A DECISION-THEORETIC APPROACH TO THE PLANNING OF AGRICULTURAL EXTENSION

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ABSTRACT

The extension agency, faced with the need to make more effective use of its resources, requires information about the value of the alternative extension messages which it expects will assist farmers to increase net income. It is hypothesised that Bernoullian decision theory is applicable to the extension agency's problem by helping it to assess the expected value of the increases in aggregate farm incomes following extension.

An extension message is seen as assisting farmers to make decisions and thereby increasing expected income. Where the extension information is aimed at helping the farmer estimate the occurrence of the uncertain events in a decision problem, Bayes' theorem provides the basis for a method of obtaining the value of the information. An extension message can also assist by helping to analyse the decision problem or by providing information about some new or innovative course of action for solving the problem.

The difficulty encountered by most published methods for evaluating agricultural extension is that of determining the proportion of the change in farm income due to extension and that due to other factors which are also affecting farm income. The method outlined in this thesis relies on a preposterior estimate of the value of an extension message which largely overcomes the problem of estimating the without-advice situation.

A start was made on testing the proposed method by obtaining information from several dairy farmers about specific decision problems, the alternative courses of action and the other details that would enable a model of the decision problems to be synthesised. Because of the difficulty of obtaining that information, and of developing an adequate model of a problem, the attempted application was reduced to one farmer and the particular problem of summer-feeding of the herd.

Summer rainfall, pasture growth, milkfat output and milkfat price were the sources of uncertainty which were incorporated into the decision model. The analysis indicated only limited potential for additional information to assist the farmer with the decision problem. The research provided some support for the hypothesis since it was found to be possible to simulate a farmer's decision problem under uncertainty and to obtain a pre-posterior estimate of the farmer's expected income without advice.

PREFACE

An extension agency, such as the Advisory Services Division of the Ministry of Agriculture and Fisheries, is faced with decisions of how to allocate its scarce resources in order to assist its clients to achieve their objectives. To assist with this problem the Ministry of Agriculture and Fisheries established a research fellowship in co-operation with Massey University. Part of the research by the first fellow, Mr J.D. Squire, was to describe a model for planning agricultural extension.

The research presented in this thesis was undertaken during the author's tenure of the fellowship and it is an attempt to tackle one of the first steps of the planning process; the question of how to evaluate the alternative extension messages to which the agency can allocate its resources?

The first chapter introduces the problem in the context of the process of agricultural extension, defines the basic research hypothesis and the goals of the extension agency. In chapter two there is a brief discussion of the ways in which extension can affect its clients' decisions and a review of some of the methods which have been proposed for the evaluation of agricultural extension. In chapter three the theoretical basis of the proposed method is outlined and chapter four reports on an attempt to apply the method in the context of a dairy farmer's decision problem of how to farm with the possibility of a dry summer. The final chapter includes the summary, conclusions from the research and some discussion of the problems which have arisen and their possible solutions.

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