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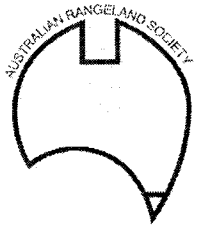

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THE 'TRIPLE BOTTOM LINE' OF NATURAL RESOURCE MANAGEMENT

L.K. Pegler and D.C. Bentley

Department of Natural Resources, Charleville, QLD 4470.

INTRODUCTION

There is a growing trend in the corporate sector to evaluate project and enterprise performance using the 'Triple Bottom Line' approach. This term refers to environmental, financial and social accountability (Elkington 1998). We advocate this approach when natural resource management projects are proposed, particularly for project evaluation.

Use of social and environmental assessments, in addition to economic studies, can add depth to analysis of natural resource management. The success of projects to deliver sustainable outcomes depends upon the integration of all management factors. Sustained outcomes are more likely in the longer term, if change is achieved across the spectrum (Elkington 1998).

METHODS

We use the Bore Drain Replacement Project (BDRP) in south west Queensland to demonstrate application this multifaceted approach (see paper by same authors). Evaluation of the project assessed the environmental, economic and social effects of BDRP in associated rangelands. The following tools were used for each component of evaluation.

1. Benchmarking of natural resource condition associated with water provision in rangelands, using two permanent case study sites in contrasting land systems (open sand plain mulga land system and wooded alluvial grassland) recorded over time. Measurements were made adjacent to abandoned bore drains and the replacement water troughs, along transects at increasing distance (between 12 m and 800 m), within one paddock currently under sheep and cattle grazing. Measured parameters included vegetation characteristics (species frequency and richness, and perennial basal area) and surface condition attributes (cover, surface physical attributes and chemical composition), using methodology adapted from Tongway (1994).

   Regional assessment was conducted of the environmental impacts (soil surface condition and vegetation characteristics) in proximity to bore drains in various land systems. Transects were recorded both downslope and upslope of bore drains, using a series of erosion and condition indices.

2. Benefit-cost analysis was used to collate and interpret economic consequences, using data collected from a survey of land managers. Data included cost and benefit estimations of grazing operations, using different water distribution systems, simulated over a ten year period.

3. A survey of involved land managers to determine social ramifications was conducted in conjunction with economic and environmental inquiries.

Conclusions from the survey of land managers will be interpreted with reference to environmental and economic assessments. It is intended to use the evaluation for ongoing project improvement, and to encourage continued land manager and government support.

RESULTS AND DISCUSSION

Results from the first measurement of one case study site (open sand plain mulga land system) in April 1999, provided benchmark data for monitoring the trend in natural resource condition associated with stock water supplies. There were significant trends observed in soil chemical parameters, but trends in vegetation and physical soil surface condition were less distinct. Electrical conductivity, pH, and sodium and chloride concentrations decreased with increased distance from drains. This may contribute to increased dispersion and structural decline in soils adjacent to drains (Wilson and Pegler

1998; Rengasamy and Churchman 1999). This case study site will be remeasured over time, as will another case study site in a contrasting land system (wooded alluvial grassland).

The regional assessment of condition associated with bore drains in differing land systems revealed that erosional features and condition decline were more often observed in mulga shrublands (kandosols) than in alluvial land systems (vertosols). Difference in value of indices between transects recorded downslope and upslope, was greater in mulga than in alluvial land systems.

This environmental data was augmented with a study of land managers' perceptions towards natural resource management in relation to the BDRP. Accelerating degradation rates associated with bore drains was recognised, and some concerns about condition around new water points were expressed. Land managers believed management of resources would be enhanced following BDRP.

A mean private benefit-cost ratio of 2.4 was estimated by land managers involved in the BDRP, with an average subsidy level of 79%. The main benefit was due to reduced operating costs of water distribution, rather than increased on-property production. The effect on animal and property management could not be quantified, but potential for improved management was discussed.

There were also social ramifications, primarily through improved quality of life (time savings, reduced stress, and health and safety issues). Land managers also identified opportunities for improved risk management, and involvement in community activities (Pegler and Bentley 1999).

CONCLUSION

The use of a 'Triple Bottom Line' approach to project evaluation recognises the need to assess wider impacts to adequately monitor and evaluate project success. Sustainable change is more likely to occur when all attributes and impacts are addressed in project implementation. Evaluation of the BDRP was considerably enhanced by an integrated interpretation of economic, environmental and social effects. Many findings were not anticipated prior to investigation, and have been used to justify funding for the Great Artesian Basin Strategic Plan.

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