Understanding Variability in Adaptive Capacity on Rangelands

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Abstract

The art and science of developing effective policies and practices to enhance sustainability and adapt to new climate conditions on rangelands and savannas are typically founded on addressing the "average" or "typical" resource user. However, this assumption is flawed since it does not appreciate the extent of diversity among resource users; it risks that strategies will be irrelevant for many people and ignored, and that the grazing resource itself will remain unprotected. Understanding social heterogeneity is vital for effective natural resource management. Our aim was to understand the extent to which graziers in the northern Australian rangelands varied in their capacity to adapt to climate variability and recommended practices. Adaptive capacity was assessed according to four dimensions: 1) the perception of risk, 2) skills in planning, learning and reorganising, 3) financial and emotional flexibility, and 4) interest in adapting. We conducted 100 face-to-face interviews with graziers in their homes obtaining a 97% response rate. Of the 16 possible combinations that the four dimensions represent, we observed that all combinations were present in the Burdekin. Any single initiative to address grazing land management practices in the region is unlikely to address the needs of all graziers. Rather, policies could be tailored to type-specific needs based on adaptive capacity. Efforts to shift graziers from very low, low, or moderate levels of adaptive capacity are urgently needed. We suggest some strategies.

Key Words: cattle industry, practice change, social resilience, social typologies, sustainable practices, vulnerability

INTRODUCTION

Millions of people around the world depend on the grazing resources of rangelands and savannas for their livelihood (Li et al. 2008). However, reports of extensive and severe degradation within these social and agro-ecological systems, resulting from both natural and anthropogenic causes, suggest that their long-term sustainability is uncertain (Stafford Smith et al. 2007; Sietz et al. 2011). The widespread clearing of native vegetation in many regions and its replacement with grazing systems, and the expansion of cropping and ploughing, has additionally and significantly increased erosion and impacted productivity (Hunt et al. 2007; Hobbs et al. 2008).

Degradation processes are especially accelerated during drought periods (Baker 2002; McKeon et al. 2004; Howden et al. 2007). Given that climate models largely predict that by 2030 some areas of northern Australia will be experiencing more droughts and lower summer rainfall (Cobon et al. 2009), effective management of rangelands is becoming urgent (Puigdefabregas and Mendizabal 1998; Briske et al. 2010). Graziers may have to contend with more frequent climate crises (such as drought and flood) and environmental degradation (such as eroding soils and limited production during drought periods) as climate change impacts manifest. If rangelands are to be protected from further degradation, and dependent industries and communities are to be sustained, new strategies to manage them may need to be considered.

Managing rangelands for climate change is about motivating graziers to make appropriate management decisions in the face of climate variability (Stafford Smith et al. 2009). These decisions need to benefit both graziers and the region. Recognizing critical periods and years (both drought years and years of plenty) can be crucial in determining the extent and magnitude of the impacts associated with climate change (Eakin and Conley 2002; Walker 2005). Knowing when to alter stocking rates, when to supplement feeding, when to agist, when to burn, and when to alter water supplies, for example, can differentiate between those graziers that are likely to be successful at sustaining their land in the long term and those that are not (McAllister et al. 2005; McAllister et al. 2006a; McAllister et al. 2006b; McAllister et al. 2006c). Graziers must also allocate resources each season based on their expectations about prices and rainfall within each season (Anderson 2003; Ash et al. 2007; Marshall et al. 2011). Adaptation success not only depends on keeping productivity at a sufficiently high level during any one season, but also on reducing stocking levels to reduce the impact on the future ability of the land to produce. If stocking rates are too high at the onset of drought, for example, soil sustainability may be diminished and impact on the productivity of future years (Watson 2004; Thomas 2008). While many graziers, however, do employ sustainable practices (Didier and Brunson 2004; Brunson and Huntsinger 2008; Fernandez-Gimenez and Knapp 2009; LaFlamme 2011), not all graziers employ strategies that are likely to be successful over the longer term (Brodie et al. 2001).

To encourage the uptake of sustainable practices and enhance the resilience of rangelands, governments and communities have introduced a range of initiatives. These have included regulatory, educational, voluntary, and market-based instruments (Moon and Cocklin 2011). These efforts, however, have been variable in their success (Sankey et al. 2009; Briske et al. 2011; Measham et al. 2011b). This might be because rangelands are biophysically variable, often low and patchy in their productivities and populations, and populations are

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