

### **Ecological studies on shrub-steppe of the western Riverina, New South Wales<sup>1</sup>**

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This thesis reports a two-phase study of the shrub-steppe vegetation in the western Riverina of N.S.W. Initially the work was directed towards a description of these shrub communities in order to provide a reference framework for further studies and to elucidate aspects of vegetation structure. Another aspect of the work described is to examine the suitability of then current numerical methods.

Principal components analysis was used to relate data from the survey to soil variables and other environmental data. Various site and species-oriented data transformations were used and compared.

Two shrub species (*Atriplex vesicaria* and *Kochia pyramidata*) were studied in detail. An observational and experimental approach was used in a causal study of their ecology.

It was concluded that the multivariate statistical methods then currently in use for describing the vegetation were of limited utility and that ecologists will need to realistically examine the basic nature of vegetation as well as consider the epistemological demands for its study. In relation to the broad study of the ecology of two taxonomically and ecologically related species it was concluded that numerous factors interact in different ways throughout the life cycle to determine their distribution and abundance.

### **Risk, uncertainty and pastoralists' decisions<sup>1</sup>**

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A survey was made in the Broken Hill-Tibooburra area situated in the western division of New South Wales. Its purpose was to explore how graziers in the pastoral zone make current management decisions on their properties when faced with uncertainty. The pastoral zone was chosen because of the extreme variability and high risk associated with the environment.

The thesis deals with the several elements that influence decision making under non-certainty. Hypotheses are set up to deal with five subjects; a) assessment of subjective probabilities, b) studies the usefulness of a family of density functions (the Pearson curves) for describing the subjective probability distributions, c) grafted polynomials for algebraic specification of utility functions, d) testing for the conservative effect and the gambler's paradox and, e) the illustrative decision problem which focusses attention on the important individual components of the problem — particularly subjective probabilities and utilities.

The problem studied emphasises the importance of considering all the relevant elements of decision problem under non-certainty. The results reinforce the view that most wool producers are not indifferent to risk. If they are averse to risk and they attempt to maximise utility their allocation of resources will be suboptimal relative to decisions based on the expected monetary value criterion.

Comparisons were made between optimal stocking rates for three criteria — expected utility, expected monetary value based on equal (Laplace) probabilities for all events. The expected utility criterion must be judged as the most appropriate because it accounts for the personal degrees of preference and belief of decision makers.

<sup>1</sup>Not the author's summary. The reader is referred to the original work for a more complete resume.