Stimulating favourable attitudes to legume growing

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Summary Research has been undertaken for the GRDC on farmers' attitudes to the growing of grain legumes. Only a limited data set from the 96 responding farmers in the North West of NSW and Southern Queensland is analysed for this report. Results show that few of the farmers sampled are not growing grain legumes. Those not growing give as their reason the lack of suitable conditions. Those growing can be divided into continuing grain legume growers and those who have (temporarily?) ceased. More data are in the process of being collected and further results and analysis will be presented at the conference.

Introduction

This paper reports the preliminary results of on-going research which is investigating farmers' attitudes to the growing of grain legumes. The Grain Research and Development Corporation has funded a Masters Student for two years to carry out the research. The underlying purpose of the research is to assist extension agencies in the passing on of information which is appropriate to their clients, the farmers. At this time (January 1993) a full report is not possible. This paper will outline the theoretical background to the variables chosen for investigation, the methodology employed so far and preliminary results obtained on part of the sample investigated to date. More detailed results will be available at the conference.

Rogers (15) covers all aspects of diffusion from both a theoretical and research perspective. Using the technique of meta-analysis, the synthesis of empirical research results into more general conclusions at a theoretical level, he is able to provide generalisations concerning characteristics of innovators and early adopters from a socio-economic, psychological and communication perspective, and about the attributes of innovations that affect their rate of adoption.

Rogers places an emphasis on the information and communication factors surrounding the adoption of innovation, the assumption being that there will be a trickle down effect from innovators and early adopters to other members of the society. In contrast, Brown (4) highlights other aspects, such as the spatial patterning of the spread of an innovation, and the importance of infrastructure as providing necessary and sufficient circumstances to allow adoption. Brown points to the supply side of diffusion. both in terms of differential perceptions of the meaning of an innovation and in the sense that not all individuals have equal access to new techniques, through lack of economic or other resources.

Ryan & Gross (16) found different communication channels to be important at different stages of the process of the adoption of hybrid seed corn, while Thomas *et al. (17)* found different sources of information were important for different status groups in forming beliefs and adoption of integrated pest management practices among cotton growers. While both these practices are not exactly comparable with grain legume growing they do point to the fact that information sources and access to them is an important factor in innovation adoption.

This research has thus attempted to find out access to and use of various communication channels for different types of farmers, both as sources of information and as sources of influence. As well as media sources there is need to take into account interpersonal influence. The classic study by Katz and Lazarsfeld (1 I) showed the importance of opinion leaders in mediating the effects of mass media messages and also demonstrated a methodology of self designation of influential individuals, obviating the need to follow up other -designated influentials outside the sample.

There is a voluminous research literature on the socio-economic, personality and communication attributes of people who have adopted an innovation earlier than the majority. Early adopters have more education, more literacy, have higher social status, operate larger size farms, more specialised farms, have a more favourable attitude to credit and a more commercial orientation to farming. Evidence on the

influence of age is ambiguous. In terms of communication, these early adopters are more cosmopolite, have more social participation, more change agent contact, greater exposure to mass media channels and interpersonal channels and a higher degree of opinion leadership. Thus early adopters are the more wealthy, have more access, and more relationships both within and outside the community. There is an interplay between the innovation adoption process, in terms of access and openness to information, and individual characteristics. Finlay (7) found the best predictors of farm practice adoption to be gross farm income, formal participation, education and number of productive man work units.

There is much less research on innovation characteristics or perception of innovations as factors in the adoption process. Rogers (16) identifies five characteristics of innovations and conducts a meta-analysis to say something about their order of importance. The characteristics he identifies are relative advantage, compatibility, complexity, trialibility, and observability. Some (e.g. Griliches (9)) see relative advantage, in terms of economic gain, as the prime attribute in affecting adoption. However, this has been disputed by Brandner & Kearl (2), Brandner & Strauss (3) and Havens & Rogers (10).

Havens & Rogers assert that once an innovation has fulfilled the minimum consideration of profitability, it is largely the amount of interaction between individuals who have or have not adopted which determines the rate of adoption for individual farmers, and that it is not objective profitability but the individual's perception of profitability. Brandner and Kearl found congruence (Rogers compatibility) to be stronger than age, education, income, and economic importance of the innovation in determining whether hybrid sorghum would be planted. The Ecologically Sustainable Development Group Agricultural Report 1991 (6) points out that the fact farm families are willing to accept relatively low and variable levels of cash income compared with other sectors of industry suggests that the benefits of farming are not all economic.

The growing of grain legumes as a rotational crop with wheat is being advocated as a type of conservationist measure. As Dumsday *et al. (5)* point out, the majority of soils in Australia are shallow, infertile and fragile - new soil is created extremely slowly so Australian soils are essentially a fixed stock of a resource. Thus soil conservation has become an important issue. Legumes can fix nitrogen back into the soil and thus reduce costs of fertiliser on the next crop. They can also be a cash crop in their own right and would thus seem to have both conservation and economic attributes.

A debate has arisen in which one side questions the validity of innovation diffusion perspectives in dealing with the adoption of conservation technologies. Pampel &Van Es (13) split agricultural conservation technologies into unprofitable (conservation) technologies and profitable (commercial) ones and found that there were different predictors for adoption for these two types. The cost of most conservation technologies is seen as exceeding benefits on a short time basis. It is argued this leads the farmer to reject them. However, Nowak (14) argues that there are institutional inefficiencies in the development and delivery of relevant information and assistance which are major reasons for the non adoption of conservation technologies.

Farmers' general attitudes to ecology as opposed to technology would appear likely to have an influence on the value they place on conservation techniques in farming and on their perception of the attributes of particular innovations. Beus & Dunlap (1) developed paradigms of competing agricultural orientations, altemative versus conventional, and designed and tested a scale to measure adherence to one or other of these paradigms. A shortened and modified version of this scale to assess farmers' attitudes to agriculture, to see if those with more 'green' attitudes to farming are more favourably disposed towards grain legume growing and whether perceptions of the benefits of legume growing are related to general attitudes to agriculture.

Methods

A pilot study was carried out in August, 1992 at the big agricultural equipment exhibition at Gunnedah (AGQUIP). An open ended interview schedule was employed, firstly to check if questions were appropriate and secondly to elicit answers in farmers' own words. A battery of thirteen attitude statements were also tested for comprehension and clarity of meaning. Following this pilot a more structured

questionnaire was developed utilising answers provided by farmers in the pilot. Some modifications were also made to the wording of the attitude statements in line with farmers' comments. The questionnaire was designed to be self administered.

A total of 150 questionnaires were mailed to farmers in the North West of NSW and Southern Queensland. One hundred of these were sent by the Grain Legume Association of Australia to their members. The remaining fifty were sent to readers of Australian Grain magazine. These readers had previously responded to an insert in the magazine asking for volunteers to take part in a farmer survey. Each survey was sent with an accompanying letter explaining the purpose of the survey and a return stamped addressed envelope.

The questionnaire included questions on perceptions of grain legume growing, sources of information for legumes and for farming information in general, reading of farming magazines, listening and viewing of farming programs on radio and television, farming organisation membership and level of activity. frequency and type of contact with Department of Agriculture agronomists. It also asked farmers for their experiences with grain legume growing, their attitudes to conventional versus alternative agriculture and economic orientations to farming. plus a range of background variables, including farm size, age, educational level etc.

Of the 150 questionnaires sent out a total of 96 usable ones have been returned. Data have been entered onto a data base, StatView, to enable statistical analyses to be carried out. All results quoted below are significant for two-tailed tests unless otherwise specified.

Results and discussion

Analysis is primarily in terms of 'grower status'. Of the 96 farmers included in this preliminary analysis a total of 5% had never grown grain legumes. One of these was growing pasture legumes, the remainder did not consider their land or climatic conditions suitable. There were no growers who were attempting a crop for the first time. The next biggest group was farmers who had grown legumes in the past but were not growing a crop in November 1992, 28%. The main reason given for this was unfavourable conditions. Very few of these farmers indicated that they would never plant grain legumes again. The majority thus appeared to have temporarily ceased growing. Finally. 67% of farmers had grown in the past and had continued to grow.

A series of correlations were run between grower status, that is continuing growers, growers who had ceased, probably temporarily, and non growers, and a selection of variables. Thus a total of 36 variables were chosen, on the basis of the literature reviewed above. Some of these correlations produced significant results, but there were no relationships between grower status and farm size, education level, age or positive versus negative income. Neither did there appear to be any relationship between the number of changes made on the farm in the last three years and grower status.

Similarly, few attitudes were significantly related to grower status. However, as predicted continuing growers were more likely to disagree that farmers should use mostly synthetic fertilisers and pesticides to maintain production levels rather than natural methods like crop rotation or biological pest control, ($R=-0.23$, $p=0.02$,). Continuing growers were more likely to disagree that good farming depends mainly on personal experience and knowledge of the land ($R=-0.27$, $p=0.01$). While the definition of good farming was not specified this attitude statement was designed to assess the emphasis farmers placed on personal knowledge and skills as opposed to experts, specialists and science. It is possible that high agreement with this latter statement might be related to legume growers adopting a more 'scientific' approach to farming. Continuing growers were also less likely to agree that it is better to make a smaller profit than try something where there is a chance of financial loss.

With regard to perceptions of legume growing, grower status was not related to seeing their potential to add nitrogen to the soil as their most important advantage. Indeed, this was the most important advantage for the sample as a whole (mean=2.I I, SD= 1.31). In contrast, seeing the advantage of grain legumes as being a good alternative cash crop was much lower (Mean= 3.92, SD 1.82). There was a

significant relationship between grower status and seeing legumes as more difficult to grow (R=-0.36, p=0.01), that is, continuing growers saw grain legumes as easier to grow, while non-growers saw them as more difficult. Grower status did not affect seeing compatibility of grain legumes with other crops in terms of changes that would have to made in planting, maintenance, harvesting, marketing or equipment. This would appear to indicate possibly that geographic area in terms of soils and climate may be more important factors than experience. Further analysis is planned to look at this based on postal code data.

There was a positive relationship between grower status and living in an area where most of the farmers were legume growers (R=0.26, p=0.01), and as might be expected there was a strong relationship between grower status and having talked often about grain legumes to other farmers in the area (R=0.35, p=0.01). However grower status did not relate to perceived importance of keeping up with what is new in farming. Keeping up with what is new in farming is important for most farmers (Mean=1.38,SD=.38 and is strongly related to giving advice about farming (R=0.29, p=0.01), but not to asking other farmers for advice (R=0.14, N.S.). While grower status was not related to asking other farmers for advice, there was a negative relationship between being a continuing grower and asking for advice (R=0.19, p=0.10). Results also show that for the farmer group as a whole giving and receiving advice is strongly related (R=0.24 p=0.02) . Thus farmers who place a very high value on keeping up with new techniques would appear also to be those involved in the group processes of advice giving but tend to seek their own information outside.

While grower status is not related to number of farming magazines read it is related to amount of contact with Department of Agriculture district agronomists (R=0.25, p=0.02) and also related to the membership of the number of farming organisations (R=-0.51, p=0.01). This implies that continuing grain legumes growers may more actively seek out advice from experts on a one to one basis are also members of a larger number of farmer organisations. However, analysis to date has only looked at membership of number of organisations, not the degree of activity. Further analysis is required to see if there are relations between grower status, organisational activity and group membership.

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