

Using Bayesian Networks to improve understanding of survey data; A case study of adoption of conservation practices by landholders

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Abstract

In this exploratory study Bayesian Networks (BNs) are compared with more traditional analytical techniques used to interpret a survey of conservation practice by landholders. A pre-existing survey of 503 landholders in the Wimmera region of Victoria was used as the basis for a BN. The survey had been designed to understand the factors that influenced fencing of remnant vegetation on farms. This exploratory study was used to test the application of BNs to social research prior to a larger study of the drivers of vegetation change across three Natural Resource Management (NRM) regions in northern Victoria (see www.LandscapeLogic.org.au).

Australia's 56 NRM regions are required to report to the federal government on the environmental impact of their management decisions, and to date, this reporting has typically taken the form of output reporting, describing the nature and amount of investment made and the resulting on-ground activities. The policy of outcome reporting means that regions are seeking ways to improve their understanding of causal relationships between intervention and environmental condition and collect that captures that change.

Bayesian Networks (BNs) were selected for this study as they are capable of integrating quantitative data and expert knowledge from different sources to map causal pathways between management interventions and likely environmental response. While BNs are being increasingly used to model the biophysical, social and economic impacts of natural resource management strategies, they are not yet widely used to explore the influence of social factors on the adoption of conservation practice by rural landholders.

It was found the use of BNs increased the depth to which social researchers could interpret their data, improved their ability to communicate the implications of the study to their peers and stakeholders, and provided a means to articulate their understanding of casual relationships in a form that could easily be transferred to and used by managers.