Developing a regional incentive for retaining rangeland ground cover

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Abstract

The management of ground cover is central for sustainable pastoral production in the Australian rangelands. Where changes in management achieve an increase in ground cover above the expected, then enterprise income may be reduced in the short-term. Under this scenario there is a trade-off between the natural resource benefit (public benefit), against forgone income through sacrificed feed-base (private cost). This trade-off provides a basis for considering public funding for private landholders to maintain ground cover above the expected. Performance-based incentive schemes that maintain above expected ground cover may provide potential benefits to landholder participants and the broader public through reduced soil erosion and drought mitigation and recovery. To date, no performance-based rangeland scheme has been implemented in Australia at a regional scale. We provide background to a new initiative to design a regional performance-based incentive scheme to manage ground cover in the rangelands of western New South Wales.

Introduction

Maintaining ground cover is a major issue in Australia's rangelands. For South Australia the annual off-site costs of wind erosion (human health issues) have been estimated to be around $56 million (Cork *et al*. 2012). In NSW, "The Red Dawn" wind storm event (September 2009) was estimated at $300 million (cleaning, transport and construction disruptions, employee absenteeism) but reduced soil fertility and the loss of soil carbon may be more than $9 million/year (Tozer and Leys 2013).

Over time, ground cover has been accepted as a proxy for the provision of ecosystem services such as soil conservation. The importance of retaining ground cover is embedded into natural resource planning for western NSW through catchment targets to retain 50% ground cover. However, this target may not be achievable for some Land Systems, or on degraded land, even under favourable seasonal conditions. Western Local Land Service (WLLS) has provided incentive funding which supports infrastructure development to achieve catchment ground cover targets. Whether these levels of funding will facilitate large-scale (regional) changes in ground cover is debateable given that in the last decade approximately 0.02% of the area serviced by WLLS received incentive funding (Grant 2012).

Alternative funding mechanisms such as market-based instruments (MBI) have been shown to be effective in promoting positive environmental outcomes though are most effective within a mix of policies (Moss *et al*. 2012). MBI, the West 2000 Plus Enterprise Based Conservation Ground Cover Incentive, was piloted on three western NSW properties for 10 years (Alemseged 2013). Operational details of this program have been documented by Hacker *at al*. (2010). Here, the authors argue that retaining groundcover above thresholds aimed at maintaining soil stability under poor seasonal

conditions, or realising regeneration opportunities under favourable seasonal conditions, is in the public interest but will often be achieved at private cost. Similarly, a public interest achieved at private cost is argued in situations where ground cover is below the desired threshold but is nevertheless above what might be expected from seasonal variation. While Hacker *et al.* (2010) also found the costs associated with monitoring and reporting in the pilot were comparable to MBIs elsewhere, the development of a method that utilises remotely sensed groundcover monitoring has the potential to be a cost efficient method for large scale applications.

To upscale the ground cover incentive concept beyond the pilot stage, we are undertaking a study to develop a framework for the implementation of a "Regional Incentive to Retain Rangeland Ground Cover" following the steps below:

1. Identifying key thresholds

Key thresholds for the incentive payment include the level of ground cover that should be delivered as a 'duty of care' (DoC), and the levels beyond which 'additionality' can be assumed and an incentive justified. The DoC equates to the expectations for land stewardship and the 'additionality' defined as the difference between expected ground cover (under the current seasonal condition) and the actual ground cover.

Under common law the DoC to the environment is poorly defined and a 'statutory duty of care' which clearly articulates a definition has been proposed by some authors (Earl *et al.* 2010). For NSW Western Division pastoralists a statutory DoC is embodied in the requirement of the NSW Western Land Act (1901) not to overstock without providing quantitative criteria. We propose to define this DoC by equating it with the catchment target of 50% ground cover. Below the 50% ground cover threshold, an incentive would be payable only where ground cover (actual) exceeds expectations (expected) so that an additional 'management benefit' can be inferred (Figure 1a). Payment amount is related to the size of this additional benefit with the assumption it has been achieved at a private cost (sacrificed production). This payment recognises restorative management of degraded land or operating in landscapes incapable of supporting 50% ground cover in current seasonal conditions.

Where the actual ground cover is above 50% and exceeds the expected ground cover an incentive will be payable which as in the previous scenario is related to the difference between actual and expected but the level of incentive will be lower, perhaps a fixed payment (Figure 1b). This payment recognises management where regeneration opportunities may occur under good seasonal conditions rather than exploiting increased ground cover for immediate private benefit.

Determination of the level of 'expected ground cover' should include the effects of the previous seasonal conditions (past rainfall) as well as the innate potential of the site to support vegetative growth. It is the level of ground cover that might be expected in the absence of any management change aimed at landscape restoration.

2. Measuring 'expected' ground cover

There is no reliable method for the calculation of both expected and actual ground cover to-date (Hacker *et al*. 2010). We propose to test the sensitivity of remotely sensed Fractional Groundcover (Landsat) to detect small changes in ground cover. Using the values calculated for expected ground cover by Hacker *et al.* (2010) on two properties in the pilot study we will examine the correlation of these values remotely sensed Fractional ground cover for the same 10 year period.

3. Engaging pastoral stakeholders

Effective engagement with pastoralists, industry and other stakeholders will underpin the success of the proposed incentive scheme to build relationships based on trust. Pannell *et al*. (2006) found that the goals and motivations of landholders are a significant influence on decision making. Greiner and

Gregg (2011) found that most pastoralists have a strong stewardship ethic but regional differences were substantial. In the development of a regional MBI scheme there is the need to understand the particular characteristics of pastoralists including their goals and motivations. It is also important to identify any constraints such as labour, capital and time resources that may influence their decision to participate. In the process of consultation and engagement direct and indirect contact will be made with stakeholders including workshops, surveys and interviews.

Summary

The intent of this outcome-focussed incentive scheme is that in retaining ground cover the landscape will be in the best possible condition to respond to deteriorating or improving seasonal conditions.

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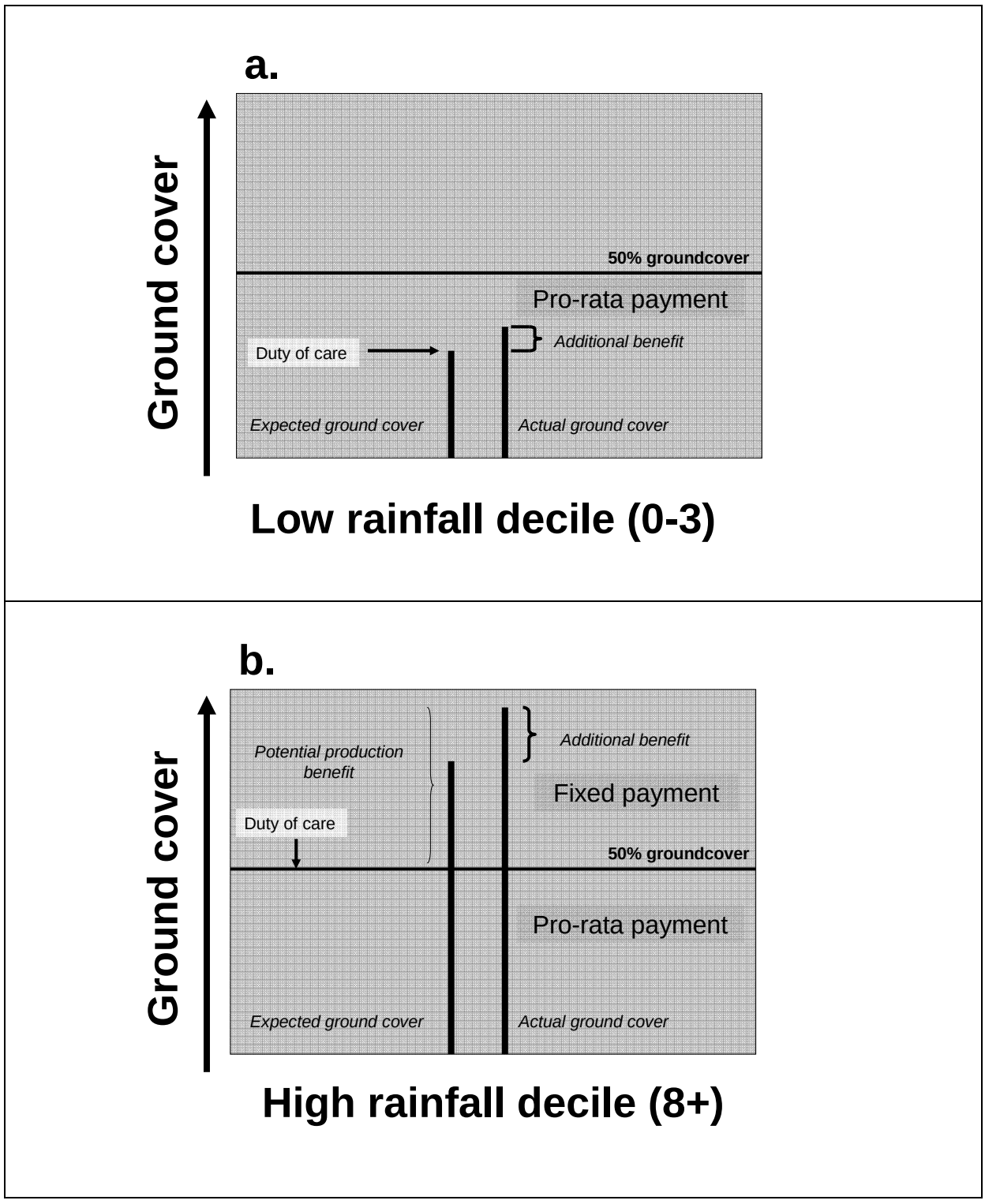

Fig.1. The proposed ground cover incentive scheme uses the difference between expected and actual ground cover in poor (a) and good (b) seasonal conditions.