

## **The development of a prototype expert system for agricultural extension**

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### **Background**

Computer programs designed to assist in the decision making process are known as "expert systems". Such programs have proved very useful in other scientific fields, however few efforts have tried to apply this technology to the problems of information transfer in agriculture. Expert systems consist of two distinct components: a knowledge base of facts and rules, and a mechanism or control structure which allows that knowledge to be applied to the solution of a particular problem. A key factor in the success of any expert system is the quality and quantity of knowledge provided by experts.

The New South Wales Department of Agriculture is developing an expert system for advisory officers, based on lucerne. It is known as LATIS - Lucerne Agronomy and Technology Information System. Lucerne is the most widely grown perennial pasture legume in New South Wales and many farmer enquiries received by district agronomists relate to its agronomy, particularly the establishment, management and persistence of the crop. While there is a large amount of technical information that advisors can use, much of it is inaccessible, outdated or fragmented into numerous published and unpublished sources. An information storage, retrieval and updating system combined with the ability to interrogate data bases would overcome many of these problems. However, no attempt has been made to co-ordinate and interpret this data and present it in a form that can be directly related to farmers by our advisory officers.

### **Design of LATIS**

LATIS will be designed for interactive use, primarily by advisory personnel using desktop microcomputers. In its simplest form it will provide answers to questions most often asked by farmers. At a second level of operation, specific problems will be solved in an interactive decision making process using details from individual farmers. Further levels will contain data bases of experimental results, relevant lucerne references, economic analyses, parametric budgets and irrigation data. Where possible the development of LATIS will use existing software for both the expert system and the data bases.

The general program outline will provide access to a range of modules or subroutines including:

Agronomy, Management, Waterscheduling, Variety Selection, Diseases, Nutrition, Insects and Insecticides, Weeds and Herbicides, Seed Production and Economic Analyses.

### **Discussion**

The provision of up-to-date technical information and its interpretation into management outcomes will enable producers to be better informed when making decisions. The use of electronic transfer of technology will provide a decision support system for agricultural advisors. The successful development of LATIS will also provide a mechanism for the dissemination of information between researchers, advisors and producers.

Information technology is a developing scientific discipline and as such little work has been done in Australia. Various information transfer packages have been developed, such as Teletext and Videotext for farmer use, with varying success. The advent of an expert system approach may in the future allow the use of information technology in problem solving for agriculture.