

# Can graziers assess sustainable and productive pastures?

GM Lodge<sup>a</sup>, LH McCormick<sup>b</sup> and SR Murphy<sup>a</sup>

<sup>a</sup> NSW Agriculture, Centre for Crop Improvement, RMB 944,  
Tamworth NSW 2340

<sup>b</sup> NSW Agriculture, District Advisory Office, PO Box 71, Manilla NSW 2346

Through skills learnt at PROGRAZE courses (Bell and Allan 2000) and by using simple assessment tools such as the Pasture Health Kit (McCormick and Lodge 2001) graziers are increasingly able to assess the productivity and sustainability of their pastures. However, measurement of sustainability by indicators can be complex and involve techniques not readily available to graziers. Scott *et al.* (2000), for example, developed a sustainability index based on soil, pasture, and animal production data and profitability. In this study, we calculated a sustainability index for data from four grazing treatments (1997 to 2001) at two native pastures within the Sustainable Grazing Systems (SGS) program and compared these results with subjective scores for the same treatments made by graziers in spring 2001.

## METHODS

*Developing a sustainability index.* Data collected from spring 1997 to spring 2001 was used to develop a sustainability index similar to that described by Scott *et al.* (2000). Four treatments were examined: continuous grazing at 4 sheep/ha (C4), continuous grazing at 6 sheep/ha (C6), continuous grazing at 8 sheep/ha with superphosphate and subterranean clover applied (C8+sub), and rotational grazing at an annual rate of 4 sheep/ha with 4 weeks grazing and 12 weeks rest (R4/12). For each treatment data were averaged over years for; animal production (wool produced, number of grazing days, number of days of supplementary feeding, and liveweight gain); pasture [herbage mass (total, perennial grass, annual grass, forb and legume)], ground cover, litter mass and number of species; soil health (microbial and labile carbon 0-5 cm in spring each year) and earthworms present (0-10 cm) in late winter 2000, and water (change in soil water content (mm, 0-210 cm) in wetting and drying periods and surface runoff). The economics of each treatment (\$/ha) was assessed using a 10-year gross margin calculated in a spreadsheet (S. Ellis, unpublished data). Raw data were converted to scores (-5 to +5 scale) by assessing whether a high or low value was desired for each factor. Scores for the individual layers (Table 1) were averaged to give an overall index of sustainability for each treatment.

*Graziers scores.* Sixty eight graziers attending the SGS spring field days at the 2 native pastures sites (Site 1 - "Springmount" and Site 2 - "Eloura") were split into four

groups of approximately equal size. Field day participants were given an overview of the experimental sites and treatments, but no results were presented to the group prior to undertaking these assessments. Groups were not given any prior training on the day and approximately 30% the graziers had not previously attended an SGS field day. Each group was lead by an experienced advisor and individual graziers in a group were asked to assess one of four fixed 4 m<sup>2</sup> (2 by 2 m) areas in each of the four treatments. Treatments were described in detail to the individual groups and fixed areas were chosen to be representative of the treatment and similar to each other. Graziers were therefore assessing the cumulative visual effects of these treatments over 4 years. Assessments were scored on a standard score sheet on an 11 point scale ranging from +5 (high or good) to -5 (low or poor). Using this system graziers were asked to assess dry matter availability, proportion of green, proportion of perennial species, proportion of legume, ground cover and weed content in one fixed area in each treatment. Based on their visual assessment of the pasture at this one point in time they were also asked for their opinion on likely animal production, likely dollar return, the vigour of the perennials, how well the pasture might use water, its likely soil health and whether or not they considered the pasture to be well or poorly managed. Scores for each of these 12 questions were tallied for individuals and groups and averaged for each treatment (Table 1).

## RESULTS AND DISCUSSION

Grazier's scores of paddock visual assessment after four years of the treatments were highly correlated with those developed from research data collected over that time and expressed as a sustainability index ( $r = 0.989$ , Site 1;  $r = 0.999$ , Site 2). This highlighted that graziers were readily able to discriminate between visual indicators of practices that were degrading resources at the paddock scale and those that were productive and sustainable.

Further, even with no prior training the graziers in this study were competent judges of high, medium and low levels of dry matter availability, the proportion of green (and so the proportion of dead), the proportion of perennials and legumes, ground cover and weed content. They were also able to successfully interpret the meaning of the different levels of these factors in terms of their

Table 1. Mean unweighted scores (-5 to +5 scale) for animals, pasture, soil health, water and profitability (\$/ha, 10-year gross margin) layers, averaged to give an overall sustainability index for each treatment (bold text) and compared with mean grazier's scores for each treatment at each site.

	Site 1				Site 2			
	C4	C6	C8+sub	R4/12	C4	C6	C8+sub	R4/12
<b>Sustainability index (based on research data 1997-2001)</b>								
Animals	2.4	-2.1	4.8	2.6	4.2	-2.2	3.9	4.1
Pasture	4.0	-1.1	3.7	4.7	3.7	-1.3	4.6	3.9
Soil health	-2.3	2.7	4.6	4.4	-0.8	2.0	3.6	4.6
Water	-1.0	3.0	4.9	4.9	4.2	-1.7	4.5	3.7
10 yr. GM	1.1	0.0	5.0	3.5	1.1	0.0	1.2	5.0
Overall index	0.8	0.5	4.6	4.0	2.5	-0.6	3.6	4.3
<b>Grazier's scores (spring 2001)</b>								
	-2.3	-3.9	3.1	1.7	0.4	-3.4	2.1	2.9

impact on likely animal performance, dollar return from the pasture, the sustainability of the pasture, its likely soil health and how well it would use water. Similar results for visual assessments by graziers using a Pasture Health Kit have been reported by McCormick and Lodge (2001). As with the Pasture Health Kit it was found that these simple in-paddock assessments were extremely useful for generating discussion among graziers about management issues. Scores rather than direct estimates of values were non-confrontational and so allowed a broader range of graziers with different skill levels to feel comfortable about participating in the activity. While some of the graziers conducting these assessments may have previously used the Pasture Health Kit, about 30% of participants had not previously attended an SGS activity and there were no discernible differences among respondents.

## ACKNOWLEDGMENTS

SGS is an initiative of NSW Agriculture, Meat and Livestock Australia, Land and Water Australia, the Murray-Darling Basin Commission and other collaborating agencies. We thank the grazier participants and Warren McDonald, Alan Bell and Ian Collett for assisting with the groups.

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