

FOREWORD

The rangelands, covering about 80% of Australia, are renowned for their highly variable climate and low and erratic rainfall: they are indeed “A land of droughts and flooding rains” (*My Country* by Dorothea Mackellar). Unfortunately, these lands are progressively degrading from the cumulative effects of recurrent droughts and chronic and/or widespread under-management, amongst a range of other factors. In many locations, traditional pastoral enterprises are uneconomic, particularly at the scale of the family farm, which undermines towns and communities as less money is spent in local businesses, jobs are lost and people leave looking for work in larger centres.

The rangelands are being placed under increasing pressure by a changing climate. Acceptance of climate change by some landholders who are already dealing with a highly variable climate is recognised. This influences the level of preparedness that is undertaken or indeed possible for pastoral production to be ecologically sustainable.

The need for new economic settings for viable production, possibly new tenure for repair and protection of multiple values, and government support for the management of ecosystem services, will require a new public/private partnership.

Increasingly, a social compact will be required between urban and rural communities to match their expectations of how the land and its resources are valued and managed. Already investment in pastoral lands for carbon sequestration is occurring. Clarification of the duty-of-care responsibilities between government and landholders in managing land and water will be important, particularly to protect ecosystem services and special values.

This collection of papers is not only about pastoral production. There is a continuing degradation of biodiversity and a lack of representative national parks across many rangeland bioregions. There is a significant and growing nature-based tourism industry, and the Grey Nomad phenomenon provides a baseline of economic support for many towns. The tourism industry may become increasingly constrained by lack of access to natural places, and the industry could be invigorated by consolidation of the park estate.

This Dialogue has raised many questions that require extensive, ongoing research and analysis, for example:

- *Are community expectations unrealistic regarding a sustainable future for the rangelands when in terms of the spectrum of values and purposes identified, most properties are under-resourced, under-staffed and under-managed?*
- *How is it possible to adequately resource, staff and manage these properties to achieve a sustainable future for the rangelands?*
- *Do rangeland industries need a social licence to operate and thrive?*
- *Are the problems of rangelands economically intractable for individuals?*
- *What should be the agricultural policy direction in a modern advanced economy?*
- *How can we encourage groups of people to make their homes in the empty places outback?*

Many of these questions appear intractable at this point in time. This Dialogue and these *Proceedings* have strengthened the conversation amongst some of the key stakeholders and provide a focus for multidisciplinary enquiry to inform policy makers and the broader community.

The key message is that the productivity, viability and resource condition of large parts of our unique rangelands will rapidly decline unless existing policies, economic drivers and management practices are urgently reviewed.

Paul Sattler OAM, Ross Hynes and Geoff Edwards

EXECUTIVE SUMMARY

The discussion at the Rangelands Dialogue and within the pages of these *Proceedings* produced much information that is directly relevant to contemporary policy and management challenges. Accordingly, the Executive Summary of these *Proceedings* presents a list of the key points extracted from the 26 papers that follow. These summary dot points highlight key issues and can assist in taking responses regarding distress in the rangelands forward to the three levels of government and to inform the wider community.

Whilst it is not suggested that this Dialogue covered all aspects of rangelands management, its values and resources, the information presented indicates that action is urgently required if a sustainable future is to be realised. Biodiversity, water resources, Indigenous interests and the viability of businesses, both rural and urban, are obvious subjects requiring further investigation. Regional assessment of these issues across the varied subregions of the rangelands would also be important in charting the way forward.

Setting the Scene

David George

Keywords: climate risk, climate change adaptation, risk management, needs, vulnerability, planning, education

- The needs of pastoralists vary as a consequence of the cumulative factors and elements that provide a picture of vulnerability.
- Any climate-change scenario that exacerbates climate variability makes future sustainability of natural resources and communities even more difficult.
- Feedback indicates that the whole system is in crisis and potentially in a state of collapse.
- There needs to be critical analysis of the future scenarios of resource condition and trend, in order to achieve sustainable communities. This analysis must be driven by science and unfettered by politics.
- Two key questions emerge:
 - Is climate change a mere inconvenience in the rangelands?
 - How can carbon farming be framed so as to offer only positive economic benefits and not risk exposure to potential payments?
- Developing thorough climate risk management strategies at farm level and at industry level must have an expanded role.

Des Hoban

Keywords: underlying drivers, transformative change, governance deficit

- Rangelands are really stressed, including the land, people, communities and biodiversity.
- Impacts of climate change will escalate.
- Strategic research in the rangelands has been lost, and management will become trickier with climate change.
- There is a need for adequate resourcing and new institutional arrangements for transformative change.
- Past dogmas on topics such as the virtues of family farming or the merits of the free market should be carefully scrutinised.

Paul Sattler

Keywords: rangelands, conservation, national parks, duty of care

- In 1884, The Royal Society of Queensland's first President, A. C. Gregory, argued in Parliament against wide-scale clearing of the *Acacia* (brigalow) forests due to the likely impacts on rainfall.
- Nearly 100 years later in 1982, the RSQ held a Symposium on the Brigalow Belt due to concern over the extent of clearing. It was reported that only 0.5% of the original extent of brigalow was conserved, with many ecosystem types not protected.
- In 2003, modelling by CSIRO showed that a 10-fold increase in salinity could occur in parts of the Murray-Darling Basin in Queensland due to the extent of clearing, and that only a narrow window existed for action to keep the salt down in the soil profile.
- In 1985, the RSQ held a Symposium on the Mulga Lands owing to the widespread degradation due to grazing and that no national parks existed across this large bioregion. Many of the conclusions of that Symposium have been raised again at this Dialogue with little to no progress.
- In the 1990s, a number of national parks were acquired across the rangelands based on building a representative parks system. Significant effort to consolidate the park system as part of a range of conservation measures and as part of achieving sustainable managed rangelands is required to protect biodiversity, especially with the increasing impacts of climate change.
- Defining and implementing a private and a public duty of care will be a key component in planning sustainable management, in assessing public-good responsibilities and in building support across multiple stakeholders.

Economics

Ben Rees

Keywords: monetarism, monetary, Engel's Law, Say's Law

- From the early 1990s, agriculture policy has been based on rural adjustment to increase economies of scale and competitiveness, along with farmer self-reliance.
- In 1989, \$1.00 debt produced \$2.14 in output. In 2010, \$1.00 debt produced \$0.64 in output.
- Rural adjustment and reducing the number of farmers have not produced the theoretical economies of scale.
- Other sectors of the economy would have demanded change in policy direction.
- Employment has declined from 1992 onwards, especially amongst the self-employed and owner/managers, contrary to strong rising employment in other sections of the economy.

Mark McGovern

Keywords: returns to factors of production, systemic failures, capital renewal, regional Australia

- We are living in times of comprehensive capital run-down with inadequate returns to all manner of capitals, from natural and societal to economic and financial.
- Currently preferred economic and system models are inadequate, leading to serious foundational flaws in commercial, financial and public policies.
- Economic and financial distress is deepening, with significant dislocation and loss of key capacities in rural areas, including much of the rangelands.
- Drought and other natural disasters have highlighted deep problems, including unserviceable debts and inadequate farm production models, that need due attention.

- “How are borrowers and lenders in the agricultural sector to deal with the consequences of uncontrollable and unforeseen external events?” (as posed by Commissioner Hayne) remains unacknowledged and unanswered.
- In 2011, the Credit Committee of the Rural Bank noted that it had been “highlighted [5 years earlier] that the value of Queensland cattle properties were heading into a pure asset bubble and these warnings appear to have been ignored”; so, by definition, loans were being made without due regard to likely servicing incomes from after 2006.
- Program funds such as Commonwealth farm loans to temporarily ameliorate severe balance sheet strain could be better applied to rural capital stabilisation and restoration of natural assets via reconstruction and stewardship projects.

Jon Stanford

Keywords: pastoralism changes, beef consumption, climate change and international organisations, climate change and financial institutions, social cost of carbon, green bonds

- Consideration of climate change cannot be local; climate change itself is global, and a successful challenge to climate change must be global.
- Government intervention is required; Stern (2007) characterised climate change as the greatest market failure of all time.
- The convergence of approach to climate change by international financial organisations and national regulators is significant as it indicates possible future developments.
- The major developments are that insurers will scrutinise their exposure to areas affected by severe weather events; in extreme cases some rangeland assets may be denied insurance and bank finance.
- Existing lenders may look more favourably on activities promoting climate change, and innovations in the capital market may lead to greater funding for projects assisting in the transition to a carbon-neutral economy.
- The economic costs of the North Queensland floods in 2019 shed some light on the possibilities of the future. Warming is also expected to affect livestock through physiological changes, heat stress and availability of water.

Social Landscape

Heather Douglas

Keywords: rural development, repopulation, wellbeing, policy

- Rangelands cover about 80% of the Australian landmass.
- Population is unevenly distributed across Australia: average population density is 3.1 people/km², but 71% of the population lives in large coastal cities. Indigenous Australians comprise 3% of the population.
- The Australian population increased by 4 million between 2006 and 2016, but the rural population declined by more than 5%.
- Life has become more difficult in the rangelands. Overall wellbeing is lower than urban populations: rangeland residents are older, less skilled, poorer and less healthy than those in urban areas.
- Rangelands are no longer embedded in the hearts and minds of the nation, so there is a need to rethink the future.

- Changes must increase the population, create social and economic value, improve wellbeing and have effective governance.
- Indigenous development approaches are relevant to the future of the rangelands.
- Four industries have great potential to operate alongside grazing to repopulate the rangelands and improve wellbeing, viz.:
 - alternative energy;
 - major tourism events and an Indigenous Cultural Museum;
 - an inland space centre; and
 - an Outback University.

Climate Change

David Lloyd, David George and Jeff Clewett

Keywords: climate change, risk management, best management practice, education, extension, adaptation

- Climate change is a new and evolving challenge that is placing increasing downward pressure on the productivity of landscapes, long-term livestock carrying capacities and the social and economic fabric of the rangelands.
- Warming trends are not part of a short-term cycle and are linked to changes in rainfall, health of ecosystems and agriculture productivity, including in the rangelands of Australia.
- Adaptation to and mitigation against climate change is essential, not optional. Business as usual, ‘no action’ or maladaptation is contrary to the best interests of Australian agriculture and natural resources.
- New climate change and risk-management skills will be required for managing natural resources.
- Increased emphasis on education and extension processes must therefore be a higher priority in order to improve the adaptive capacity of individuals and organisations if we are to better manage climate change and drought.

Planning and Policy

Michael Jeffery

Keywords: soils for life, water and food security

- Many areas of the world face substantial soil, water and food sustainability issues. The President of the World Bank has drawn attention to the fact that: “Fights over water and food are going to be the most significant direct impacts of climate change in the next 5 to 10 years.”
- There is a need for all Australian governments to establish a national objective to restore and maintain the health of the Australian agricultural landscape.
- This must be supported by proven, sustainable farming techniques.

Michael Guerin

Keywords: consultation, environmental regulation, stakeholder respect

- The value and significance of the rangelands are not broadly understood.
- There is a need for better engagement with industry when policy settings are changed by governments.
- Property purchase for carbon credits can mean reduced economic activity and families leaving, which further reduce the resilience of local communities.

- AgForce believes vegetation management legislation is unfair, has wrong policy settings and is difficult to understand and difficult to explain to graziers. This is made worse by numerous changes over the past 20 years.
- Industry wants to contribute more, economically, socially and environmentally.
- AgForce and industry support pilot projects in several bioregions to demonstrate sustainable management of regional ecosystems and to reward best practice.

Geoff Edwards

Keywords: land-use planning, statutory authority

- Land-use planning in Queensland rangelands is required to examine the future use of leasehold lands, long before lease expiry, as well as to determine land-use requirements associated with the freeholding of leasehold lands. Leasehold land makes up >60% of the state.
- Such planning would appraise the value of land for other purposes such as national parks utilising established scientific assessment criteria.
- Pre-eminently, it would examine the implications of climate change and environment degradation to determine sustainable management regimes going forward.
- In parts of Queensland the model of the family pastoral farm may no longer be appropriate given the converging challenges of climate change, the prevailing economic framework, the cost of restoration of degraded lands, the inability to manage degraded lands sustainably, the inflated value of properties and the hollowing out of local communities.
- The Land Conservation Council of Victoria provides a useful model for land-use decision making on a systematic and consultative basis.
- There has been significant loss of research and monitoring capacity for assessing the condition and trend of natural resources and in providing sustainable models of land use.

Martin Taylor

Keywords: national parks, protected areas, ecosystem services, biodiversity, wildlife, tourism, Queensland, rangelands

- National parks (and to an increasing extent, non-government protected areas) make a vital contribution to the future economic growth of the rangelands.
- Terrestrial national parks and other protected areas conserve non-tourism ecosystem services worth at least \$37 billion per year.
- Wild-nature tourists spent \$23.6 billion in 2012–2013.
- Grey nomad tourism is growing significantly, with tourists spending up to \$16,000 each per annum in 2011 throughout Australia.
- Only 25% of regional ecosystems in Queensland are adequately protected, together with less than half of nationally listed threatened species.
- Investment in carefully planned facilities for the rapidly growing grey nomad tourism sector, in conjunction with securing new rangeland parks to achieve a fully representative system, will help diversify regional economies.

Don Keith

Keywords: native forest, apiculture, crop pollination

- The beekeeping industry has been significantly impacted by vegetation clearing, the impact of warming temperatures on vegetation, pest and disease incursions in recent decades, and the use of insecticides in broadacre farming.

- Industry decline has reduced the availability of honeybees for pollination. Maintenance of a viable beekeeping industry is vital for growth in the agriculture sector through the provision of adequate pollination services.
- Modest climate warming has caused trees to flower earlier, significantly reducing honey production, and droughts have reduced nectar production.
- With warming, peak nectar flows may be increasing out of synchronisation with insect emergence, thus contributing to widespread insect and ecosystem decline.
- Allowing the Traprock forests west of Warwick, one of Australia's premier honey production areas, to revegetate as carbon stores may be an important way forward that also provides precious floral resources for the beekeeping industry.

Ross Hynes

Keywords: crucial concepts, rangeland policy, relevant research strategies

- With climate change, impacts are accelerating and rangeland management strategies will need to rapidly adjust to enable optimum use to be made of shorter windows of production in a more unpredictable and fluctuating environment.
- Some enterprises will need to become mobilised to take advantage of intermittent rainfall events across regions, whilst some areas will need to be retired to protect remaining values and for restoration.
- Ideally, producers and conservationists should agree on thresholds of resource use to protect multiple values.
- To achieve the above effectively, all research and emerging policy need to be framed within a whole-systems approach. Why? Because the changes needed are encompassed within whole systems – systems that variously accommodate resource-use patterns that affect environmental, social, cultural and economic components across a range of scales and crucially affect their long-term persistence.

Peter Dart

Keywords: unconventional gas, mining, aquifer hydrology, land restoration, weeds, human health

- Mining for minerals (especially coal) and unconventional gas can devastate large areas of good-quality agricultural land and deplete or contaminate water resources.
- Fugitive emissions of greenhouse gases such as CH₄ from mining are not adequately measured on a continuing basis, and usually baseline measures are not taken before mining starts.
- Fracking for unconventional gas (shale and coal-seam gas) places a huge burden on water resources. Use of extracted water is very controversial, especially disposal of the salt produced.
- Fugitive emissions also contain volatile organic compounds (VOC) which can affect human and animal health.
- A major legacy problem exists in relation to the poor record of rehabilitation.
- Financial guarantees, risk assessment and community engagement are needed to ensure that mining occurs with the least impact and that rehabilitation is adequate.
- The legislation around mining does not address industry insurance to ensure that landholders are adequately covered for the impacts of mining.

Clem Campbell

Keywords: sustainable wildlife ownership, integrated wildlife management

- The Earth Charter advocates an ethical framework for sustainable rangeland management.

- A rangeland policy framework must focus on the unique landscape and ecosystems through a regional approach that engages all stakeholders.

Dana Kelly

Keywords: rangelands, pastoralists, United Nations Declaration

- Rangelands cover over half of the earth's land surface but tend to be a low priority for governments.
- Rangeland pastoralists around the world are among the world's most marginalised people.
- The Government of Mongolia is calling for an International Year of Rangelands and Pastoralists (IYRP) to increase global recognition of the value of rangelands and pastoralists, and of the increasing land-use pressures, climate change, population pressures and habitat stress.
- Australia's participation in an IYRP could further enhance our high reputation in pastoralism and would have many benefits and opportunities, including clean and green products, rural business skills, tourism, the export of solar power, and carbon management programs.
- Organisations are encouraged to support the Government of Mongolia. The UN will make a decision on the IYRP in 2020.

James Hansen

Keywords: scenario, Townsville, flood, planning

- Macro-management of extreme natural events is essential. This includes pre-planning and management to avoid uncoordinated and chaotic responses.

Pastoral Management

Geoff Niethe and Phil Holmes

Keywords: drought strategies, sustainability, stock losses, national carrying capacity, stubble grazing

- Given the decline in stock numbers in Australia, could we run sustainable historical numbers again?
- Since the 1960s, the factors leading to loss of carrying capacity in the rangelands is multi-faceted and includes:
 - the capital value of land in comparison with the value of stock;
 - increased utilisation of country, leading to lack of reserves for dry years;
 - retention of stock on pastures beyond their capacity to regenerate; and
 - over-utilisation of ground and surface waters.
- A change of focus in management is needed. The relationship between profit and pasture availability can be demonstrated in the most arid of situations.
- Management of grazing pressure is fundamental to land condition; for example, carrying capacity in the Gulf region is shown to have declined with deteriorating land condition and, if this trend continues, 50% of original carrying capacity could be lost by 2046.
- The focus must be to turn from management of stock to management of pastures and land condition.
- Assistance packages should embrace measures that demonstrate prior planning and 'best practice' grazing management.

Michael Yeates

Keywords: land management, long-term ecology, physical geography, family history, case studies

- Historical records of individual properties and related family histories can provide reliable local indicators of previous management challenges and related climatic conditions.

- Major floods have been a feature of those records, so references to average rainfall measures are useless unless very localised and very detailed.
- The variable and unpredictable nature of drought remains the most significant issue facing grazing in Australia.
- The threat to grazing lands lies in the optimism, the opportunism and the lack of understanding that drove early pioneers and continues to this day.
- If drought is such a threat, areas should be considered for alternative, sustainable uses, including tourism and conservation, with areas permanently destocked to allow restoration.

Alan Lauder

Keywords: Carbon Grazing, carbon trading, carbon stocks and flows

- Understanding carbon flows is crucial for sustainable pastoral management: carbon flows in short (labile), medium- and long-term cycles.
- Stewardship incentives can be justified for management changes that increase the flow of carbon, which improves paddock and catchment condition.
- Payments for carbon credits deal in long-term stocks of carbon and say little about driving the health of the landscape. Different metrics are required to assess short and medium flow versus long-term stocks.

David Marlow

Keywords: small water cycles

- In mismanaged landscapes with little ground cover and carbon-deficient and compacted soils, ‘small water cycles’ are degraded. Cropping and grazing practices need to be redefined to repair small water cycles.
- A healthy, carbon-rich soil generates local rainfall, reduces fire intensity and helps to create essential cloud cover.
- In large water cycles, rains are more irregular and often occur as major events.
- Queensland needs a state-wide water and evaporation management plan.

Howard Briggs

Keywords: degradation of pastoral lands, total grazing pressure, normality of drought, national approach to pastoral land management

- Queensland pastoral lands are degrading.
- Grazing pressures from livestock and wildlife need to be lowered.
- Drought is part of the normal operating environment.
- A national approach to managing pastoral lands is warranted.
- The way forward needs to recognise the private and public interests of those affected.
- The changes required will have significant social, economic and environmental consequences.

Margaret House

Keywords: tree clearing, Desert Uplands

- Older landholders, over 70, are in a better financial position with less debt and are more interested and active in the environmental health of their properties.
- Younger landholders are very interested, but their financial situation can prevent them from taking

much action. Most people who contact the Desert Uplands Committee regarding the availability of grants or assistance for environmental works are usually the younger folk.

- All Australians should contribute to the cost of landholders caring for the land.
- Landholders should be rewarded for caring for special ecological values.
- More carbon and environmental research needs to be done over a timeframe of 15-plus years, in country where trees have been pulled down and in the old-growth forest next to it.

Management – Landcare

Ken Keith

Keywords: ecosystem services, landcare, fencing clusters

- Early Landcare had great momentum and participation, but local groups with limited resources were unlikely to produce landscape-level change.
- Subsequent regional structures and purchaser–provider models missed the opportunity of more effective delivery through the network of community groups.
- Social capital built into cluster groups could be a force for delivery of ecosystem services.
- Landcare and cluster groups linked to larger administrative aggregations could be a focus for technical advice on management of ecosystem services and for auditing.
- A two-tiered system with Landcare groups linked to district Landcare committees, catchment management or natural resource management bodies would reinvigorate Landcare.

Paul McDonald

Keywords: rural extension, rural policy, land managers

- The majority of attempts at rural extension do not reach landholders or their learning networks.
- People who impact the rangelands should be at the centre of their own learning to help them measure improvements in ways that make sense to them.

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The papers in these *Proceedings* originated as briefing papers for the Rangelands Dialogue convened by The Royal Society of Queensland, AgForce and Natural Resource Management Regions Queensland in July 2019. They take the form of either short communications or opinion pieces. The editing has been conducted in a way to maintain the views of a cross-section of stakeholders from pastoralists to scientists and therefore is categorised as lightly peer-reviewed.