

"The shock of the new" constraints on farmer use of new technology

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Agriculture is just coming out of another period of depression. One of the many that have tested the hard working Australian farmer over the past 199 years. We can now look forward with enthusiasm to the forthcoming "boom-". It will be a period of further rationalisation and, as in the past, the adoption of new technology will play a very important part in maintaining and improving terms of trade for the farmer. It is the adoption of new technology that has kept Australian agriculture viable. In real terms commodity prices have continued to decline and costs have risen over the past 100 years. Technology has helped farmers to remain profitable. This must be continued so that we remain competitive on world markets without being subsidised. The list of innovations in agriculture is endless but includes:

- Rotations which include grain legumes
- Control of internal and external parasites
- Superphosphate and sub clover
- Improved varieties
- Minimum tillage and direct drilling
- Huge tractors, headers and tillage equipment Pest and weed control

Technology is defined as the application of science. This paper deals with the constraints on farmer use of new technology but also examines the successful delivery of "the new".

Australian farmers will readily adopt new technology providing the timing and the technology is right. During the wool boom period of the 50's profits were ploughed back into increasing production. This included the widespread use of superphosphate, pasture renovation and improved grazing management. In the 70's there was an increase in machinery size which increased the capacity of the labour component to produce. Conditions which favour adoption of new technology are:

Profitable markets Financial stability Relevant technology Good extension

The adoption of new technology should be on-going and is often essential when times are tough because many of these advances in agriculture have led to more efficient production. In the past seven years many sectors of our industry have been depressed, adoption has slowed down and that has frustrated workers in research and development as well as those who deliver technology to the "change agents". It is not surprising that this frustration is frequently discussed. What pressures presently exist to slow down the adoption of new technology?

1 Financial

The uncertainty of farm decision making brought about by the changed financial climate, especially interest rates.

A lack of working capital.

The effect of inflation on overhead costs.

Cost cutting pressure in agribusiness and institutions which has limited their resources to research and promote new products and systems.

Manufacturers under financial pressure have adopted a "sell and forget" attitude.

Adoption of new technology inevitably means taking one step backwards to take two steps forward. This cannot be funded when financial resources are limited.

2 Education

Many farmers have not managed to keep up with the rapid development of their industry. They are experts in many practical aspects of farming. They may have a great eye for wool quality, confirmation or animal health - the skills which only develop with a great deal of practical experience. Skills which are often envied by professionals in agribusiness. Many however, are lost when we start talking about kilograms of nitrogen, gross margins or critical weed densities. The business is now much more sophisticated so in addition to those excellent husbandry skills they are eager to learn. They have a thirst for good technical information, attend external courses and work in group development projects. They are often criticised by change agents for not showing sufficient interest in "the new". There are good reasons for this:

- Some farmers had insufficient education, not always their fault because they left school at a young age to come home and help on the family farm during periods of rural crisis.
- Extension programs often fail because those who deliver cannot speak the farmers language, they aim too high.
- Farmers live in isolation. They may be sole operators or geographically remote. They do not have the same opportunity as office dwellers to "bounce- ideas off each other.
- They often do not have time to assess and learn new technology. Recently, the pressures have been too great. They can only just keep up with what they are doing. The cost or availability of good labour is such that good managers find themselves doing menial tasks which should really be delegated.

3 Social

Farmers do recognise that they will have to adopt better management systems to survive but they have an inferiority complex about their lack of skill and ability to implement change. They may be afraid to admit that they lack education. They are embarrassed by the sophisticated approach taken by change agents. They are reluctant to ask questions in case it gives them away. They are suspicious of change agents who are unable to express themselves in simple terms.

Most people are generally comfortable with what they are doing and resent change. Change means more work, risk of failure or the possibility of being a "tall poppy". Even those who are successful may fail to receive recognition from their own peer group.

The emotional stigma associated with failure is real. In recent months many support services and seminars have been organised to help farmers deal with the financial crisis in the Victorian Mallee. To take advantage of these services would confirm what many already knew - that they should sell up. It can be likened to the patient who suspects he has cancer and will not visit the doctor, he may diagnose the worst!

4 Extension

Few manufacturers or institutions have adopted a positive approach to changing the direction of their extension services during the recent rural depression. They have had to rationalise investments in development, promotion and staffing. Too much time has been wasted on policy modification rather than on quality of service to the producer. Some problems include:

Poor communication between researchers, the change agent and the farmer.

Poor direction from higher management towards the adoption of relevant extension objectives. Too many front line change agents are trying to "re-invent the wheel" instead of accepting proven systems and

getting on with promoting them. This is particularly noticeable in the technology and systems associated with minimum tillage and direct drilling.

On the other hand some systems are being promoted ahead of their time. For example there is considerable emphasis on the marketing of rural software and computerized information and communications services. Only a very small segment of the industry is really ready for this.

A small band of change agents have to be congratulated. They are working at grass roots level and helping farmers deal with current challenges. Promoting, testing, modifying, re-testing and getting safe technology adopted by co-operating farmers. They provide the knowledge and the farmer modifies his husbandry accordingly - both are learning together. They actively visit progressive farmers offering good information. They gather good information and share it with others. These extension people often offer encouragement and recognition to these sole operators who seldom get a "pat on the back".

The new

There are some exciting challenges ahead. Technology and systems need to be put into place to meet these new demands. Priority areas will include:

- Animal nutrition and breeding
- Fertility management Financial management Information systems Land utilization
- Marketing and distribution
- Mechanization
- Pest and weed control
- Planting and harvesting practices
- Varietal selection

The new farmer

The -boom" period ahead will be characterised by some of the following changes:

Stable cost period as inflation wind-down continues world-wide and interest rates drop.

Existing and new products will be developed for marketing to the them Asian region.

Further rationalisation of farm size as inefficient and indebted producers leave various industries.

Year	Number of establishments
1966	252,162 (ABS)
1986	174,961 (ABS)
2000	110,000 (1)

Part-time farming will be an acceptable alternative to leasing or co-operative farming

Farmers will be more technically efficient and have a greater awareness and knowledge of key management success factors

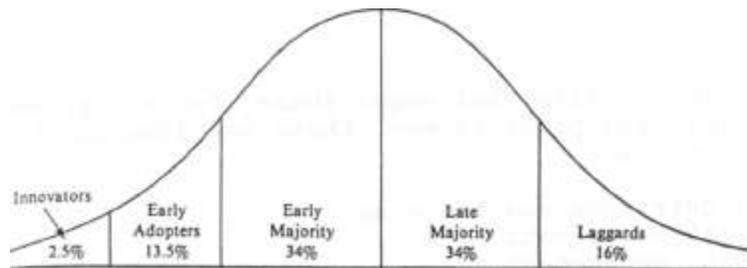
Farmers will be aware and skilled in the use of computer-based technology and information systems

They will be skilled in using off-farm resources, especially other people and their expertise

THE NEW EXTENSION SERVICE

Change agents in agriculture must understand how the diffusion process works. They will have to identify the appropriate technology and then target their effort accordingly.

Professor Rogers was the first to categorize adopters on a continuum of innovativeness, and he also concluded that distributions tend to closely approach normality:



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Professor Rogers describes early adopters, the most important target for "change agents", as follows:

Early adopters are a more integrated part of the local social system than are innovators. Whereas innovators are cosmopolites, early adopters are localites. This adopter category, more than any other, has the greatest degree on opinion leadership in most social systems. Potential adopters look to early adopters for advice and information about the innovation. The early adopter is considered by many as "the individual to check with" before using a new idea. This adopter category is generally sought by the change agent to be a local missionary for speeding the diffusion process. Because early adopters are not too far ahead of the average individual in innovativeness, they serve as a role model for many other members of the social system. the early adopter is respected by his or her peers, and is the embodiment of successful and discrete use of new ideas. And the early adopter knows that to continue to earn this esteem of colleagues and to maintain a central position in the communication structure of the system, he or she must make judicious innovation decisions. So the role of the early adopter is to decrease uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near-peers by means of interpersonal networks. (2)

In agriculture early adopters are often referred to as parish leaders or the individual to check with. He can be found by asking other farmers, "who do you turn to for information on...?" Sometimes if you are speaking to the early adopter himself, you can check his status by asking "do many people contact you for advice?" If those in extension can accurately identify the early adopter, and actively help him to achieve success, then new technology will be adopted in the way Professor Rogers describes. It will be a major step forward in speeding up the diffusion process. This approach will also remove a frustration that many change agents have when they deal with the wrong farmers. They complain that the farmers are uneducated and lacking in skill. In fact the extension agent may unknowingly be communicating with the laggards or late majority rather than the early adopters.

Successful extension

ICI Crop production Groups

In 1983, I was invited by Mr Ian Crook, Senior Product Manager with ICI to help set up and manage seven Crop Production Groups in Victoria and Southern NSW. The main reason for setting up the groups was to gather "real" paddock information on the costs associated with crop establishment and to identify husbandry problems which were limiting profitability. Gross margins were selected as the tool for financial monitoring. At the start of the project only 3 out of 63 farmers understood gross margins, only one actually used them as a basic financial planning tool.

Seven farmer leaders were selected and in turn they selected their group of seven to ten peers. The groups met in each others homes about every eight weeks and quickly a spirit of trust and confidentiality developed. Factors limiting crop yield were identified. A development program was initiated with the ICI Territory Manager and the local DARA agronomist providing the back-up support. Outside speakers were

invited to introduce additional information to the groups. In the early stages a lot of time was spent looking at and monitoring each others crops. This led to an early recognition of the components of high yielding crops. Financial monitoring also confirmed that a small increase in yield had a significant effect on improving gross margins. The learning process within the groups has been rapid and most of the good information has been provided from within.

This list of topics indicates how the level of management improved over a three year period:

- Gross margin analysis
- Weed identification
- Critical weed densities
- Herbicides and their use
- Boomspraying technology
- Crop monitoring
- Implementation of minimum tillage
- Cropping models Minimising overhead costs
- Rotation selection to improve fertility and minimise disease Gross margins for enterprise and rotation selection
- Long term weed and disease control strategies
- Plant nutrition and the role of nitrogen

Members now clearly understand that yield achievement will significantly influence gross margin. Husbandry skills have been improved by adopting better rotations, minimum tillage, timely seeding and early weed control. A new attitude has been developed to allow a more liberal approach to investments in seed, fertilizer and crop care products to improve yield. Equally a harsh attitude has been developed to minimise overhead costs.

The Schroder System of pasture renovation

In 1983, Peter Schroder, District Extension Officer (Pastures) DARA, Hamilton, conducted a farmer survey in Western Victoria. Research data had indicated that if farmers replaced Mt Barker sub clover with Trikkala they could expect to carry an extra 2 DSE/ha, due mainly to the better winter growth of Trikkala. He was concerned that farmers had not been successful in introducing Trikkala into their pastures. His survey confirmed that they hadn't. The main reason for this was considered to be low seeding rates. An average of 1.9 kg/ha was used and since then a sowing rate of 10 kg/ha has been recommended.

Peter developed a program with four broad guide lines.

1 Wait until there is a complex germination of sub clover

2 Kill it

3 Direct drill plenty of Trikkala

4 Manage to allow maximum Trikkala seed set in the first year

After two years of experimental plots and demonstration areas he set up 14 demonstrations of sowing pastures by direct drilling. The paddocks ranged from 4 - 16 ha. The farmers provided the spray, seed, fertilizer and their time. A CSN Coil Tine Drill fitted with Baker Points was loaned by the local dealer. Peter provided the skill and encouragement. Results have been generally very satisfactory.

This approach to extension is exciting because it is relevant to industry needs, it has been kept simple and he believes in the system! In Peter's own words:

"I strongly believe that sowing by direct drilling is the most successful method of establishing pastures - more seedlings more often, better seedling growth, fewer weeds. Direct Drilling is not an alternative method, it is the best method".

Farmfacts Farm Business Project

In 1986, farmer colleague Tim Hutchings from Yerong Creek and I set up Farmfacts Farm Business Project. A series of management groups for farmers with the same group-bought computer hardware and software. The main object of Farmfacts is to encourage group members to use computers competently in farm management.

A total of 52 farmers have been formed into eight groups and it took more than a year to assemble groups, sell the idea to several sponsors and decide on suitable hardware and software.

There are plenty of computers out there on farms, but many of them are gathering dust because farmers are afraid of this new technology and they have not been getting easily accessible help.

Farmfacts members will benefit from working with the same hardware and software and working in groups over a two year period. They will be computer literate at the end of this period and will then make their own decisions about rural software or computerized information and communications services

Summary

- 1 Australian agriculture needs "the new" to survive
- 2 Change agents must deliver relevant technology
- 3 Early adopters are the prime target for good extension
- 4 Good progress can be made by setting up formal farmer groups
- 5 Farmers who adopt new technology should be given recognition and encouragement

References

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