

Farmer participation in the development and implementation of a new technology: Introduction of lucerne (*Medicago sativa L.*), a perennial legume, into South-West Western Australia.

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ABSTRACT

Lucerne is experiencing a resurgence in popularity in south-west Western Australia since its demise due to insect attack in the 1970s. With new insect resistant varieties lucerne is once again becoming a viable pasture option for farmers. There is however, a slow rate of adoption of lucerne for a number of social and economic factors. The main limitations to the adoption of lucerne by farmers are past negative experience, farm systems dominated by annual pastures, changing wool and wheat commodity prices and perceived establishment and management difficulties. To overcome these socio-economic limitations a Model of Lucerne Adoption was developed in which the target group for the technology, the farmer, took an interactive role in the implementation of a research and extension program.

KEYWORDS

Lucerne (*Medicago sativa L.*), farmer participation, research, extension

INTRODUCTION

The south-west of Western Australia has a dryland salinity problem associated with rising watertables. Presently, 1.8 million hectares of agricultural land is affected with estimates for the area to increase to 6 million hectares within the next 15 years (Anon, 1996). Dryland lucerne (*Medicago sativa L.*), a deep rooted perennial legume pasture species, has the potential to economically improve farm sustainability by decreasing ground watertables. Farmers however, for a number of social and economic reasons, have been slow to adopt lucerne with area established since 1980 remaining at less than 10 thousand hectares (ABS, 1994).

To maximise the area and rate at which lucerne is established the Model of Lucerne Adoption (MLA) was developed from modifications to the Farming Systems Research and Extension model (Jiggins, 1993). This paper will discuss how the Model of Lucerne Adoption uses farmer participation to maximise the efficacy of adoption of lucerne in Western Australia.

Economic and Social Factors Affecting Lucerne Adoption

The slow uptake of lucerne in Western Australian farm systems can be attributed to four factors

- Insects
- Dominance of annual pastures
- Establishment and management difficulties
- Commodity prices

Area of lucerne in Western Australia was reduced by 85% between 1970 and 1980 due to attack by the Spotted Alfalfa Aphid (*Therioaphis trifolii* (Monell) *maculata*) and the Blue Green Aphid (*Acyrtosiphon kondoi* Shinji). Variety improvement research programs have developed new cultivars with Spotted Alfalfa Aphid and Blue Green Aphid resistance. However, the 1990's farmer is not confident in new varieties and consequently, not prepared to re-establish lucerne pastures.

Annual legume pasture species are the dominant component of the ley farming system because of desirable characteristics such as tolerance to heavy continuous grazing, hard seededness and contribution to soil nitrogen (Gladstone, 1975). Whilst lucerne can potentially equal the benefits of an annual legume, management of annual and perennial species is very different. Schroder *et al* (1993) conducted a survey in North Central Victoria and found that poor adoption of lucerne was due to establishment difficulties and the need for rotational grazing of the lucerne. This observation was supported by Hill (1996) who attributed

the major constraint for adoption of lucerne was due to the dominance of annual pasture management practices and an unwillingness change. Both Schroder and Hill suggested that most perceived establishment and management difficulties were problems that could be overcome by a better program of extension.

The final factor that has contributed to poor adoption of lucerne has been the decrease in wool and an increase in wheat commodity prices over the last five years (ABARE, 1996). Changing market trends have forced many farm businesses to shift allocation of land from sheep to crop enterprises. Consequently, incentive to invest in pasture improvement in the present economic climate remains low.

Model of Lucerne Adoption

In light of social experience and economic trends the Model of Lucerne Adoption (MLA) was developed. The model encourages exchange of ideas and a pro-active approach to implementation of lucerne research and extension activities. The hypothesis tested by the model is that if people who the technology is aimed at take ownership through decision making, then the rate and efficacy of technology adoption will increase.

The MLA is structured on the Farming Systems Research and Extension Model (FSR/E) where the farmer is conceptualised as a system manager and the extension agent as a diagnostic partner and promoter of new technologies and practices among members of like farming systems (Jiggins, 1993). The MLA consists of a research institute and a funding body who support an on ground lucerne research and technology developer (LRTD). The role of the LRTD is to facilitate a committee of farmers who represent a larger group of farmers who will potentially adopt lucerne. The LRTD, the committee and the wider mass of potential adopters form the Great Southern Lucerne Growers Group (GSLGG). There are flows of communication to and from all levels of the model with ideas becoming more concentrated as the flow of information moves towards the LRTD (Figure 1).

The research and extension program is regularly revised after discussions between committee members and lucerne growers. The LRTD together with other agronomists and extension specialists facilitate communication at each level and work with the committee to formalise a program which best meets the interests of the farmer. Using this approach one of the major weaknesses of the FSR/E model is addressed, that is it fails to be truly interactive, with the research body remaining the focus of idea creation and expansion.

Implementation of a Research and Extension Program

Research

Involvement of the GSLGG in the process of experimentation strengthens ownership, applicability and credibility of results for the farmers who observe the experiments. Farmers participate at all stages from the development of experiments, to their implementation and monitoring often loaning machinery for use in establishment and management of sites.

Extension

If you tell me, I will listen.

If you show me, I will see.

If you let me experience, I will learn.

Lao-Tse, 430 BC

To tell, show and experience are the fundamental components of adult learning. The MLA uses the 'tell and show' components in extension with the aim of maximising the dissemination of information so that the

farmer is facilitated to experience and therefore, learn. Farmer-Farmer interaction is strongly encouraged because it allows communication to occur between people who have a common empathy for farming life. Sharing 'real life' experiences leads to credibility and trust of information that is shared. The three tools of extension used in the MLA are newsletters, field days / forums and the media (radio and print).

Measure of Success

Seed Sales

Projected estimates for 1997 seed sales is 72 tonnes. This is a four fold increase on the quantity of seed sold in 1995 (Figure 2). If an assumption is made that the lucerne is sown at a rate of 4 kg/ha then the total area of lucerne that will be established at the end of the 1997 season will be approximately 34 thousand hectares. This represents an 88% increase in area since 1994. Hill (1996) estimated that 9.32 million hectares of south-west Western Australia is potentially suitable for lucerne however, a project aim of 100 thousand hectares has identified as feasible. At the current rate of establishment this aim would be achieved in the year 2003.

Great Southern Lucerne Growers Group Membership

The GSLGG was formed in September 1995 and has since attracted 100 subscribing members. Of this group 50% have established lucerne since becoming members.

Discussion

Farmers who decide to grow lucerne will do so on knowledge collected from other environments and adapted to Western Australia. It is expected that initially, the rate of adoption of lucerne will be slow and only by those farmers who are considered to be innovators. It is not expected that farmers who tend to be risk adverse will sow lucerne until it is proven in the Western Australia environment.

The major problem with the Model of Lucerne Adoption is that it has difficulty in co-coordinating outside interests, particularly that of commercial business. There exists the temptation for entrepreneurs, who have minimal experience with lucerne agronomy to incorrectly

advise their clients. Given the fledgling nature of the lucerne industry in Western Australia incorrect advice that leads to economic loss through establishment or management failure must be avoided.

The next developmental stage of this model is to bring together all external parties interested in lucerne and devise an action plan that will benefit all participants, most of all the farmer.

CONCLUSION

If social and economic factors hindering establishment of lucerne can be identified and overcome through the successful implementation of the Model of Lucerne Adoption in Western Australia then it can be expected that the aim of establishing 100 thousand hectares of lucerne by the year 2003 will be achieved.

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Figure 1
Model of Lucerne Adoption in Western Australia Farm Systems.

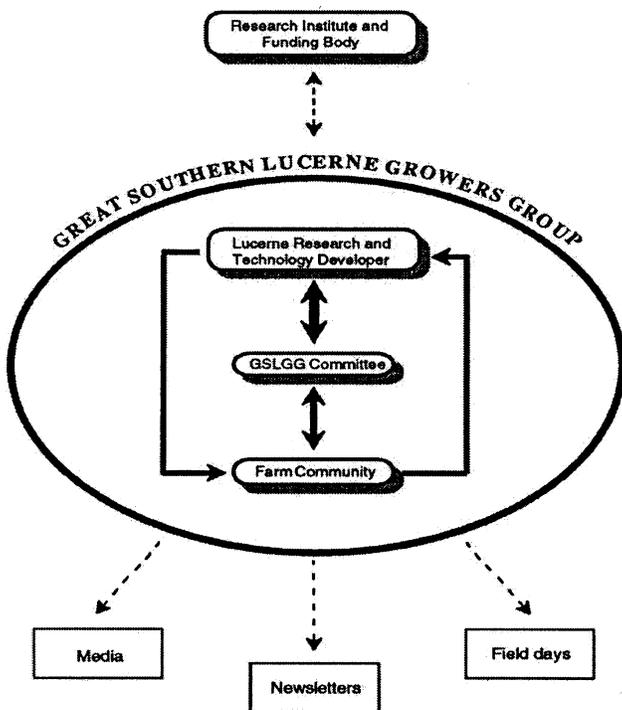


Figure 2
Seed sales of lucerne (*Medicago sativa* L.) in Western Australia in 1995 and 1996 and projected seed sales for 1997.

