2.2.1 Recruitment	6
2.2.2 Process	7
2.2.3 Questions	8
2.2.4 Analysis	8
3 Media and government discourses	9
3.1 Two typical ways drought is framed	9
3.1.1 The ‘Battling adversity’ frame	10
3.1.2 The ‘Managing business risk’ frame	11
3.2 Battling adversity: Discursive strategies	13
3.2.1 Emphasizing drought as a powerfully negative natural event	13
3.2.2 Presenting graziers in an adversarial relationship with drought	15
3.2.3 ‘Rallying community’ narratives	19
3.2.4 Unsympathetic government narratives	20
3.2.5 ‘The relief of rain’ narratives	21
3.2.6 ‘Unknowable’ weather narratives	22
3.3 Managing business risk: Discursive strategies	24
3.3.1 Drought as a regular business risk	24
3.3.2 Presenting graziers in a ‘professional’ relationship with drought	25
3.3.3 ‘Empowered management’ narratives	26
3.3.4 Knowledge as the key to management	27
3.3.5 Governments as facilitators of risk management	28

4	Firsthand accounts from graziers	29
4.1	Participants' motivations and values	29
4.1.1	Self-direction, creativity and independence	30
4.1.2	Connecting with animals and the landscape	31
4.1.3	Improving livestock and the property	33
4.1.4	Honouring history and traditions	34
4.1.5	Financial security	34
4.2	Perceived threats and difficulties	35
4.2.1	Drought	36
4.2.2	Drought as part of a cycle rather than a permanent change	37
4.2.3	Growing social marginality	39
4.2.4	Increased government interference	41
4.2.5	Increased debt	42
4.3	Trusted networks of knowledge, science and information	43
4.3.1	Subjective knowledge and experience	44
4.3.2	Family knowledge	45
4.3.3	Trusted people	47
4.3.4	Group-based knowledge events	49
4.3.5	Constraints on knowledge sharing	50
4.3.6	Science and climate information	52
4.4	Assessing drought risks	55
4.4.1	Rainfall, pastures, watering points and livestock	56
4.4.2	Heuristic knowledge	59
4.4.3	External information sources	61
4.4.4	Factoring in change	62
4.5	Attitudes to drought preparedness	63
4.5.1	Duration of drought	65
4.5.2	Uncertainty	65
4.5.3	Government interference	65
4.5.4	Debt	66
4.6	Reported drought preparation practices	66
4.6.1	Herd management	66
4.6.2	Infrastructural improvements	72
4.6.3	Financial reserves	74
4.6.4	Pursuing supplementary livelihoods	75
4.6.5	Improved land management	76
4.7	Support for drought preparation	77
4.7.1	Support for infrastructure	78
4.7.2	Enabling financial endurance	81
4.7.3	Extension, communication and knowledge support	85

4.7.4	Supporting innovation	87
4.7.5	Building the reliability of climate science	88
5	Key issues identified	90
5.1	Competing discourses around drought	90
5.2	Cultural beliefs and values complicating drought preparedness	91
5.2.1	Complex motivations	91
5.2.2	A perceived separation between drought and climate risk	92
5.2.3	Reliance on 'traditional' sources and forms of knowledge	93
5.2.4	Distrust of seasonal climate forecasting	93
5.2.5	Difficulty managing uncertainty	94
5.2.6	Social constraints on drought preparedness and innovation	94
5.2.7	Limited awareness of the full spectrum of drought preparation practices	95
5.2.8	Expectations for support	95
6	Next steps	97
	References	99
	Appendices	101
	Appendix 1 Interview information	102
6.1.1	Summary of South West interviews	102
6.1.2	Summary of Central West interviews	105
6.1.3	Summary of North and Far North interviews	107
	Appendix 2 Interview protocol	110

1 Introduction

Under the Drought and Climate Adaptation Program (DCAP), social scientists within the Department of Environment and Science (DES) have implemented a program of social research focusing specifically on drought preparedness in Queensland grazing enterprises. Despite existing government-lead programs and resources, it is believed that many graziers in Queensland do not effectively manage for climate variability or adequately prepare for future drought conditions, making this an important issue for climate adaptation in Queensland primary production.

In the first phase of DCAP, qualitative interviews were conducted with grazing industry specialists and leading graziers to explore the various elements at play in graziers' decisions to prepare for drought. This research identified a set of individual and social factors that might constrain graziers' drought preparedness, such as barriers to the adoption of available knowledge and information, particular attitudes and preferences in regard to business management and planning, and disempowered mindsets in regard to the extent to which drought can be prepared for.

This report contains the findings of a second body of social scientific research that directly engaged with drought-affected grazing families to gain a deeper understanding of the personal and social factors - collectively referred to as 'cultural factors' - that influence drought preparedness. It presents the findings of 40 qualitative interviews conducted with graziers across Queensland, as well as a discourse analysis exploring the different frames and messages around drought and drought preparation in the Queensland media. This report synthesizes these findings, suggesting possible ways that policy, and government-led extension, communication and science can facilitate a cultural shift towards greater drought preparation and resilience the Queensland grazing industry.

1.1 Clarifying our terms

While the stated goal of the Drought and Climate Adaptation Program (DCAP) is to help primary producers better manage drought and climate impacts, in the broadest sense this can be understood as supporting primary producers to remain economically, socially and ecologically sustainable in a time of considerable *change*. Given its dependence on natural resources and natural processes, primary production in Australia is particularly affected by shifting climate trends, and it must also contend with many other economic, political, and global changes. A huge amount has already been achieved by Australian primary industry to manage and adapt to a changing climate, but the nature and magnitude of these changes has led to uncertainty regarding the best paths toward maintaining this vibrant industry and the rural livelihoods that depend upon it.

There are a number of terms that can help clarify the goals of government when it comes to supporting primary industry, graziers and grazing communities as they deal with and manage the changes impacting them. At the broadest level, we can understand our aim as playing a facilitative role in building the *resilience* of the Queensland grazing industry to remain viable in the face of climatic variability. Meeting this broader goal, however, means identifying the key areas in the grazing system where greater *adaptive capacity* can be achieved. Even more specifically, *drought preparedness* is a form of adaptive capacity that governments may have a role in fostering, through policy, extension, communication and science. These concepts are discussed in a little more detail below.

1.1.1 Resilience

The concept of resilience has emerged as a standard aspirational goal for both government and non-government organizations addressing the problems of a world facing uncertainty, change and an increased likelihood of environmental disruptions (Adger et al, 2011; Reid & Botterill, 2013; Schipper & Langston, 2015). The word derives from the biological sciences, where it refers to the capacity of an ecological community or ecosystem to reorganize itself and absorb disturbance, so it still retains its functional and structural integrity, even during times of change (Adger et al, 2011).

In relation to environmental and social policy, however, its use has been expanded to refer not only to natural and environmental systems but also to human-created systems, including social systems, communities, industry sectors and more. Put more simply, resilience is the way people, groups, institutions and environments respond to change *together* that better manages its impacts (Jones 2017, p.xxii).

The strength of resilience thinking is that it conceives of socio-ecological systems as fluid networks that can change and adapt in response to significant difficulties and disturbances. Even in the face of what can seem insurmountable problems, this means there are solutions to be found, and ways of building the long-term robustness of these systems.

1.1.2 Adaptive capacity

The ability of parts of a socio-ecological system to adapt in response to change underpins its resilience. Adaptive capacity is a term given to this ability, and can include the cultural, social and technical skills and strategies that individuals, groups and social systems draw upon to adapt to environmental and socioeconomic changes (Adger et al, 2011; Marshall & Stokes, 2014).

Adaptive capacity is not just a set of personality traits or preferences. It manifests at multiple levels in a socio-ecological system. In the case of drought and climate variability in the Queensland grazing

industry, greater adaptive capacity can be achieved at a variety of levels, including in the psychological and emotional abilities of individual graziers (e.g. Armstrong et al, 2011), in the management of grazing businesses (e.g. Dahles & Prabawa Sulisowati, 2015), in the livelihood opportunities of grazing families (eg. Lawless, 2018; Tanner et al, 2014), and in the cohesion, inclusiveness and well-being of grazing-dependent rural communities (e.g. Chuang et al, 2018).

1.1.3 Drought preparedness

Within this framework, drought preparedness can be understood as a form of adaptive capacity that can help build the resilience of the grazing industry and the long-term viability of individual grazing enterprises in the face of a variable climate.

What constitutes drought preparedness is complex. Social scientific research conducted in the first phase of DCAP (DCAP1) drew on the accounts and perspectives of grazing specialists and a small number of leading graziers, to help articulate what ‘drought preparedness’ looks like (McCartney, 2017). It found that drought preparedness involved sound *preparation skills and activities*, including the ability to adopt and apply specific practices such as herd, pasture and land management, as well as some *key material and infrastructural elements* including low debt, financial reserves, watering points and storages. It also found evidence of a *drought preparedness ‘mindset’*, involving a number of personal, attitudinal and social factors including:

- strategic, managerial and analytical skills – including the ability to plan ahead, to think ‘outside the box’ and draw on diverse forms of knowledge;
- a willingness to prepare, a tolerance of uncertainty, an ability to understand risk, and openness to alternative points of view; and
- cohesive and supportive family, industry and community connections.

The findings of the DCAP1 social scientific research suggests that, as well as encouraging the adoption of specific drought preparation practices and assisting with structural improvements, finding ways to foster and build a preparedness mindset might also assist in the achievement of a more resilient and adaptive grazing industry.

1.2 Understanding cultures of drought preparedness: Research aims

This report defines ‘culture’ in the social scientific sense, as a broad term encompassing three elements:

- the deeply taken-for-granted knowledge, beliefs, values and meanings that develop in social groups – including professions, organizations, communities and industries – through which the world and others is understood;
- the practices through which groups operate together, share knowledge, minimize risk and get things done; and
- the things (e.g. tools and technologies) that we design and use to share knowledge and practice our culture (Highmore, 2016).

Put simply, culture influences what we do, how we do it, and what we think is possible. In certain contexts, the ways that members of a community see the world and themselves, how they work together, what they value, and what they take for granted, can facilitate new ideas, practices and technologies. These beliefs, attitudes and practices can be understood as a form of ‘cultural capital’ (Flora and Flora 2012). Conversely, in particular contexts, certain cultural beliefs and practices can act as constraints, limiting what we believe is problematic and what we imagine to be the possible avenues to action and resolution. These cultural constraints may need to be challenged and shifted in the development and adoption of new ideas, practices and technologies.

There is significant body of work already addressing how drought, as well as being a climatic phenomenon, is also a culturally and politically mediated concept (e.g. Anderson, 2014; Cockfield, 2013; Jones, 2017; Rickards et al, 2017). There is also a growing body of work exploring the importance of addressing culture, and enhancing cultural capital, in building adaptive capacity and resilience in the context of climate change (e.g. Adger et al, 2013; Tanner et al, 2014). In line with both these bodies of work, the research contained in this report aims to explore the cultural knowledge, beliefs and practices influencing the drought preparedness mindset and the move towards greater adaptive capacity and resilience in the Queensland grazing industry. Taking a qualitative approach, and drawing on two distinct research methods, this research seeks to identify:

- the culturally-mediated ways that Queensland graziers understand and approach drought, drought risk, and the practices involved in preparing for drought, and how these may help or constrain their drought preparedness; and
- the critical areas in which policy, extension and science might influence these understandings and approaches to foster greater drought preparedness and resilience.

2 Research approach

Two distinct social research methods were used to explore the cultural aspects of drought preparation from different perspectives. These methods use different analytical approaches and draw on different forms of qualitative data. The approaches are:

- a discourse analysis of rural media stories and government communication material to illustrate and compare the multiple ways that drought and drought preparation is framed and constructed; and
- a thematic analysis of firsthand accounts gained directly from drought-affected Queensland graziers through an open-ended interview process. Analysis was positioned to identify similarities and differences in experiences, values, attitudes and practices regarding drought, drought risk, and drought preparation.

Both these approaches are discussed in more detail below.

2.1 Discourse analysis

Just as natural phenomena can influence how humans physically and mentally experience the world, language and communication play an important cultural function, influencing and shaping how the world is understood and known. As a key concept in the social sciences, discourse refers to patterns in the way we think, talk, write and communicate that both reflects the cultural knowledge, interests and values of different social groups, but also works to influence and produce the cultural worlds in which we live, feel comfortable and operate (Fleming et al, 2018).

Analysis of existing and dominant discourse can shed light on how cultural ideas and ways of seeing the world are created, transmitted and maintained. *Discourse analysis* is an established research method whereby forms of communication are closely examined to understand how they reflect and construct social life, giving meaning to the various people and things in it. It has been shown to have important applications for work relating to the environment, climate change and natural resource management (e.g. Fleming et al, 2014; Schlosberg et al, 2017; Taylor et al, 2014).

2.1.1 Data collection

Media articles from three news sources considered to be of particular relevance to Queensland graziers were the focus of this discourse analysis. These were *The Queensland Country Life*, the *Courier Mail* and *ABC Rural*. In order to better facilitate the comparison of drought messaging, publicly available government material (e.g. websites, online newsletters, media releases) relating to drought and drought preparation were also included in the analysis.

Global news and media databases Thompson Reuters Westlaw and Factiva were used to search for and download media articles from the *Queensland Country Life* and the *Courier Mail*. A search for articles containing the word 'drought' (refined to exclude any articles relating to 'Sports' or 'Real Estate') between June 2016 and December 2018, yielded over 1000 *Queensland Country Life* articles and over 500 *Courier Mail* articles. These were then collated into PDF files (to minimise the size and number of files) and imported into the qualitative software package NVivo for analysis.

ABC Rural articles relating to drought were searched for and accessed directly from the ABC News website using the website's search function. The results were refined to include rural and agriculturally focussed articles, and yielded 65 articles which were individually downloaded using the NVivo 'NCapture' function. Due to difficulties regarding file size, *ABC Rural* articles were analysed in a separate NVivo file to the *Queensland Country Life* and the *Courier Mail* articles.

Material from Queensland and Australian government reports, factsheets, newsletters and drought websites were systematically downloaded, page by page, into NVivo using the 'NCapture' function.

2.1.2 Analysis

Analysis of media articles and government communication material paid particular attention to identifying:

- **Discursive frames** i.e. how drought and drought management is being defined and described; and
- **Discursive strategies** i.e. the narrative and rhetorical tactics that are adopted to give these definitions structure and power.

After the text was imported into NVivo, an initial phase of exploratory open coding was conducted, in which excerpts of relevant text were given descriptive tags relating to the ways it was framing, presenting and describing drought. Using NVivo coding hierarchies, the researcher categorized these descriptive codes into four descriptive classifications, and then performed a comparative analysis of the material within these classifications to create a typology of the different drought framings across these criteria. During this process, attention was paid to the key discursive strategies that give salience to these framings of drought and drought preparation.

2.2 Qualitative interviews

2.2.1 Recruitment

A total of 40 interviews were conducted, involving 80 participants. A summary of interviews, including the number of participants at each, some background details and relevant notes can be found in Appendix 1.

Research participants from four Queensland areas were interviewed:

- The South West region – 14 interviews
- The Central West region – 11 interviews
- The North region – 10 interviews
- The Far North region) – 5 interviews

Interview participants were recruited through a combination of methods, including referrals by:

- Drought Relief and Assistance Scheme (DRAS) officers (the majority of participants);
- DAF extension officers; and
- other interview participants (the minority of participants).

Additional clarifying information was requested of DRAS and DAF officers regarding whether they regarded the people they were referring to be interviewed, as ‘leaders’ or not in terms of drought preparation. Providing this information was voluntary, and it was only provided for a very few participants. Where applicable, it is included in Appendix 1.

Interviewees were contacted by the researcher via email and/or telephone and invited to participate in the research. Those that agreed to be interviewed were assured confidentiality with respect to their participation and any comments they provided.

2.2.2 Process

Interviews took an informal ‘kitchen table discussion’ format, and were typically held on the grazing property. Any person involved in decision-making for the grazing business was invited to participate. In total, 80 people participated in the interviews, with interviews most commonly taking place with two participants. Occasional telephone conversations were also carried out.

Given the difficulty of the drought experience, and the emotional dimensions of drought management, a priority for the researcher was ensuring that interviews were conducted with a sense of courtesy, respect and acceptance. At the beginning of the interview, and where necessary during the interview, the researcher made assurances regarding research confidentiality, the voluntary nature of the research, and that there were no ‘right’ or ‘wrong’ answers. This preamble is included in the interview protocol in Appendix 2.

A letter was left with all face-to-face interview participants re-iterating the purpose of the research and the ethical issues involved. This letter also provided follow-up contact details for the researcher and the project leader. For phone interviews, this information was provided via email.

With the participants' verbal consent, interviews were audio-recorded.

2.2.3 Questions

A semi-structured interview format was used. Questions were carefully formulated to cover a range of topics, as well as minimize the potential for bias. These questions were kept open-ended so that research participants could raise the issues that were important to them. Prompts were similarly open-ended and were used to invite the participants to expand on their accounts and allow deeper exploration of the assumptions and the emotional and mental processes underlying them.

An interview protocol can be found in Appendix 2.

2.2.4 Analysis

Interviews were transcribed verbatim using a professional transcription service.

Data analysis and coding was conducted on interview transcripts using the qualitative analysis software package NVivo.

After importing transcripts to NVivo, an interpretive process was followed to analyse the data, following the principles from thematic analysis and grounded theory (Babbie, 2011). First, the researcher classified interview material into high-level qualitative categories that corresponded to the key interview questions. The researcher then classified interview material under each of these categories into descriptive codes, naming each as an issue, example, idea, or observation brought up in the interviews. This process of 'open coding' resulted in a large number of unclassified codes, which were merged and clustered as collective issues and themes became evident, and were reflected upon and compared across the interviews. The result of this collective, iterative process was a hierarchy of key themes which formed the basis of the findings.

3 Media and government discourses

This section presents the results of the discourse analysis of rural media stories and government communication in relation to drought. First, two key discursive frames regarding drought and drought management, are summarized and compared. Second, the discursive strategies that give these frames structure, power and influence are discussed in detail.

3.1 Two typical ways drought is framed

Through a thematic analysis of the media and government textual material regarding grazing and drought, it was possible to classify the discursive material into six key categories. These categories were:

- how drought is being defined;
- how drought is being experienced;
- the knowledge drawn on to deal with drought;
- the skills graziers need to deal with drought;
- what 'support' for graziers regarding drought might look like; and
- what the ultimate solution to drought might be.

It was then possible to identify some of the ways that the material qualitatively differed in each of these categories, allowing the researcher to distil a great deal of qualitatively complex data into a simplified comparative typology, containing two broad categories, or types, of drought and drought management discourse.

For ease of description and communication, this typology consists of two major ways drought is framed in the media analysed. These are referred to as the 'Battling adversity' frame and the 'Managing business risk' frame. These are discussed in more detail in Sections 3.1.1 and 3.1.2.

However, the following should be noted:

- Although the 'Managing business risk' frame presents drought in ways that are more reflective of government policy agendas, the purpose of this discourse analysis is not to make a simplistic judgement on which discursive frame is 'better' than the other. Instead, this analysis focusses on how each works to influence the way drought is understood and managed. Though it may not immediately appear so, *both* approaches can provide valuable insights for finding ways to build and reinforce cultural capital in the idea of drought preparedness that fits the values, worldviews and mindsets of the grazing community.
- Although the analysis of this discursive material focussed on qualitative aspects of the material (i.e. what was being said, rather than how much it was said), there were considerably

more pieces of text coded under the 'Battling adversity' frame than the 'Managing business risk' frame. While this does not represent a comprehensive and generalizable quantitative evaluation of media content on drought (a dedicated content analysis would be the best way to obtain this), it is a good indication that in the media articles analysed in this study the 'Battling adversity' frame was considerably more dominant than the 'managing business risk' frame.

- In line with the research approach chosen, it was not possible to quantitatively compare the frames of drought across the media sources analysed. However, these media sources contained examples of both 'Battling adversity' and 'Managing business risk' frames (with the former more common in all, as per the note above). The government material analysed was exclusively within the 'Managing business risk' frame.
- This typology reflects only how drought is defined and presented in the textual material. It does not necessarily reflect the impact of these definitions on the actual, real-life views of the grazing community. Their views are likely to be far more situational, complex and contradictory than this typology.

3.1.1 The 'Battling adversity' frame

In this frame, drought is a weather event that is bestowed with considerable power as a key agent in the hardships, disadvantages and adversity experienced by Queensland primary producers and rural communities. Many of the narratives within this frame present dryness and drought as profoundly difficult events in rural lives, with overwhelmingly negative effects on the financial and psychological well-being of graziers, other primary producers, and rural communities. This frame is often very present-focussed – it tends to deal with drought that is already happening, rather than drought in the future.

That these narratives exist is not surprising given the actual effects of drought on landscapes, livestock and economic stability. However, the emphasis on drought's destructive power works alongside another narrative which presents drought-affected rural producers as 'battlers' in an adversarial, competitive relationship with drought and the weather. Here, graziers and other primary producers are typically depicted either in situations of endurance or survival, drawing on knowledge and skills that enable them to play a game, gamble or fight against the negative influence of drought. In these narratives, drought and graziers are pitted against each other: there are winners and losers. When drought wins, graziers are 'forced' to react and take measures (such as late destocking), to survive. When graziers win, they are depicted as having been strong and stoic, lucky, or as having 'outsmarted' and fortified themselves against drought.

Within this broader discursive frame, support is depicted as coming from both local and broader communities, and associated organisations and charities, that rally around battling graziers to help them deal with the difficulties posed by drought. The need for sympathy and support from governments and politicians during drought is another discursive theme, with a key narrative that presents struggling producers as being either forgotten or ignored by elite urban groups and people in positions of power.

In the 'Battling adversity' frame the ultimate solution to drought is enough rain, which signals the end of the drought event, and an upturn in graziers' fortunes. Rain events are often depicted as a source of intense relief for graziers and a cause for celebration.

Table 1 Summary of the 'Battling adversity' frame

Dominant definitions of drought	Present-focused: A negative and profoundly difficult natural event caused by a lack of rain
How drought is experienced	In the here and now, as a major threat to grazing families and rural communities more broadly.
Knowledge drawn on to deal with drought	Vernacular knowledge (or what is often called 'common sense'): Direct experience, lessons from previous droughts, on ground know-how and rules of thumb, short term weather forecasts. <i>Knowledge that allows graziers to respond to the immediate problems posed by drought.</i>
Skills required to manage drought	Adversarial (battling) skills: Psychological fortitude to fight or to 'ride the drought out', luck and good fortune, the ability to gamble against drought.
Support for drought	Rallying community support (local and more broadly) and a sympathetic government, e.g. feel-good stories about helping 'our' farmers.
Solutions to drought	Rain, which is a relief when it comes and a cause for celebration.

3.1.2 The 'Managing business risk' frame

In this frame, the power of drought as an agent in the hardships, disadvantages and adversity experienced by Queensland primary producers and rural communities is minimized, and drought is presented as one of many business risks facing graziers, which they must find ways to 'work with' in

order to remain viable. Here the frame of drought is future focused – rather than presenting drought as something that *is* happening, this frame presents it as something that *will* happen.

Rather than presenting an adversarial relationship between graziers and drought, the relationship between graziers and drought depicted by this framing can be described as somewhat administrative. Drought is an ongoing risk to be managed and controlled, and the skills that are required to do this involve the ability to be strategic and unemotional, to look forward in time, and to prepare and plan.

Within this broader discursive frame, support for drought management is depicted not as deriving from communities, charities, and sympathetic politicians, but from networks of knowledge, expertise and information, that enable graziers to look forward in time, make decisions and plan. Grazing experts, scientists and the government are presented as potential facilitators of drought preparation information.

In this frame, drought is not depicted as a discrete weather event, with an end brought about by enough rain. Instead, it is part of a broader climatic trend and there is no ultimate solution (or resolution) to it: it is an ongoing risk that requires continuous preparation, planning and management.

Table 2 Summary of the 'Managing business risk' frame

Dominant definitions of drought	Future-focused: One of many factors that individual grazing businesses must 'work with' to remain profitable.
How drought is experienced	As a future risk that must be known beforehand and prepared for.
Knowledge drawn on to deal with drought	Scientific knowledge: Climatic patterns and broader trends, grazing decision-support knowledge. <i>Knowledge that allows graziers to create future scenarios around drought and work towards them.</i>
Skills required to manage drought	Strategic skills: The ability to make careful decisions, to trust and draw on scientific information, and to plan strategically.
Support for drought	Scientific expertise and lots of information - but ultimately drought is an individual business responsibility, with limited role for government.
Solutions to drought	No 'solution' - it is an ongoing business issue.

Narratives of extreme difficulty

As well as these emotive terms and phrases, media stories often used evocative narratives to emphasise drought and dryness as a powerful cause of emotional difficulty for graziers and other primary producers. The excerpt below is one of many examples of these types of narratives. In it, a grazier is described as experiencing 'heartbreak' as he engages with weather forecasts and weather charts, looking for rain that is desperately needed by himself, his livestock and his broader community. With the prolonged dryness comes a sense of desperation:

NO RAIN, MORE HEARTBREAK. [Property owner's name] switched off the portable television set, disheartened by the forecast of continuing fine weather over southeast Queensland. It was soul-destroying, he said, to see the weather chart come up dry and without even a hint of the rain that rural producers needed desperately. His property is so dry that for three weeks now he has been on the road with 150 cows and calves he is trying to keep alive until the drought breaks. Courier Mail, 3 January 2018

In the quotes below, drought is presented as being a terrible natural event, creating untold suffering for regional towns, graziers and rural communities. The metaphors used paint drought as a powerfully negative force: it is described as a punishment from nature, a disease, and something that holds people hostage:

Before last month's rains, Longreach had suffered Mother Nature's cruellest punishment, a drought lasting more than two years. It's the kind of place where earth usually crumbles to dust under your footsteps and spindly grass disintegrates on contact. Courier Mail, 03 July 2016.

The drought she calls "the disease" is sticking around longer than anyone had hoped. And the winter months are usually the driest, so there's no reprieve in sight...The relentless weather has held her family to ransom since the new millennium. ABC Rural, 31 July 2018

From Warrnambool to Winton, from Coonamble to Ceduna, farmers are hurting, hostage to the weather and market forces. Courier Mail, 29 July 2018.

The element of surprise

As well as emphasizing the difficulties of drought, drought is also often depicted as being unexpected and surprising in its severity, with references made to historically significant dry periods to accentuate this. In the quotes below, accounts of graziers being shocked by the severity of the current drought, and the emotional suffering that it was creating are evident:

It's been a tough decade for [grazier], punctuated by death, disease and drought...."It felt like we were under a curse. ... And then with the four-year drought and losing the sheep and having to sell all the cattle, it left me wondering," she

says...[Grazier] has seen her fair share of droughts over the years. About every three years they might get a year of drought, but she's never experienced anything as severe as this. Courier Mail, 14 August 14 2016.

"It's gone on for so long, it's like back-to-back droughts ... everybody is a bit shocked, horrified, because we never thought it could get as bad as this," [grazier] says. In Western Queensland, farmers are comparing this big dry to the famously severe drought of the 1880s. [Grazier's name] runs a cattle station [location] in Western Queensland where 2017 was the driest year in 38 years of records... "It's just relentless, you don't sleep because you can't stop thinking about it," she says." ABC Rural, 28 July 2018

Quantifying the extent of drought

As well as using repetitive emotional terms and dire adjectives, media stories also repeatedly draw on quantitative data – including data relating to drought-declarations - to emphasize the extent of drought as part of its impact and severity:

Thirty-four of the state's 78 local government areas are entirely or partly drought declared – with 16 of those having endured drought conditions for more than four years. Courier Mail, December 17 2017

Currently 57.4 per cent of Queensland is drought-declared, including 23 councils and four part-council areas. There are also 85 individually droughted properties in a further 11 shires. ABC Rural, 27 Aug 2018

Ninety-eight per cent of NSW and around two-thirds of Queensland is in drought or drought-affected, with pastures turned to rubble and the cost of freight and feed skyrocketing. ABC Rural, 28 July 2018

Almost 60 per cent of Queensland needs more rain. And NSW is worse. Ninety nine per cent of the state is experiencing drought conditions. ABC Rural, 31 July 2018

3.2.2 Presenting graziers in an adversarial relationship with drought

In line with the overwhelming picture presented in media accounts of drought as a powerful and negative natural event causing profound hardships for graziers, was a second clear discursive framing in the media in which graziers are presented as adversaries to drought – that is, as opposing and working *against* drought rather than working *with* it. There were several different ways that the media discourse presents graziers and drought in an adversarial relationship, and these are discussed in turn below.

Battling metaphors and narratives

The first way that the media presents an adversarial relationship between graziers and drought is through metaphors and narratives that depict a 'battle' with drought, as illustrated in the quotes below:

DROUGHT-stricken Queensland primary producers have been hit with a significant increase in interest rates under a Commonwealth scheme designed to assist them battle through the ongoing climate disaster. QCL, 24 August 2017.

But grazier [name] – who, with husband [name], oversees a 70,000-acre operation that is still battling the effects of dry weather – says the absence of solid rain continues to have a significant impact on their property. Courier Mail, 23 September 23 2017.

Associated with battling metaphors were militaristic metaphors that placed drought in the role of invaders, and graziers in the position of endurance and defense:

Graziers in Queensland, New South Wales go into 'survival mode' as the drought marches towards the coast - ABC Rural, 26 June 2018

Another interesting aspect of discourses around 'battling' drought, were narratives about solutions to drought being found in fortification strategies, overcoming drought, or 'drought-proofing':

In an effort to drought-proof their western Queensland property, [graziers] have invested in a fodder factory. ABC Rural, 10 April 2018

But despite [politicians] childhood desire to be a cattleman, he gave grazing away in 1974. Anning says he couldn't see a future, with bullock prices barely enough to buy a pair of riding boots. It was a bumper cattle season that caused the beef price slump of 1974-78 and precipitated the end of his dream life as a cattleman, but Anning's big ambition as a senator is to overcome drought. He wants marginal country...drought-proofed by the dams and diverted rivers of a rejuvenated Bradfield scheme – named after the man who proposed it in 1938, Story Bridge engineer, John Bradfield. 9 December 2017

Gambling and game narratives

As well as 'fighting' with drought, graziers' actions to manage and deal with drought were also commonly likened in the media to a process of gambling or playing a game, in which graziers work both with and against 'the odds' in their response to drought:

***Rolling the dice with restocking** But not everyone is in a position to consider taking the gamble. Some are considering the more fundamental question of whether to stay or go. ABC Rural, 2 September 2016.*

It's a gamble: those that can keep enough cattle alive through this drought will

obviously be in a better position to restock once the weather turns. But it's an expensive gamble. ABC Rural, 2 October 2018.

Last year [name] took a punt before the rain and bought Merino ewes in lamb to Border Leicesters for \$140 and later sold that ewe lamb for \$197 on a rising market. Queensland Country Life, 24 August 2017.

Graziers are gambling on borrowings to restock herds and our grain growers are watching on in delight as India's desire for a chick pea curry turns the humble legume into our chief grain export, eclipsing wheat. Courier Mail, 13 February 2017.

Within these gambling and sport narratives, getting the edge against drought is often attributed to graziers' luck and good fortune, rather than their strategic skill, planning and foresight:

Despite the tight spot, [grazier] said he considered himself lucky for jaggging a few isolated storms last year. "We've had a bit of relief— we haven't had a full season — we've had a lot of cattle away in the last five years, but a lot of our country is still alive," [grazier] said. ABC Rural, 18 Feb 2018.

Endurance narratives

As well as using strength and fortification to fight drought, the media frequently presented dealing with drought as a matter of finding ways to endure it, bear the emotional difficulties and stoically wait it out. Determination is one psychological tool for enduring drought:

From very humble beginnings, the utter determination of four generations of [name] families working together, enduring floods and droughts and the highs and lows of the beef industry, taking gambles and not forgetting their profound love of the land, has seen [property] remain in the [surname] family for 100 years.

"I reckon this is the last year we can keep hanging on the way we have — it's a little bit hard to keep absorbing those tough years one after another — sooner or later you start scraping the bottom of that barrel," [name] said.

When you actually feel and see people's struggles emotionally and financially to support their livelihood, it shows how hard it is to survive through these times. ABC Rural, 26 October 2016

Other stories presented graziers' as using hope and optimism to help them survive and endure through drought:

While the past few years have shattered the dreams of many in cattle country, longed-for rains have broken the big dry and with beef prices at a record high, graziers are taking the opportunity by the horns.

Cattle king [name] can see the end of the drought. His rugged face, etched and weathered by a lifetime on the sunburnt land, holds the promise of a new dawn.

Out here, on the headwaters of the mighty Channel Country, a record-breaking dry spell of four years has finally broken.

"It's hope. That's what it is," says [name], a fifth-generation, millionaire grazier on [his property in remote Queensland]. "It is the beginning of the end. Everyone is very optimistic about the future." Courier Mail 29 July 2016.

Defeat and triumph narratives

Consistent with adversarial narratives and associated representations of graziers as battling, gambling against, and enduring drought, were frequent depictions of graziers overpowered, constrained, and in some cases, completely defeated by drought. A subtle form of this narrative can be found in the quotes below. In them, graziers are described in terms of being victims 'forced' to destock in response to the drought, implying that this action is taken only because drought removed any other options. Presenting destocking in this way depicts it as a reactive, last-ditch effort in the battle against drought, rather than a considered and deliberate drought strategy:

"Commercial cattle producers were forced to sell down their herds to protect themselves against the drought conditions which worsened in the later half of the year," Mr Keyes said. Queensland Country Life, 1 December 2018.

Within a year of those major stock loses, the drought worsened and the [names] were forced to completely de-stock their 19,035ha (47,000 acre) adjoining properties, [property names]. Queensland Country Life, 10 August 2017

The family were forced to destock seven or eight years ago due to dry conditions but slowly returned to the beef game only to be faced with another drought. QCL 26 July 2017

Cattle slaughter rates through Queensland and New South Wales are rising as farmers are forced to offload livestock as the drought bites. After a slow start to the year, weekly cattle numbers have surged since June. The increase in cattle slaughter numbers coincides with the sharp decline in cattle prices, as farmers have been forced to quit livestock with the lack of pasture. QCL 13 October 2017

Being forced to shoot stock was another version of these narratives of defeat:

QUEENSLAND graziers could be forced to shoot their cattle, as parts of the state are savaged by soaring temperatures on top of an extended drought. Courier Mail, 22 September 2017.

"One day we went out and cattle were bogged in dams. All we could do was shoot the cattle. I was standing there watching these little fellas just euthanising cattle. They were 14. We just couldn't get the cattle out, no matter what we did. But that's the things bush kids see. They are experiencing life at its best and its worst." Courier Mail 16 July 2016

In the story below, rather than being testimony to strategic thinking and preparedness, a totally destocked landscape is presented as emblematic of defeat and surrender. Highly emotive terms are used, with the 'total' destocking of cattle described as an 'exodus', the landscape as 'drought-stricken', graziers as 'giving up', and the situation by a stock agent as the 'worst' thing to see:

There is an exodus of cattle leaving drought-stricken parts of western Queensland as graziers give up on seeing a wet season, two months before the rains are usually due to finish. [Stock agent] describes his client base as mature — with one grazier aged in his mid-80s.

[Stock agent] said neither of them had seen the region facing a total destocking of sheep and cattle as it was now.

"This region will be destocked ... I reckon you can put a zero on it — probably the worst you want to see," [Stock agent] said. ABC Rural 18 Feb 2018

As well as destocking, other operational and managerial approaches are depicted as being 'forced' by drought. In the quote below, graziers attempting to explore alternative income streams are depicted as futilely trying to 'outrun' the serious issues facing them, including drought. While such narratives are well-intended, they nonetheless present graziers in a disempowered position, as victims of drought rather than agents capable of adapting to and working through drought by seeking other opportunities:

In the past decade alone, primary producers like [name] have faced drought, flood, a global financial crisis, a stubbornly high Australian dollar and a brief but crippling ban on live exports to Indonesia.....Many of [name]'s colleagues tried diversification to outrun the financial apocalypse. Some...went into aquaculture, others such as the [Family name] went into tourism. Many more were ruthlessly culled from the industry. One such family, [name] made a desperate attempt at carbon farming before the banks closed in during October 2014, forcing them to walk off [property] after seven generations of the family had lived on the land. Most Queensland grazing families will hold on to properties with a grim determination until the very last toss of the coin, not simply because of the weight of family tradition, but because they are deeply in love with the life. Courier Mail 7 May 2016

3.2.3 'Rallying community' narratives

A third discursive strategy in the 'Battling adversity' frame was a strong narrative presenting rural communities and the broader Queensland and Australian community, rallying around graziers, and providing them with support as they battle and endure drought. The heroism of drought charities and community organizations features heavily in these narratives.

Drought-stricken graziers in Queensland's central and north west have turned away from fizzled-out hopes of deliverance offered by Cyclone Alfred in the Gulf of Carpentaria this week, and are looking instead to the material and psychological

lift promised by the Burrumbuttock Hay Runners. The grassroots movement to deliver hay and hope to primary producers on hard times has been cranking through the gears over the last few months to organise what will be the third enormous delivery of hay to a widespread region that's had minimal rain relief, and is about to hit top gear. In an effort that resembles the first incredible 1860km trip in January 2016, described at the time as creating a new Australian legend, some 120 prime movers hooked up to 200 trailers, carrying somewhere in the vicinity of 5000-6000 square and round bales of hay, will be setting off from Darlington Point, near Griffith, and other parts of Australia, on February 23. The difference this time is that the destination is Muttaborra, 150km further than the convoys have travelled before.

A group of army veterans who have served in some of the toughest wars in history have travelled hundreds of kilometres to a different hostile environment — drought-affected Queensland. The eight retired soldiers travelled from Townsville to combat the unforgiving outback sun and carry out practical tasks unable to be completed by graziers because of the demands of drought. The project, led by ex-ADF community group Oasis, has started at a shearers' quarters at Goolma Station, 60 kilometres from Winton. ABC Rural, 17 Oct 2018.

As well as actual stories about charities helping graziers, media reports often contained rhetorical material regarding the moral and economic imperative to support graziers during times of drought. Here, the message is not just that the community helps graziers, but that the community *should* help graziers:

Queensland needs agriculture. It is a \$7 billion a year industry employing close to 60,000 people and the linchpin of our economy. It has had financial aid but that doesn't lessen the brutality of watching a lifetime of work literally die. Courier Mail, 14 September 2016

3.2.4 Unsympathetic government narratives

As a counterpoint to the 'rallying communities' narrative, politicians and the government were presented as unsympathetic antagonists to drought-stricken graziers. In the descriptions below, politicians are presented, with some disdain, as privileged, shallow, and uninterested in the plight of rural communities:

[Senior Queensland politician], sitting in her little inner-city electorate populated by greenies, can afford to smile and be content. She doesn't have to worry about her job. She doesn't have to worry about small Queensland country towns slowly dying due to the drought and lack of jobs. Courier Mail 25 May 2017

Weatherwise, almost 90 per cent of the state is drought declared, with another three regions set to be added to the record high list. Meanwhile, [Senior Federal politician] dons his akubra and heads to the Snowy Mountains to announce a multibillion dollar plan to expand the iconic hydro scheme, aimed at driving down power bills. Courier Mail 30 December 2017

The following description of the government process surrounding drought assistance is similarly disdainful, presenting the government as obstructive to drought support rather than facilitative:

What they don't need is Brisbane-based bureaucrats dreaming up red tape regulation that makes the process of accessing drought assistance almost as difficult to stomach as the drought itself. Courier Mail, 25 July 2018.

Laws introduced to protect vegetation were also used as an illustration of government desertion of grazing businesses and communities:

With the drought rolling into its fifth year in the region, Cr Godfrey said communities had been deserted and the new laws were going to destroy what was left.

"We're trying to grow our communities and we're already losing people," he said.

"This is just another nail in the coffin for south west Queensland, and it's quite a big one."

According to Cr Godfrey, research going back almost three decades was being ignored in the process of implementing the land clearing legislation. ABC Rural, 17 March 2018.

3.2.5 'The relief of rain' narratives

A common narrative in the 'battling adversity' discourses depicts the experience of sufficient or enough rain as the primary resolution to drought. Media articles often highlight the experience of rain as a relief to graziers and other primary producers, and as the catalyst in a change for the better. These textual narratives are often accompanied by visual depictions of pouring rain, drenched landscapes, and joyous adults and children revelling in the downpour. The quotes below illustrate how rain is used as an emotional counterpoint to drought, bringing a sudden and welcome end to the hardships and difficulties associated with dryness and equated with the onset of hopeful feelings and economic upturns:

Rump steak and Big Mac lovers can rest easy. After 10 years of drought, Queensland's beef industry is emerging from the doldrums... Courier Mail, June 2017

Residents are celebrating after storms rolled through Queensland's southern inland overnight providing relief from painfully dry conditions, but the Bureau of Meteorology (BOM) says it is not drought-breaking rain. ABC Rural, 5 Oct 2018.

Wet weather to bring some relief for farmers in drought-stricken parts of Queensland ABC Rural, 24 August 2018

Mother Nature has finally relented and delivered some much needed rain in some parts of Queensland leaving many producers smiling. QCL, 3 October 2017

Fortunate farmers have gone from drought to soaked pastures and hope for winter

crops in just one night of rain. Courier Mail 3 April 3 2017

TWO DAYS OF HOPE *A storm system poised tantalisingly close to Brisbane last night holds the best hope in more than a year that southeast Queensland can scrape through the drought. Courier Mail 22 August 2017*

The wettest winter on record in Longreach has lifted spirits and seen optimism return to a region ravaged by three years of severe drought. ABC Rural, 2 September 2016.

Alongside narratives in which rain was described as being a much-needed circuit-breaker to the tensions and emotional difficulties associated with drought, and a catalyst for better times, were others in which rainfall was discussed as potentially 'breaking' or bringing about the end to drought:

What will it take to break the drought? - *It is difficult to define when a drought is broken because of the various impacts of prolonged dry weather. When it comes to rainfall deficiencies, or a "meteorological drought", Dr. Trewin said a period of a few of months of above-average rainfall would signify the end of a drought. But for a farmer it is about income, according to New South Wales Department of Primary Industries agronomist Rohan Brill. "It is certainly not in the bag until it is in the bank," he said. Queensland Country Life 8 November 2018*

Despite the bleak outlook, the father of three said he had no doubt he would see the end of this drought while still on the land. "We do what we love — that's probably why we keep doing it — I just get up and do what I love every day, so that's the main thing," [name] said. "I've got a wonderful lady behind me and three awesome kids, so that makes it a lot easier." ABC Rural, 18 Feb 2018

Farmers' drought agony fades - *ONE more good wet season this summer and experts say the vast parts of the state currently under official drought conditions might return to normal, which is great news. For the past four years Queensland has suffered through an almost unprecedented dry, with up to 86 per cent of the land parched. It has sent millions of animals to their deaths, primary producers to the edge and communities into decline.... If the rains do come, the future won't be as simple as a government declaring the trauma over. There are years of work ahead for farmers – the expense of restocking, the difficulties of animals who may not be able to breed because of malnutrition, accumulated debt and the well-documented mental health effects. A declaration of a technical end to the drought is not some scientific guarantee of regular rains at the right times. But we hope they come. Courier Mail 14 September 2016*

3.2.6 'Unknowable' weather narratives

Closely aligned with narratives describing the relief experienced by graziers in the event of significant rain, are narratives that emphasize how changeable and unpredictable the weather can be. Emotive, fatalistic language is used to paint a picture of the weather and rainfall as intrinsically unknowable and outside the control of human beings:

THERE has never – even before modern climate arguments – been anything straightforward or predictable about Queensland's environment. Areas that have been rich for years suddenly fall into poor times. Cities flood. Rivers run dry. Glorious greenery erupts and then vanishes. Species vanish and then prosper. Years of profit turn to heartache in just days; decades of heartache turn good in just days. Courier Mail, 22 July 2016.

As part of narratives regarding the unpredictability of the weather, stories regarding rain events often emphasize the geographical disparities in rainfall, contrasting the good fortunes of those in areas that received rainfall with those who did not. By doing so, these stories inadvertently emphasize the drought as hardship narrative, with graziers again depicted at the mercy of fickle weather:

As always, the difficulty in this sort of crystal-ball gazing is finding the balance between the haves and the have-nots in a year of patchy seasonal conditions. Courier Mail, 13 July 2017

As [Tropical Cyclone] Debbie slowed and weaved on its approach to the Whitsunday coast on Tuesday, the hopes of many in the [region] for rain faded. [Grazier] was among those expressing disappointment at the outcome. "It felt a bit like Christmas had been cancelled," [they] said. "It was so exciting but we should have known better." Queensland Country Life, 30 March 2017.

Despite a solid start to 2017, where parts of far north and north Queensland received a drenching, most of the region including drought declared areas in the northwest of the state are still waiting for the wet season to kick in. Queensland Country Life, 2 February 2017.

WHEN the weather behaves out of character in Queensland it often spells disaster. But the unusually mild winter has put smiles on the faces of just about everybody, particularly farmers. It has produced a bonanza in strawberries and pineapples and the chick pea growers are in a sweet spot. But there are some exceptions, as beyond the Great Dividing Range, hundreds of graziers are yet to see the end of drought. Courier Mail, 22 July 2017.

Similarly, while media stories about rainfall often have a celebratory tone, they also contain cautionary tales about the dangers of assuming that rain events signal the end of drought:

"Whatever that green does, it's just so much easier on the eye," grazier [name withheld] said. [Grazier] and her husband [name] live at [station name], about 100km north-west of Longreach. The property has been in the family for the past 70 years. "It's lovely and green now but there's more to that to break the drought," [name] said. ABC Rural, 2 September 2016.

No pot of rain gold - *It was the end of January 2015 and graziers in the [details removed] region were cautiously welcoming their first big summer fall of rain in years. [Grazier's name] was caretaking the next door neighbour's property [details removed] when between 50mm and 100mm fell, and tiny green shoots were*

poking up amongst the black stalks in the paddocks. He was cautious about what the rain would do, saying "we're definitely going to need another four inch hit to do any good", and he was wise to be that way. The follow-up didn't eventuate and two years later, he and his parents, [names] were still battling a drought that was in its fifth year. Queensland Country Life, 28 December 2017.

Stories and descriptions of weather reports and experts 'getting it wrong' was another component of unpredictable weather narratives:

I wouldn't be a weather reporter these days for quids. For the first time ever, I recently heard a representative from the weather bureau deliver a heartfelt apology for getting it wrong, and disappointing so many people. The criticism for this latest failed forecast had been gruelling, he said. He reminded everyone of the "inexact science" that is weather forecasting and apologised a few more times before declaring that there was still "a chance of showers" over the next couple of days. Courier Mail 9 March 2017

Greens leader Bob Brown in 2006 agreed we faced the "spectre of permanent drought" and The Age quoted armies of alarmists, including the Bureau of Meteorology's Bertrand Timbal: "We are just not going to have that sort of good rain again as long as the system is warming up." So up went the desalination plants. Then down came the laughing rain, flooding Brisbane and filling dams. Courier Mail, 2 September 2016.

3.3 Managing business risk: Discursive strategies

Rather than presenting an evocative depiction of an adversarial relationship between graziers and drought, the relationship between graziers and drought in this frame can be described as more clinical and administrative. Rather than painting an emotionally affective picture of drought as a profound hardship, these strategies pare this aspect of drought back to present it as an ongoing business risk to be managed and controlled. The skills that are required to do this involve the ability to be strategic and unemotional, to look forward in time, and to prepare and plan.

3.3.1 Drought as a regular business risk

Rather than presenting drought as a hardship or difficulty, this discourse presents drought as if it were an unremarkable part of grazing life and agricultural production. Here the language contrasts starkly with the negative language discussed in Section 3.2.1 (which paints a picture of drought as a profoundly and uniquely difficult event for graziers to have to deal with). Instead, in this frame, there is an absence of visceral adjectives, and little emotion is associated with drought. As well as this, drought is also presented as something that is an inevitable and unavoidable part of primary production. Implicit in descriptions of drought as a risk, is a normative definition of drought that is

future-oriented. It is something that *will* happen and should be continuously prepared for, rather than a current hardship that needs to be endured or resisted:

Droughts are part and parcel of farming in Queensland and there are no miracle cures or quick fixes. To deliver better value for money for government and improve the quality of support for farmers we need to look beyond just reactionary measures. Queensland Country Life 16 March 2017

Support measures are in place to help farmers manage their business risks, including drought—as well as support to help farmers meet their basic household expenses when times are tough. Australian government DAWR factsheet

Droughts are part of life for rural Australians; they can occur anywhere at any time. Primary producers should know how to prepare and cope with drought. Queensland Emergency Services website.

In addition to this, emphasis is placed on drought as a more neutral part of broader and permanent climatic trends, rather than as a discrete event caused by changeable and unpredictable weather cycles:

Climate change poses challenges for all sectors of the Australian economy but particularly for those sectors dependent on natural resources, like agriculture, forestry and fisheries. Australia's climate is changing and the impacts of climate change can be seen in the differences we are experiencing in rainfall, temperature and extreme weather events. Climate change will influence our actions, choices and decisions. The Farm Support Division of the Department of Agriculture and Water Resources works to ensure the interests of the agriculture sector are considered in climate policies. The Farm Support Division also works with other areas of the department to advance the sector's capacity to deal with a changing climate. Australian government DAWR website.

3.3.2 Presenting graziers in a 'professional' relationship with drought

Instead of presenting graziers in an adversarial relationship with drought, the 'Managing business risk' frame tends to position graziers as businesspeople working strategically with drought as they would any other business factors. These narratives are often used to counter the 'disempowered' messages often dominant in the media. They instead present graziers in a position of rational authority, making sensible decisions rather than submitting to drought or being 'forced' to do something:

Challenging the public perception of drought: not all farmers are 'busted cockies with starving animals' - *Farmers are concerned the media is focusing too heavily on drought disaster stories that are damaging the reputation of Australia's livestock industry. They also say the majority of farmers are not shooting their animals or letting them starve in paddocks. In recent weeks, stories profiling farmers struggling to feed stock, often showing underweight sheep or*

cows or even dead livestock, have been headline stories across Australia. ABC Rural, 6 Aug 2018

As our front page story reveals, producers are no dummies when it comes to managing drought and those facing winter with less than ideal pasture stocks will be busy adjusting their feeding or selling strategies accordingly. Queensland Country Life, 23 February, 2017.

As well as stories about graziers managing drought as ‘professionals’, rather than battlers, media reports also contained persuasive material regarding the moral and economic imperative for graziers to become more emotionally-detached business people during times of drought:

Acutely aware of the changing weather patterns, the [family] say the way the country is managed needs to change. "We have to be really good businessmen if we want to succeed out here," [grazier] said. "There's no chance for mugs or anything like that, we've got to do a proper job." ABC Rural, 14 December 2018.

While there appears to be overwhelming public support for helping farmers through drought, concerns have been raised by economists as well as farmer representatives — including both the former and current head of the National Farmers' Federation. A central concern is that drought support could undermine farmer preparedness for future droughts and longer-term adaptation to climate change.

Another concern is that the simplistic "farmer as a victim" narrative presented by parts of the media overstates the number of farmers suffering hardship and understates the truth that most prepare for and manage drought without assistance. Sensationalist media coverage can also damage Australia's reputation as a reliable food producer. Images of barren landscapes, stressed livestock and desperate farmers send the wrong signals to customers and trading partners. ABC Rural, 23 Oct 2018.

3.3.3 ‘Empowered management’ narratives

Closely aligned with presenting graziers as adopting a professional approach to drought are narratives about how drought can be incorporated into broader management strategies and systems. This process – of working ‘with’ drought rather than ‘against’ it – is presented as the means by which graziers can empower themselves in a changeable climate:

THEY are five inches short of their average summer rainfall and haven't seen run off rain in 22 months, but [property owners] are still smiling. The family run a Droughtmaster and now Senepol-cross cattle operation on their [details removed] property, 80 kilometres from [SEQ region], selling bullocks direct to the meat works. Due to a dry season this year they were forced to sell "the bottom half" of their number 2015 steers to feedlots for the first time. This will give the remaining cattle a better chance at finishing off. But, the couple believe their situation would be a lot worse if they hadn't adopted a holistic management system two and a half

years ago. Holistic management recognises nature as a whole function and to use it effectively landholders need to work with nature and not against it [property owner] said. Queensland Country Life, 23 February, 2017

The following excerpt is an example of such a narrative. In it, an agricultural consultant argues that by adopting 'grazing best practices', graziers can become managers rather than victims of drought, and can use science and holistic practices to balance the needs of their cattle (and sources of profit) with the needs of their pastures. By adopting the role of manager, risk can be minimised and profit can be maximised:

[Principal consultancy nutritionist] delivered the science-based supplementation workshop at [property name]. [Principal consultancy nutritionist] said dry pastures could leave graziers with low protein, stubble and roughage to get stock through summer, so supplementation could play a vital role...

"It comes back to the benefits of grazing best practices that land managers undertake to help minimise the risk of drought and maximise opportunities during good seasons," [Principal consultancy nutritionist] said. "It's about balancing how much grazing occurs and how much time is allowed for recovery of the grazed pastures, and knowing what feed additives to provide livestock, including custom supplement mixes for optimum performance dependent on the season.

"Healthy animals fed balanced diets and provided with good supplies of fresh water will be the most productive. These animals will be the most profitable to the landholder and the most efficient users of nutrients." Queensland Country Life, 11 January 2018.

3.3.4 Knowledge as the key to management

Unlike the narratives in the 'Battling adversity' frame that emphasize graziers' adversarial skills to battle with, gamble against, or otherwise endure, drought, the 'managing business risk' frame emphasizes the importance of graziers better *knowing* drought, rather than fighting with it. Specialist knowledge, particularly in the form of scientific and agricultural experts, is a large part of 'managing business risk' discourses:

Innovative research will be converted into information systems and processes to support Queensland graziers to manage drought and climate challenges more effectively. Queensland DAF website.

"Our business is in the process of being transformed," he said. [Company], which runs cattle properties across Queensland and the Northern Territory, is increasingly using technology to maximise beef production and battle adverse weather conditions such as drought. "We are improving the consistency of beef production by investing in technology and innovation such as data analytics, pasture mapping and genetics," [name] said. Courier Mail, 15 July 2016

Minister for Agriculture and Fisheries and Rural Economic Development, Bill Byrne said the Queensland Drought Mitigation Centre (QDMC) is already helping Queensland producers better manage increasingly volatile climate events.

"While drought is a part of life in Queensland, it's one of the biggest challenges faced by our producers which leads to significant economic, environmental and social impacts," the Minister said.

"No group is affected by changes to our climate more than producers. They are on the front line and that is why this initiative is a major advance for our food and fibre sector.

"The ultimate challenge for scientists is to be able to better predict the start and finish of a drought period.

"So to address this challenge, the Palacyszuk Government has partnered with the USQ to form the QDMC which I'm officially launching today" Queensland Country Life, 22 June 2017

3.3.5 Governments as facilitators of risk management

Finally, another key narrative in the 'Managing business risk' frame presents the role of government as a facilitator of risk management primarily through the provision of information and scientific expertise:

The Queensland Government is investing millions of dollars to help producers better manage drought and climate events with new tools including more reliable forecasting, insurance products and customised climate information. DAF media release, 7 November 2018

The Australian Government supports farmers to manage their business risks and to prepare for, manage through and recover from drought and other hardship. DAWR factsheet, August 2017

"By combining USQ expertise and the considerable scientific resources of the Department of Science, Information Technology and Innovation, along with the experience and knowledge of the Department of Agriculture and Fisheries, we can improve our understanding of droughts and help producers to better prepare for them," Minister Enoch said. "Droughts are an inevitable feature of our Queensland climate. "This comprehensive research program will help us to understand how multi-year drought sequences affect our grazing industry and develop a range of decision support products including remotely sensed data to help producers manage this risk." Queensland Country Life, June 22, 2017

4 Firsthand accounts from graziers

The results of 40 qualitative interviews conducted with Queensland graziers are discussed in this section. Many of these interviews involved more than one person and covered a range of subjects and issues.

To illustrate and expand on the themes identified from these accounts, direct quotes from these interviews are provided in italics.

In order to protect the anonymity of participants:

- Identifiers in all interviews (except the names of certain public figures, scientists, or government employees when mentioned) are removed; and
- Quotes are labelled with **only** with an abbreviation of the region in which the interview was conducted (eg. SW, C, N and FN). An indication of *who* is talking (e.g. Male 1, Female 1, Male 2 etc.) is also given.

Care was taken to ensure that quotes from all interviews conducted are included in the results.

Further details about interviews can be found in three tables presented in Appendix 1. This includes:

- South West Region - Section 6.1.1
- Central West region – Section 6.1.2
- North and Far North region – Section 6.1.3

For the purposes of streamlining this report, the participants' responses to background questions regarding history in grazing, goals and approach to business are included in the interview summary tables in Appendix 1. This information is deliberately kept broad to maintain the anonymity of research participants.

4.1 Participants' motivations and values

The question "What are some of the things you love most about your business and life here?" was asked at the beginning of the interview, and was designed to elicit some background knowledge regarding the motivations driving research participants as they worked and lived on their properties. Responses were often enthusiastic, with participants eager to share what they loved most about living and working on their property. It is interesting, but not surprising, that responses indicated a far more complex set of motivations and values underpinning the lives of the research participants than the drive for profit or financial security. Participants also valued being self-sufficient and

independent and of being able to solve problems creatively and their intrinsic connections to the land, the animals and the natural environment. As well as this, they valued working to 'improve' the land and the animals, and they valued their history on the land. As they described what they love about life in primary production, several participants described themselves in terms of being limited in their ability or willingness to consider other lifestyles or occupations, particularly those working for an employer or living in a city.

4.1.1 Self-direction, creativity and independence

This was the most dominant theme in research participants' descriptions of what they loved about what they do and living where they live. Participants described valuing the sense of control and autonomy that their lives and work brought, often responding to the question regarding what they loved most about what they do with such terms as 'working for yourself' (SW), and 'owning what you do' (SW):

Male 1: I think people say lifestyle, but I think one of the biggest things about lifestyle is you're your own boss, I think.

Female 1: [Took the] words out of my mouth! CW

As they outlined their perspectives more deeply, participants articulated the sense of freedom and independence that this autonomy brought. Being situated in remote, rural locations also played a role in these accounts of self-direction. Several participants described loving the sense of space - both geographically and psychologically - that came with rural life and living away from other people. This space often meant having privacy and protection from outside influences that were seen as constraints on individual freedom and autonomy. As one participant put it, 'it's knowing that big brother is not looking down at you' (N).

When describing what they love about their work, some research participants also described a deep sense of creative purpose, of feeling connected to the work they do, and a joy in finding innovative solutions to problems and seeing direct results from their work:

Male 1: For me, the main thing is that I feel as though we're at the forefront of basically understanding our environment and how grazing can impact and interact with our environment in a positive way. We've seen a lot of positive changes in that space just on our property through different types of grazing methodologies. I just - I suppose, for me, I love the fact that we can see that connection. We understand the connection between what we do and producing good quality food, which in turn affects, yeah, human health and all those flow on benefits. I really feel that the work we do is - has the foundation humanity on a broader level because what we do really affects our planet and the food that people eat. N

Male 1: The other thing is you actually get a sense of achievement out of just about

every job you do... You put in a new fence, there's an achievement. You put up - oh it doesn't matter what you do - there's always a sense of achievement. You breed a new foal, there's an achievement in the fact that he's there. Then you see him progress through to his full potential and your kids do the same thing, don't they? SW

Female 1: I just so love where we live, Gillian, and I think when you're doing what you love, and I always think this about the drought, it really makes you step up to that next level, because you have to find a way to still survive even though there's no money in the bank. CW

As they related what they loved about what they do, several participants described what they considered to be the 'undesirable alternative', often painting a picture of living in a city, working a desk job, being employed by someone else, and battling traffic to drive somewhere away from home to work. This alternative was presented as placing unacceptable limits on their autonomy and their sense of purpose, compared with the grazing lifestyle, as the quotes below illustrate:

Male 1: Like, when you stop and think about it, what can be better than owning and running your own business and having your own family there around you helping? And you're all helping each other, hopefully, and you're watching the whole thing grow. Isn't that a lot better than what the average man in the street, that's got a job in somewhere in the town or the city, he goes his way in the morning, and everyone goes their different way, and they go and, you know, do a day's work for someone else? They're making money for other people instead of doing it for themselves. Isn't it better than that? That's the way we see it, and that's what gets us through the bad times and the good times. That's what gets us through, because we won't...we won't give up, you know? SW

Male 1: I mean I couldn't really live in a city. I used to like it when I was younger but as the party scene and everything else wore off I just couldn't stand it. I go down to Brisbane now and lock myself in a room and watch TV and go for a run on the beach and try to avoid everyone.

Researcher: What don't you like about the city?

Male 1: Too congested, people running around madly going nowhere doing nothing, it's just mindless. It's just totally mindless. SW

Female 2: You don't have to sit in an office all day every day. I hate that. CW

4.1.2 Connecting with animals and the landscape

As well as self-direction, independence and creativity, connecting with animals and the landscape was another common theme in participants' responses to the question of what they loved most about living on their property and doing what they do. Here, participants described the intrinsic satisfaction

that simply being around animals (including wildlife, pets and livestock), plants and the natural environment brought them. Some participants referred to the pleasure of working in 'good, clean country' (N), while others described strong bonds with the animals around them:

Male 1: I just love working with stock. Animals, actually. Just being with them. Like we love animals. Like we have horses. We ride horses, we have dogs. We have just...[motioning to the birds in the trees around us] like that fella there talking to us this morning...

Female 2: That's basically what we are - caring for animals - isn't it?

Male 1: Yeah. Like regardless of what type or kind, like we have all sorts of things turn up here that is just part of your daily...We've got four black cockatoos that have moved in here 12 month ago and they're nested here and they've got babies up there at the moment. Just things like that. SW

Some reported finding rewards in watching the animals thrive under their care, while others described the intrinsic pleasure found in living and working in beautiful, natural surroundings:

Female 1: ...it's really satisfying to see cows and lots of little calves and everything's got water and grass and... you know. So there's a personal satisfaction that you've done the best you can for your animals. Because it's an extreme environment. FN

Female 1: You have pride in your business because it is - like it's a beautiful part of the world. This is a beautiful spot. You do, you just get those moments when we're out mustering all the time because it is a beautiful place. We'll all be on our horses and it just doesn't get better than that....

Male 1: It's a therapeutic job. SW

Female 1: The birds, we love the birds don't we? The wildlife. I just love looking around...Many walks. Yeah I love to walk, I love to look out and just look around and - I love it, I just love the land. It's beautiful. When it's lovely and green you take photos like anything, because it's just so pretty, it's so pretty. SW

In the quote below, research participants describe deriving a sense of purpose, even in dry and difficult times, from knowing that on their properties they are a part of broader natural systems and ecologies:

Male 1: You're just a part of the whole power of the universe that you live in here. It's just nature and - yeah, oh well there's difficulties - but there's a lot of good things too. SW

Female 2: Yeah, I think the space and the animals and even just...Even when it's dry, you look at your sunsets every night and you see the sunrise every morning and you get to see the stars in the sky. CW

4.1.3 Improving livestock and the property

As well as describing the connection with animals and the landscape as one of the key things they loved about their work, participants also spoke of the pleasure and satisfaction derived from more instrumental relationships with the land and animals. Here, the satisfaction is derived not simply from being around animals or being on the land, but in exerting influence to make them more productive and more amenable to human purposes. This process often referred to as 'improving' livestock productivity, the land or the property, was a key source of satisfaction and joy in the graziers interviewed. Seeing the effects of better nutrition and selective breeding on livestock was a common source of satisfaction:

Male 1: What motivated me was, what's always motivated me, is improving the property and seeing the sheep going. Like, improving the sheep all the time. Breeding better and better animals.

Female 1: Innovative and - yeah.

Male 1: Getting more and more, better and better lambings, and that kind of thing. That really motivated me. At the ag college, pastoral college... I can remember the old ag master telling - the old sheep master telling me that the average lambing in this district is 49 per cent. We ended up, 2011 and 2012, we were getting 106 and 109 per cent. We did a lot of work and spent a lot of money to set it up for that... but we got a hell of a kick out of that. CW

Male 1: We don't just run animals. The aim is to try and improve the quality of those animals every generation. It's not just "there they are, there. They're right and them and their mother, their sons and daughters will be the same as them" sort of thing.... No. You want them to be better. CW

Meeting the challenge of improving livestock and the property also appeared to be an ongoing motivation for some participants, something driving their interest in the work that they do. For example:

Male 1: I see it as a bit of a challenge to improve the country or make properties out here more viable or just improve the landscape, if you like....Mmm, oh well, I come here and I want to make it profitable and I believe that with different management you can make places both more profitable and ecologically sustainable. I don't know if that's why I came here originally. I think just because I love cattle, always wanted to own a cattle station probably and that seed was sewn in the sixties. These blocks were being balloted and I came as a sort of six to eight-year-old kid with my Dad looking at them and he put his name in for numerous but never ever got one. So, I... yeah, I've always loved cattle. FN

4.1.4 Honouring history and traditions

As well as self-direction, connection to animals and the landscape, and the satisfaction of improving the property, some participants pointed out to the researcher that their 'lifestyle' was not so much a personal choice, but an intrinsic part of themselves and their histories. As shown in the examples below, some participants stated that they knew little else but life in primary production, while others expressed how integral the grazing lifestyle was to their sense of self by describing themselves as being 'born' into it and having it in their 'blood':

Male 2: Don't know no different. [laughs]. N

Male 1: We're just born to it, born to rear cattle and that's what we do...Oh well that's our job and hobby and... yes, I don't know...if you took that away I don't know what else I'd do. N

*Female 1: ...we love the lifestyle because it's what we both know, it's in our blood
CW*

In line with these descriptions of grazing as a part of participants' family history and sense of self was a desire to maintain these histories and traditions by remaining on the property and in grazing:

Male 1: One of the questions you asked earlier was why do I stop here, but I can take you to a dam that they built with a wheelbarrow. I can take you to a dam where they ploughed it and loaded in onto a dray and took it around and tipped the bags out. I can show you the old house here that they cut with the pitsaw and all these sorts of things. It's a part of me. You wouldn't part with it would you? SW

4.1.5 Financial security

Financial reward was not commonly described by participants as something they loved about their life and work. While it was acknowledged that there was money to be made in grazing, especially during good times, participants spoke about money mainly in relation to a sense of security, and of being able to maintain a desired livelihood on the land:

Female 1: It's not a very pretty lifestyle. Well sometimes [it is] but...

Male 1: It's a little bit of both. There are profits there I think, but I think you've got to get to that size of an operation and only recently with the way the markets have been, if you had of asked me that question two years ago I would have just said no. It's the way the market was with sheep, wool, everything. I just would have said no, there was no money in it, we were really just doing it to get these kids up and educated and whatever. But things have changed in the last couple of years. The cattle market's probably doubled. SW

Male 1: The other thing that might have motivated me a bit was trying to make a small place pay. CW

It's rewarding when we're making money. I like putting into place those plans that are going to lead to us making good coin. Yeah. Yep. CW

4.2 Perceived threats and difficulties

Responses to the question 'How does drought impact you and your way of life?' indicated that, like the values described in Section 4.1, participants' understandings of drought were complex. Some described drought as a straightforward hardship and a negative impact on their ability to improve their livestock and their productivity, but many also described it as an unavoidable part of grazing life, and something that should be accepted. For some, accepting drought involved seeing it as a difficulty to be endured, while for others it meant treating it more as a challenge, against which skills in self-reliance and problem-solving could be built. Others even saw it as an opportunity to think innovatively.

The idea of drought as a challenge and an opportunity was strongly connected to attitudes regarding drought as something that can be prepared for. To avoid repetition, this material is discussed in Section 4.5.

What was largely absent in these accounts of drought was a connection between the nature and severity of drought and broader climate trends. Instead, drought was often understood as being part of a regular and observable cycle, with an underlying assumption that a dry season or event is offset and balanced in this cycle with a subsequent wet event. The idea of irreversible and anthropogenic change to this cycle was often described with distrust and scepticism, with participants' own past and present experiences of drought considered more reliable indicators of drought risk (this is also discussed in Section 4.4). An adherence to the belief that drought follows an established pattern is likely to be a key constraint in participants' ability to fully comprehend the changes facing the grazing industry, and thus a key factor in their ability and willingness to prepare for, and adapt their livelihoods and enterprises to, broader climate change.

Although it was not asked as an explicit question during interviews, discussions regarding the impact of drought on grazing livelihoods often led to conversations about other significant challenges faced by participants, and the constraints these placed on their ability to independently manage their properties, their connections to the landscape, their livelihoods and their ability to work in the manner they wished. Many participants were keen to point out that drought was one threat amongst many they had to face. As well as increasing levels of debt, they described other important threats including an increasing sense of marginality and isolation in agriculture, and a perception that many government policies and environmental regulations curbed their ability to work autonomously and efficiently. These accounts suggest a tendency to understand the vulnerability of grazing businesses and livelihoods in terms of the more immediate problems of perceived social and political

disadvantage, rather than environmental threats over the longer term posed by unsustainable land practices and climate change.

These five themes – Drought, Drought as part of cycle rather than a permanent change, Growing social marginality, Increased government interference and Increased debt – are discussed in turn below.

4.2.1 Drought

In response to questions regarding the impact of drought, several research participants described their experiences of drought in terms of extreme difficulty. One of the key aspects of this difficulty was witnessing livestock become under-weight, and the hardship of feeding drought-distressed cattle:

Researcher: For somebody who never lived on the land and never really knew what drought was, how would you describe it to them?

Male 1: A mongrel! [laughs]

Male 2: Heartbreaking.

Male 1: Yeah.

Male 2: For me anyway, the cows getting distressed.... N

Male 1: Imagine if you had a mob of kids that you were looking after that hasn't been fed for a couple of days. Every minute of every day it's time, that's the biggest thing I notice, you are on - it's just time, you just have no time. You can't physically afford to pay enough people to do the things that need to be done to get, you know. Or keep a business going normally as well as this whole other thing that's going on in the background. You've still got the day to day phone calls to ring up about a bill that's wrong or day to day things that go wrong, a pipe's burst somewhere, a tank's leaking somewhere. So you've got to do the same things but all of a sudden you've got these livestock that are actually like, you know. You've got to drop everything to go and do them first. SW

Another aspect of the difficulty of drought is the prospect of psychological distress for oneself and for other people. In the account below, a research participant describes the difficulty of watching and supporting others go through prolonged drought:

Female 1: It's hard. I hate to see the land so bare and black. I feel for it. In 13-14 when it was really [bad], it was good to get up and do the feeding and... then to come home and close the curtains. I always thought it was like being an ostrich and burying your head in the sand...

The men, you know, I feel for them. Even [Male 2 – her son], even though he can go back into town, he was going back into town and everything like that, and he

can come out the next day to hold [Male 1 – her partner] up. But then it came - in 13-14 it came too hard for him, it went on for too long and he was getting down. Then he couldn't come out.

So it left it up to [Male 1] and I. Then [Male 1] got so down, so down, and I just remember how hard it was for him to get out of bed. But he did, he did, he got out of bed and it was really hard for him. We mixed the feed ourselves and put it around and - you know and how hard it was to be happy and put a smile on your face to support them, to do whatever you could to make it easier on them. SW

As well as describing drought as an unavoidably difficult part of rural production, some participants described drought as part and parcel of rural production, making it a hardship that could be endured and somehow 'lived with', despite the profound emotional difficulties:

Male 1: But, anyway, it's something you learn to live with. But I can understand a lot of these farmers getting so depressed and taking their lives. There's been quite a lot of suicides and I can see where they come from. N

Female 1: It sucks everything out of you. The dryness from the weather, it's like you're shriveling up as well. You know when it's cold and it gets windy and you know how your skin starts drying out? Well that's exactly how the drought feels to me. There's no moisture, there's no nothing, and you just feel as though you're just shriveling up. Every bit of moisture is taken out of you. Well that's the way it is... We bought into this situation, so we just have to put up with it. N

Male 1: But I mean if you don't like being here - if you don't like droughts well don't be here, that's all about it. If this is what you call a drought, what we've had is a drought, and you don't like it well don't be there. N

However, even though the research participants overwhelmingly described drought as having negative impacts in a financial and emotional sense, some participants were also able to see drought as a challenge or an opportunity that could be learned from. This definition of drought was also central to much of the discussion around attitudes towards preparing for drought, and thus is discussed further below in Section 4.5.

4.2.2 Drought as part of a cycle rather than a permanent change

As the impacts of drought were described by research participants as both a hardship and a part of rural life, there was also some evidence in the interviews regarding a tendency to understand drought as part of broader and regular weather patterns, which were often referred to as 'cycles'. These beliefs were often expressed in relation to whether broader change was occurring, and the rationale that the weather follows cycles was often held up as a reason to deny or dismiss claims about permanent climate change:

Male 1: They're talking climate change nowadays, I don't know. Climate always changes.

Female 1: I think it's a cycle, yeah. SW

Many participants drew on their memories, personal observations, historical weather records and the experiences of older generations on the property, as evidence for their faith in these cycles:

Male 1: Grand-dad was born at the end of the Federation drought. Dad was born in a drought, Mum was born in a drought in 1940s. I was born in the wet season at the end of April, which is uncharacteristic, and that went into another eight-year drought. So these eight- and ten-year drought cycles are not uncommon. I really object to all these record temperatures that they're putting out, on the basis that they're discounting a lot of the old data that used to be around. Mum and Dad can remember these temperatures and hotter. I'm not saying if it was for a specific day at a specific time, or that sort of thing, but yes, it's hot. Yes, it's dry, it's drought, and there might be a global climate change out there, but that is totally irrelevant to what we're facing and fighting...change is inevitable. It's been happening all the time now, I think, but we're seeing also nothing new [laughs]. CW

Male 1: I can remember the finish of the 1946 drought. At that stage my father was living up in [town]. They brought a lot of cattle through on the hoof because we didn't have road transport and that sort of thing. The [common area] was flogged to a dust bowl just around the township there. It's happened to us three times that I can recall. That's just normal. Then in 1946 and when I was a little fella, I can remember enormous dust storms. You'd see them rise up in the west and start to roll in; just big red storms. We had a dust storm last week and I said to somebody that was the first time I've seen one of those since the 60s. I couldn't remember one since the 60s. It had come up in the west and just gone over the - blocked everything out as it went past. No, I don't think that it's changing much, and I don't think that climate change has got a great deal to do with what's happening. SW

Other interview participants went further to express considerable distrust regarding assertions that climate trends were exhibiting permanent changes, with many displaying skepticism regarding the science behind climate change claims:

Male 1: ... But most of it's a lot of bullshit. Like they'll just have big words, a whole heap of scientific fact that - this climate change thing that they're - there is not even two people in the same room that'll agree on that let alone having some scientific fact behind it. SW

*Male 1: You talk about climate change here and you listen to the weather reports, they can't get the bloody weather right two days out and here they are predicting climate change. It's just a load of rubbish. The climate's been changing since the world's been... if you look back through history how much of the continent was ice at one stage and how much was forest and this is before we had car or motorcars
N*

Male 1: I think it's interesting to look at the historical data and there appears to be a bit of a trend that our drier years are getting more frequent and longer. But when you live here for 70 or 80 years it's a pretty short time in the history of the universe, isn't it? So probably if you look back before Christ you would see the same variation in weather. FN

Other participants expressed skepticism regarding the motivations behind climate change claims:

Male 1: Well that silly bugger that went down the Murray-Darling and said it would never flood again.... Tim Flannery. He went down the Murray-Darling and said it would never, ever flood again and it flooded the next year. The reason of course, why it flooded, was because of climate change. The climate has always been evolving, we know that. The impact that man has had on it would be nothing like what happened with the dinosaurs all disappeared and nature repaired itself. I don't think people give nature enough credit for its ability to heal. Okay, people say we're making a few mistakes at the moment but nature will heal itself, given time. The biggest problem with climate change at the moment is it's become a business and people aren't willing to let go of the money they're making out of climate change.

Researcher: Who are you referring to?

Male 1: All of the bloody 'suits'! SW

Female 1: You know did you know that 35 years ago there were 345,000 primary producers in Australia? Today there are fewer than 87,000...The federal government policy is anti-agriculture too. Anything to do with so-called climate change or emissions trading, all of that is designed to get people out of agriculture. So then you can have all the big conglomerates come in, they'll buy it all up and they'll do what they want. The government will just direct them. SW

Despite this, some participants did think that drought was a part of a broader climate trend, and this belief was leading them to start thinking more strategically:

Female 1: I don't even call it a drought anymore Gillian, because I don't really talk about it to other people on the land but I think the weather's changed and that this is our new normal. I think if we keep talking about drought it puts you in that head space of "oh, we just need to keep taking government support and keep coping until it goes back to normal". But my mindset is "right, this IS normal". The people that can adjust the quickest are the people that are going to survive, so that's what we need to do. CW

4.2.3 Growing social marginality

As they discussed their values and the impact of drought, many participants discussed the social changes they had observed regarding grazing and life on the land. While some positive changes were mentioned – such as better roads and improved communication services – most often these

changes were expressed as being damaging to the security, status and well-being of grazing economies and communities. One of the threats to grazing discussed was the gradual decline in the number of family-run farms and more properties coming under corporate management:

Female 1: the family farm's soon going to be a thing of the past, and I don't think that's a good thing because no corporation can run a place - they're not going to work the hours and do what we do. They're not going to be there to fight fires. They're bigger places. It's just - I don't think they will run it as well. I just don't - they don't have that passion like he's got. CW

Some participants also discussed a gradual erosion of grazing-based communities, describing population decline, lost economic opportunities, lowered accessibility of services, difficulty hiring adequate labour, as well as an increased sense of social isolation and once-thriving rural towns and centres becoming less cohesive and vibrant:

Male 1: The life on the land has become so much harder because back in the early days, especially with wool, I'm talking about in the 1950s, there was just so many staff on these places. Now you go to a place and half the time there's one person on the property, no more than two, and it all goes back from - a lot of the people that work on the land, they left the land, they went to the mines, got big money and as a result it is nearly impossible to get staff to help you. I call that rural decline... But the decline as far as living on the land has just gone back so far, it's not funny....It is sad and you've got all of these places - they're huge homesteads with all of these outbuildings and you go to a lot of these places and half of them are falling down because people just can't afford to maintain all of these buildings like they were years ago. I don't know whether you've noticed it in your travels. N

Female 1: I can remember this town about 30-odd years ago...this was a thriving town wasn't it? It was a thriving town... and people are just leaving in droves.

Male 2: When we were kids you could walk up that street any night of the week, there would be people walking up and down looking in the shop windows nine o'clock at night.

Female 1: Cafes would be open at night time to say nine o'clock or whatever.

Male 1: The pubs, you couldn't get in... Any night of the week you'd be five or six deep in the lounge trying to get a drink. They've just killed it. There's nothing....If they think the drought's only affecting the properties they're stupid. Like our shop there, we've lost six people out of that shop in the last two months and all their families have left town. SW

In line with the perceived erosion of grazing communities, other participants described shifts in the values placed on grazing, with grazing and pastoral industries being seen as less important to Australia's economy, its cultural identity and its politics. This included a perception that grazing and agriculture was coming under increased scrutiny because of its environmental and animal welfare impacts (especially in regard to land clearing in Mulga country and live export in the northern

regions). Both State and Federal governments were described as being complicit in this scrutiny, a perception that appears to be part of these participants' sense of alienation:

Male 1: John Howard, if you recall...saw farming as a part of Australia's identity....what I'm about to say next, this is going on all across the Western world, where most of the communities are losing their respect for where their food comes from...You know, 10,000 yuppies drive their car to the beach at Bondi, but they see a farmer ploughing a field. Ploughing! Going across a paddock, ploughing a field to grow a mob of beans or whatever like that, and they want to attack him because he's kicking up a cloud of dust and the like. FN

Male 1: What you see out there, that's our resource. Are we going to bloody ruin that resource that we've got? Because that's the only resource we've got for production. The conservation movement - why they can't have that mindset beats me. We're not here to ruin the country, we're here to enhance the country, and as well as try and feed the nation and feed the world. That's the way I see it, as a major threat to primary production in Australia. I really do. FN

Male 1: The government can't think of enough ways to torture us. You never see anything good about what farmers do. It's always "we're destroying the planet, we're doing this, we're doing that". SW

4.2.4 Increased government interference

Alongside this belief that grazing was becoming more marginalised was an associated view that graziers were being targeted by certain government policies and regulation. In line with the importance placed by the research participants on self-determination and freedom, as well as the ability to 'improve' their properties, this targeted regulation was often identified by participants as a key threat to their way of life. Many participants, particularly those in the South West region, were keen to discuss the impact of the introduction of vegetation clearing laws, with several expressing anger regarding the Queensland governments' curbing of graziers' power to control vegetation and regrowth on their properties:

Male 1: The Australian government has superseded Mother Nature to be a threat to the man on the land, and that's a pretty powerful thing to be doing. FN

Female 1: Now this is the wickedness we're up against. In Queensland a murderer has more rights than someone who pulls down a tree on their own place. If that's not wicked, I'm not here. The Queensland government has just lost everyone. There's no way anyone is going to talk to you because they've totally and utterly annihilated any type of trust. There's no trust left. And sadly the bureaucracy is just as powerful as the ones who are making the laws. It's a double-edged sword. They're there to impede, they're there to enforce, they're there to, you know, make themselves more powerful, and the people who are, you know, the citizens of Australia, more powerless. SW

Increased administration and reporting to government, as part of operating a grazing business, was another issue often raised by participants. In the quotes below, participants describe how requirements for record-keeping and reporting to government created increased work, and also the suspicion that record management makes it 'easier' for the government to monitor and target them:

Male 1: Every time some government department starts to do something, it's causing us paperwork and headaches. CW

Female 1: The government introduces NLIS. I think it's the biggest rort in the world. I actually do but we have to do it. You can't just put your head in the sand and say no we're not doing it. You have to do it and you have to live with it...I don't even know how some of these people [don't keep records] how they're getting away with that. I think they must be paying someone to do it. You look next door and you just think "my god, he is like 50 years behind all of us"...Why aren't they picking on people like that? The answer to that is, they go to wherever it's easy for them.... They won't go to those places because they are too hard. N

4.2.5 Increased debt

Another aspect of grazing life that many participants expressed concern about was increased levels of debt and financial dependence on lending institutions. Many older participants, in particular, observed the impact of increased debt on younger generations and a growing consumerism and materialism in regional areas. In addition, an ethic of 'buy now, pay later' and the subsequent accumulation of unsustainable levels of debt (often seen to be encouraged by banks) were identified as a key threat for future life on the land:

Male 1: Everyone lives on credit. Even just the everyday person lives on credit. Once upon a time, you didn't have to go back long ago that when you first left school, you lived in a - you might have lived in a rented house with old - someone else's second hand gear. I mean I didn't own anything for the first 20 years that I left school. You were happy with second hand stuff. Whereas now young people are leaving school and they've got to have the flash new car. They've got to get the package for the house. They've got to have all the white goods. Everything's got to be brand new. There's so much debt going on so no-one actually knows how to go without. So that's where droughts get harder too is that once you experience having a bit of stuff, no-one wants to go back. No-one wants to pull back and go "I don't want to live without that anymore". SW

Male 1: I think the whole of Australia has got themselves into a corner. To be quite serious I don't know what's going to happen. In the last decade, or last two decades, it had become the fashion to borrow as much money as you can get hold of and live accordingly. I wasn't brought up like that [laughs]. I think that, yeah - I don't know what's going to happen to us because we're so far in debt. I see people paying money for land that - and unless land values continue to rise - there is no way in the world that they can make enough money out of livestock or wool or

something to repay the debt. I'm not an economist but where's it going to finish?
SW

4.3 Trusted networks of knowledge, science and information

The questions ‘How do you find the information and knowledge you need to make decisions on your property?’ and ‘Can you tell me about any situations in which you draw on scientific information to make decisions about the running of your business?’ revealed the different types and sources of knowledge that the participants used, and the degree to which they were employed and trusted, as well as whether (and how) they adopted scientific knowledge into their businesses.

The responses indicate that the participants differed in the range of knowledge they accessed and used to manage their properties. Some appeared to have a limited approach to knowledge seeking and the use of scientific information, relying primarily on relatively limited knowledge networks comprising their own subjective knowledge and experience as well as that of their family members. Others, however, were more proactive knowledge seekers, describing themselves as enthusiastic learners who deliberately sought to diversify and expand their knowledge networks to include many sources of information. Where it had practical applications, science – particularly in regard to soil, pasture, breeding and herd management – was part of these knowledge networks.

For these more active knowledge seekers, deep discussions of business practices with people who were experienced, qualified and able to think differently to the mainstream, was highly regarded. In addition, there was an emphasis on the need for personalized one-on-one information-sharing, and a tendency observed for participants to identify key *people* – such as extension officers and scientists - as trusted and preferred sources of knowledge and advice rather than more general sources of information such as websites, organizations and institutions. Knowledge sharing events, such as paid courses, workshops and field days, were also highly valued by some participants, especially for their benefits in expanding these participants’ connections with ‘like-minded’ producers, and their potential to challenge the same participants’ beliefs and experiences, in terms of what is possible for sustainable business practices and productivity.

However, responses to these questions revealed two potential issues regarding the ways in which participants seek and share knowledge. The first was an indication that the more proactive knowledge seekers sometimes felt constrained from openly sharing their learnings and experience within their local social networks, including their neighbours, local communities, and sometimes even within their families. There appeared to be several elements to these constraints: the general attitude that business was best kept as a private matter, a reluctance to openly discuss drought and climate change for fear it might create emotional suffering in others, and an unwillingness to call attention to the poor business practices of peers and neighbours.

The second issue in regard to participants' knowledge seeking and use of science was the skepticism and frustration commonly expressed by research participants regarding the perceived accuracy of climate science and forecasting. While many participants acknowledged that the accuracy of seasonal climate forecasting was improving, they still felt that it was an inadequate basis for important decision-making.

These six themes – Subjective knowledge and experience, Family knowledge, Trusted people, Group-based knowledge events, Constraints on knowledge sharing and Science and climate information - are discussed in turn below.

4.3.1 Subjective knowledge and experience

A form of knowledge that most research participants reported using to make decisions was their own subjective knowledge which they described as intrinsic to their lived experience and learned through long histories working on pastoral properties. Their accounts indicate that these forms of knowledge are highly valued as 'traditional' (see Section 4.1.4) forms of knowledge within local grazing communities, and might even comprise a primary source of knowledge for a small section of graziers. Vernacular phrases were often used to describe this traditional knowledge, such as learning 'at the knee' (SW) of one's elders or going to the university of 'hard knocks' (SW).

Lived experience was often characterized as being particularly legitimate and trustworthy because graziers could connect it with practical results, learning on the ground and through trial and error. It can also be understood as the basis of 'heuristic knowledge', which is knowledge gained through trial-and-error experience which then becomes expressed as rules of thumb or short-hands to apply to current or future problems and decisions. Many emphasized the value of heuristic knowledge, and the need to learn from experience so as not to repeat mistakes:

Male 1: All the gee-whiz, flash stuff we're doing at the top end is good, but back on the ground level we're still peasant farmers. We're price takers, not price makers, despite all the industry's work into it. What I was going to say is that we get "our experience from making bad decisions and we make our decisions based on our experience". That is an old saying CW

Female 1: The more you do, the better decisions you make. You do, the more you...

Male 1: Experience is a big thing.

Female 1: It is, we're not just stumbling around making trial and error decisions... Well, maybe we were...but now I think we're getting a lot better, because we probably made a lot of mistakes and I don't want to make them again.

Male 1: There's been a couple of decisions that haven't worked, but as [Female 1] said "If you didn't do them now, you would have done it in 10 years' time anyway".

Female 1: Yeah, and we'd be more exposed.

Male 1: Whereas now I've done it and I've gone well I'm not going to let that happen again, or I'm going to be more aware of things that did go wrong.

Female 1: It's a refining, we're still learning. SW

Although it is normal and to be expected that many graziers would value and emphasize heuristic knowledge, there were also differing accounts from the research participants regarding the extent to which heuristic knowledge, by itself, could be considered a reliable basis for making decisions. In the quote below, a research participant demonstrates a considerable amount of faith that his history and experience allows him to just 'know' what to do:

Male 1: I've been brought up on the land and I suppose you get into a pattern and you know what to do, from year to year. N

Other research participants, however, were far more skeptical about relying solely on their own heuristic knowledge. In the quote below a husband and wife grazing team who openly identified themselves as life-long learners and great believers in information and education, discuss how an over-reliance on established knowledge, limits their capacity to change and improve business practices. In addition, they mentioned how their desire to continually challenge their taken for granted knowledge makes them different from their peers:

Male 1: Well, let's say that a lot of our peers don't place as higher value on education as what we have. Not only for our children but for ourselves as well. So "you don't know what you don't know". Quite early on, we sort of looked at things and [thought] "if this is as good as agriculture gets, not sure that we really want to be part of this. So why do we do it like that?" So if you go and ask a lot of people in the industry "why do they do that?", they go "oh, we've always done it like that". So that to us isn't necessarily an answer that we're extremely comfortable with...

Female 1: I think [you need to] be realistic too and be prepared to look at the real thing not just what you think should be there or what... SW

Many participants reported actively supplementing their subjective, experiential knowledge with more externally derived forms of knowledge. These external forms of knowledge will be discussed below.

4.3.2 Family knowledge

A frequently mentioned way of diversifying the knowledge and information drawn on to make decisions was using family networks, both on and off farm. Partners appeared to play different and often complementary roles in seeking out and sharing knowledge and skills:

Male 1: You've got to manage cash flow, which is one thing that ..the main strength we've had in our business is that we've - through [Female 1]'s skill set - if it had just been me we would have blown up years ago, but she had a skill set that enabled us to get better control over our business and that is so key. N

The input of adult children, who had travelled, pursued different interests, sought alternative qualifications, and established businesses elsewhere, was often drawn upon to bring different experiences, techniques, attitudes and qualifications to a grazing business' management processes:

Female 1: If they want to bring science into properties [son]'s the person you should have been talking to.

Male 1: Our son, yeah. He's right into technology stuff, you know?

Female 1: He's out at the property. He stays out there. Yeah, he's right into like water monitoring, all that science sort of stuff. SW

Male 1: I've got two daughters. I don't question them [laughs] but this particular daughter has got a doctorate and [worked in overseas country] and [worked in another senior position]. Then I get an e-mail from her: "don't sell the place dad we want it" [laughs]. Back they come. She takes up this holistic management and thinks that's a great idea. Dad has to try it; so dad tries it; and then she decides she's too busy to help him! When you're a good dad you don't fall out with them, you just say "that'll be all right, yeah I'll manage" [laughs]. SW

While most research participants made reference to drawing on family networks, some appeared to rely particularly heavily on a combination of heuristic knowledge and family-based knowledge. In the quote below, a husband and wife grazing team describe themselves as reticent about socializing, but are comfortable drawing on their son's knowledge and experience regarding different types of cattle, to apply it to their own enterprise:

Female 1: Family, family is - we're not very social people, we stick mainly with family all the time.... We've learnt over the years, we had likes of Hereford cattle and that, when we first took over [property name] [Male property owner]'s father was a Hereford man and that, and we had them for years. Then we sort of found out that in the droughts and that, in the dry times and that, oh these things just fall to pieces....

Male 1: Now [son], he's got a different view to us and he's bringing in - he's the black cattle. So now we've gone into the Angus. We're crossing them now with the Brangus because the Brangus has got that bit of Brahman in it that's for the dry times [unclear] more suitable for the dry times, so we've gone that way. Well he has, he's sort of talked us [into it] but anyway, he's doing well SW

Other participants, however, describe deliberately pushing against the limits of family-based knowledge networks. In the quote below, another husband and wife grazing team describe actively trying to avoid their peers and their parents' isolation and dependence on heuristic knowledge when it came to seeking information:

Female 1: You can't be with people even our age or a bit older who've always done the same or done what their parents have done, you can't do that.

Male 1: Yeah, you've got to be open to change.

Female 1: You've got to be open.

Male 1: My parents were very... it was very much a closed book, they learnt from their mistakes I guess and that was it. They didn't take a lot of external influence in, a little bit but I don't reckon enough.

Female 1: It was the way you've always done it, you've got to keep doing that.

Male 1: Yeah, if it worked 20 years ago it still works now, things like that. SW.

4.3.3 Trusted people

Accounts from those research participants who deliberately sought out different sources of information and knowledge indicated a tendency to preference individual *people* as trusted knowledge sources, rather than more general information sources such as websites, institutions, and organizations. When asked where they go for information, research participants frequently mentioned specific people they trust such as scientists and grazing experts. For example:

Female 1: I really like, the department puts them on...her name is Jillian Alexander, so they've been around for decades but we've probably only started really getting interested in the last few years. They do a lot of days in grass budgeting, so you make a decision in January if you've got enough grass for the year, and you sell if you don't, in January, so you don't sell when you've run out of feed and they're skinny and they're worth nothing. SW

Male 1: There was a seminar here in [town], it was the Grazing Best Practice or the BMP...There was all sorts of things, modules, that day, including biosecurity, some of the new regulations regarding that, also poisons, chemicals. The most interesting person I found, the only reason I went there, was a man, he's a scientist, so I suppose got a doctorate of something, and his profession was soil health. So I found that very interesting to see how that all works. CW

As well as identifying individual people, many research participants emphasized the value of personalized face-to-face interaction with paid experts and extension officers. In the following quote, a grazier, who had earlier in the interview expressed considerable frustration regarding the difficulty communicating with the Queensland government in regard to non-drought issues, singles out

particular DAF extension staff as exceptional in their commitment and dedication to personalized extension:

Male 1: Now, the Gulf Cattleman's Association's acknowledging two DPI guys, Joe Rolfe and Bernie English..... They make a conscientious effort....They were really good. They come out and they take us through and they teach us about grasses and everything like that, and they are very helpful. Those guys deserve every bit of acknowledgement that they can get. FN

The ability to have in-depth discussions with independent experts about the specific issues facing their businesses and the properties was highly valued by participants:

Female 1: Well I think probably the best one is having someone who's independent, like Alison Larard, when we're sitting down and going to make decisions. She's independent of what we think. Do you know what I mean? And we sit there...

Male 1: We bounce ideas off.

Female 1: Bounce ideas off her, and then we sit down and re-crunch it and say, well it's going to cost this and...

Male 1: She's a, I don't know if that's a thing but, like the business studies that she's got, we then can talk about it... FN

The people that participants rated as trustworthy sources of advice and information came from a range of places – they were associates to the grazing business such as agricultural brokers, paid agricultural advisors, mentors, scientists, authors and government extension officers. Nonetheless, there were some regularly mentioned traits in participants' accounts of the individuals they particularly trusted for advice. These included:

- a long practical history in and dedication to primary production;
- a perceived passion for and excellence in their respective fields;
- keen analytical abilities including the capacity to think against the mainstream or 'outside the box';
- the ability to apply knowledge to the specific and unique needs of participants' grazing business; and
- a perceived commitment to high quality advice and service.

In the excerpt below a couple, younger than many other research participants and relatively new to running their own business, discuss the reassurance that comes from being able to receive trusted advice from agricultural brokers and financial advisers. Referring to a specific local broker, they

describe this trust deriving from several factors. First is his agricultural experience and knowledge, which they observe as both established but also actively and continuously developed. Second is his own participation and financial interest in agriculture, which brings a sense of being in 'the rural game' together. Third is his ability to understand their personal preferences and goals to provide specific tailored advice. Fourth is his demonstrated reliability and commitment:

Female 1: We have a really good broker and I think that also has helped us as we've got older, getting a good team around you. A lot of people are against brokers and I probably was too, but we have a really good guy...and we really value his input and his experience.

Researcher: Why is that? What makes him good?

Female 1: He's experienced. He's was an agri-bank manager for I don't know, 20 odd years...Yeah, and he is just one of those [people who are] always learning. Smart. Just a humble [person] but learned...

Male 1: He's also got a bit of an open mind to whatever's going on. He loves the rural game, he's bought himself a property recently....I think he does see what his clients see a bit. We've used brokers before and you know...

Female 1: ..I think they try the one size fits all whereas he makes a judgment on the personality a bit, on where you want to go, on what risk you need to take in the short or medium term, he's an unusual...

Male 1: He's a good broker, and also he's very contactable, so I can ring him now and if he wouldn't answer now I reckon he'd ring back after lunchtime. When we were buying this property, he knew we were looking around, he was in Italy wasn't he? He rang me back at two o'clock in the morning over there to say "I'm away now, I'll have a look at it and I'll get something in a few days' time". We'd be one of his smallest clients, he's got huge...

Female 1: Well he's one of those that go above and beyond, which is what we have to do in our industry....

Male 1: He's really good, he's saved us a lot of money financial-wise and he's just a good guy to bounce ideas off. SW

4.3.4 Group-based knowledge events

The value of bouncing ideas off others was mentioned by several research participants, with many reporting that they attend extension events and participate in courses as a key way of coming into contact with like-minded people in order to share information and ideas. The most commonly mentioned course was Grazing for Profit offered by Resource Consulting Services (RCS). The comments regarding this course were mostly positive and, as well as coming into contact with other participants, the benefits of the course included applicable actions such as pasture budgeting, controlled mating, and pasture spelling and rotation. Others events mentioned included Beef Sen\$e,

Nutrition Edge, Leading Sheep, Grazing BMP and related activities organised by regional NRM groups.

4.3.5 Constraints on knowledge sharing

One interesting theme identified in participants' responses to questions regarding their knowledge networks and use of science, was a feeling of being constrained in who they could discuss business and drought management related matters with. In the quote below, a younger grazing couple compare their own attitudes to seeking advice and information to that of their parents' generation. Whereas they observe their parents to be more closed off and cautious about sharing information about business practices, they describe themselves as more open. They attribute their parents' attitude to a fear of judgement from peers regarding what constitutes the 'correct' practice, and their own to welcoming external input in the interests of improved practices:

Female 1: I wonder if that's the fear of being judged that they're not doing something right. Whereas [partner] and I, we're like "tell us what we're doing wrong, so how we can fix it!" We don't care!

Male 1: I reckon maybe in older farming societies there definitely was a fear of being judged and there's probably a lot more money involved so people had big bank accounts they didn't want to tell people about, whereas a lot of that's not there anymore but there's still the same families are there so they don't actually want to disclose, I don't know, don't you reckon? Sometimes. SW

Other participants also made the attitudinal distinction between 'fearing judgement' and 'welcoming feedback', associating this ability to be open about their business practices with their experience in and exposure to coordinated peer-based education programs:

Female 1: It's "don't look over my fence", sort of thing, a lot of times. But anyone who has been through a process like RCS is just "hey, look, we're just happy to put it out there and if you can give us some information or some help or some ideas"...

Male 1: Some neighbours are good, some are. But you never seem to get down into the real I guess financial stuff or anything like that. People want to keep some things confidential. FN

In the quotes below, participants describe taking care to limit their discussions about their business practices with their nearby neighbours, due to a fear that they may not agree, and a cautiousness around appearing 'behind' or 'ahead' of them financially:

Male 1: I've got a couple of very good neighbours that look after me. Yeah, but we've all got different - this is one of the things about the bush, we don't agree on

- everybody's got a different agenda haven't we? How we do things and what the value of the land is to them; and what their status is. It just depends doesn't it? SW

Male 1: I talk about everyday things, but I don't talk much about my actual investments or anything like that. That's kept very close to my chest...I don't like people to know what I've got and what I haven't got. N

While a reluctance to disclose information or practices might not be problematic when it comes to one's individual financial status, there may be more serious implications when it comes to achieving the more far-reaching changes required in the context of drought preparedness and climate adaptation. In the quote below, a female participant describes how a concern for her neighbours' vulnerabilities prevents her from sharing her beliefs regarding the need to prepare for the impacts of a changing climate, increased temperatures, and potentially increased droughts. Her well-intentioned desire to protect her neighbours from shorter-term 'doom and gloom' constrains the potential for sharing knowledge regarding longer term preparation strategies:

Female 1: I don't want to talk about doom and gloom until it's confirmed. I know what I think and I've got my plans on how I'm going to manage it, but I don't want to be saying to a neighbour who may not be feeling as good as me "oh you know, we're all doomed. It's going to 40 degrees for the rest of our lives" because nearly all our neighbours are older than me and one of them needs a double knee construction and..You know? I just think life is hard enough without talking about that sort of stuff, but if they asked me the direct question I would talk about it. But I don't bring it up because, I don't know. CW

This desire to 'protect' more vulnerable peers and neighbours may also limit the potential for graziers to act as advocates or champions of the adoption of new knowledge and adaptive practices in their local grazing communities. In the quote below, a participant who describes himself as a very active knowledge seeker and who has been referred to the project as a 'leading' grazer, illustrates these constraints using an example of a sexist and racist joke told at a barbeque as an analogy. While other communities, he says, might actively work to suppress the telling of such jokes through the expression of collective disapproval, he argues that his community (himself included) would instead act to protect the feelings of the joke-teller and, by doing so, implicitly condone his behaviour:

Male 1: Barbecue conversations, shotgun club conversations. They normally fall to the lowest common denominator. So, the standard of conversation rolls along at the lowest level....

So, if you're all poking the sausages and there's four of you there, if someone tells a sexist joke or really, a savage, brutal racist joke or bloody something like that that's about someone we know. That's the standard. That's accepted. Whereas if the smartest guy says something, everyone just dismisses him. Whereas if you go to city, and if I was to tell my ghastly bloody racist joke or whatever I do, you can

see everyone just looks at you and goes "oh, for fuck's sake, mate!". They give you the look of "don't do that".

Whereas out here, it's more that you wouldn't want to make that poor bugger that comes in and thinks that's a reasonable thing to do, you wouldn't want to make him feel uncomfortable! So, you all stand and there and go, "yeah, what about that". And so you follow it up with another one. So, conversations often... I find myself at times where I'm really wanting to have intellectual conversations, I seek out those that have them. CW

The participant uses this example of joke-telling example to demonstrate his community's approach to 'bad' drought practices and outdated beliefs: although these practices may be counter-productive, no one draws attention to them for fear of embarrassing people. The grazier acknowledges his own complicity in this by choosing to remain silent and only discussing his position in more 'intellectual discussions' with people like himself.

4.3.6 Science and climate information

In response to the question 'Can you tell me about any situations in which you draw on scientific information to make decisions about the running of your business?' many interview participants could not think of any situations. As was also observed in Section 4.3.3, however, those that did use scientific information tended towards mentioning the names of specific scientists rather than institutions, websites or tools. These were often local or ex-government scientists who had presented and published widely on relevant grazing and land management issues or who had written textbooks and manuals owned by the participants. Of these participants, many acknowledged the importance of scientific information and reasoning as a basis for good decision making. In the quote below, a husband and wife grazing team describe the value of a scientific approach as a way to avoid 'blindly' adopting costly practices that may have no real benefit:

Male 1: So, we're big believers in science. We've got a daughter that is into ag science, and we're big believers in the science, and...

Female 1: Science is interesting.

Male 1: You can't afford to waste money. A lot of people put out these blocks, don't they, and they're full of shit. They do nothing for them, but they feel better because they've chucked out a block. But it's actually doing nothing for their beasts. It's not what's lacking. It's a waste of time. CW

However, many participants were also quick to point out that the value of scientific information was limited without demonstrated practical applicability:

Male 1: So a lot of advice - scientific advice out there actually absolutely works in

theory, got no question about that, but show it to me in a practical situation, where it's actually worked, and it's a different story. And that flows through a whole range of scientific information that's available by economists and all of those sorts of stuff.
SW

What we're really interested in is what works, you see. We listen to all of the stuff, I don't read too many things, but you just listen and then if you pick up on an idea well then you might give it a go and if it works well, then you're quite happy to go along with it. But a lot of the stuff we try and do here is just basic, good common sense type stuff. SW

A couple of participants discussed the importance of participating in scientific trials to demonstrate specific applicability of science, and others described the importance of translating scientific theory into grazing practices. A range of different ways of doing this were mentioned, including the science-based information and tools provided through RCS courses and DAF extension activities.

Male 1: Through RCS we learned a bit of science. If you go to the average grazier and you ask them the science behind grass growing they wouldn't be able to tell you. Through RCS we got a bit of science I guess. FN

However, the most common type of scientific information mentioned by interview participants was climate and weather related prediction, which is understandable given that these discussions centred on drought and that all interview participants were currently or recently affected by drought. Most participants acknowledged that they frequently referred to weather information (most often by consulting the Bureau of Meteorology (BOM) website), Landline, the newspapers or the evening television weather reports), and also described referring to it when assessing drought risk (this is discussed further in Section 4.4.3):

Female 1: He hopes that the long-term average forecast will change. Probably 10 times a day he looks at it [laughs].

Male 1: They're actually reporting that long-term information on Landline, every bit now, so that's there. Giving you a little bit of an in depth analysis of what's actually going on with the weather systems - the Indian Ocean and all that sort of stuff, which is pretty - very important. FN

Male 1: Yeah, long-range forecasts. Yeah, El Nino and all those sorts of things SW

Others described how they believed that the accuracy of weather prediction had improved:

Male 1: Well, we sort of follow it and I must say they are getting fairly good at techniques, contrary to what most people will tell you, but I think the weather bureau does a pretty good job these days in forecasting. So we don't put the bank on it but we do take notice of what they say. FN

However, many expressed frustration regarding what they considered inaccurate weather predictions. When climate-related science was mentioned, it was often to express scepticism about the reliability of seasonal forecasting and the role of climate information in making drought decisions. In the quote below, for example, a research participant (referred to the project as a leading grazier) describes, with considerable frustration, BOM's limited ability to accurately predict weather forecasts, calling it 'particularly un-useful' as a basis for decision-making. As he expands on this statement, it becomes clear that his grievance relates not only to accuracy, but also to the ways and times the climate science and its predictions were being updated and communicated:

Male 1: We're probably always conscious that it could get ugly. We're always watching out for dry times...I'm a constant consumer of all the various websites around the place that tell us whether it's raining or not. I must admit...we get sick of BOM for their ability to predict weather. They're particularly un-useful.

Researcher: Can you tell me why?

Male 1: Look, numerous examples. Like 2016 we got a lot of winter rain... We'd already had five inches, then all of a sudden, they said "you're going to expect several months of wet weather". But it had already started raining! It's raining on the roof and they're telling you it's raining...

Last year their monsoonal onset was definitely late. The next month, definitely early. The next month after that, definitely late. They only do three in the spring. How can you go from bloody saying 95 per cent chance of really early onset to, within a month, five per cent chance of early onset, and then back to 95? We're not talking a pendulum trending in a direction here, we're talking about swinging back and forth....

Like last year: "Debbie's going to be coming to land over the top of Yeppoon and Rocky and it's going to get to here". It had that purple colour which is like five to ten inches over the top of us, and it stayed over the top of us. The rain...the cloud got to Alpha and the cloud got to here. But [after it turned and went south] they kept the purple colour over us saying "look out, big rain!". Those sorts of things all the time really make us quite cynical of the three-monthly outlook. I just don't know enough about their modelling techniques and other things like that, but it could use some seriously rigorous reviewing of their accuracy levels. They need a real kick in the arse, those guys. They're bloody hopeless. CW

In the quote below, a husband and wife grazing team describe a long-standing distrust of weather predictions based on specific encouragement – received years previously - from scientists to adopt weather-related information into their grazing decision making which ultimately proved inaccurate:

Female 1: So years ago back in the 2013 drought they were doing some forums up at [town]. A particular weather forecaster actually came up and did this forum. He said that in a sense, well as a drought proofing tool, we needed to better prepare for the drought through climate forecasts. So, we should have been

looking at the climate forecast and predicting that it was going to be dry and selling off our cattle for that. That came from quite a well-known forecaster. Well I don't think they've got anything right.

Male 1: Name him. [says forecaster's name]! Name him, shame him! [laughs].

Female 1: So we have a 12 months forecast that we can get on Farmonline...we laugh at it...

Male 1: It's a local joke! SW

Other participants highlighted the emotional impact of inaccurate weather predictions, and the creation of false optimism and subsequent disappointment:

Male 1: I must say I've probably found them less use than useful. I mean - I don't know whether you heard but earlier this year there were people that had rain forecast for them. I know up at Hughenden they forecast six inches or something and she didn't come and people were just absolutely ropeable...I mean it wasn't just the Bureau, it was also all these other ones that forecasted...the Bureau weren't the only ones that forecast this good rain. But people just - they're betting on that one rainfall and when it doesn't come they're just so devastated. SW

Female 1: As an example...my brother in July, they brought in that big change. They were going to get 200 mil of rain. Everybody ran home from the local races and...Thank god he stopped. He only got 1000 acres in and he got 10 mil of rain and that was all the rain he got, 10 mil of rain but it stopped him planting which was good. So it all died. It's dead. So he's paid for 100 acres of feed, tractor, wages.

Male 1: \$70 an acre.... SW

These attitudes to seasonal climate forecasting are highly likely to influence the extent to which the forecasting tools offered to graziers to assist with drought preparation are valued and adopted. Although several graziers did acknowledge that forecasting was improving, incorrect forecasts and the false optimism appear to have the potential to create long-standing distrust in participants.

4.4 Assessing drought risks

Responses to the questions 'When you are making decisions about your property and business, what signs tell you that dryness and drought might be becoming a problem?' and 'Can you tell me about the types of knowledge and information that you use when you are assessing drought risk and managing drought?' demonstrated that participants assess their drought risk through drawing on a combination of knowledge. At the forefront in graziers' accounts of assessing drought risk were their direct observations of specific aspects of their own property, such as amounts of rain that had recently fallen, groundcover and condition, the level of water in dams and watering points, and the condition of their livestock. However, their responses also indicated that these direct observations are not used in isolation, but work in combination with 'heuristic' knowledge, which graziers use as

'rules of thumb', to guide their judgements of risk in the face of unavoidable uncertainty. This heuristic knowledge most often related to weather patterns and seasonality and was often described to the researcher in a very matter-of-fact manner, indicating that it is deeply taken-for-granted knowledge. Closer examination of these heuristics reveal that they are built around participants' property's rainfall history, on trial and error-type learning, on stories told to them by previous generations on the property, as well as other more unusual ways of having 'faith' in the predictable cycles of the weather and nature on their property. These heuristics, however, may indicate a possible over-reliance on the beliefs about patterns or 'cycles' of weather when assessing drought risk for their properties.

The use of external information when assessing drought risk was less commonly reported by the graziers spoken to in this research. When it was discussed, this external information involved short- and long-term weather forecasts, professional advice, watching the news, talking to others, and using available decision support tools.

A concerning aspect about responses to this question was that only a couple of participants acknowledged that broader climate trends and changing weather patterns may be bringing a level of uncertainty to their established, heuristically-based ways of assessing drought risk. As discussed in Section 4.2.2, many discounted the idea that climate change might be having a permanent effect on weather patterns and their ability to judge on-going drought risk.

These four themes – direct evaluation, heuristics, external information, and a discounting of the effect of climate change - are discussed in turn below.

4.4.1 Rainfall, pastures, watering points and livestock

Unsurprisingly, when graziers were asked the question 'How do you know when dryness and drought is becoming a problem for your property? What do you look for?' they most commonly described observing and monitoring four different parameters on their property. The first parameter was the amount of rainfall that the property had received. Graziers often described the process of measuring rainfall, keeping rainfall records, and incorporating rainfall (or its absence) into management decisions. For example:

Male 1: Because it hadn't rained by the beginning of February, we were selling cattle and we were selling breeders, cows and calves. We're selling females with calves which you don't do normally but we did sell a lot of cows and calves. N

Male 1: The first thing that we take notice of is once we get past Easter time there and there hasn't been any substantial rain, so we've got it in the back of our minds that we've got no substantial subsoil moisture, so therefore we're not going to get very far. Most of our rain is summer. You know, months like August, September,

we're nearly zero. We look at our rainfall records quite often so that is something that we use just to see what we've had for the last 12 months, to give us a bit of an idea of where we're travelling. Okay, so at the moment we sort of destocked as much as we could, or what we thought, by July. July/August is about when we destock. So August is our dry month of the year on average followed by September which is our second driest. Then in October our average rainfall starts to pick up. November is even better and by the time we get into December, December is our third highest average rainfall month. So yeah, every year we get prepared to offload, depending on what rain we've already had, we mightn't have many stock numbers on because the previous year has been dry, so we've got to make a decision what we're going to keep, you know, six months out before it gets dry.
CW

Male 1: I just.... yeah, soon as it don't rain, you know? If it's not building up right, you sort of can think "it's not going to rain". Just our history, yeah. N

Longer-term rainfall records were also drawn upon to assess how problematic periods of dryness were becoming. In the quote below a family discusses comparing historical patterns of rainfall on their property with more recently recorded rainfall levels to judge whether they were experiencing a particularly dry year:

Male 1: I think we had a bit over eight inches last year, so we're in a 21 inch rainfall country and we've had 480 points this year.

Male 2: [Other property] hasn't had reliable summer rain in seven years...

Female 1: Well last year that eight inches was the lowest rainfall we've had here in 100...

Male 2: No it wasn't, was it?

Female: Yes it was. Last year was the lowest rainfall we've had in 111 years. Because we've got rain records since [relative] bought the place.

Male 1: Yeah, 1906.

Female: Since 1906, 2017 is the lowest rainfall ever. 2010 was the highest rainfall ever. We got 45 inches or something, didn't we, that year? SW

As well as rainfall, graziers also described looking at their pasture to assess coverage, and whether there was enough feed available to sustain stock. Some graziers described deciding drought was a problem 'when the feed starts to disappear' (SW) or 'when grasses start running out' (N). Others described a more complex process of feed budgeting:

Male 1: Well, you also assess the number of stock and each paddock, so you know whether the number of stock - that amount of feed is okay for a while for that number of stock or you might move some of those stock or if you've got a better paddock - like because of the extent of the area that we've got, we've got a fair few

paddocks that usually they're all in much the same condition. But no, surprisingly, they're not are they? Because they grow different types of vegetation, so you do - yeah, you assess and...

You don't get rain and there's - then you're looking out ahead. You've got to keep looking ahead. That doesn't look like going to be rain, well you do your sums and if you haven't got enough feed on, you've really got to budget on what you've got there. Is that going to last you six months or eight months or whatever you're going to thing? SW

As well as pasture coverage, the quality of the grass in the pasture, both in terms of nutrition for livestock and its ability to regenerate, were also indicators that graziers considered when assessing drought risk. Many participants discussed assessing dryness through nuanced observations of grass colour:

Male 1: Yeah, basically just all of our grass, that's our business really. With no grass we don't make any money. You can see the leaf on it, it's not yellow. Like now anyone with any grass, even if you go back to town you'll see grass that's got a yellowy colour. If it's black like a lot of this stuff around here there's no - it's like cardboard. If it's got that yellow colour there's still a bit of nutrition in that, so if it's missing or it gets down to only having a little bit, when it does rain if it goes below that like this, it's going to take a lot of rain to get this country going again. Whereas if it's still got a bit of yellow and it's that high you might only get an inch or two and all of a sudden you'll have grass again. That's where we're trying to head now. SW

Male 1: I suppose the grass will tell you the story. It'll get a bit short and the cattle start to chew your grass down... Yeah, it just goes grey... It's not palatable for them, it's very harsh. SW

Less commonly, graziers reported gaining independent advice on pastures and feed. In the following excerpt, a husband and wife on a property in northern Queensland discuss the value of gaining independent advice regarding grass budgets:

Male 1: Pasture monitoring is a huge one that we're only starting to get a bit of a handle on it, wouldn't you say?

Female 1: Yep.

Male 1: Because, again, all information - information is power to make better decisions. I think one of the greatest tools that would be potentially - we've had help with - we've had people come out - independent people come to our property and help us do grass budgets. N

However, other graziers were skeptical of objective methods for calculating feed-budgets, emphasizing the primacy of knowledge gained through practical experience and passed down through generations:

Male 1: Okay, feed budgeting is you go out with a square metre stick and throw it over your shoulder, and you count how many blades of grass and what size and species, and you multiply that by the property area and take a picture and have a look at the pictures and compare them and come with an estimate of how much feed you've got for the month and for the year. Now, my next door neighbour's a very enthusiastic younger couple and trying to do everything by the book. She said "what do you think about all this stuff?" and I said, "well, actually, yeah, my grandfather's been doing that when I was a kid but they called it experience, and they done it every day - just looked out the window of the Toyota as they drove around every day".

It's not quite scientific. They've put a method to it. I can understand all that, but having said that, regardless of how much time you spend managing and looking, if you haven't got any grass in the - by Christmas - or any rain, come April, any rain is not going to bring Mitchell grass. All the feed budgeting in the world isn't going to help, because, as I keep saying about people making budgets, I'm for them in theory, but you've got grass - you have a shower of rain in winter - it can dissolve it like tissue paper and it's like a bushfire went through - you've got nothing overnight. CW

4.4.2 Heuristic knowledge

It is understandable, given the amount of climate uncertainty that graziers contend with, that they develop personal short-hands or 'rules of thumb' when assessing risks and taking management action. As well as physically observing and monitoring rainfall, pasture, water and stock conditions when assessing their drought risk, many graziers also responded to the question 'How do you know when dryness and drought is becoming a problem?' by describing the heuristic knowledge they draw upon to guide their assessments and evaluate drought problems. These heuristics were comprised of graziers' beliefs regarding what was considered 'typical' or 'normal', particularly with regard to weather, rainfall and seasonal patterns. These heuristics were then incorporated into drought risk assessments and time-based cut-off or decision points, when the risk became great enough for particular management decisions (such as when to destock), to be made:

Male 1: So if we get to March and it hasn't rained - you know you're still - you're going into winter then you know that you've got to get rid of this many cattle off that place. SW

Male 1: Other than that I mean the second week in November you should get two inches of rain. By the second week in November you should get two inches of rain. If you don't, you're starting to get into a bad way and I mean obviously if you haven't had rain by Christmas time it's probably getting close to too late. SW

Male 1: The difference between a good farm or a bad one is a couple of inches of rain. Now, where they get it and when they get it and who got it makes a difference. If we get something - February is our wettest month. If we don't get something by

the end of February, we've made bad decisions. If we get an inch and a half of rain, we've got - well, at the moment our ewes could be worth \$20 a head. They could be worth over \$100 a head at the end of February if it rains. CW

Male 2: Yeah, when there's no rain by end of February or whatever. Yeah, Easter, yeah.

Male 1: Easter usually.

Female 1: Well you know if it hasn't rained by February your chances are you're going to have a lighter or a shorter growing season anyway and then obviously by April anything after that you're not going to see a lot of growth. There's sort of two cover points. N

Conversely, these heuristics or rules of thumb were also used to identify when they had been 'lucky' (SW) and achieved typical or more than typical amounts of rain:

Female 1: I mean obviously if you don't get rain by November you start to panic a bit. I say that and then this year we went through until March before we got decent rain. We were just lucky that we did get decent rain. SW

Male 1: Yes, we have dry times. Yes, we have three or four drought years in every 10. We might have one or two good years, three or four average, if we're lucky. CW

When prompted about how they had come to adopt these rules, many participants explained that the seasonality affecting their property followed observable patterns or 'cycles'. When asked how they had learned about these cycles some graziers responded that they 'just knew' (SW) or had been learned through 'experience' or 'trial and error' (N). Others based their heuristics on rainfall records:

Male 1: Well it's just from records. You just look back through your records and you see that by the middle of November you've probably had two inches of rain which is enough to start growth. SW

Male 1: We have a really simple system up here in the north. We get all our rain in the summer, and by Eastertime you know it's done until the next summer. Anything in between that's an absolute bonus, so you know, by the first of April, how much feed you've got to go forward with....It doesn't get much simpler than up here. It's done. That's what we've got. They're the animals we've got. At that point in time you can match your carrying capacity - your stocking rate to your carrying capacity and move on. So you just don't hope and wish that it might change, because there's a fair chance it won't - not up here. It's very simple. FN

For broader climatic patterns, graziers also described referring to historical rainfall records kept on the property and the stories they had been told by older relatives.

Male 1: You should be able to tell from experience and say if you're going into winter and you've got no feed, well, the chances are, if you look at your rainfalls, you can probably say that one year out of four or five could be a wet winter. I'd go more one out of five.

Female 1: We've got records here back to 1927. There's a couple of years there that are not complete, but the rest of them...

Male 1: We don't have to look at figures. We just know that winters are generally pretty dry unless you're lucky... SW

Male 1: Well it's nearly as sure as the sun comes up... you might get a couple of years of big rain, then it'll dry off. I always remember my grandfather, he was straight out of Devonshire, England. He had a Devonshire accent. I said to him one day, "It's dry grandad". He said "Woo-hoo, we've seen some dry since we've been on the creek". I often think about it. It's another dry that's come while we've been on the creek. It's just a reoccurring thing. It's going to happen, you've just got to be prepared for it. SW

More unusual indicators of impending dryness and rain were mentioned by a few by graziers:

Female 1: Oh, when we see those morning glories...Well, when we see them that will be a happy morning. We haven't seen them yet but that always means rain. We're just starting to look out now. They should be starting to pop up soon, hopefully. That's worth living out here, seeing something like that. I just thrive on them every year, and I'm just waiting for those clouds to come on in. N

Male 1: The signs were right, old people around here were saying the rain trees were blooming and the bloodwoods were flowering, it was a possibility. So you couldn't really kind of hope that maybe there might not - like signs and things...It's superstitious, I suppose, you shouldn't really cling to that, but it gives you hope that maybe there's a chance. CW

4.4.3 External information sources

Incorporating to external sources of information into drought risk assessments was reported less often in response to the question 'How do you know when dryness and drought is becoming a problem for your property?' As is also discussed in Section 4.3.6, information regarding longer term weather trends gained from television shows such as Landline and via the Bureau of Meteorology website was mentioned by some interview participants as part of assessing drought risks.

Male 1: It's - you're really looking at pasture levels and water storages. More and more probably taking a bit more notice of the long-term forecasts...

Male 1: We certainly use all the tools that are available to us to help us make a decision. Yeah pretty much. Then we just go on our gut feeling at the end of the day. You ascertain all those things and then - so you develop in your mind the best

solution or the best way to go. Because obviously if they're predicting a wet winter well you sort of think oh well maybe - maybe, maybe, maybe not. But if they're predicting - because the SOI is a very good indicator. If the SOI drops below zero well then we know we're in trouble CW

However, in the quote below, a husband and wife grazing team discuss the emotional costs of relying too heavily on weather forecasts when making management decisions, arguing that pasture and ground cover should be considered a more reliable form of information on which to base decision-making:

Male 1: I think that weather forecasting has been more detrimental to people's mental health than anything. I think it's been terrible because there's people sat out here for three years, and something would come out and it's a La Nina year or an El Nino year, so people think "thank god, it'll rain this year" and it didn't.

Female 1: "Let's hold our cattle because we'll just wait, we'll just wait".

Male 1: And start feeding it. I think it's very dangerous. I'd go as far as saying they shouldn't be doing it because people make decisions off that information and they haven't figured it out by then. I think the decisions are right there in front of you. If you just go out and look at your pasture and assess what your pastures are, it's pretty simple, isn't it? N

As well as weather information, some graziers also mentioned incorporating more tangential types of information – such as market trends, stock and beef prices – into their drought risk assessments and decision-making.

4.4.4 Factoring in change

While it is understandable that, in the face of unavoidable uncertainty, graziers use many belief-based short-hands or rules of thumbs when assessing drought risk, some interview participants expressed growing doubts regarding the reliability and efficacy of these rules for assessing risk in the face of changing weather patterns:

Female 1: So I suppose [through rainfall records] we can see if any patterns occur, but the patterns are changing, so that's unreliable, too....Even in our short time here, we just don't get that definite wet and dry. Now it can - a lot of people are still saying, "well, the lambs are dropping in the period where we're going to have the most pasture growth", but it just doesn't happen. I think you just have to say, "all right, well, we're going to lamb at this time of year" because we just don't know when that good pasture growth is going to be. Yes, it's not clear cut anymore as a wet and dry. CW

Male 1: Well I mean obviously you're trying to make a business and you're trying to make money and you're trying to get ahead. The same as every business you

do have problems. I mean when I first started we used to think that three out of 10 years would be drought but I'm not sure that either the three years is blowing out to four years or maybe the two years that probably weren't going to be drought are getting much closer to drought. You probably expect a couple of good years, three bad years, and then five average years. But I'm beginning to think that that might have been a little bit generous and I don't think it's quite that good. I think it's worse than that. SW

However, despite some interview participants acknowledging changing weather patterns, many others were quick to minimise the possibility that weather patterns were irrevocably changing. Instead, it was often argued that extreme events, such as prolonged drought, were not anomalies, but a normal part of broader cycles; this has been already described in detail in Section 4.2.2:

Male 1: There's definitely something going on. I think it's - you do expect in a 20 year cycle to probably have 10 ordinary years and 10 good years, but in the last 18 years it's been hit and miss all the time. It feels like we've only been getting rain every second year. We just go on dam levels and that sort of stuff but it would probably be our driest five years on record, at least four years anyway it's been since 2000. But [that's] not necessarily got to do with the general consensus on climate change, I think this is part of a bigger cycle that, you know, when that crazy fella, that Indigo Jones fella talking about the sun spots, you know, they talk about one in 400 year cycles, that sort of stuff... so I just think it's another one of those and unfortunately our generation has hit it. In 10 years' time it might be all different, it might be a good season again CW

4.5 Attitudes to drought preparedness

When asked the question “Do you think drought is something you can plan and prepare for? Why or why not?” the majority of participants affirmed that, yes, it was possible to plan and prepare for drought. Some described drought as something that you could learn from:

Female 1: But every time Queensland gets another drought, you get better and better prepared on your block. You make sure you put your water in. You make sure your infrastructure's good. You make sure that you start making those business decisions.

Male 1: You have a shed full of hay when you're going into winter before you start. Yeah.

Female 1: You choose whether you want to feed your cattle through it or whether you want to sell early. SW

Female 1: I think [drought] makes you more determined. Toughen up you big sooks because - get in there and bloody stop whinging and just do your best. Because we have. We've done it. So you guys toughen up. Yeah, it was all doom and gloom when we first went into drought. Oh, what are we going to do? But get your head together and think about it. So I think we become a bit more resilient. We've got

things in place for next time. We're right. As in, we'll be fine because we've - instead of whinging about we just tried to change the situation and that's where people just need to take a good, long look and, okay just become more resilient. N

Others described drought preparation as not only possible, but a personal and professional responsibility:

Male 1: But I mean if you don't like droughts well don't be here, that's all about it. If this is what you call a drought, what we've had is a drought, and you don't like it well don't be there. N

Male 1: I mean you know...people that sit back and whinge about the drought and everything, they have to get off their butt and do something themselves as well and that is drought management. The drought management plans that they're talking about, that's just all stuff on paper. You've got to actually practice it, you know? N

Others even explained how, with adequate preparation, it was possible to turn drought into an opportunity for profit:

Male 1: I guess now is as good a time to say it as any: I reckon you can make money out of a drought.... You know Warren Buffett's famous quote? "Be greedy when others are fearful and be fearful when others are greedy?" This is preparing into a drought. When you have your good years you sell your cattle down to your bottom number that you...

Female 1: ...can survive on.

Male 1: You can survive on, yeah. And you use that money to put it into farm management deposits and you use those lower stocking rates to have your country in good condition going into the drought. So when the drought hits you're going into the drought with plenty of grass and money and farm management deposits. So you can then reduce your selling so that your numbers build up to your carrying capacity at the end of the drought. And you can use your FMDs over that period as well as your sales that are necessary. Then the moment at the end of the drought when cattle prices spike you hook in and sell, which is simple as falling off a log, but to have the strategic plan and the action to put yourself in the position to take advantage of that takes a bit of planning and a bit of sorting out. FN

However, the majority of participants were careful to clarify that while it was possible to prepare for drought, there were limits on the extent to which it could be fully planned and prepared for, and there were several reasons given for this caveat.

4.5.1 Duration of drought

Several participants explained that while there were things you could do to prepare for drought, these couldn't prepare you for a drought that was particularly severe or prolonged:

Male 1: What's being experienced in western Queensland right now, you can prepare for that first two years. If the third summer fails, then it's beyond any – anything you've - well, basically, there's not much left, is there? FN

Female 1: Well, we weren't prepared. We definitely weren't prepared. The old fellow that owned this place before us [he said] "oh I've never seen that - because we live right beside a creek - never seen that creek that low." And he was here, he was 73, he was born and bred here! And I'm thinking "even if he could have been here he would not have been prepared, because the property wasn't prepared and he's never seen it that bad". So, how can you really prepare for something that's going to keep going on for years? N

4.5.2 Uncertainty

Some graziers indicated that given the high levels of uncertainty they faced with regard to the weather, combined with fluctuating market prices and the unreliability of available feed, it was difficult to feel absolutely confident that they were prepared for drought:

Male 1: I think it is [difficult] because you don't know how long it's going to go. You can't make too big a decision too early because it might rain in a couple of weeks. Of course you listen to the forecasts but a lot of the time it goes in one ear and out the other.

Female: The one thing we did do though, a few years ago when that money was around was the watering structure.

Male 1: Yeah, that's one of the best things. SW

4.5.3 Government interference

When discussing drought preparations, participants cited government policies and regulation as a constraint to their ability to adequately prepare for drought:

I mean drought is a normal phenomenon, no one's saying it's not. But a lot of people say, you know, it's climate change. That's rubbish, Australia has always had droughts. But we can't manage them if all the policies that are put in place are taking the cream out of it. So, they say 'oh, you should be able to manage it'. How can you manage six years? How can you manage six years, and now they've got us so we can't even do what we've been doing for 200 years in agriculture in Australia, which is utilize our vegetation to feed our animals. How can you manage

six years? Because you can't put aside enough money because of the anti-agricultural policies have made sure that we are price takers all the time, and we cannot control our input costs, so it goes on and on and on and on! So I'm just fed up with them! SW

In the excerpt below, a grazier describes how increased costs associated permits directly inhibited his ability to prepare for drought:

Male 1: Well, it's difficult to prepare for, but we can do it. But when you're getting - when you're getting, like I explained to you, a \$40,000 unnecessary setback, that, you know, is just man made, really. That's a manmade cost. It's not a Mother Nature cost. So that money, could easily be in our pocket, to drought proof us. FN

4.5.4 Debt

In line with Section 4.2.5, some participants raised the broader social and economic issue of increased levels of debt in the grazing sector, arguing that it placed added constraints on drought preparation:

But you don't borrow against the price of your farm, you borrow against your ability to pay the money back. It just all of a sudden becomes living on equity. The rural sector's living on equity at the moment and that's where we are - that's why droughts are so hard to manage is because everyone's living on equity. SW

4.6 Reported drought preparation practices

4.6.1 Herd management

The majority of responses to the question “What kinds of practices do you think preparing for drought might involve?” made reference to herd management practices, such as making strategic stocking decisions, breeding for increased drought tolerance, and controlled breeding.

The most commonly discussed herd management strategy to prepare for drought was the decision to destock by selling livestock to avoid or minimize the burden of having to feed cattle during dry times. Many graziers described partial or complete destocking as a key component of their drought strategies. They recognized that the key benefits of destocking were minimizing both the cost and the physical and emotional labour associated with feeding stock during drought, avoiding having to sell at peak times, and maintaining the integrity of pasture so that it was available and able to respond quickly to rain:

Male 1: Back in 1992, well, even before then, we hung onto cattle thinking it was going to rain and it didn't. As I said to you the other day, it's not rocket science.

We've probably learnt from experience that if it hasn't started to rain by the end of January or looking signs of going to rain, I think you start to...have other options of either agistment or sale and just back off for a few years until it does rain and the beauty with what we're seeing now is we've got some grass that we can carry on with, keep our own stock because agistment's non-existent. That's how we've sort of - that's the way we think about. You're better off just destocking, putting the money somewhere and when it does rain, well you're sort of ready to go. N

Male 1: Oh, you've got to be prepared to plan for it. You can't just go right we're going to sell these tomorrow. You've got to plan for it. Especially when you think to yourself we need to get rid of these cattle, usually the meat works are that full up or the exports, you've got to plan to get rid of them as well. N

Female 1: ...It did rain a couple of weeks later, but we've never regretted or looked backwards, have we? We just - that was the decision, and we did it. It was sad, though. It wasn't easy. I just so felt for [Male participant]. He put his life into those sheep. It was terrible...

Male 1: [But] I know people up the north who got probably \$2 million or \$3 million in debt to buy feed, and they're still doing it. Still buying it...

Female 1: It still hasn't rained. CW

Other graziers described their preference to destock early a lesson learned through extreme hardship and stress:

Male 1: The issue with the drought - this current drought which is so different to every drought that we've had is that there's nothing anywhere. There's no feed, there's no hay. Well if there is you've got to pay astronomical dollars for it. Because New South Wales is in a world of hurt, there's no crops down in the Darling Downs. So I mean you wouldn't even - it's prohibitive to go and buy hay or cottonseed or any feed to try and feed them through the drought. In 2013 we spent well over \$250,000 just on drought feed through that summer. That's not counting all our lick and everything else that we feed out. That was just in our small operation, that's how much extra debt we acquired in that short time. We said we'll never do it again.

Male 1: There was no realised profit from that.

Female 1: No gain. There was no gain.

Male 1: That was just dead money. SW

The difficulties involved in destocking

Although research participants acknowledged destocking as a beneficial drought preparation practice, it was also clear in the interviews that the decision to destock was rarely taken lightly. The majority of participants described destocking as an inherently difficult decision to make, full of uncertainties and anxiety. In the quote below, a husband and wife grazing team relates how they make decisions to destock based on rainfall they had received, the time of year, as well as market

prices at the time to make these decisions. Despite this, they still experience unavoidable uncertainty regarding the destocking decision, likening it to a process of playing a card game with fate:

Male 1: ...because it hadn't rained by the beginning of February we were selling cattle and we were selling breeders, cows and calves. We're selling females with calves which you don't do normally but we did sell a lot of cows and calves.

Female 1: The season wasn't working out and we thought "well, yes, it's getting towards the end of your wet period really" and thinking well there's not much more rain from April on, and we had not much chance of growing grass in February, March. You've got to account for that.

Male 1: Then we had - the market was good...Like you've just got to play the cards that you're dealt - play the cards you're dealt. It's why a lot of people can't break into the cattle industry because there are so many variables. If you've got a supermarket, you know that there are 24 tins of plum jam on the shelf and that sort of thing... N

In the quote below, a grazier discusses the uncertainty he experiences regarding whether destocking is the 'right' thing to do. This angst appears to be derived from an associated belief that the weather (and therefore rainfall) is often changeable and unpredictable, which can lead to his destocking decisions having perverse outcomes. He concludes that, with the security of having mulga for feed, it is often better to hold on to stock:

Male 1: ...you don't know how long the drought is going to be! So you get dry times, and then you get droughts. So if you [destocked] every time, that would put you in a bad position again. This is where the risk and the, as I call it, the abnormalities is in it all. You don't really know what's going to happen. You could just go and sell a heap of them and all of a sudden next month it rains like buggery. We can winter rain too. Two years ago, we had a big winter. But you know come October, because it's early, it's not grass. It's all going to be gone because the heat just kills it. So that's the variance in your seasons.

...If you're virtually down to nothing and you virtually got no money, you then got to go and borrow more money on what you already owe. Because everyone in the bush owes money, because of the cost of land. I know when was it 2013, 2014 where people - it was bad, and they sold. They weren't getting a lot of money and then there was a bit of rain and they jumped in and restocked. Then 2015 it got crook again. They said "oh, I wish I hadn't of bloody bought then". But how do you know, see? It's very difficult to always make the right decision. People make decisions, some people less than others. But the big thing is if you can come through with a certain amount of your stock, well you've got a chance. But if you can't you're in trouble. That's why in the Mulga Lands we need mulga. SW

From some accounts, it appears that some graziers' anxieties around the 'gambling' aspect of the decision to destock stems from a taken-for-granted normative belief that in order to be a 'good' drought practice, destocking must achieve the 'right' outcome (i.e. destocking is only a good

business decision if you bet the right way and 'win'). In the account below, another grazier describes the stress associated with the time lag between making the destocking decision and the relief of finally being sure it was a 'right' decision:

Male 1: Last year, we sold our heifers that were due to calve on their first calf. They were due to start calving in September. I sold them at the beginning of July. For three months, I was "Shit, I've done the wrong thing, I've done the wrong thing!" That's how it gets to you. You think "All that effort". ...I would sit here and argue with [my wife] "Oh, I shouldn't have sold those". We actually went to Western Australia for holiday for three weeks in July. I sold them just before I left. All the way, I was "I shouldn't have sold those, I shouldn't have sold those"... But it paid off in the end, yeah.... By the by the time we hit September, thank God I'd got rid of them. SW

The three graziers below describe a careful, staged approach to destocking based on the belief that breeding lines and particular breeders represent their 'livelihood' and should be retained wherever possible:

Male 1: Well I don't like selling cows that you don't want to sell.

Male 2: Yeah, extras or whatever...

Female 1: Other than cull for age, so if you've got to start going in and selling other cows but the good ones.

Male 2: Yeah, yeah.

Male 1: You've got to decide which ones you can afford to get rid of. It's all well and good to get rid of cattle so you don't have to feed them I suppose, but that's our livelihood. That's our living so you can't sell everything.

Female 1: You've got to try to pick which ones are the best to get rid of...

Male 2: Yeah.

Female 1: ...every year, so that obviously your herd numbers don't get to - on an increasing rise, so you got so many young replacements coming in, so many old cows going out. If I suppose you need to start decreasing the female numbers, sometimes the age of cull might have to come down. Instead of 10 years of age you might be culling them at nine for example. But it's - yeah, probably more about you more look at the turn-off cattle, so the male cattle and they might be going sooner than they normally would so that those cows don't have to necessarily go.

Male 2: Yeah.

Male 1: You've got to have breeders. N

Pragmatic approaches to destocking

While some graziers describe the destocking decision as very difficult, others advocate a more pragmatic approach to side-step the emotional connection to their breeding stock and the anxieties

of wondering whether they are going to 'win or lose' the destocking gamble. One of the ways that these research participants maintain this pragmatism is by adhering to rules of thumb in which early destocking is *always* a good strategy, whether or not it ends up raining or not. These rules of thumb are often expressed in idioms such as 'sell them or smell them' and 'there's no such thing as a good old cow':

Male 1: Getting rid of the surplus stock that you're not going to really need. When it all comes down, you just want to keep your bare breeding stock. When they're ready to go, they're going. That's what someone said, "Only fatten them once and that's it, that's when they're going". There are a lot of people that get attached to them. "Oh I can't sell her, she's a good old cow." There's no such thing as a good old cow. [Laughs]. SW

Male 1: At the moment, our best strategy appears to be - well, it's not new, either - the old farmers would say "better to sell them than smell them". Which is not really politically correct or something nowadays, but it pretty much sums it up. We try and sell off our older stock, our dry stock, our wethers, and maintain a core nucleus of breeding ewes. We've got a genetic line going back 50-odd years, of almost stud quality ewes, but every drought comes and right at the end of it, seven or eight years, you've nearly got to sell them all, or they all die, one way or another, and you've got to start with someone else's culls and rejects, because that's all you can afford. CW

Male 1: You've got to have a fair idea of what's going on in that six months otherwise you just, oh, suddenly there's no feed, they're telling us it's not going to rain for another three months. Then it's too late...The saying is "sell them or smell them". I know that's pretty rough. Once they reach a certain condition, you just can't sell them. You can't truck them, you can't - so you're forced to sell them - forced to feed them. [Six months] gives you time. It's no good saying next month. Everybody else is doing it. You get to a certain point, everybody starts, and of course everything happened this year. SW

Despite their rules of thumb and pragmatic approach, these research participants still describe how destocking requires them to grapple with emotional conflict. In the quote below, a husband and wife describe how, even though they know rationally that destocking early is a sound practice, it still involves a personal battle against anxieties regarding the perceived risks of destocking, and the 'security blanket' of hanging on to stock:

Male 1: Another good quote is "sell and regret, but sell anyway". [I think what stops people destocking] it's that security. They just have this security. We're the same, but we fight with it - we fight with our personalities - but it's a security blanket of those livestock around you.... You've got to work at it. [It's] a fight within yourself. It always feels like a gamble.

Female 2: I've always said that we're the biggest gamblers in the world, because we gamble with the prices. We gamble with the weather. We gamble with

the interest rates. We gamble with bloody everything. FN

As well as grappling with personal anxieties, there is some evidence that these participants also run against the grain of social norms in their pragmatic attitudes to destocking. In the quote below, another husband and wife grazing team describe themselves as emotionally prepared to fully destock if required. It is an approach that they think others should adopt too, but they acknowledge that their 'cruel' preference to run their 'cattle properties as a business' goes against the more established social norm of retaining emotional and financial attachments to breeds and bloodlines:

Female 1: It's a hard and fast thing to say to someone who's been in the industry for 50 years, and they've built up their herd. To turn around and say to them: "Sell your cows".

Male 1: It's hard for people yeah. And they've been raising cows for, they've had their cows for... Yeah. Grandfather maybe gave them the cows and you're attached to the bloodlines.

Female 1: You get very emotional with it. I hope, and I hope we never have to do it. But don't get attached.

Male 1: A lot of stuff we're saying is fairly cruel. But now if we don't, we've got to run these cattle properties as a business.

Female 1: Yeah, it's no longer the old bank and bag and swill around the bills and pick out the one you want to pay. Sorry, it's gone.

Male 1: You've got run them properly otherwise you'll go broke. FN

In the quote below, a husband and wife team describe their decision to destock in preparation for drought. For them, the decision to destock early does not involve an internal battle, so much as the feeling of pressure that the social norm to hold on to cattle creates. They describe their decision as going against what they consider to be the more popular opinion of working to retain cattle during a drought, and they acknowledge that, at first, it was not easy. From this account, it appears that both the knowledge and social support provided through the RCS network may have played a role in enabling them to have confidence in taking the less socially prescribed option (as discussed in Section 4.3.4 above):

Male 1: basically recently because the droughts have gone on so long we've turned towards selling off livestock. Whereas once it was "we need to retain these breeders". You hear so many people say it "oh we're going to keep our cows alive and ra-ra-ra".

Female 1: [mimicking a nagging tone] "Because you'll never be able to replace them!".

Male 1: We've decided that that basically isn't true and the money it costs to maintain that herd of breeders is just too much money, you don't make it back.

You're actually committing to losing money, that's our view.

Female 1: Doing [the RCS courses] that we've done over the last few years, you've got to look after your pasture, your block. If you are keeping stock on them when it's vulnerable it doesn't come back as quick when it does rain. Hence we destocked here, we're running half our breeders at [other town] on our other block, and we're just doing it a bit easier than we normally...

Male 1: We're doing it a lot easier in drought.

Female 1: We're not spending money on them. We've shut down. We're not spending.

Researcher: Was it difficult to make that decision?

Male 1: Not really. It would have been to start with but it basically worked in with what we were doing anyway, we were just saying "well instead of running say this many cows to make this much money but spending that much money to get them, let's just try and drop it a bit and spend less". Because that's been a big focus, we've just said that rather than spending this high input business, we'd have a less input but bigger profit. SW

On the flipside, other participants described the push to sell cattle early as the norm that they worked against. In the quote below, an interviewee describes how the difficulties and risks associated with destocking made him consider agistment as the more desirable alternative when it was available, causing him to go against popular opinion.

Male 1: I'm probably the older person now myself - but a lot of older people are of the opinion that you've just got to sell, sell, sell, sell, sell or forget - never regret. But the problem with that is though when the drought breaks you've got to get back into production and pretty quickly because you might only have two or three years maximum to get yourself back on your feet again. If you've sold all your stock it could take you 12 months to two years to - because usually when the drought breaks stock are very, very hard to source. So we go to a lot of trouble seeking out good agistment. CW

4.6.2 Infrastructural improvements

A second key practice that participants often reported as being part of their drought preparation strategies was making infrastructural improvements to their property – such as improving existing or developing new water infrastructure, feed storages, and fencing. These types of practices were described as highly valued by participants due to an increased sense of control over various important components of their grazing business, namely available water, available feed, and lowered competition from pest animals (e.g. kangaroos, wild dogs). The creation of more reliable water sources for livestock and spreading out water points so that previously under grazed areas could be opened up to livestock, were the most often mentioned examples, which is not surprising given that many participants were recipients of the Emergency Water Infrastructure Rebate Scheme (EWIR):

Female 1: When we bought this place it ran on natural water. We have since put in 32 new watering points that water has never been before, so it can - you can take cattle out to places they've never been before because there's water here now. There's grass, there's water. So you can prepare. But if it goes on too much longer, then we... [laughs]. We took a good hard, long look at this and we actually got some mapping done, which is essential - every property owner should have mapping done - to see, okay how can we utilise our pastures and blah, blah, blah. Being on such a big area. You know, like there's places the cattle haven't been before and now they are there. Plus the tanks. We've put a lot of infrastructure in with tank wise. Poly pipes, oh I don't know how many semi-trailer loads we've had of poly pipe come through. N

Male 1: I think there's a couple of things with a drought. I think that one is you've got to keep on top of your water infrastructure. We've got dry dams at the moment. I've never had - in the time I've been here I've never had dams dry for as long as what I have at the moment. This country normally runs water pretty easily. But a lot of this country didn't get much rain last year, or the year before. 2016 was a good year stock wise, but all the rain was in little bits, it didn't run a lot of water. So a lot of these dams haven't been full-full since 2015. We've gone in and cleaned a couple out, made them bigger, because simply to be ready for when it does rain. You don't want to spend the money when it's dry, but at the same time you've got to take the opportunity to be prepared because the next dry time will come. We put down a new bore in 2013. We've got 17 kilometres of Polypipe running away to basically give us a little bit of a backup strategy where we could run water from it. CW

Creating storage facilities so that feed and supplements could be stockpiled and stored was another infrastructural measure that participants reported as part of their drought preparation practices. These storages provided these graziers with a sense of security that they could buy feed and supplements when demand and prices were lower, and store it for use when these inputs were difficult to source or more expensive:

Female 1: Like we've been trying to, over the years, drought proof ourselves. That's been our biggest thing, to drought proof ourselves and everything like that. There's been a lot. Especially in the farming that [Male 1] does, buying [all] implements and everything like that, and then over the years we've upgraded and upgraded to what we've got now. We bale all our own hay, which he grows. If it's a good season we sell it, but not all of it, we keep some for ourselves. ...it's all dry land, it's all dry land. We've just baled this year, what did we bale, 1200 bales on another paddock that he's got all ploughed up.

Female 3 (a little girl): We made a shed for all the hay to go in!

Female 1: We built another shed, haven't we? And put all the hay there. So we've - yeah at the moment we're feeling pretty secure that we've got hay sitting in there that, when we're hearing stories of not being able to purchase the hay and how far it's coming from and the freight costs and everything like that. SW

Well, the government there one stage they gave us an incentive to build sheds, hay sheds and stuff like that. We built a cotton seed shed come hay shed and that's helped a bit. Because we usually get - well, we're just getting 50 tonne of cotton seed here now this week, next week. [It gets] very expensive. Double what we paid last year. SW

Male 1: I think the only thing that they could do would be to try and encourage people to put in on farm storages for feed of some description so that as soon as the drought hits you're not paying top dollar for your food stuff, that's the problem. SW

4.6.3 Financial reserves

Research participants also commonly reported taking a fiscally conservative approach in preparation for drought. For some, this meant being realistic about goals and of 'over-managing' available resources, while for others it meant adopting a more bare-bones financial approach, including jettisoning additional costs and tightening belts during both good and difficult times:

Male 1: Like the drought's actually not that big a management issue if you have no future expansion. If you're not really looking to expand then droughts are easy to manage. You knuckle down - you put a feed budget out at the start of winter and you say, right ho we can get through until - well we know we're not going to get a decent break until December. We might get a bit of a scud but you're not going to get a decent break until December. So you say, "right ho all those stock have to go" and we will have enough feed to manage those. But in our situation at the moment is we're trying to maintain a herd size that we can step into another place without putting ourselves behind the eight ball. So we've got to over-manage our country here...SW

Male 1: When my grandfather came here in [year], they came in a horse and cart with four kids and...they had no money; they had no water; they had no refrigeration; they had no communication; there wasn't even wireless in those days. How they got dug in I don't really [know] it's just a miracle how they hung in. My old grandmother said well we're doing no good moving about the country; we might as well stay here. So they stayed here. My father, he did a job for 10 bob a week somewhere; helping somebody with cattle and this sort of thing. Every bob counted. I think that's rubbed off on me. They came through a depression and couple of world wars and you learnt how - you become an economist. You've got to manage money. You worry about the drought, but if you weren't managing money before you got to the drought then you're going to be in a hell of a mess. There's one thing - if you're going to live in this country, don't get yourself hopelessly in debt. That's one - that's rule one. SW

Others advocated getting rid of debt and putting money away during good times to draw upon when times were tough:

Male 1: Yes, I think that no matter how much money you've got to pay back to the bank you should always try and put some money aside in a farm management deposit, that is tax free, otherwise it's just going to go on tax dollars anyway. So do the homework, don't go and spend everything on new tractors and vehicles and whatever it might be, it could even be a new truck so you can go to the [camp draft] or something like that. Put that bit of money that might otherwise be seen as tax dollars in a farm management deposit and don't go out and spend it straight away. The following year, just always keep a buffer there. So I think farm management deposits are fantastic but sometimes you just can't put it away. That's a bit difficult. CW

Female 1: I'm not sure, maybe they're thinking that one day they'll get five or six years of really good years where they'll get exceptional rainfall and like Dorothy Mackellar summed it up, it's a land of "droughts and flooding rains"...we get those good years, that's when we have to try and put a bit of money aside if we can and save up for the dry times and reduce - well mostly what we're trying to do is reduce debt, bring the debt down, because when you've got debt, it is hard. Like if you were on a property where you don't owe anything, it's a completely different scenario, or owe a very small amount. CW

4.6.4 Pursuing supplementary livelihoods

Research participants also described pursuing various ways to diversify their business as part of their strategy to prepare for drought. Some described seeking avenues to grow different products:

Male 1: We bought goats that are a lot more sustainable in this environment. They'll live off the smell of an oily rag. But also we manage gidgee regrowth with the goats.

Female 1: So they're a management tool as well. [And] it's the most consumed meat in the world. So there is a massive market for goats. CW

Others described seeking off-farm avenues for creating sources of income that were largely independent of rainfall. Although this did include off-farm businesses in towns nearby, the most common form of creating an off-farm income reported working with shares and other investments that could be managed from the property:

Female 1: I came across a friend of ours and they said "oh we've actually started currency trading". I said "I hate currency trading, I wouldn't want to do that". And she said "oh, I've got this awesome mentor, gosh he's good". I said "oh well, maybe if you've got the right person as a mentor maybe I'd be prepared to change", because that's what I can't find for options trading is a good mentor. So that's what I did. So I really want to have this off-farm income and I'm only probably a quarter of the way through the learning material, but every day I just think when I'm trading and I can actually make some money, this'll be the boarding school fees...CW

Male 1: My greatest interest in life is shares, blue chip shares. N

Male 1: We had the business before we had this place. The bank wouldn't let us borrow the money to buy this place without the cash flow from that business. I didn't intend to keep it this long. But every time I get a dry year I'm very glad to have the extra income. CW

Others sought employment off-farm:

Female 1: Well another thing too that I think has made my husband and I more viable is we've done a lot of contract work while we've lived here to have another income. When the children were young at school, sometimes we missed out on a lot of school sports and things because we were away doing contract work and stuff. But that was the lifestyle that we chose, like we wanted to have something to leave our kids, something we enjoyed and when it's a good year, it pays us back. CW

4.6.5 Improved land management

As well as herd management, infrastructure, being more frugal and pursuing alternative livelihoods, some research participants discussed managing pastures as part of their drought preparation practices. Rotational grazing and spelling paddocks was often discussed by these participants as part of their drought management strategy:

Male 1: The critical time is when you get rain and the grass wants to start growing and you've really got to get the stock off and give it at least six to eight weeks to recover properly. After you get a decent shower of rain, you normally just try and stop and get the country to do the seeding, or just to build a bulk of feed back, really. So we just move them around quicker. When it tends to rain, you can move them quicker; when it gets dry, you tend to slow down a little bit. SW

Male 1: In good times, you need to move cattle around. Like you can't just flog out your paddock. Spelling paddocks so that gives it time to grow, the seeds drop, you know, it just - more body of grass. Can't just keep putting cattle in the same old paddocks. Like you rotate your cattle. Even like you know, six weeks with no cattle in the paddock will help to get the grass growing again. N

The value of improved pasture management was sometimes described by participants in quite straight-forward terms, as a necessary step in terms of maximizing the quality and quantity of feed for livestock:

Male 1: The most important thing here are your cattle, they make you your money, but stock it lightly, pasture and water, that's what you've got to keep your eye on. N

Others, however, discussed the value of pasture management as a preparatory practice that gave them an additional sense of security going into a drought. In the quotes below, participants describe looking after pasture as a process of placing environmentally-based resources in reserve. Like

reserves of cash kept in farm management bonds, pasture management was sometimes described as making an investment in grass that could then be drawn on in difficult times:

Female 1: But we're very careful with our paddocks. We don't overrun them. We could probably put a few more thousand on here but we - it runs nicely, not over grazing, 7000 head no worries at all. We spell paddocks as well. So we take care of the grass we've got and yeah, we don't - they don't get flogged out. We do try and keep one up our sleeves, a paddock to - well at the moment we have, yeah.
N

Male 1: But to me, the two most important things are to have reserves of cash and grass, and if you haven't got any reserves of cash, well you need to sell your cows early and if you haven't got reserves of grass, still got to sell them anyway. You need to have both of those things in reserve. FN

Male 1: It's a part of Australia. You're going to have your wet times and you've got to budget for it, really, and manage a way out of it, the best way you can. I think you've just got to look after your land too. Because once you start over-stocking and you get your grass down real short, it just takes so much more to get yourself back out of it. SW

Less commonly, the need to look after soil as well as pasture was mentioned by participants as a preparatory practice and an additional means to build resilience:

Male 1: We've got to look at this country with grazing pressure. We've got to look more at the soil health...unless you've got that right nothing works. As dry as your land can get, if it's in good, healthy conditions it will get through. It's all about looking after the land while it's vulnerable. CW

Male 1: Soil health drives everything in our business. That's what drives the production. It's just able to have our country in a state that whenever - whatever variable rainfall we get we're one of the most variable rainfall areas in Australia. We need country - we need to work hard with our animals and our infrastructure to graze the land in such a way that when it does have a rain event.... the evaporation rate up here is something like two and a half to three metres a - so it's huge. If we have bare ground whatever moisture falls on there just gets sucked out the next morning. It's about having good cover on your soil, your soil protected with grass. N

4.7 Support for drought preparation

To explore perspectives on support for drought preparation, research participants were asked 'What ways could the government work with graziers to help improve industry preparedness for drought? What should the government's role be?' In line with the emphasis on infrastructural improvements as a means of gaining a sense of control regarding drought (discussed in Section 4.6.2), and the fact that many participants were recipients of infrastructural subsidies, many responses to this

question reflected an expectation that the government should focus on offsetting the costs of fortifying properties against drought. There was also an expectation that the government could help enhance the financial endurance of producers during drought, through debt and financial management tools, and also by subsidizing some of the costs associated with drought, including freight costs. An interesting aspect of some accounts was the differentiation between subsidies and other forms of government assistance, such as farm household allowances. For some participants, the availability of government subsidies made certain drought practices justifiable as 'sound' business management, while household allowances were something to be avoided as they indicated a more serious business problem. However, accounts from those who *did* access the household allowances, indicated that accepting this assistance was a catalyst for facing and addressing unhelpful business practices and beginning to do things differently.

Other suggested forms of support for drought involved enhanced extension, communication, education and knowledge support, and fostering innovation in grazing and rural communities more broadly. Participants were also asked whether there was a role for climate and scientific information to support drought preparedness, the responses were overwhelmingly concerned with improving the reliability of weather forecasts.

These five themes – support for infrastructure, enabling financial endurance, extension, communication and knowledge support, supporting innovation, and Building the reliability of climate science – are discussed below.

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4.7.1 Support for infrastructure

In line with the value that the research participants place on their ability to 'improve' their properties (see Section 4.1.3) and their preference for seeing infrastructure as a key way to fortify themselves against drought (see Section 4.6.2), a major theme in desired governmental support for drought preparation was the continued support for infrastructural improvements. Although the Emergency Water Infrastructure Rebate (EWIR) is designed to help with the cost of establishing water infrastructure for emergency animal welfare needs, many participants were highly supportive of it in the context of longer-term drought management. The overwhelming majority of accounts of the EWIR were positive, and graziers reported that the scheme added to their longer-term security beyond simply providing emergency water. These additional benefits included improved management of livestock and pasture condition, a reduction in bogging (and the associated emotional difficulty of euthanizing bogged animals), enhancing the value of the property, and some

broader knock-on effects of the scheme to regional economies (e.g. creating employment and business for local equipment suppliers). In the quote below a husband and wife grazing team discuss using the EWIR as part of a longer term scheme to gain certainty regarding bore-fed watering points on their property:

Male 1: We sort of did the program and it was useful, and it will pay us back, but it'll take 20 or 30 years. The kids will see it more than us. Up here, if you run out of water...

Female 1: ...you're gone. So that's a bit of security...

Male 1: Like I say, actually when a farmer has got a bit of money, those projects with the poly, where they gave us so much and we did, it was nearly dollar for dollar, is magnificent.

Female 1: Yep. But they only open up when you drought declare...A lot of times we've got feed, but there's not the water. If cattle have to walk more than two or three kilometres to water, they just lose weight. It's counter-active. You're walking five kilometres to get a feed and by the time you come to the water, what feed they've eaten has just walked off. They're just surviving. Whereas if you've got your property set up with better water infrastructure. Again I'm only talking for the North. Because normally we get a season and we get some sort of feed. FN

In the following quote, another husband and wife team discuss the benefits of the EWIR in terms of allowing them to undertake permanent improvements, resulting in better pasture and land management:

Male 1: The water infrastructure rebate which is another really good scheme that the government has got....A lot of the feed is badly utilised because if you haven't got enough watering points it gets flogged out around the water within a couple of kilometres. Then it's about average grazing pressure. Then you get right back to the extreme and then nothing is eating at all. So it gets overgrown. So you've got degraded country around the waters because it's been flogged. You've got degraded country right out because it's been under grazed....By being able to spread your water, spread the grazing pressure, it's a huge help. So that infrastructure grant...I know we both agree we'd like to keep the water infrastructure grants happening. If you're giving subsidies for freight or for fodder or agistment even though that's all very good, you've got to do the same again next drought, next drought, next drought. But if the whole country - it's a "win/win" with water infrastructure.

Female 1: It's a permanent thing isn't it? And you've got to buy the materials and everything before you can actually get the funding. So there's no roting of it you would hope.

Male 1: That's right, yeah. We've got three people coming to put it in. We've got a water infrastructure grant for - just the other day for [another property]. We've got three people coming to put in that pipeline. So the local businesses benefit. The

contractors benefit. They employ locals. We benefit. The sheep benefit. CW

In the quote below, a grazier discusses how, unlike applying for a Centrelink safety net, she is comfortable participating in an infrastructure-based subsidy scheme like the EWIR because she considers it a more proactive form of drought assistance because of its longer term value in 'drought-proofing':

Female 1: My husband and I feel that probably the best scheme that the government's ever put in place and one we've used the most, because we've never claimed Centrelink payments, we've never had Centrelink assistance. We have claimed water infrastructure money, because through this drought it's made us more water wise... That's drought-proofing yourself for not only us, but for our children or for whoever buys the property after us. That's infrastructure there. It's such a good scheme because it gives people the initiative to have a go at trying to improve their property, so you're improving the value by doing that. CW

Although the EWIR was a key topic in research participants' discussions of drought preparation support, some interviewees also suggested possible subsidies for other infrastructure, such as feed storages:

Male 1: I think the bore infrastructure stuff has been unbelievable and if we could somehow work out so that people had enough feed on hand to at least get them going... We've done that a little bit. We've got enough room down here for three road trains of hay and two road trains or three road trains of grain. Yeah, we've got food on hand now, so we haven't had to buy any feed at the stupid prices, basically. SW

While tangential to drought preparation, several participants also expressed support for government subsidization of exclusion fencing, on the basis that better pest management provided associated benefits relevant to drought preparation such as better pasture (through reduced competition from macropods) and livestock management (through reduced predation from wild dogs). Exemplifying a strong belief in the benefits of drought-proofing, some research participants even called for governments to provide infrastructural fortification on a regional scale:

Male 1: Well I don't know much about the Bradfield Scheme but it appears to me that there's all that water going down the other side of the range from here that creates havoc at Bundaberg and all those other towns. If there was any way of diverting some of that water back into the Murray system, I just can't understand why we're not doing it. I mean obviously it's only going to be certain areas but I just can't believe that they're taking all that water out of the Murray for ecological whatever. I mean they're talking about wanting to increase the food we produce by doubling it in the next couple of years, well you're not going to double it over the next few years if you're going to take the water off them. I mean the Murray has gone dry before. There's plenty of photographs in the 1900s when it went dry. But

let's not worry about that. I just think that if there's water over there and we can get it over here I can't understand why we don't do it. SW

Male 1: I think if they wanted to do something about it...they'll turn those big fresh rivers up north there back inland and put that water inside, which will create a whole different environment out here because you'll have moisture for the things that'll wipe deep droughts out. Anyway, our government's too stupid. They sold us out. Successive governments, I'm not just saying the Labor or the thing, just one after the other. There's been no infrastructure put into Queensland since old Joh Bjelke-Petersen was here. SW

4.7.2 Enabling financial endurance

Other frequent responses to questions regarding ways for governments to work with graziers to support better drought preparation and resilience were suggestions that focussed on improving graziers' financial literacy and resilience.

Assistance to manage an unpredictable income was one supportive role research participants could see for government. One example of drought-related assistance available to graziers was often mentioned in this context: the Australian government's Farm Management Deposits (FMD) scheme, which gives concessional tax treatment to money deposited into an eligible financial account during good production years which can be drawn on in later years when the funds are needed. Many graziers saw this scheme – both in practice and theory - as a positive way to manage inconsistent incomes due to climatic variability:

Male 1: We've got Farm deposits. You can put them away, but when you draw those in a drought they're subject to tax, but that does help you, if you have a big year, to put money away into a farm deposit and when things get really bad and you're running short of running expenses you can withdraw it. I've been using them the last few years actually. Actually I've put them in but I haven't had to draw on them. But when I do draw on them they're also subject to tax. No, but I do when I - it will depend on the amount of tax. If you've got a really bad year, financially, and you're pulling them out, they're going to attract tax, but a lot of them would be used to be running the property in a bad year. N

As well as FMDs, some research participants suggested additional access to government rural financial counselling services through the Queensland Rural and Industry Development Authority (QRIDA) could be another way to support drought preparation:

Female 1: I think QRIDA is a good way of helping...those financial counsellors. If they could somehow try and make them a little bit more accessible and a little bit - what would you say, accessible in the fact that - or more utilized?

Male 1: Yeah.

Female 1: Rather than being [for] the down and out bloke. Use them as a free service, sort of like that, because accountants are very hard to do much with these days. They charge you just to look at them and walk in the door. I'm sure they put the ticker on.

Male 1: Talk about his kids and charge you.

Female 1: Yeah. Whereas to me, I've often thought with those financial advisers or - not financial advisers, financial counsellors, I wouldn't mind having them out just to look at the books and give advice and go, well this is what you might need to do. SW

However, in line with the tendency that graziers expressed towards adopting a fiscally conservative or a 'bare bones' expenditure approach to prepare for drought (see Section 4.6.3) the most common way that research participants suggested that governments could support them was to help them control the costs of production associated with their business. These costs included valuation-based State Land rent for leasehold land, and government loans with lower interest rates than regular lending institutions:

Male 1: I don't know how you'd do it, but one thing that really irks me about the state government in this drought is...Okay, we're not freehold. We're grazing homestead perpetual lease, so we've got to pay the lease. They didn't increase the actual rate of the lease, like the percentage of what you had to pay. But what they did was, instead of assessing that the unimproved capital value of the property as 20 per cent of the real estate value, they just put it up to 25. So that is actually a 25 per cent increase in your payment! They might say "oh, we didn't increase the rate". Well, they increased the percentage of how it's valued, and that just like that was a 25 per cent increase.

Female 1: If you're thinking of ways how the government could help, they certainly could have deferred that.... CW

Male 1: The government could, when a drought is declared, give us cheaper interest or something, so you can keep...Usually by the time you get the assistance, you're too far gone. They've got to get in a bit earlier. N

Assisting with the costs of freight for fodder or sending cattle to agistment was another key way that participants envisaged government support for drought management. When these subsidies were mentioned by research participants, they were often described as being helpful for offsetting the considerable costs involved in grazing during drought. What was also noted by the researcher is that participants who were supportive of freight subsidies also tended to adopt strategies to rationalize their use and frame them as a legitimate form of government assistance for their business. In the quote below, for example, a grazier justifies the use of freight subsidies in light of the relatively disadvantaged position he sees himself occupying in the broader economy, the taxes and fees that

he sees the government receiving through freight networks, and the contribution that freight subsidies make to the people who provide freight:

Male 1: A pretty big cost for us living out here is freight. So if you're going to bring in grain, it's obviously all a bit dear at the moment, but sometimes you were able to buy grain for say \$250 a tonne, if you're carting it in bulk bags like tonne bags it's probably going to cost you \$200 a tonne to get it here. So you're looking at 40 per cent of the cost is freight. If you're doing bulk it might be something like 35 per cent of the cost is freight.

So I think [freight rebate] is probably a good one bearing in mind that those truck drivers have got big expenses too and one of them is probably their registration costs that goes back to the state government. There's also fuel excise of which there's GST on top of it as well, which all goes back to state government. So just to be able to do business, and there's a lot of indirect taxes we get caught up in.

You know, every time that goods pass through a set of hands the taxes just keep increasing. I suppose it's the way you make an economy work, that you pass through as many hands as possible and everyone gets a chop of it, but the end user or the consumer of it at the end is paying top dollar. It's a bit like the old saying that farmers are the only people in the world that buy everything for retail price and sell everything at wholesale price and pay the freight both ways. CW

The availability of government freight subsidies appears to play a role in some graziers' rationalizations that using them represents 'sound' business practice. In the quote below, a grazier discusses how the eligibility of agisted cattle for a freight subsidy makes agistment the more attractive option than destocking, because restocking after destocking is not eligible for subsidy. In his account, the fact that a freight subsidy for agistment is supported by the government indicates not only that he *can* use it, but that he *should* use it. Even when agisting cattle becomes problematic, the grazier still does not appear to question his decision to send cattle to agistment, instead regretting only that there was no government freight subsidy available for bringing in new cattle:

Male 1: The government has freight subsidies that are available to people who are bringing stock home and taking them away on agistment and so forth, but if you buy any more stock than what you have sold in the previous 12 months, well you don't get any freight subsidies for those stock you're bringing back on. Even though say for instance the drought may have broken and you want to buy a lot of stock to bring back to get yourself nearly up to full stocking rate, well there's no avenue there for any help from the government as far as freight subsidy...not that you probably should really deserve it, but I mean if it is something that is there and if you can use it, well you probably should.

Researcher: Have you used freight subsidies?

Male 1: We did when we had some stock. Previously we were able to get some cattle away on agistment down in New South Wales. We only had them there for a couple of months and the fellow sold his place and we had to get them off and

we couldn't get anywhere else for them so we had to sell them and we didn't get the money that's going around now for cattle. But we were able to get a freight subsidy then for taking them away on agistment and we probably would have been able to get it for bringing those particular cattle back home. But then because we'd sold them, and then that was four or five years ago, if we wanted to buy more stock now to replace them and bring them back, we wouldn't be eligible for a freight subsidy. CW

The strategies used to construct various government-provided offsets for the costs of grazing during drought as 'legitimate' forms of assistance becomes particularly evident when compared to the ways that the research participants understood and framed the Farm Household Allowance made available to them through the Australian Department of Household Services. Although some participants spoke positively about receiving this allowance as a safety net during drought, with one even describing it as a 'lifesaver' (CW), accounts from others indicated a perception that Centrelink-style allowances were somehow different to tax benefits and government subsidies for water infrastructure and freight. In the following excerpt, a husband and wife grazing team (referred to this project as an example of 'leading' graziers), discuss taxation benefits and government subsidies made possible under drought declarations. Whereas these benefits and subsidies are described as a reasonable and sound part of managing drought, accessing the Farm Household Allowance is seen as indicative of not being viable as a self-sufficient family business:

Male 1: Yeah being drought declared I think it's pretty important that you can get that declaration for tax purposes. We've been able to sell off breeding stock and that kind of thing. Also tax deductions on feed. Then obviously you're eligible for low interest loans from - not that we've ever used any QRIDA loans or anything.

Facilitator: You haven't?

Male 1: No.

Female 1: All we've really used is the freight subsidies. So it's all freight subsidies that we've used. Oh [and the] interest subsidy when it was in - when it was still available. It's not available any more.

Facilitator: How about the federal government assistance - you know, the farm household allowance?

Female 1: Oh the household support - no. We've never used it. We feel that if we - and this is probably being a bit cynical but well it's just how I feel - if we need support to put food on our table we shouldn't be here. CW

The reticence expressed about accepting household assistance or 'hand-outs' (SW) is concerning given there was also some evidence that, unlike freight subsidies which could be legitimized as 'sound' business practice, the safety net provided by the household allowances worked as a catalyst for 'doing things differently' and changing their practices to be more resilient in the longer term. In the account below, a grazier relates how the difficulty accepting assistance made her and her partner

think more realistically about their existing business approach and practices (which she describes as getting by on 'hard work and heart'). She also talks about becoming aware of the educational opportunities opened up by government assistance, and even though they weren't exactly what she needed, she remains open to opportunities for alternative livelihoods and additional income sources that might allow her to return to a position of greater financial independence:

Female 1: But I think the government is doing plenty and I think I've been given... I get given so much help and I just want to be not the one receiving the help. I feel like we've been dry for so long and I remember the first time I got handed money in an envelope and how devastating it was and how bad it made me feel because I needed it. Now I nearly feel like I'm so used to it...It's not that I expect it but I don't know where it will all end and I just want to - I don't know - get myself off needing support and funding...It's in the back of your mind so yeah, I think there's plenty but I think it's very - a dangerous position to be in for the government to be giving so much drought support, because if the weather doesn't change what's going to happen?

....Within the Farm Household Allowance they have an education grant that they give you. They'll put \$3000 towards your education, but only things run by a government-approved registered training organisation, which cuts down about... every good course I want to do is not run by a government training organisation, so it doesn't cover that. But I think as you get older, like [husband's name] and I have always got by on just hard work and heart. We're both [middle-aged] now and we have realized it's not sustainable. So I think the currency trading really appeals to me because if you're not physically able to work as hard as you used to, well you've got an avenue to make some money. CW

Only one research participant suggested possible subsidies for improved land management:

Male 1: Yeah. I think one of the incentives that maybe the government could put out there is for people to, say, through the taxation system I guess, offer a tax deduction for an activity that improves your land condition, whether it's setting up rotational spelling or poisoning weeds or whatever...and your training could come under that, if they go to a Grazing for Profit course or an MLA Beef Up forum or something. A hundred and fifty per cent. It needs to be a real lolly to get people to... it needs to be serious. FN

4.7.3 Extension, communication and knowledge support

Despite the emphasis on infrastructural assistance and enabling financial endurance, some research participants responded to the question about support for drought preparation by suggesting ways that the government and other organisations might help them expand their knowledge networks and develop better business and land management practices for managing drought. In the quote below, a husband and wife grazing team outline how support provided through DAF and their regional NRM

group opened up a large number of learning opportunities for them, including accessing trustworthy expert advice on feed budgeting:

Male 1: We got supported to do an RCS school, and that was the foundation of us realising that we had a lot to do. That was a - that's a big help.

Female 1: NQ Dry Tropics has been amazing in terms of accessing funding, government funding, and directing it into programs that really do support their graziers.

Male 1: Change on the ground...

Female 1: Yeah. They don't just throw the money at anything. They seek really solid feedback and they do a lot of research and find the best people out there to provide services, and services that are really going to make an impact on the ground. They've been fantastic in our area. That's a big help. The ability to send somebody out and help develop skills for feed budgeting is really - like [partner] said, it's really important...

Male 1: We had someone out from the Bowen Basin region, so a different landscape, different type of country, but you're effectively measuring kilos per hectare of feed, so it doesn't matter where you're from. The thing we love about him is he does this for a living. He's a grazier that does a little bit of contracting outside of work.

Female 1: ...provided through DAF, I think?

Male 1: Yeah, it was. It was DAF.

Female 1: He can't do everybody, so we need more of that, people who are skilled in that area. Because there's a bit of a science to measuring how much grass you've got out in the paddocks. N

In addition, some research participants were supportive of the idea of improved information and knowledge sharing networks, to support drought preparation:

Female 1: You know when the cyclone's coming or tsunami is coming, there's flashes on the television? You've got enough technology, why don't they do the same for droughts?...

Male 1: But they have to be aware not to start a panic sort of thing, you know. If you start flashing on the news there's a drought coming, sell your cattle, it could artificially drive the price down and there's only about three meat-works companies that...

Female 1: Well, maybe not that harsh, you know? More, "have you measured your feed for the coming dry if we have a drought?"...Just to make people aware that there's going to - just emotionally...

Male 1: It should be networks, it doesn't have to be out on the public arena. It's a bit of - whether it's blokes like Joe Rolfe that come round and say...

Female 1: Yeah, but blokes like Joe Rolfe can't go one-to-one - they don't go one-to-one anymore.... I still think that that's not such a bad idea. Everyone watches Landline, everyone watches the news. Just "We could be in for a drought, just make sure you measured how much grass you've got. If you don't know how to measure your grass, contact your local DPI or whatever". FN

4.7.4 Supporting innovation

Another way that research participants responded to the question about government support for drought preparation was to suggest avenues for fostering innovation in the grazing sector and for reinvigorating the rural towns and communities. One part of this involved a reduction in what participants often described as government constraints and controls on people seeking to try different things. In line with a perception of increased government interference in grazing (see Section 4.2.4), many participants were supportive of the removal of environmental regulations which they saw as limiting their ability to improve their land and feed livestock. Others suggested that government interference discouraged good practice. Others suggested that political interests, generalised principles of what constitutes 'good practice' and shorter-term political cycles impeded the ability for longer term support for more innovation in the grazing industry. For example:

Male 1: I guess this is all about politics, really, when politicians are making a decision they are doing it for personal gain, to get re-elected, above the good of the nation. This is happening on a four-year cycle and these businesses and operations are here for longer than four-year cycles. We've been here for 120 years! So it's...

Male 2: A vote-buy.

*Male 1: You've got to have a far longer term perspective of an agricultural operation than the next elections are. That's all. I'll give you an absolute example is [senior Queensland politician] getting elected there with Green's preferences. That's a self-interest to appease a minority group, with the people with the mulga treated the same as someone in Cape York. You just can't generalise. It's not a one-size-fit-all policy. It's - if you want to get into this stuff, then do it properly. Don't just put your pen through the whole thing and say, that's what we're going to do with Queensland. It's got to be considered on a region-by-region basis. Just changing the rules means strife for a lot of these people. On a four-year cycle the goalposts are moving. You're trying to put a strategy in place that's going to take you way beyond four years and all of a sudden that's gone. So it's causing a massive amount of angst. They're just going from one election time till the next.
FN*

However, other research participants located the role for government in supporting innovation more broadly, by providing increasing services to regional centres and enabling a more diverse and resilient economy. In the quote below, a participant (referred to this study as an example of a 'leading'

grazier) describes how the government, by providing improved telecommunication services to regional towns can help these centres become less dependent on natural resource based economies and less vulnerable to drought. A key aspect of this shift is enlivening regional towns by making them more attractive to people with different enterprises and business approaches:

Male 1: ...We need to invest in commerce and economic activities out in these parts of the world that are not dependent on bloody rainfall. So, we've got tourist things going on and we've got more sophisticated tourist things. We get a little government encouragement, I suppose, for more manufacturing companies that can fit into our little communities out here and...some of the things that go on in the mainstream....But give us a really good internet highway here at all costs, because that'll keep people out here.

...The odd people. Not the bloody typically normal person that comes from out here. They're not the ones that make a difference. The ones that make a difference are the odd-bods. They've got some massive internet bloody concept that they're going to come up with, and they need to employ 20 people because they've got a packaging company because they've got this idea about bloody exporting Ugg boots to the world. So, you've got a couple of containers, and they just needed - they've got a massive web presence and they've got this big business that exports thing. They need a bloody - an internet portal that is just so fast and reliable and flash. Because it keeps those two weirdo geek people living out here. Because it's that geek who will come up with the idea. Whereas your standard Aussie family, bread and butter, watch-the-league-on-Friday-nights type of people, they're not going to come up with something that's going to turn a business into a massive business. As a general rule of thumb, it's the odd people. The odd people are going to make the big things happen out here. But they need the internet. CW

However, others were more dubious about the potential for the government to encourage innovation, arguing that government hierarchies limited and slowed down the potential for creative ideas and innovative thinking:

Male 1: To me it's a typical DPI attitude...I don't know whether they get reprimanded if they buck the system or if they come up with an different idea to somebody up the ladder, whether they get frowned upon or the person up there gets his nose put out of joint because somebody from down here come in with a good idea. Whereas, it should be encouraged! It's like successful workplaces, some of the best ideas come from the blokes that are doing the sweat...FN

4.7.5 Building the reliability of climate science

Research participants were specifically asked how they saw the role of climate science and weather information in helping graziers prepare for drought. The most common response to this question was improving the accuracy of short and long term weather forecasting:

Male 1: If you really want to know what the best possible thing that could happen would be for any agricultural industry in Australia would be someone that can really tell you what the weather's going to do. CW

Beyond reliability, most research participants had difficulty identifying the specific qualities they would look for in a science-based decision support tool. In line with Section 4.3.6, many saw climate and weather information as only one component of the things they needed to make decisions. In the quote below, one participant made reference to the need for any tool to have practical applications for helping him manage complex and highly specific decision-making:

Male 1: I think the danger with all this is people always look for an easy fix, and they're not out there, because it's so complex what we're dealing with. It's not a - it's about tying a lot of stuff together. Maybe there would be an algorithm that could be built for that. You think you've got the right ideas, but are they the right ideas? There's a lot of - there's so much information out there. How do you pull it all together to fit within - because everyone's got a different business. Everyone's got a different business model. Everyone's got different debts and different demands or needs. N

5 Key issues identified

5.1 Competing discourses around drought

Through a comprehensive and comparative analysis of media and government accounts, this report has demonstrated two competing ways of framing of drought. One appears to be more prominent in the media: the ‘Battling adversity’ frame presents drought as a profoundly difficult climatic event causing disadvantage to Queensland primary producers and rural communities, who must battle, endure or gamble against it with support from communities, charities and sympathetic politicians. The less dominant frame – the ‘Managing business risk’ frame strips away the emotionality and hardship of drought to present it as a risk, much like any other, that grazing businesses must manage through a professional or administrative, rather than adversarial approach, with the help of scientific expertise and knowledge support.

These competing discourses of drought are consistent with research conducted in other States (Anderson, 2014; Jones, 2017). By articulating and acknowledging their key differences, we can begin to understand how messages which present drought as a business risk might struggle to gain traction in drought-affected grazing communities and the broader Queensland population. In these affected communities, messages around drought as a discrete climatic event causing individual hardship might have considerably more salience, particularly during times of drought. By further examining the discursive strategies adopted by each frame, this report has also identified some key ways in which the ‘Battling adversity’ frame gains its persuasive and discursive dominance and its subsequent cultural capital. This includes its repetitive use of highly emotive words and phrases, and the powerful and persuasive rhetoric, narratives and metaphors that work to paint a rich picture of drought as a profound difficulty.

The next step arising from this discourse analysis is to identify the ways that government and associated groups might build the cultural capital of alternative discourses and frames to encourage and promote drought preparedness and resilience. There are variety of means to do this, and the most effective way may not necessarily be by arguing against or countering the more emotional narratives and logics used by the ‘Battling adversity’ discourses. Indeed, the promotion of drought as ‘just another’ business risk may alienate those who experience drought as a profound difficulty. There may be merit in applying the strategies that have worked for the ‘Battling adversity’ framing (e.g. repetitious use of evocative phrases and words, narratives around community support) to strengthen cultural capital in the idea of drought as a manageable business risk.

It is suggested, as an outcome of this research, that DES social scientists and DCAP communications officers work together to formulate effective and feasible communication messages,

building on the learnings of the discourse analysis. By way of example, these actions may include finding ways to:

- use emotionally compelling discursive strategies – such as empowerment narratives - to build up the idea of planning and preparation as vital skills for managing the difficulty of drought alongside more adversarial skills;
- explore using repetitive and emotionally meaningful words and phrases to paint a more appealing picture of drought preparedness as a desirable social norm; and
- encourage rural communities, community organisations and Queensland communities to ‘rally around’ graziers to support them as they *prepare* for drought as well as just endure and survive it.

5.2 Cultural beliefs and values complicating drought preparedness

5.2.1 Complex motivations

The results of this research indicate a complex set of motivations and values underpinning the lives and choices of the research participants. Although there were some indications that increased profitability was a key motivation driving some participants’ approach to business, it is likely that other motivations relating to the maintenance of grazing livelihoods, rural communities and connections to the land also play a key role. These include the desire to operate self-sufficiently and without interference, to exercise creative freedom and innovation, and to maintain attachments to place, nature and the land as well as family histories and traditions in grazing and primary production.

Put simply, there may be more keeping people in grazing than straight-forward financial self-interest and the desire for profit, and this has important implications for strategies aimed at building cultural capital in drought preparedness, resilience and adaptive capacity. The deep connections that many participants report in regard to their livestock and properties, for example, may constrain their perceived mobility and their options in terms of adaptive practices that require considerable geographical flexibility (e.g. temporarily moving into a nearby town or city to find work), or their ability to ‘let go’ of breeding stock easily.

In addition, as governments and industry seek to promote drought resilience and climate adaptation as a rational measure vital to ensuring the ongoing profitability of the grazing industry, this emphasis may not have as much meaning or persuasive power for more intrinsically motivated graziers. Indeed, the promotion of drought as ‘just another’ business risk may alienate those motivated by different values. There are many different benefits to drought preparedness, adaptation and resilience and a specific communication strategy that *multiplies* the messages about these benefits may appeal to a broader range of values and motivations. For example, as well as an individual and personal business responsibility, drought preparedness could also be promoted as an opportunity for graziers to build and demonstrate their skill and knowledge as producers and land managers. It

could also be framed as an important part of the continued survival and empowerment of grazing livelihoods and grazing-dependent communities, as a way of maintaining connections to country and rural life, and a way of continuing grazing traditions for future generations. The DES Social Science team can work with relevant DCAP staff to develop such a strategy.

5.2.2 A perceived separation between drought and climate risk

The results of the qualitative interviews showed reasonable evidence of a conceptual separation made by research participants between the problems they face in relation to drought and the possible risks posed by longer-term climate change. Whereas participants considered drought a difficult experience that could have profound impacts, there was a tendency amongst many to use language that normalized drought as a regular occurrence and an everyday part of life on the land. Drought was described as part of a 'cycle' with the implicit assumption that there was a balance to this cycle – that dry times would be followed by wet times and so on. It was also noted that discussions about the impacts of drought tended to move quickly to what participants considered as other, potentially more important, issues to be addressed, namely a growing sense of social exclusion and marginality in agriculture and increased government interference in grazing business and property management.

The adherence to a cultural belief that drought is a normal part of life and that weather follows 'cycles' is not exclusive to Queensland graziers, nor is it necessarily problematic. Producers' direct experience of seasonal fluctuations and cycles is limited to their lifetimes, and the idea of a broader cycle is often drawn upon, metaphorically, to communicate weather patterns. Graziers' belief in climate cycles, which eventually balance themselves out, has been noted by drought scholars in other States (Jones 2017). However, a continued adherence to imagining the weather as a regular and repetitive cycle between wet and dry times may become problematic if it interferes with the ability of grazing enterprises to adequately respond to the prospect that these amplitude and frequency of seasonal variations are experiencing permanent change. For many participants, this appeared to be the case: while some did acknowledge the climate was changing, several others were dismissive of the idea, adhering to the belief that they could manage patterns of drought using the same approaches as previous generations.

These findings point to the possibility that a proportion of Queensland graziers may not be fully aware of the nature and extent of the climate risks facing them, which is likely to have important implications on their ability to adequately prepare themselves for these risks. They also suggest the possibility that some graziers might understand their own vulnerability more in terms of perceived social and political disadvantages than in terms of environmental threats like climate change. Any efforts towards promoting and encouraging greater drought preparedness in the Queensland grazing industry must incorporate measures to address this lack of awareness. Given the sensitive nature of

drought and climate, however, it is advised that any communication strategy to address these issues be carefully and collaboratively designed, drawing on specialized expertise in the area of climate risk communication.

5.2.3 Reliance on ‘traditional’ sources and forms of knowledge

The results indicate that research participants draw on a combination of knowledge when managing their properties and assessing their drought risk (Sections 4.3 and 4.4). There were graziers who could be described as more active knowledge seekers and users, and who drew on a diversity of knowledge sources and types. However, others appeared to be far more limited in their knowledge seeking and use of science, relying primarily on relatively contained knowledge networks comprising their own subjective knowledge and that of their family members.

When it comes to assessing drought risk, the interviews also found that many participants relied almost completely on direct observations of specific aspects of their own property used in combination with heuristic forms of knowledge, based mainly on their own subjective experience about weather patterns and seasonality. These heuristics were often derived from taken-for-granted beliefs about weather ‘cycles’, their own property’s rainfall history, trial and error-type learning, and the experiences of previous generations on the property.

It is important to note here that the use of one’s own experience and heuristic knowledge is not necessarily a bad thing, and in many contexts it is often sufficient for solving problems and making decisions. Heuristics are an important strategy, used by all humans, to make quick decisions and create a sense of security in situations where complete certainty is impossible. However, a reliance on heuristics and ‘closed’ knowledge networks can become problematic in situations where change is occurring and complex decision making is required. In these circumstances, established ways of doing things may no longer be as effective, and an over-reliance on these ‘traditional’ forms of knowledge may affect long term adaptive capacity and resilience.

These findings indicate the continued need for developing, delivering and promoting innovative science-based information, the need to design knowledge support to enhance its relevance and useability, and the identification of avenues whereby any support can be incorporated, where possible, into existing knowledge networks.

5.2.4 Distrust of seasonal climate forecasting

Seasonal climate forecasting, accessed via TV and print news, Landline, and weather websites, was mentioned as participants discussed the information and knowledge they draw upon to assess and respond to drought risks. However, while some participants acknowledged that they believed that

forecasting was improving, it was often described with skepticism and frustration. Seasonal climate forecasting was perceived to be unreliable, and there were several elements to this perception. First were participants' memories of past experiences – sometimes many years previous - in which they had been encouraged to incorporate seasonal forecast information into their decision-making which had subsequently proven to be incorrect. Second was the timing and way that online seasonal climate forecasting was communicated, with issues such as rapid changes in rain predictions often compounding participants' perceptions of weather information being unreliable. Third, was the emotional impact of inaccurate weather predictions and the experience of optimism and subsequent disappointment when predicted rain did not arrive.

These findings support the continued need to build the accuracy of seasonal climate forecasting as a tool that producers can use to make drought-related decisions. Indeed, improved seasonal climatic forecasting was discussed as one way that government science might help graziers prepare for and manage drought. However, as well as enhanced accuracy, this research also supports the need for continued engagement and communication to rebuild trust in climatic information and enhance the adoption of forecasting tools.

5.2.5 Difficulty managing uncertainty

In line with the findings of social scientific research in the first phase of DCAP (McCartney 2017), the results of the interviews indicate that the unavoidable complexity and uncertainty involved in decision-making during periods of drought can create emotional conflict and potentially stress and fatigue for graziers. In the interviews, decision-making was often compared to gambling, and specific decisions, especially ones relating to destocking (Section 4.6.1), were considered difficult even for those graziers who adhered to clear and established strategies for early destocking. This supports the continued need for decision support tools, services and aids to assist graziers with decision making, but also the need to explore other ways to support graziers as they engage in difficult decision-making – often against the grain of more established 'traditional' forms of knowledge (Section 5.2.3). Enhancing the accessibility, use-ability and reliability of these tools will be important as it will enable graziers to develop competency and trust in external decision support services.

5.2.6 Social constraints on drought preparedness and innovation

There was a tendency for more forward-thinking research participants to describe themselves in terms of being 'out on a limb' within their local social networks in terms of their attitudes and practices. There were also accounts of participants feeling constrained in their local communities in terms of their ability to openly discuss different ways of doing things and particular business practices more broadly. As well as a general feeling of constraint and of being 'different', participants described

social norms around treating business and finance as private matters, a courtesy around discussing drought and climate change for fear of creating emotional suffering in others, and sensitivity around interfering in or 'calling out' the poor business practices of peers and neighbours.

At the same time, many forward-thinking participants also described themselves putting much effort into seeking information from outside these immediate networks, with many placing great value in finding and talking to people with similar approaches to themselves. Knowledge-based programs and events – both government and privately run – were often seen as beneficial for interacting with other innovative producers, respected scientists and government extension officers.

This finding indicates the importance of continued government support for innovative and open knowledge networks to facilitate drought-preparedness and adaptation, especially those that allow the provision of both one-on-one interactions and on-farm discussions, as well as broader peer-based mentorship and collective knowledge-sharing. It also suggests a need to build the capacity for open knowledge-sharing at a more local, grass-roots level, by finding ways to challenge the dominant beliefs and attitudes that close off these avenues for discussion and to build support for innovation and drought preparedness at a community as well as at an individual enterprise level.

5.2.7 Limited awareness of the full spectrum of drought preparation practices

The majority of research participants agreed that it was possible to plan and prepare for drought, with some describing it as an opportunity for learning and a challenge through which one can become a more skillful grazer. When it came to describing the practices they used to prepare for drought, research participants tended to focus on herd management practices such as following conservative stocking rates and destocking, infrastructural fortifications such as fencing and water infrastructure, and financial practices such as cutting costs and keeping money in reserve. While these practices have a positive effect in helping grazing enterprises manage the impacts of drought, an additional emphasis on other practices such as land, pasture and soil management as well as strategic planning would have indicated a more holistic approach to preparedness (McCartney 2017). It is certainly possible that research participants still adopt these additional practices but in this research, did not identify them as ways to prepare for drought. These findings point to the need to use drought policy, communication and extension to further promote drought preparedness in grazing as involving a full suite of beneficial land, herd, property and business management practices.

5.2.8 Expectations for support

Responses to the interview question regarding the best ways for government to support industry preparedness emphasized assistance that enabled graziers to reduce the costs of production and fortify themselves against drought, rather than adapt to broader change and uncertainty.

Government infrastructural assistance such as the Emergency Water Infrastructure Rebate (EWIR) was overwhelmingly supported due to the increased and prolonged sense of security the infrastructure gave participants. An interesting aspect of accounts about subsidies for freight costs was how participants made sense of them compared to other forms of government assistance, such as the Australian government's Farm Household Allowance (FHA). While government subsidies were seen by some participants as a legitimate way to maintain certain grazing practices (such as agistment and drought feeding), the household allowance was described as being a 'handout', indicative of a more 'serious' business problem and something to be avoided where possible.

What is interesting about this is that, by lending legitimacy to established management approaches, these subsidies might actually limit the impetus for change and adaptation by enabling graziers to feel as if they are 'getting by' during drought. In contrast, accounts from those who accessed household allowances indicated that not only do they provide a vital safety net during difficult times, but can also act as a catalyst for identifying unhelpful business practices and for creating opportunities for change.

A careful analysis of drought policy must acknowledge that a focus on minimising the difficulty of drought in the short term may impact on longer-term economic, environmental and social resilience. To this end a clear differentiation must be made between support intended to enable the financial and emotional endurance of grazing businesses in the short term (managing *current* drought), and the need to encourage practices that enable the capacity for adapting to climate variability in the long term (adapting to *future* droughts).

6 Next steps

The recommendations arising from this research are broad. Following the finalisation of this report, the DES Social Science team will work closely with DCAP to develop a separate document containing a more detailed and specific set of actions to address the issues identified. The five broad recommendations are:

1. The development and implementation of a communication-based strategy to enhance the cultural capital of drought preparedness.

A number of research findings indicate the need for enhanced communication around drought preparation and climate adaptation in Queensland grazing and related communities. It is recommended that DCAP develop a communication strategy that specifically aims to build the appeal of drought preparedness and climate adaptation. This strategy would:

- formulate effective, emotionally compelling and feasible messages that strengthen the idea of drought as a manageable business risk and drought preparation as an important grazing skill;
- seek to engage rural communities, community organisations and the broader Queensland population as well as individual grazing enterprises; and
- promote the benefits of drought preparedness in a range of contexts (e.g. at an individual, industry and community level) and appeal to a broad range of graziers' values and motivations.

2. Engage experts in climate risk communication to advise on the best pathways towards enhancing awareness of the climate risks facing Queensland grazing.

The findings suggest that Queensland graziers may not be fully aware of the nature and extent of the climate risks facing them. Any efforts towards promoting and encouraging greater drought preparedness and climate adaptation in the Queensland grazing industry must begin to address this. However, given the emotional and financial difficulties associated with drought and climate variability, it is advised that any strategy to address these issues draw on specialized expertise in the area of climate risk communication.

3. Continue to foster knowledge networks and educational events through grazing extension

The findings of this research indicates the need for continued extension and open knowledge networks to facilitate drought preparedness and adaptation, especially those that allow the provision

of both one-on-one interactions and on-farm discussions, as well as broader peer-based mentorship and collective knowledge-sharing. It also suggests a need to build the capacity for open knowledge-sharing at a more local, grass-roots level, by finding ways to challenge the unhelpful beliefs and attitudes and to build support for innovation and drought preparedness at a community and enterprise level.

4. Continue building the useability, accuracy and adoption of seasonal climate forecasting, as well as innovative decision support tools with specific and practical applications for end-users

There were several findings, including a distrust of seasonal climate forecasting and the emotional difficulties associated with drought-related decision making, that support the continued need for improved forecasting and innovative, user-focused decision support tools to support the grazing industry. As well as accuracy, improving graziers' understanding of these tools and their integration into decision-making is also very important.

5. Continue to reform and review drought assistance arrangements

The findings indicate that the need to help producers manage the difficulty of drought in the short term should not impact on their drought preparedness and longer-term economic, environmental and social resilience. A clear differentiation must be made between support intended to enable the financial and emotional endurance of grazing businesses in the short term (managing *current* drought), and the need to encourage practices that enable the capacity for adapting to climate variability in the long term (adapting to *future* droughts).

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Appendices

Appendix 1 Interview information

6.1.1 Summary of South West interviews

	Interview attendees	Reported history	Reported goals	Reported business approach	Reason for referral (if applicable)	Other notes (not exhaustive)
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to Male 1) • Female 2 (visitor) 	Long history in grazing	'Surviving the drought' (Male 1)	Informal.		No formal qualifications beyond school, 'just the university of hard knocks' (Male 1)
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1). 	Long history in grazing.	Raising children. Potentially succession.	Continually budgeting and making formal plans because 'you wouldn't survive if you didn't' (M1). Use computer packages. Draws on formal advice, including paid advice.		Tertiary qualifications in business.
	<ul style="list-style-type: none"> • Male 1 	Mixed history.	Retirement.	Not specified.	Referred by another research participant.	No formal qualifications beyond school.
	<ul style="list-style-type: none"> • Female 1 • Male 1 (partner to Female 1) 	Long history in grazing.	Raising children.	Consult with each other continually. Actively seeks out information through diverse knowledge networks.		Agricultural and tertiary business-related qualifications.
	<ul style="list-style-type: none"> • Female 1 • Male 1 (partner to Female 1) 	Long history in grazing.	Succession	Very structured in planning approach. 'Business planning converts' (Male 1).	Referred as an example of	Tertiary qualifications in agriculture.

			Developing land and infrastructure.	Formalised written plans. Draws on external, paid advice. Proactive when comes to seeking information	'leading' graziers.	
	<ul style="list-style-type: none"> • Female 1 • Male 1 • Male 2 (son of female 1 and M1) • Female 2 (partner of Male 2) 	Long history in grazing.	Succession	No formal plans. '[Partner] doesn't believe in budgets. Doesn't believe in figures from an accountant, doesn't believe in any of that' (Female 1).	Referred by another research participant.	No formal qualifications
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) 	Medium history in grazing.	Greater productivity	Does formal budgets as bank has demanded it. 'Between just two computers and tough love from the bank managers, we've really lifted our game' (Male 1).	Referred as an example of 'average' graziers.	Qualifications in agriculture.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) • Male 2: (son) • Female 2: (partner to Male 2) 	Medium history in grazing.	Retirement	Not specified		
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) 	Long history of grazing.	'Getting by' (Female 1)	Not specified	Referred as an example of 'average' graziers.	Has diversified products and business interests elsewhere.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) • Male 2 (worker) 	Long history of grazing.	Making the place viable economically and environmentally.	Most plans are 'in your head' (Male 1). Seeks advice and talks to people all the time.		
	<ul style="list-style-type: none"> • Female 1 	Long history in grazing.	Not specified	Not specified	Referred to project as an example of an 'average reactive' grazier.	

	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) • Male 2 	Unspecified	Unspecified	<p>Plans in head regarding feed but no formal written plans.</p> <p>'I'm a fellow that knows what I'm going to do a week out' (Male 1).</p>		
	<ul style="list-style-type: none"> • Male 1 	Long history in grazing.	Simplifying the business.	<p>Always budgets – both financial and feed. Financial budgets done using computer package. Feed budgets tend to be done in head.</p>		No formal education beyond Year 10.
	<ul style="list-style-type: none"> • Male 1 	Long history in grazing.	Eventual succession.	<p>Not specified but has paid for an agribusiness consultant to review the business.</p>	Referred by another research participant.	

6.1.2 Summary of Central West interviews

	Interview attendees	Reported history	Reported goals	Reported business approach	Reason for DAF referral	Other notes
	<ul style="list-style-type: none"> • Female 1 • Male 1 (partner to Female 1). 	Long history of grazing.	Retirement.	Keeps a lot of records, used paid advice. Attends many educational events.	As an example of 'leading' graziers.	Applied agricultural training. Completely destocked at time of interview.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) 	Long history of grazing.	Possible succession, eventual retirement.	Treats it like a business. Use computer program for financials. Other planning mostly using notebooks and in heads. Uses paid advice	As an example of a 'proactive' grazier.	Applied agricultural training. Only partially stocked at time of interview but not in drought conditions.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to Male 1) • Female 2 (daughter) 	Long history of grazing. 'I've known nothing else' (Male 1)	Getting through drought.	Formal approach – currently in process of drawing up business plan. Male 1 and Female 1 share decision-making. Seek advice, unclear if paid advice.		Applied agricultural training and tertiary agricultural qualifications.
	<ul style="list-style-type: none"> • Female 1 • Male 1 (partner to Female 1) 	Long history of grazing.	Succession and building a good herd.	Formal, collaborative approach. Has a 'drought selling program' (Female 1).		
	<ul style="list-style-type: none"> • Male 1 	Long history of grazing.	Getting through drought. Diversifying the business	Formal, strategic plans. Paid advice. Describes self as active knowledge seeker	As an example of 'leading' graziers	Professional qualifications.

	• Male 1	Long history of grazing.	Not specified.	Not specified		No formal qualifications beyond year 12.
	• Female 1	Medium history of grazing.	Raising children. Expanding business.	Formal approach. Likes written goals and plans for the business.		
	• Female 1	Long history of grazing.	No defined plans.	Uses paid financial advisors. Very active knowledge seeker		
	• Male 1	Medium history of grazing.	Retirement.	No formal plans. Describes approach as 'autocratic'.		
	• Male 1	Long history of grazing.	Not specified.	Paid financial planning and succession planning.		No formal education beyond Year 10. Some applied agricultural training.
	• Male 1	Long history of grazing.		No formal planning.		No formal qualifications since year 10.

6.1.3 Summary of North and Far North interviews

	Interview attendees	Reported history	Reported goals	Reported business approach	Reason for DAF referral	Other notes
	<ul style="list-style-type: none"> • Male 1, • Male 2 (son of Male 1), • Female 1 (partner of Male 2) • Female 2 (worker) • Male 3 (worker) 	Long history of grazing.	Paying off debt. 'Becoming sustainable and profitable' (Male 1)	No formal planning. Discusses issues as a family group but does not write anything down.	As an example of an 'average' grazier.	Some family members with agricultural qualifications.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to male 1) 	Medium history of grazing.	Running an ecologically sustainable and profitable business, becoming industry leaders. Raising children.	Self-described 'growth personality'. Acknowledges that formal planning is key. Uses computer packages to plan.		Combination of agricultural and business- related qualifications.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to Male 1) • Male 2 (son). 	Long history of grazing.	'To carry on' (Male 1) Potentially succession.	No formal plans. Discussions over smoko. M1 'can't turn computer on' F1 does the email.		
	<ul style="list-style-type: none"> • Male 1 	Long history of grazing.	Unspecified	Unspecified		
	<ul style="list-style-type: none"> • Male 1 	Long history of grazing.	Retirement.	No formal plans. Relies on external income.		
	<ul style="list-style-type: none"> • Female 1 	Medium history in grazing.	Getting through drought.	Not specified	As an 'active' grazier.	
	<ul style="list-style-type: none"> • Male 1 	Medium history of grazing.	Unspecified	No formal plans. Family in constant discussion but no written plans.		Tertiary qualifications in a business-related degree.

	<ul style="list-style-type: none"> • Male 1, unknown age 	Long history of grazing.	To expand and diversify the business.	Uses formal plans and family meetings.	As an example of an 'active' grazier.	
	<ul style="list-style-type: none"> • Male 1 	Long history of grazing.	Retirement	No formal planning. 'Keeps things in head'. Uses advice of brokers.		
	<ul style="list-style-type: none"> • Male 1, unknown age 	Long history of grazing.	No defined goals. Just making a living.	Prefers informal approach. Describes self as keen learner.		
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to Male 1) 	Long history in agriculture.	Possibly succession and retirement.	Formal. Uses paid consultants and formal planning techniques.		
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to Male 1) 	Long history of grazing.	Retirement.	Always has a strategic plan for meeting goals. Mostly written down but not always. Formal family meetings to plan and discuss. No paid advice except for financial advisors (for off farm investments). Draw on government extension and private business courses.	As an example of an 'active' grazier.	No formal qualifications.
	<ul style="list-style-type: none"> • Female 1 • Male 1 (partner to Female 1) 	Medium history grazing.	Raising children. Eventual retirement and succession.	Female 1 described Male 1 as making most of the decisions and keeping plans in his head. Not much discussion.	As an example of a 'reactive' grazier.	Tertiary qualifications in unspecified area.
	<ul style="list-style-type: none"> • Male 1 • Female 1 (partner to Male 1) • Male 2, 	Long history of grazing.	Build sustainability of the property and succession.	Formal approach, with structured strategy	As example of an 'active' grazier.	Qualifications in agriculture and business.

	<ul style="list-style-type: none"> • Female 2 (partner to Male 2) • Male 3 (visitor). 			<p>meetings and written plans.</p> <p>'Our learning is ongoing. It never ends' (Male 1)</p>		
	<ul style="list-style-type: none"> • Female 1 • Male 1, (partner to Female 1) 	Medium history grazing.	Reducing debt. Restocking.	Formal approach to budgeting and financial management.		Trade and tertiary qualifications in a business related field.

Appendix 2 Interview protocol

Preamble (2 minutes):

Just a few other important things to make clear before we get started:

- There are no silly, wrong or impolite answers.
- Every aspect of this interview is voluntary. If you do not want to answer a particular question, or if you want to end the process altogether, you are free to do so at any time so please say so – we'll just move on with no questions asked.
- Protecting your confidentiality is really important to me and nothing you say to me today will be attributed to you. I will report on the responses, but not who said them. I will be de-identifying transcripts of this interview so that information cannot be traced back to people, places or businesses.
- Consent to record

Any questions for me?

Part 1: Background and general business approach

1a: First of all, I'd like to briefly get an idea of your background in grazing and the way you like to run your property and business.

- How big is the property?
- How many animals does it carry (good year/bad year)?
- How long have you owned/managed this property? Where were you before?

1b: And what are some of the things you love most about your business and life here? What kind of things make all the work you do worth it?

1c: What are you working towards in terms of the future? What are your goals/next steps?

1d: How would you describe your approach to making decisions about your property and business?

1e: And how do you find the information and knowledge you need to make decisions on your property?

1f: Can you tell me about any situations in which you draw on scientific information to make decisions about the running of your business?

Part 2: Perspectives on drought preparation and drought management

2a: How does drought impact you and your way of life? Your region or community?

2b: When you are making decisions about your property and business, what signs tell you that dryness and drought might be becoming a problem?

2c: Can you tell me about the types of knowledge and information that you use when you are assessing drought risk and managing drought?

2d: Do you think drought is something that grazing businesses can plan or prepare for? Why/why not?

2e: (If yes above) What kinds of practices do you think preparing for drought might involve? What do you do to plan and prepare your business for periods of extended dry times before those times become bad?

Part 3: Support for drought preparation

3a: What ways could the government work with graziers to help improve industry preparedness for drought? What should the government's role be?

3b: Could other organisations – such as scientific, community, charities and industry groups – play a role in supporting graziers like yourself prepare for and manage drought?

3c: How might climate and scientific information help you prepare for drought and make business decisions?

Part 4: Wrap up

4a: That is all of my main questions. Is anything I haven't asked, or anything we haven't discussed, that you think is important to the issue of drought and drought preparation?