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# Excluding stock from riverbanks for environmental restoration: The influence of social norms, drought, and off-farm income on landholder behaviour

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ABSTRACT

Governments often use voluntary agreements to encourage landholders to adopt environmental practices, such as excluding stock from grazing riverbanks. In Victoria, Australia, government agencies subsidize the adoption of these projects, while landholders are required to continue maintaining stock exclusion indefinitely. In the absence of further financial or legal enforcement, landholder compliance depends on the motivation and decision-making of individual landholders. Social beliefs about the responsibility of landholders to improve the condition of degraded riverine ecosystems, known as social norms, influence farmers to adopt new environmental practices. The influence of social norms on behaviour weakens when people perceived themselves to be constrained. From late 1996 to mid-2010 landholders in Victoria endured more than ten years of drought that has reduced productivity, and income. Drought conditions may influence whether landholders continue to exclude stock over the long-term, despite holding positive social norms. However, behaviour is influenced by perceptions of constraint; landholder perceptions may not reflect drought severity. Perceived drought affectedness may also be related to the amount of income obtained from farm activities. This study examined the relationship between social factors, (including injunctive and descriptive social norms, and symbolic and instrumental social beliefs, perceived drought affectedness, actual drought severity), and the percentage of overall income that landholders obtain from farm activities. A social survey, and assessment of river restoration projects, was conducted with 93 landholders in rural Victoria, Australia. We found that landholders who continue to graze riverbanks hold weaker social norms about excluding stock in drought conditions. Grazing behaviour was explained by social norms, and perceived drought affectedness together. Perceived drought affectedness was best explained by actual drought severity, but also by the amount of income obtained from farming activities, rather than either factor alone. Policy makers should consider using drought relief funding to subsidize the purchase of additional stock feed during droughts to encourage farmers to continue environmental stock exclusion, particularly when farmers rely on farm activities for most of their income.

## 1. Introduction

Efforts to improve environmental management in river basins often involve projects with rural landholders One of the most common projects in Australia (Brooks and Lake, 2007) and the United States of America (Kondolf et al., 2007) involves establishing voluntary agreements with landholders to exclude stock from grazing riverbanks in order to promote ecological recovery. In Victoria, Australia, government agencies subsidize the cost of adopting environmental behaviours for stock exclusion, such as constructing riverbank fencing, while landholders are legally responsible for continuing to exclude stock from the fenced riverbank (Department of Sustainability and Environment, 2011). To be successful, stock exclusion behaviours must be maintained indefinitely (Moore and Rutherfurd, 2017). Ideally, compliance should be monitored and enforced (Gunningham, 2003). However, in practice, stock exclusion projects are rarely assessed, and, to our knowledge, non-compliance has never been penalized. In the absence of legal repercussions, the long-term success of these projects depends on the motivation of individual landholders.

An underlying assumption of using voluntary agreements is that landholders are motivated by non-monetary incentives (Danne, 2003), such as beliefs about social pressure to behave or not behave in a certain way, known as social norms (Armitage and Conner, 2001). Numerous studies suggest that environmental social norms influence landholders to adopt environmental behaviours, including stock exclusion (e.g., Greiner and Gregg, 2011; Wauters et al., 2010). However, no research has explored whether environmental social norms also motivate landholders to continue to maintain environmental projects (in this case, stock exclusion) over the long-term.

Stock exclusion involves different activities and costs for adoption and maintenance. Thus, landholders may be influenced by different motivations and barriers to adopt a project, as compared to maintaining a project (Moore and Boldero, 2017). Establishing stock exclusion is subsidized, however, maintenance involves costs associated with

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growing or purchasing additional feed for stock to compensate for lost fodder after the exclusion of stock from grazing riverbanks. Riverbanks can produce up to 25% more fodder for stock than pastures (Aarons et al., 2013). Furthermore, the cost of maintaining stock exclusion is exacerbated during droughts. Reduced pasture growth, and, thus farm incomes, simultaneously increases the need to purchase stock feed, and reduces the financial capacity to do so. Perceived constraints, such as cost or financial loss, can reduce the influence of social norms on behaviour (Ajzen, 1991). Between 1997 and 2010 (Steffen, 2015) landholders in Victoria experienced one of the most persistent and severe droughts in the period of European occupation (known as the Millennium Drought), resulting in reduced agricultural production and increased debt (Horridge et al., 2005; Mpelasoka et al., 2008). Thus, while environmental social norms may motivate landholders to adopt stock exclusion behaviour, the costs associated with purchasing stock feed, particularly in the context of the Millennium Drought and continuing financial hardship, may reduce the influence of social norms on the maintenance of stock exclusion.

This study investigated the relationship between the continued maintenance of stock exclusion behaviour, environmental social norms, and drought, in three regions of Victoria, Australia. The purpose of the research was two-fold. First, we explored whether social norms influence the maintenance of stock exclusion, and therefore the effectiveness of using voluntary agreements for river restoration projects that involve landholders. Second, we examined the relationship between drought and landholder behaviour.

Social rural research about the relationship between agricultural environmental behaviour and social beliefs often uses very broad measures of social beliefs (e.g.,Greiner and Gregg, 2011), rather than measures of specific cognitive constructs, such as different types of social norms (Burton, 2004). Behavioural research makes several distinctions between types of social norms that have important implications for the design of interventions to promote environmental behaviour in rural communities. For example, Cialdini et al. (1990) distinguish between social norms about how an individual believes they 'ought' to behave, known as *injunctive norms*, and social norms about how an individual believes significant others 'actually' behave, known as *descriptive norms*. This distinction is important because each type of norm has distinctly different conceptual and motivational foundations (Cialdini, 2007). Injunctive norms are "*concerned with perceived social pressure, that is, the person's potential to gain approval or suffer sanctions from significant others for engaging in a behaviour*" (Rivis and Sheeran, 2003, p. 219). Descriptive norms are beliefs about the prevalence of behaviour and, thus, are influenced by information about how important others actually behave (Lapinski and Rimal, 2005).

Interventions can promote either descriptive or injunctive norms to encourage pro-environmental behaviour (Biel and Thøgersen, 2007; Cialdini, 2007; Göckeritz et al., 2010). With one exception (Minato et al., 2010), rural research does not distinguish between injunctive and descriptive norms (e.g., Fielding et al., 2008). Minato et al. (2010) analysed landholder responses to open-ended survey questions and identified injunctive and descriptive social norms, rather than using direct measures of these constructs. Thus, we examine the relationship between stock exclusion and both injunctive and descriptive social norms.

Further, people can simultaneously hold multiple, often conflicting, social beliefs about a single action or object. A common distinction is made between *symbolic* and *instrumental* beliefs (e.g., Cary, 1993; Crandall et al., 1997; Lievens, 2007). Symbolic beliefs reflect long-standing ideology, and tend to be unaffected by self-interest, while instrumental beliefs are, "*founded on the real-world consequences of actions*." (Crandall et al., 1997, p.96). Thus, social norms may vary depending on the context of the belief object or activity, and whether the context pertains to ideology or self-interest. For example, instrumental beliefs about contagion have more influence on the activity, 'keeping social distance from persons with HIV/AIDS', than symbolic beliefs about the association of HIV/AIDS with drug use and homosexuality (Crandall et al., 1997). Thus, an individual could hold positive injunctive norms towards homosexuality, and yet choose to keep social distance from persons with HIV/AIDS on the basis of negative beliefs about contagion.

Similarly, Cary (1993) found that landholders can simultaneously hold two types of beliefs about how they 'ought' to behave in relation to environmental projects. Positive beliefs about the importance of environmental behaviour tend to be *symbolic* in nature; *symbolic beliefs* may contribute meaningfully to social ideology but do not necessarily result in the performance of environmental behaviour. Rather, the performance of environmental behaviour is influenced to a greater degree by beliefs about the practical value of the behaviour, such as the impact that performing the behaviour will have on farm businesses. These *instrumental beliefs* may conflict with *symbolic beliefs* held about the same behaviour (e.g., Crandall et al., 1997). For example, landholders may believe that ideally they 'ought' to maintain stock exclusion, while simultaneously believing that in reality they 'ought not' to maintain stock exclusion if there are negative repercussion for their farm business. Thus, the strength of injunctive social norms may vary depending on the context of the activity, in this instance, whether performing environmental behaviour has a negative impact on farm businesses.

The fact that people can hold multiple conflicting beliefs about a single behaviour suggests that specifying the context of an activity or object is important for accurately measuring social norms. Thus, we examined the relationship between landholder environmental behaviour, and two different types of injunctive social norms: injunctive social norms about symbolic beliefs, and injunctive social norms about instrumental beliefs. We chose to distinguish between symbolic and injunctive beliefs by constructing social norm measures that stipulate two conflicting scenarios: (1) ideal scenarios that present no negative repercussions for farm businesses; and (2) less than ideal scenarios that present negative repercussions for farm businesses. The scenarios were related to the presence or absence of drought conditions. Following Cary (1993), we anticipated that injunctive norms about maintaining stock exclusion in scenarios of good water availability and high farm productivity would be *symbolic* in nature, and thus not related to whether landholders maintain stock exclusion. In contrast, we expected that injunctive norms about maintaining stock exclusion in scenarios of drought and low farm productivity would be *instrumental* in nature, and thus related to whether landholders maintain stock exclusion.

The second purpose of this study is to explore the relationship between drought and the maintenance of stock exclusion projects. Drought conditions can prevent landholders from adopting environmental practices (Curtis et al., 2008). Ajzen (1991) argued that perceived behavioural control (PBC) lessen the influence of social norms on the performance of behaviour. We did not measure PBC, however, in principle Ajzen (1991) suggests that *perceptions* of constraint can weaken the influence of social norms on behaviour. Importantly, landholder *perceptions* about the impact of drought on their farm businesses do not necessarily reflect the *actual* climatic severity of drought conditions. For example, Lukasiewicz et al. (2012) found that landholder beliefs about climate change are based on local experiences rather than a scientific understanding of climatic conditions. Along with actual climatic conditions, perceptions of drought affectedness may also be influenced by how heavily landholders rely on farm businesses for their financial security. Nelson et al. (2005) found that landholders who have multiple sources of income tend to be more resilient to external stressors, such as climatic events, compared to those with only a single source of income. Similarly, Kebede (1992) found that landholders with incomes from both agricultural activities and off-farm activities were more likely to adopt environmental behaviour. Riparian areas produce significantly greater amounts of fodder than pastures, and preventing cattle from grazing can result in financial losses, both in terms of the additional cost of purchasing extra fodder, and in terms of needing to