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& DEVELOPMENT CORPORATION

Agricultural Extension, Learning and Change

A report for the Rural Industries Research and Development Corporation

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Foreword

A number of service providers and rural research and development corporations identified possible synergies of working together and the benefits for them and their customers if they combine resources with the purpose of improving the efficiency and effectiveness of extension and learning opportunities in rural industries.

A priority for the group was to conduct a comprehensive review of relevant research and development being undertaken in Australia and overseas on new methods for agricultural extension, continuous business improvement in other relevant industries, facilitation of change processes and farmer learning

This publication summarises the relevant recent and current research and development (R&D) on agricultural extension, learning and change. The paper was developed primarily through a review of publicly available literature published since 1997 on the topics of agricultural extension, facilitation of change processes and farmer learning.

This project was funded by six R&D Corporations — Rural Industries Research and Development Corporation, Meat and Livestock Australia, Grains Research and Development Corporation, Woolmark (now Australian Wool Innovation), Horticulture Research and Development Corporation, (now Horticulture Australia Limited) and Dairy Research and Development Corporation

This report, an addition to RIRDC's diverse range of over 900 research publications, forms part of our Human Capital and Communications R&D program, which aims to enhance human capital and facilitate innovation in rural industries and communities

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Simon Hearn
Managing Director
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Executive Summary

This briefing paper summarises the relevant recent and current research and development (R&D) on agricultural extension, learning and change. The paper was developed primarily through a review of publicly available literature published since 1997 on the topics of agricultural extension, facilitation of change processes and farmer learning.

This paper reports on what research has been conducted in four key areas, as identified by the steering committee of the Joint Research and Development Corporation project:

1. Institutional change and organisational structures supporting learning and change
2. The professional development of farm advisers including their structural arrangement and careers
3. The facilitation of enhanced learning/change processes on farm
4. Better understanding of the barriers to participation in learning opportunities

For each of these areas, the topics of relevant research, and the major findings, are reported[1], and gaps and weaknesses in the research are identified. The main findings are summarised below.

For the purpose of this review, the term extension was used to include any advisory, consulting, technology transfer, research, training, marketing, industry development, learning, change, communication, education, attitude change, collection and dissemination of information, human resource development, facilitation, or self-development activities that are undertaken with the aim of bringing about positive change on farms and in agriculture.

1. Institutional change and organisational structures supporting learning and change

The current Australian institutional and organisational structures supporting learning and change processes include state and federal departments of agriculture and natural resource management; private extension providers; private agricultural businesses; vocational education and training providers; the national training authority; state training authorities; industry training advisory bodies; research and development corporations; Universities; farmer organisations; and other non-government organisations. These existing structures and institutions may have elements that foster learning and change processes (such as their links with industry), and elements that do not (such as the way they reward their staff). The relationships between each of these organisations (e.g., public and private; research and extension) will influence learning and change on-farm.

The main topics of recent research on institutional change and organisational structures were identified as:

- the provisioning of extension around the world and in Australia;
- policy for extension provision; and
- organisational factors affecting the delivery of extension.

[1] Further detail on innovative approaches identified in this literature review is reported in Appendix 1 (briefing paper 2).

This literature indicated extension structures are undergoing major change worldwide and in Australia. The international research provides a framework for evaluating the effectiveness, efficiency and accountability of service provision, and for identifying who is best to deliver what services and when. While there has been a major review of the changes to extension provision in Australia, there is a need to continue this work and identify the way in which relationships and structures are changing, recognising the interdependency of extension and research. From this, new opportunities for increasing the efficiency, effectiveness and accountability of extension will emerge. In addition, there is little evidence of the implementation of the research on ways in which extension organisations can improve their own effectiveness. This is an area requiring further research.

2. The professional development of farm advisers including their structural arrangement and careers

The Australian agricultural sector is supported by a wide and varied group of farm advisers, described here as extension practitioners. These include public sector extension officers (including Landcare, Bushcare, Waterwatch etc.) private sector consultants (on all aspects of farming, including farm management, personal relationships, finances, taxation, business development etc), agribusiness field officers, product sales advisers, stock agents, scientists and more. The professional development of these extension practitioners is linked to their ability to foster learning and change on farms and in agriculture. Their structural arrangements (such as length of contract and opportunities for professional development) and their career opportunities, influence the agricultural sector's ability to support on farm change.

An appraisal of the literature on agricultural extension indicated a paucity of research on extension practitioners. The review reports on a limited number of studies that examined the role of the extension practitioner, competencies, training of extension practitioners and the employment environment of extension practitioners.

Whilst there is an availability of extension practitioner training and development opportunities in Australia, there is a requirement to better appreciate who the practitioners are, their skills and competencies, professional environment, performance, and the specific expectations of clients and employers. In addition, there is no research on the structural arrangements of extension practitioners, and the impact this has on the provision of extension services. Such understanding can provide a firmer basis for the construction of development and training pathways and for improving the efficiency and effectiveness of agricultural extension.

3. The facilitation of enhanced learning/change processes on farm

Extension, as defined above, aims to bring about positive change on farms and in agriculture. This largely involves the use of processes to facilitate learning and change within the agricultural community. These processes, or 'extension methods', include groups, media, field days, education, advice, facilitation, lead farmers, focus farms, demonstrations, videos, publications and more. Extension also includes the process of planning research and extension, from understanding client needs, developing a plan, appointing staff and implementing and monitoring a program, through to evaluating impact.

There has been much research in Australia and overseas on the facilitation of learning and change in agriculture. These have examined:

- how learning occurs on farm;
- the extent to which learning/change processes are occurring on farm;
- how characteristics of farming and farmers influence change;
- the role of the learning content;
- processes for facilitating learning/change; and
- keys to the successful facilitation of learning.

This literature review identified that the research on processes for facilitating change on farm is largely limited to single evaluations of individual projects or programs. There is little comparative analysis of different approaches to facilitating change. There is little examination of the learning or change processes, of the quality of process delivery, or of the combinations of processes that are likely to be most effective under given circumstances. Despite an increase in evaluation of extension, there is still little publication of findings beyond the institutions for which they have been conducted. In addition there is little evidence of the research on these topics to date drawing on disciplines outside education and extension. For the research or extension practitioner it is difficult for them to determine what processes are most appropriate for their situation, and thus how they should design their extension effort to be more effective, and more efficient.

4. Better understanding of the barriers to participation in learning opportunities

Barriers to participation in learning or change opportunities may be factors related to an individual, their spouse, their family situation, and the characteristics of their farm, business, rural community or industry. They may also be related to the content, accessibility or delivery of the learning or change opportunities presented to the farmer.

The research on barriers to participation is limited in its depth and breadth, particularly in terms of understanding who is participating, why and what can be done to address barriers to participation. Little data has been collected on actual farmer participation in learning and change opportunities. Little is therefore known about potential untapped opportunities or problems with current provisioning. Further work is required to increase the awareness of the need to collect participation data. Reasons for and against participation in all forms of learning opportunities need to be further explored. Only in doing this can appropriate education products be delivered in an effective manner.

The contents of this paper, and the other three briefing papers[2], were circulated for feedback, and discussed at a workshop in Melbourne at the end of August 2000.

[2] Appendix 1 - briefing paper 2: Existing and potential innovative approaches to creating demand for learning and change. Appendix 2 - briefing paper 3: Opportunities for R&D to foster the development of human capacity in Australian agriculture Appendix 3 - briefing paper 4: Communication of developments in extension research and practice to Australian extension providers

1. Introduction

This briefing paper aims to summarise relevant recent and current research and development (R&D) on agricultural extension, learning and change. The paper was developed primarily through a review of publicly available literature published since 1997 on the topics of agricultural extension, facilitation of change processes and farmer learning. Additional information was obtained from seminal works before this period, and from suggestions of documents recommended through a broad consultation process with more than 60 potential investors, researchers, practitioners and customers of agricultural extension. The contents of this paper, and the other three briefing papers, were circulated for feedback, and discussed at a workshop in Melbourne at the end of August 2000.

This paper reports on the major literature in four key areas, as identified by the steering committee of the Joint Research and Development Corporation project:

1. Institutional change and organisational structures supporting learning and change
2. The professional development of farm advisers including their structural arrangement and careers
3. The facilitation of enhanced learning/change processes on farm
4. Better understanding of the barriers to participation in learning opportunities

The scope of each of these topics is described in the relevant sections of this report. From the outset of the project, the terms were interpreted in the broadest way possible. The term extension was used to include any advisory, consulting, technology transfer, research, training, marketing, industry development, learning, change, communication, education, attitude change, collection and dissemination of information, human resource development, facilitation, or self-development activities that are undertaken with the aim of bringing about positive change on farms and in agriculture.

The sections outlined in the key areas 1 to 4 are presented in the current document according to the nature and extent of the research on each topic. The type of research and the main findings are documented, followed by some conclusions about the quality and appropriateness of the research.

While much of the recent research on agricultural extension has been on the topic of participative research and extension, this work is not reported here due to a recent review undertaken by the Land and Water Resources Research and Development Corporation (LWRRDC) on this topic (Gleeson *et al.* 2000). In addition, there was little Australian literature on theoretical frameworks for extension published during the years under review, nor was this an area of examination for the contract. As such, the authors acknowledge that this literature review is neither extensive, nor exhaustive. However, we do believe that it captures the major works relevant to Australian agricultural extension.

2. Summary of relevant R&D on institutional and organisational structures supporting learning and change processes

The current Australian institutional and organisational structures supporting learning and change processes include state and federal departments of agriculture and natural resource management; private extension providers; private agricultural businesses; vocational education and training providers; the national training authority; state training authorities; industry training advisory bodies; research and development corporations; Universities; farmer organisations; and other non-government organisations. These existing structures and institutions may have elements that foster learning and change processes (such as their links with industry), and elements that do not (such as the way they reward their staff). The relationships between each of these organisations (e.g., public and private; research and extension) will influence learning and change on-farm.

Haug (1999) reviewed factors impacting on extension worldwide and noted that the study of extension institutions and their relationships is now a major focus for extension research. As such, there is a significant body of literature examining institutional and organisational structures supporting learning and change processes in agriculture. This section draws heavily on the dominant works of Carney (1998), who undertook a critical review the supply of agricultural services throughout the world; and in Australia, the work of Marsh and Pannell (1998, 1999 and 2000), which examined the changing nature of extension provision within Australia.

This paper describes the results of these and other studies using the following structure:

- the provisioning of extension around the world and in Australia (Carney 1998; Marsh and Pannell 1998, 1999 and 2000; Umali and Schwartz 1994);
- policy for extension provision (Carney 1998; Roling 1990; Alston and Pardey 1996); and
- organisational factors affecting the delivery of extension (Price 1999; Beer *et al* 1996; Van Crowder 1998; Keen and Stocklmayer 1999; Carney 1998);

2.1 The provisioning of extension

In many first and third world countries significant changes are occurring in suppliers and level of provisioning of extension. Carney (1998) investigated changing public and private roles in extension. Government models for provisioning of agricultural research, development and extension (RD&E) are considered to have fallen into disrepute in many countries due to poor progress in achieving policy aims such as export, food security and social well being (Goss 1994). Carney (1998) suggests that public sector involvement in research and extension is littered with wastage, lack of relevance and failure.

This section briefly examines the research on some of the newly emerging extension systems around the world, drawing largely on the work of Carney (1998). These new structures include those with changes to the suppliers of extension; those which are decentralised, mixed private and public roles; farmer driven provisioning; extension form private companies; groups of companies-producer associations providing extension services; extension providers share-cropping with farmers; and other organisations providing extension. For each of these emerging structures, an example is presented. The Australian situation is then reviewed.

Changes to the suppliers of extension

First world countries such as Britain, France and New Zealand are heading towards complete privatisation of agricultural extension services, while in other countries private and non-government services have been purchased by government. Carney (1998) suggests that generally, non-government participation in extension is most effective when government retains significant responsibility for the cost of service, and provides training equipment and monitoring. Examples where government involvement has been maintained include Chile, where the government's role is now coordination of private sector provision (Berdegue 1997); and Costa Rica, where vouchers are initially given to farmers to 'pay' for private extension provision, and then phased out over time. Similar 'subsidised' schemes operate in Australia.

Decentralisation, mixed private and public roles

Carney (1998) proposes, "China provides the most notable model of decentralisation and mixed public and private services". In China, groups of farmers pay for extension advice provided by Agrotechnical Extension Centres (AEC's). These AEC's link national and regional information as well as accessing information from research institutes, universities and individuals. Also in China, farmer organisations receive information from scientists and consultants who are invited to sit on their boards and become shareholders in market based enterprises.

Farmer driven provisioning

The Ugandan farmer driven option is an impressive example of a full alternative to public sector provisioning of extension (Carney 1998). The Uganda National Farmers Association (UNFA) established a 'demand-driven, cost recovery' extension service in a number of districts in Uganda. Upon request for training or advice, UNFA employees (who are often former public service extension agents), provide the service at full cost recovery rates. Carney (1998) suggests that the scheme is quite successful and has been requested to take over extension provisioning in at least one district.

Extension by private companies

According to Carney (1998), input supply companies, providing products such as seed, research and fertiliser are also in a position to provide information with their products. In most circumstances such companies only provide extension to 'market' their own products (Schwartz 1994; Umali and Schwartz 1994). Even so, Crompton (1997) sees such companies as potential providers of extension since they have regular contact with farmers and the existing 'network' required for extension provision. Schwartz (1994) noted this was the case regardless of whether the private company was trying to sell supplies or purchase quality product from growers. Marsh and Pannell (2000) report much evidence of extension by private companies in Australia, creating a complex system with a number of consequences. Martin (2000) points to stock and station agents as a first port of call for farmers and highlights their often unrecognised role in agricultural extension.

Groups of companies-producer associations providing extension services

Carney (1998) identified that groups of companies sometimes act as publicity arms for their member companies and engage in activities without immediate commercial benefits. The Agro-chemical Industry Association of Zimbabwe's chemical safety program is one such example (Carney 1998). The association aims to obtain inexpensive chemical protection clothing for its farmers. A similar example of this type of activity is the Indian Fertilser Association, which publishes literature and sets up demonstration plots (Umali and Schwartz 1994).

Extension providers share-cropping with farmers

Carney (1998) reports that share cropping arrangements exist in Ecuador, where farmers supply land and labour and the government extension agent supplies advice and inputs. Ameur (1994) reports that farmer arrangements with unlicensed providers from outside the public sector are also common in China.

Commodity organisations

Commodity organisations have been successfully involved in extension of new production techniques and Carney (1998) cites several international examples where such an organisation has had significant extension success. Martin (2000) discusses the role of commodity organisations in Australian extension provision.

Non government organisations (NGOs) and farmer organisations

NGOs often work in difficult and complex situations where government services are weak or non-existent. They provide services and methodologies for Research and Extension work that are often subsequently adopted by the public sector (Farrington and Ameur 1991). Carney (1998) suggests that farmer organisations, even though they are often both consumers and providers of information are not well positioned as providers of extension because among other problems they lack the financial and human resources that are needed. It is common to find that they are more interested in immediate issues and market access and price than extension (Collion and Rondon 1998).

Recent institutional changes to provisioning of extension in Australia

In the past, major providers of agricultural extension in Australia and overseas have been State departments of agriculture and primary industries. This has been supported by a well developed private sector. Recent changes to public sector agricultural extension in Australia follow a worldwide trend of decentralisation of agency activities (Rivera 1996). Vanclay and Lawrence (1995) refer to extension as being in a 'state of crisis' brought on by pressures relating to finance, effectiveness, legitimation and theory.

Recent reviews and restructuring of Australian extension organisations have resulted in policy directions aimed at achieving greater effectiveness and efficiency in agricultural extension. Although efficiency and effectiveness are purported to be the driving force of recent change, Marsh and Pannell (1998, 1999 and 2000), in their review on changing relationships between private and public sector agricultural extension in Australia, suggest that in many cases, recent restructuring has been for reasons other than benefit to agriculture.

Marsh and Pannell (1999) report that agricultural departments have responded to the driving force for change in a range of ways including:

- developing industry partnerships;
- adoption of the funder-purchaser-provider model;
- outsourcing;
- differing degrees of integration or separation of agency responsibilities;
- cost-recovery; or
- redirection of extension activities.

Along with the restructuring of agricultural extension services, Marsh and Pannell (1999) report concurrent developments in the Australian private sector including a greater role in research and extension and a greater input into policy and research priorities.

Impact of changing extension provision

The retreat from agricultural extension by state departments of agriculture is expected to have a range of medium and long-term impacts for Australian agriculture. Marsh and Pannell (1998) question the capacity of the private sector to immediately provide similar levels of Research, Development and Extension services to those previously offered by government, and note that many providers are dependent on government support. They report there are fewer incentives for the private sector to provide public good information in Australia.

Where information is disseminated as a 'secondary task' which complements another activity, Schwartz (1994) points out that the extension information, even though it is a public good, will only benefit those who have access to the primary activity. Umali and Schwartz (1994) propose that provision of erroneous information can reduce consumption of extension information to suboptimal levels. In some situations where government has relinquished itself of research in the area in question, both the farmer and the government may no longer be in a position to legitimately value the extension information.

These changes in extension provision also have implications for agricultural research. While extension is often considered as a means of delivering research information to farmers, it can play a dual role of conveying farmers' information back to researchers. Marsh and Pannell (1998) suggest that Australian Research and Development corporations now accept private sector researchers, and question the infrastructure costs and 'in kind' contribution estimates of state departments of agricultures, Universities and CSIRO. This, combined with the increased emphasis on intellectual property rights, has contributed to a fragmentation of the flow of information from research to farmer and vice versa (Marsh and Pannell, 1998). Carney (1998) reports that increased pluralism in extension provision may further fragment any possible demand that extension may exert on research. It is suggested this is a problem since there is little pressure from extension for driving appropriate research to be conducted in the first place.

Research in Australia and New Zealand presents evidence for collaborative approaches to research and extension. In a study of the development of technology for the New Zealand dairy industry, Paine (1999) recommended that in the new extension environment, organisations need to work together to effectively develop new technologies. Keen and Stocklmayer (1999) in their review of research corporation's communication strategies, recommended collaboration across organisations would increase the efficiency of information delivery. Carney (1998), who also looked at the provision of research, proposed that multiple funding and supply of agricultural research contributes to increased stability of provision and better research.

2.2 Policy for the provision of extension services

Government policy on whether or not it should provide extension, what type of extension should be provided, who should pay, and how extension should be provided plays a critical role in determining the nature and extent of extension provisioning in any particular country. Past models for legitimising government roles in Research, Development and Extension are in disrepute largely due to poor government progress in achieving policy goals of export food security and social well being (Goss 1994). Old aims for extension provision are disappearing, and new models are now emerging. The concepts of effectiveness, efficiency and accountability now dominate debate over government involvement in extension.

Within the area of Research and Development on policy for the provision of agricultural extension services, the main areas examined in the literature include the purpose of extension (Roling 1990. 1991; Kaimowitz 1990; Carney 1998; Alston and Pardey 1996; Marsh and Pannell 1998, 1999 and 2000); determining how to decide what services should be provided, and to whom (Carney 1998; Umali and Schwartz 1994; Merrill Sands and Collion 1993; Smith and Thompson 1991; Marsh and Pannell 2000; Martin 2000).

The purpose of agricultural extension

Roling (1990, 1991) and Kaimowitz (1990) propose that extension should focus on 'overall livelihood enhancement" in order to realise rural people's full potential. They continue that traditional agricultural intervention may not service the needs of non-landed rural people, and extension needs to be responsive to the changing needs of rural people.

Alston and Pardey (1996) in their work on research and extension policy propose that research and extension are not effective mechanisms for reducing poverty in rural areas. They recommend that research and extension should be done at the commercial level and other means should be adopted for support of rural people.

Carney (1998) cites many examples where government research and extension are isolated from clients. This results in a fundamental lack of concern by individuals and governments for rural producers. Carney (1998) suggests that this isolation leads to growers being seen and treated as ignorant and in need of modernisation.

What services should be provided, to whom, when and who should pay?

Carney (1998) suggests that evaluation of extension service provision has been largely based upon social indicators and economic growth, but few have considered goods and services available to rural people. Furthermore, Carney (1998) proposes that there has been little investigation into who the services actually serve. Nor have there been investigations into the impact of changes in government service provisions.

To address this, Carney (1998) developed a framework for classifying goods and services to determine which were appropriate for public provision, private or mixed provision. She was then able to apply this framework to extension, research and marketing services to determine whether they should be provided by government or by the private sector. Carney (1998) emphasised the strong interdependence of agricultural extension with research and marketing in achieving positive change for agricultural communities. Her examination of different types of research demonstrated that the stage of the technology (pre-technology; prototype technology or useable technology), and the type of technology being developed (mechanical, chemical, biological or agronomic), influenced what type of research and extension services were required, and who was best positioned to provide the service.

It is generally recognised that government should not be in competition with private provision of extension, but should address the problem of only partial service being provided by profit oriented companies (Smith and Thompson 1991). New emphasis should be placed on partnerships between public and private partnerships in less well serviced areas:

> "For free markets to work better governments should also work better" Klitgaard (1991)
> "Market orientation and state minimalism are incompatible" Streeton (1996).

Where governments continue to act, accountability should be deliberately pursued.

> "Advantages in this lie not only with increased efficiency and effectiveness but also strengthening civil society" Carney (1998).

Public sector cost recovery systems can contribute to accountability. When consumers pay for a good, they express and enforce satisfaction of their needs (Merrill Sands and Collion 1993). Accountability can be improved through strengthening links between rural people and the public sector; and through improved evaluation of extension (Dart *et al.* 1999).

Carney (1998) proposes that in order to improve efficiency governments should withdraw from areas where markets function and invest in infrastructure that makes markets possible. Around the world, cutting costs within organisations has been achieved by just getting rid of people. But cost cutting without regard for "effectiveness of services" is counterproductive (Carney 1998). It is often more appropriate to find cheaper ways of undertaking activities, such as building new partnership with other organisations, rather than reducing the workforce.

In most states of Australia policy relating to provision and practice of agricultural extension has been driven by consideration of private and public goods, competitive neutrality, user pays, and cost recovery (Marsh and Pannell 1999). The delivery of extension has been strongly influenced by changing administrative structures within State governments and a change in the paradigm within which the extension community operates (Marsh and Pannell 1999). This has led to:

- greater emphasis on provision in public good areas;
- more involvement of the private sector;
- emphasis on development of the human resource in agriculture;
- growing commitment to participatory processes in extension activities; and
- cutting back and changing of direction of government spending commitments.

2.3 Organisational structures for extension provision

Few studies have examined the impact of the internal structure of an organisation on its ability to provide effective, efficient and accountable extension services. While Gleeson *et al.* (1999) examined the characteristics of creative research environments; there have been no equivalent studies of extension organisations. Five principles of goal setting, bounded freedom, reward and recognition, social interaction, and effective leadership were proposed as a means of fostering the creative environment. While it is likely that many of the findings would be broadly applicable to those working in extension, this needs to be verified.

Alexander and McKenzie (1997) in their analysis of the use of information technology in university learning have demonstrated that institutions play a major role in helping their education providers to perform to a higher level. Other relevant studies include those of interdisciplinarity (Price 1999); communication strategies of Australian research and development corporations (Keen and Stocklmayer 1999) and strategies for aligning organisational activities with its objectives (Beer *et al.* 1996; Coutts 1995).

Price (1999) has examined the advantages and disadvantages of an interdisciplinary approach to Research, Development and Extension in agricultural systems, where teams from a range of fields of expertise work collaboratively on a research and/or extension project through each step of the problem solving process. The key to achieving interdisciplinarity is effective management of Research and Development, but there are many barriers to this occurring, particularly within organisations (for example reward systems; and discipline based research structures).

Keen and Stocklmayer (1999) report that many research programs in Australian research and development corporations (RDCs) may either impose, emphasise or by-pass communication strategies completely. Communication strategies that do exist are often embedded in the management style of the project and are influenced by the nature of the study. Keen and Stocklmayer (1999) argue that the

efficacy of RDCs' communication are hindered through self-evaluation of efficacy, exclusion of communication personnel from review activities and suggest that the structure of finances within research portfolios all effect the communication process even before research is initiated.

Beer *et al.* (1996) suggest that the effectiveness of an organisation is dependent upon the alignment of an organisation's structure, control systems, incentive systems, corporate culture and management style, and that this is often considered as the general manager's role. Beer *et al.* (1996) report that where re-alignment in an organisation is required, a number of unfounded assumptions are often held. Examples of these assumptions include that:

- employees are motivated to adjust their roles by rational arguments from management;
- those employees have the new attitude skills needed to enact the changes; and
- if deficiencies exist in employees these can be corrected through communication and education.

Beer *et al.* (1996) conclude that there are significant gaps in the organisational literature and current practice on enacting realignment in organisations. The authors propose that 'cultural norms' govern attitudes and behaviour, and that this is difficult to change through normally accepted channels unless there is a broader shift in culture. Recognition of employee's beliefs, assumptions and behaviour is called for before any realignment can take place. The researchers propose that many of the most significant of these beliefs and assumptions are undiscussable, and their undiscussability is undiscussable. Nevertheless, Beer *et al.* (1996) report that a variety of intervention methods have emerged that are especially designed to promote trust and open dialogue between management and subordinates.

Coutts (1995) explored the role of extension policy in facilitating positive change by researching the initiation, development and early implementation of a formal extension policy in the Queensland Department of Primary Industry between 1987 and 1994. He found that extension policy formulation operated at the strategic level, building external commitment and requiring across government negotiation. The process legitimised public sector extension and resources were secured to put in place new structures, processes and positions. However, implementation was prescriptive and not consultative, such that this process limited 'commitment at the collective level' to the endorsed policy. Coutts (1995) recommended benefits would be gained from regular negotiation and review of extension policy within the organisation.

2.4 Conclusion

The literature on organisational structures for agricultural extension indicates that these are undergoing major change worldwide and in Australia. The international research has provided a framework for evaluating the effectiveness, efficiency and accountability of service provision, and for identifying who is best to deliver what services and when. While there has been a major review of the changes to extension provision in Australia, there is a need to continue this work to identify the way in which relationships and structures are changing, recognising the interdependency of extension and research. From this, new opportunities for increasing the efficiency, effectiveness and accountability of extension will emerge. In addition, there is little evidence of the implementation of the research on ways in which extension organisations can improve their own effectiveness. This is an area requiring further research.

3. Summary of R&D on the professional development of farm advisers their structural arrangements and careers

The Australian agricultural sector is supported by a wide and varied group of farm advisers, described here as extension practitioners. These include public sector extension officers (including Landcare, Bushcare, Waterwatch etc.) private sector consultants (on all aspects of farming, including farm management, personal relationships, finances, taxation, business development etc), agribusiness field officers, product sales advisers, stock agents, scientists and more. The professional development of these extension practitioners is linked to their ability to foster learning and change on farms and in agriculture. Their structural arrangements (such as length of contract and opportunities for professional development) and their career opportunities, influence the agricultural sector's ability to support on farm change.

In an environment seeking to improve client focus, it is easy to place less emphasis on the other partner in development, the extension practitioner. Indeed, second only to the lack of definitive research seeking to fully understand farmers, the literature appraised to date tends to indicate a paucity of research on extension practitioners. Despite this there are a range of important questions concerning the training of extension practitioners that deserve consideration. These include:

- who are they; how are they employed;
- what roles do they perform;
- what training and professional development is available;
- what training and competencies do they currently have;
- what competencies should they have;
- how are their skills recognised; and
- what is the availability of this resource.

Some of these issues are discussed in the literature, but not many are accompanied by substantive data. An integrated approach to the development of extension practitioners must consider each of the elements outlined above. Some studies have addressed components of this dynamic. Such research can start with better understanding the practitioners' specific roles and an examination of the ways in which they are expected to meet the needs of their farmer clients. This review reports on the relevant Research and Development on the role of the extension practitioner, competencies, training of extension practitioners and the employment environment of extension practitioners.

3.1 Roles of the extension practitioner

In an increasingly broad and dynamic extension environment, extension practitioners may deliver services ranging from technology transfer to facilitative human development, performing in the roles of development, program or information extension, in private or public agencies (Coutts 1995; Marsh and Pannell 2000). Changing perspectives of rural development add to the diversity of roles and employment structures as detailed by Phelan (1995) in Ireland. However, this review did not uncover any research providing greater detail about these roles or their importance in current extension delivery in Australia, nor the training priorities that might be indicated by such information.

3.2 Competencies

Straw *et al*. (1996) detailed some of the key competencies required of extension providers in general. These ranged from interpersonal and communication skills, to knowledge, planning, evaluation and ethical competence. No data was found in the literature to indicate how widely these skills are applicable nor how prevalent they are amongst extension providers. Straw *et al*. (1996) recommended the incorporation of such competencies into training course structures.

In the US, Ladewig and Rohs (2000) presented a large data set assessing extension workers against a suite of 12 management proficiency criteria, important to the design and implementation of educational programs. Competencies that could be strengthened were: setting goals and standards, getting unbiased information, time management and prioritising, appraising people and performance, and disciplining and counselling. Weaknesses in thinking clearly and analytically, and in listening and organising were highlighted.

3.3 Training of extension practitioners

Straw *et al*. (1996) comprehensively detailed the post-graduate training in rural extension available in Australia. It was suggested that competencies could be better addressed within these training courses and the approach to training content broadened. Participants indicated enhancement of skills and knowledge as a key motivating influences, and that there were issues of concern relating to access to training, provider performance, learning support and linkages between institutes.

Van Crowder *et al*. (1998) indicated that undergraduate agricultural science courses can respond to market demands by placing more emphasis on extension and client needs. This reflects a general principle that market and role requirements, their attendant competencies and hence training content, each require more rigorous attention.

Marsh and Pannell (2000) note that training inexperienced private consultants is a developing issue, in light of a reduced availability of appropriate staff recruited from the public sector. This leads to the wider question of what skills are available and where. Hannam and McGregor (1997) examined the education and training needs of rural merchants, but little quantitative data was provided to support this discussion. Further to this, the Rural Training Council of Australia has examined the skills requirements of rural merchants and developed units of competency for rural merchant qualification (RTCA 1999).

Most recently, Martin (2000) examined the role of stock and station agents in information provision for Australian agriculture. These were found to play an important role in the provision of marketing and technical information, usually via face to face interaction. About one fifth of the agents surveyed were found to have university education; with 71% having a high school or TAFE background. Martin (2000) concluded there was huge potential for supporting the farming community and communicating research through support for stock and station agents.

In Ireland (Phelan 1995) the provision and content of extension practitioner training changed to reflect the widening roles of the extension provider. Post-graduate programs in rural development are offered and courses have changed to place less focus on agriculture and more on the provision of business, human, marketing and tourism skills.

3.4 Employment environment

The conditions of employment, tenure, remuneration and recognition would all be expected to have a role to play in the performance and training of extension practitioners, but these aspects were not discussed in the literature reviewed. Carney (1998) notes that not only is it important to focus on providing training in new skills such as social mobilisation and participatory rural appraisal, but there must also be a focus on improving the immediate working environment. Environments that encourage responsiveness and initiative can improve effectiveness (Tendler 1997, cited by Carney 1998).

Employers can take an active role in encouraging the training of extension practitioners by adopting professional job standards based on key competencies, and by providing or seeking financial support for employees to undertake training (Straw *et al*. 1996). Cadetships, mentoring, and career development workshops can foster the wider development of the human resources available to an organisation, as Elix *et al*. (1998) noted when discussing the increased inclusion of women in agriculture.

Gleeson *et al*. (1999) examined the role of creativity in successful research and development. Five principles of goal setting, bounded freedom, reward and recognition, social interaction, and effective leadership were proposed as a means of fostering the creative environment. Such principles would seem appropriate support for the development of the extension environment also.

Other aspects of the employment and organisational environment such as those discussed by Beer *et al*. (1996) are dealt with when considering institutional arrangements.

3.5 Conclusion

Whilst there is an availability of extension practitioner training and development opportunities in Australia, at present it seems there is a requirement to better appreciate who the practitioners are, their skills and competencies, professional environment, performance, and the specific expectations of clients and employers. In addition, there is no research on the structural arrangements of extension practitioners, and the impact this has on the provision of extension services. Such understanding can provide a firmer basis for the construction of development and training pathways and for improving the efficiency and effectiveness of agricultural extension.

4. Summary of relevant R&D on the facilitation of enhanced learning/change processes on farm

Extension, as defined in the first section of this paper, aims to bring about positive change on farms and in agriculture. This largely involves the use of processes to facilitate learning and change within the agricultural community. Learning includes both learning what and how (single loop learning); and double loop learning (learning why). The processes for facilitating learning, or 'extension methods', include groups, media, field days, education, advice, facilitation, lead farmers, focus farms, demonstrations, videos, publications and more. Extension also includes the process of planning research and extension, from understanding client needs, developing a plan, appointing staff and implementing and monitoring a program, through to evaluating impact.

There has been much research in Australia and overseas on the facilitation of learning and change in agriculture. This review focuses on recent studies from Australia and New Zealand. These have examined:

- how learning occurs on farm (Bamberry *et al.* 1997; Kilpatrick *et al.* 1999a; Kilpatrick 1996);
- the extent to which learning/change processes are occurring on farm (Synapse Consulting 1999; Bamberry *et al.* 1997; Kilpatrick 1996; Kilpatrick *et al.* 1999a);
- how characteristics of farming and farmers influence change (Vanclay 1999; Fulton and Champion 1999; Reeve and Black 1998; Kilpatrick and Bell, 2000);
- the role of the learning content (Kilpatrick *et al.* 1999a; Reeve and Black 1998; Bryant 1997);
- the effectiveness of learning/change processes for facilitating change on farms (Bryant 1997; Alexander *et al.* 1997; Morgan, 2000; Keen and Stocklmayer 1999; Paine 1999; Millar and Curtis 1998; Kilpatrick and Bell, 2000; Reeve and Black 1998; Kilpatrick 1996; Woods *et al.* 1993) and
- keys to the successful facilitation of learning (Alexander *et al.* 1997; Fulton and Champion 1998; Virtual Consulting Group 1999a; Dart *et al.* 1999).

These studies and their major findings are described below. Topics lacking research are identified.

4.1 Learning/change processes on farm

Farmers learn through a combination of mechanisms such as reading, experts, farmers, the media, experience and observation, groups, field days, seminars, conferences and organised training or education (Bamberry *et al.* 1997; Kilpatrick *et al.* 1999a). Farmers prefer non-organised non-institutional learning (such as one on one with experts and peers, experience, observation and the media) to organised training and education (Bamberry *et al.* 1997; Kilpatrick 1996). Kilpatrick *et al.* (1999a) described farmer patterns of learning, motivations for learning and the role of women in farm management learning. They demonstrated that farm management learning is a function of the learning of both the male and female members of the management team.

Bamberry *et al.* (1997a) defined informal learning as all those mechanisms not included as part of the structured accredited courses of study offered through educational institutions. Kilpatrick *et al.* (1999a), however, distinguished between informal learning as individual learning from experience and observation, other people and the media; and education and training as organised learning activities. This latter definition is used for this report.

4.2 The extent to which learning/change processes are occurring on farm

The nature and extent of farmer learning and change has been examined by researchers in terms of adoption of technology or participation in education and training. Farmer participation in education and training has been reported as low compared to the rest of Australia's population (Synapse Consulting 1999; Kilpatrick 1996; Garnaut and Lim-Applegate 1998). This low level of participation in formal education has led to a call for increased education and training of Australia's farmers and for an identification of strategies for improving participation in tertiary education (Synapse Consulting 1999). Bamberry *et al.* (1997), however, argue that farmers are not as poorly educated as the statistics suggest given that much of their education is continual, informal and derived in the workplace. Kilpatrick *et al.* (1999a) present evidence that most farmers studied were involved in some sort of management, marketing or management-related change.

4.3 The relationship between extension and learning/change on farm

Funding of extension has been premised on the concept that increased knowledge and skills bring about positive changes on farm. Kilpatrick (1996) demonstrated that farm profitability increased with farmer education. While this has not been clearly supported by some studies (Garnaut and Lim-Applegate 1998; Bamberry *et al.* 1997), Quinn (1999) has recently demonstrated a strong relationship between farmer educational levels and adoption of technology in the beef industry; and Reeve and Black (1998) demonstrated that continuing education increases the likelihood of farmers adopting sustainable farming practices. The reasons for the contradictory evidence are largely related to the researcher's definitions of 'education' and 'positive change on farm'. However, there is significant evidence that extension can lead to positive change on farms. This can be found in the numerous evaluations of extension programs (as listed, for example, in Dart *et al*. 1999). These evaluations report increased knowledge and skills, and positive changes to the farm operations of the participants involved.

4.4 Farmer and farm characteristics influencing learning/change processes on farm

The influence of the social context of farming on learning

One of the main areas of research on the facilitation of enhanced learning/change processes on farm has been understanding how on farm change is influenced by the farmers' personal, family, business, industry and regional characteristics. Vanclay (1999) argues that farming is a social activity with distinctive farming styles. The author advocates that the social context within which farm management occurs must be understood if research and extension are to be successful. Other authors focus on the need to understand and address the needs of the farm family, and the farm family business rather than the individual farmer (Fulton and Champion 1999; Reeve and Black 1998; Kilpatrick and Bell 2000; Virtual Consulting Group 1999).

The influence of the personal characteristics of the farmer on learning

Many studies have been conducted on how the personal characteristics of farmers influence learning. Kilpatrick *et al.* (1999a) demonstrated that the type of learning women are involved with would vary from one farm family to another. Kilpatrick (1996) demonstrated how farmer educational background influences participation in learning. There is little evidence, however, about the extent to which personal characteristics improve or hinder the learning process. Shrapnel and Davie (2000) have studied the influence of personality in determining farmer responsiveness to risk.

4.5 Characteristics of the learning content

Kilpatrick *et al.* (1999a) also examined the impact of the characteristics of the learning content on farmer interest in learning. While farm management training was considered a high priority by industry 'leaders', farmers did not view it similarly. Bryant (1997) examined farmers' computer usage patterns and the impact these had on farm management practices. She identified that few farmers were using sophisticated information technology to support farm management and that some perceived computer-based office work not to be 'real' work, and hence did not purchase a computer. This supports the large body of research on the adoption of technology that has demonstrated the relationship between adoption and perceived relevance and nature of the technology or information (Guerin and Guerin 1994; Rogers 1983).

4.6 Processes for facilitating learning/change

Major reviews of extension methods have been undertaken by Woods *et al.* (1993); Kilpatrick *et al.* (1999a); and Bamberry *et al.* (1997). In the process of evaluation of numerous extension programs, different approaches to facilitation of learning/change on farm have been examined. Although this was often not the primary objective of the research, many studies report on the effectiveness of the methods used. The processes reported here include groups; information technologies; workshops; home study; and participative research and extension.

Group processes

The literature on group processes was reviewed by Woods *et al.* in 1993. These authors examined both one-off groups and on-going groups, but in attempting to do so, they found large gaps between practice and reporting in the literature. A checklist of key characteristics for one-off group meetings was developed from the available literature, with recommendations that a participatory action learning/action research be used, and that other information delivery methods are required to complement the one-off group method. On-going groups were reported to have great potential for supporting learning and change, but Woods *et al.* (1993) reported a lack of objective evaluation linking group processes with adoption or change. Again, a participatory action learning/action research approach was recommended.

Since the report by Woods *et al.* (1993), there has been an increase in the use of groups, and in the level of evaluation of their effectiveness. In Queensland in particular, there has been a significant body of research on action learning as the basis of individual and group learning activities (Clark *et al.* 1999a; Clark *et al. 1999b*). This focuses on developing the skills of individuals and groups to recognize their current level of knowledge and to seek further information and understanding in order to solve problems. Evaluations of this approach have demonstrated significant learning amongst participants (Clark *et al.* 1999a).

Kilpatrick and Bell (2000) evaluated the effectiveness of the Executive Link process of the formation of 'boards' of five to six farm businesses, all overseeing one another's operations through a facilitated

process. Kilpatrick and Bell (2000) found that the communication process allowed learning within each farm business team, leading to better coordination of the efforts of all members of the farm business team.

Another process developed to assist farmers to solve their own problems is the "interest specific learning groups" developed in the dairy industry. Virtual Consulting Group (1999) developed and reviewed a process for training farmers to run and manage their own learning groups. The research indicated that with coaching support and administrators, such groups could be an effective adjunct to externally facilitated groups.

While the quantity of information on groups has increased, there has been limited major research to examine groups in depth: who participates in groups, why, what are the steps they go through; which group processes are appropriate for which circumstances; how can group effectiveness be evaluated; what skills do extension practitioners need to effectively facilitate group processes? Considering their domination of public service extension activity in Australia, significantly more knowledge and understanding of their operation and effectiveness is needed.

Information technologies for delivering learning

A major study of the potential of information technologies (IT) for use in learning was undertaken by Alexander *et al.* (1997). While the 104 learning projects evaluated were delivered in a University framework, the research provides valuable information on the costs and benefits of introducing greater levels of information technology to learning and teaching. It also provided recommendations for how to use information technologies to maximize student learning outcomes. The study showed the costs of delivering IT learning were low for students, but high for institutions and staff. Students also benefited from improved quality and productivity of learning, improved access to learning and improved attitudes to learning. Staff benefits included improvements in job satisfaction, understanding of IT and of student learning, needs and difficulties. University departments benefited from the staff development opportunity afforded by individuals' participation in the projects; and institutions benefited through the enhancement of their reputations as innovators in teaching.

The role of computers

While Bryant's study of computer usage patterns amongst Australian farmers (1997) did not directly examine the role of information technology in farmer learning, subjects provided evidence of having learned more about their business by using computers. When asked about their plans for future IT use, however, subjects did not report 'learning' as a future use, rather they reported they would use computers for financial and paddock mapping programs, and for obtaining quick up to date information on marketing and research.

Other learning processes

Reeve and Black (1998) assessed the relative impact of participation in home study programs, local groups and information networks on the adoption of sustainable farm practices. They recommended that high priority be given to computer courses in rural areas and that there should be increased emphasis on delivering courses through farmer groups. Kilpatrick (1997) reviewed delivery methods for education and training to rural Australia. Delivery methods examined included extension courses for farmers; farmer discussion groups and TAFE courses. Kilpatrick (1997) found that delivery methods that facilitated peer interaction were most attractive to those already in the workforce.

Daniels and Woods (1997) evaluated the effectiveness of a workshop training activity for improving business management skills of farm families. They found the workshops brought about changes in skills, teamwork and decision-making, with the resulting learning and change was occurring over several years. Keys to success were identified as involving the whole management team and the use of follow up after the workshop.

Participative research and extension

Keen and Stocklmayer (1999) reviewed the effectiveness of the communication activities of Australia's research and development corporations (RDC's) and recommended strategies for improvement. To ensure the needs of the end-user are met, Keen and Stocklmayer (1999) recommended that the communication framework should involve the development of partnerships with key stakeholders at all stages of research project initiation, planning, implementation and completion. This would provide an opportunity for two-way communication between all parties during the course of the project, allowing researchers to respond to end-users' needs.

In studying the process of technology development in the New Zealand dairy industry, Paine (1999) drew similar conclusions. He found the early development of technology users in the development process avoided later constraints to development. Millar and Curtis (1998) in their examination of the nature and role of farmer knowledge in temperate pasture management in the Murray-Darling Basin, concluded that farmer local knowledge could play an important role in guiding scientists and extension practitioners in understanding the systems in which they (the scientists and extension practitioners) are conducting research and extension.

Selecting appropriate processes for facilitating learning/change

In its review of human resource development and extension in the dairy industry, Virtual Consulting Group (1999) concluded that effective extension needs to appropriately utilize a range of methods and processes depending on circumstances. Woods *et al.* (1993) in their examination of extension methods and their applicability, drew the same conclusion. However, the use of groups now dominates Australian public sector extension, reflecting the public sector's policy shift away from one-to-one extension. Marsh and Pannell (2000) identify some concerns with the widespread use of groups, particularly that they may not be being used when most appropriate. No studies, however, have examined the effectiveness of the variety and combinations of current approaches used in either public or private sector Australian extension.

Process design factors affecting a successful learning outcome

Most of the studies of learning examine the factors affecting participation in learning, rather than the effectiveness of the learning activity. While it is likely that in many cases the same factors affect each, few research reports make the distinction between the participation and learning. The Roy Morgan report on FarmBi$ (Morgan 2000) found that the learning activities offered by this program were well received for a number of reasons: they met the learner's needs; the provided value for money and they were well executed.

One of the most comprehensive reviews of factors affecting the outcomes of learning activities has been that of Alexander *et al.* (1997). As mentioned above, these authors reviewed the factors affecting the outcomes of information technology projects. Their conclusions, however, were relevant to all learning projects:

> "The use of a particular information technology did not, in itself, results in improved quality of learning or productivity of learning. Rather, a range of factors was identified which are necessary for a successful project outcome, the most critical being the design of the students' learning experiences."
> Alexander *et al.* (1997)

The factors identified by Alexander *et al.* (1997) include the need to properly plan, fund, manage, execute and evaluate (and continuously improve) the learning program. The study made recommendations regarding funding arrangements for IT learning project; and the criteria by which project proposals should be evaluated (i.e., on the extent to which they were likely to lead to positive learning outcomes for students).

The role of evaluation in learning/change processes on farm

The recommendation of Alexander *et al.* (1997) for continuous evaluation and redesign of learning projects is supported by the work of Dart *et al.* (1998). These authors reviewed the literature on evaluation of agricultural extension and argued that the effectiveness of extension in Australia could be improved by increasing its accountability. This would then require more appropriate use of planned evaluation, which in turn would lead to better planning of extension projects, and better results.

4.7 Conclusion

The research on processes for facilitating change on farm is largely limited to single evaluations of individual projects or programs. There is little comparative analysis of different approaches to facilitating change. There is little examination of the learning or change processes, of the quality of process delivery, or of the combinations of processes that are likely to be most effective under given circumstances. Despite an increase in evaluation of processes, there is still little publication of findings in beyond the institutions for which they have been conducted. In addition there is little evidence of the research on these topics to date drawing on disciplines outside education and extension. For the research or extension practitioner it is difficult for them to determine what processes are most appropriate for their situation, and thus how they should design their extension effort to be more effective, and more efficient.

5. Summary of R&D on better understanding of the barriers to farmer's participation in learning opportunities

Barriers to participation in learning or change opportunities may be factors related to an individual, their spouse, their family situation, and the characteristics of their farm, business, rural community or industry. They may also be related to the nature of the learning or change opportunities presented to the farmer.

This review focuses solely on Research and Development on barriers to farmer participation in learning opportunities, leaving aside both barriers to adoption of technology and barriers to change. In this paper learning opportunities have been broadly defined using the categorisation of Kilpatrick *et al.* (1999a) who separate farmer learning into two categories, informal learning and education and training. Informal learning is taken as individual learning from experience and observation, other people, and the media. Education and training is seen as any organised learning activity in which farmers learn as a group and includes 'formal' accredited courses, as well as non-accredited courses, field days, seminars, and farmer-directed groups.

The review has found that researchers have identified barriers to participation in education and training, but there has been little research identifying barriers to informal training despite the conclusion of Bamberry *et al.* (1997) that informal learning, combined with learning on the job, was the main source of education for many farmers.

5.1 Extent of participation in education and training opportunities

Information on the extent to which farmers are participating in learning opportunities will be useful to judge the significance of barriers to participation. However little information appears to be available. A national survey of Australian farmers found that over a twelve month period 80% of farmers participated in programs such as field days, courses, seminars and workshops while only 3% attended accredited training courses such as university and TAFE (Kilpatrick 1996). In a later study Kilpatrick *et al.* (1999a) state that farmers are not participating in the type of training that industry leaders and agricultural educators see as a priority, such as marketing and management. There is little information about farmers participation in informal learning apart from Bamberry *et al.* (1997), nor is there recent research comparing participation in learning by farmers with participation levels in other industries or within the rural community generally.

5.2 Barriers to participation related to farmer characteristics

Several studies have found that there is a self-reinforcing division amongst Australian farmers where the better educated and informed are more likely to seek and participate in further learning opportunities than those less educated (Kilpatrick 1996; Kilpatrick *et al.* 1999a; Quinn 1999; Weatherley 2000). Other barriers are previous unsatisfactory experiences of education and training (Kilpatrick *et al.* 1999a; Reeve and Black 1998); a rural ideology that does not incorporate education and training as a valued part of farming (Fulton and Champion 1999); dysfunctional family relationships brought about by the multiple stresses faced by rural Australians (Reeve and Black 1998); farmer perceptions that developing their strategic thinking and business management are not relevant to their business goals (Kilpatrick *et al.* 1999a); lack of recognition of previous (unaccredited) learning (Napier and Scott 1994, cited in Kilpatrick *et al.* 1999a); and in males, increasing age, and

distrust of the vested interests behind some training delivered by private organisations (Kilpatrick *et al.* 1999a).

Barriers specific to women's participation in learning and management in the agricultural sector have been examined by Elix *et al.* (1998); Reeve and Black (1998); and Kilpatrick *et al.* (1999a). Barriers to education and training include male domination of mixed-gender training activities; lack of access to childcare (Kilpatrick *et al.* 1999a), and in farms where there is a traditional separation of farm and household tasks women's participation is markedly lower (Reeve and Black 1998). Barriers to participation in management include time, other commitments, self-confidence, stereotyping and male attitudes (Elix *et al.* 1998). ANTA has recently prepared a paper segmenting the different types of learners, including strategies for engaging these learners in training (ANTA, 2000).

5.3 Barriers to participation related to characteristics of individual and institutional providers of education and training

Several researchers have identified the 'social distance' between farmers and scientists and/or industry leaders as a source of poor communication and lack of understanding between farmers and those intent on setting the agenda for change in agriculture (Millar and Curtis 1999; Kilpatrick *et al.* 1999a; Abel at al 1998; Vanclay 1999). Indeed, the traditional attitude of scientists and extension agents that it is they that should be setting the agenda for farmer learning and change is seen as a barrier to more participative and farmer-directed forms of learning (Rose 1996; Virtual Consulting Group 1999).

Vanclay (1999) argues that the technical bias of research organisations, extension agencies, and their staff and their subsequent failure "to acknowledge that farming is a social and cultural activity is responsible for the limited success of extension." A 1996 survey of people and organisations involved in extension delivery revealed a recognition of this in some organisations (Rose 1996).

Millar and Curtis (1999) found that providers place insufficient emphasis on the processes through which effective learning can be ensured compared to the content of information packages, thus hampering the uptake and use of that information. Elix *et al.* (1998) identified several barriers to women's participation created by the attitudes and behaviour within agricultural organisations.

The credibility of learning providers in farmers' eyes has also been identified as a barrier. An opinion that the TAFE system lacked credibility was expressed in Rose (1996), and Marsh and Pannell (2000) state that a lack of knowledgeable staff amongst providers leads to farmer disinterest.

5.4 Barriers related to learning content

Morgan (2000) found that content was the most important factor influencing farmer participation in learning activities. Several researchers have found that if information or training is not seen as relevant and applicable by farmers they are unlikely to access or use it (Keen and Stocklmayer 1999; Kilpatrick 1996; Kilpatrick *et al.* 1999a). Beer *et al.* (1996) report a similar finding in organizational management literature that shows change is resisted if lower level managers cannot see a connection to their business goals. This also relates to research, with the lack of relevance of research and research findings to tackling industry issues being identified as a significant barrier to extension in Rose (1996).

The volume and diversity of information now available is contributing to a perception of information overload (Marsh and Pannell 2000; Kalim Quamar 1999) and there was a concern expressed in Rose (1996) that insufficient integration between all those providing information is giving mixed messages to farmers.

5.5 Barriers related to accessibility of learning opportunities

Gaps in provision due to the decline of public extension services and subsequent market failure to fill those gaps have been identified (Rose 1996; Carney 1998; Marsh and Pannell 2000) as well as uneven information delivery (Marsh and Pannell 2000). For education and training that is available, publicity, the length, location (and amount of travel) and scheduling of programs, as well as the availability of childcare all affect participation (Kilpatrick *et al.* 1999).

An international review by Kalim Quamar (1999) found that poverty was a major barrier to technology transfer and while he emphasised absolute poverty in developing countries, it is probable that relative income levels between farmers in Australia affects their opportunities for learning with studies indicating that many education and training opportunities are mainly targeted or accessed by the top 10-20% of farmers (Murray-Prior and Hart 1998, cited in Kilpatrick *et al.* 1999a; Rose 1996); low profit reduces participation amongst beef producers (Quinn 1999); and income affects access to information technology (Groves 1999).

5.6 Barriers related to the method of delivery

Various researchers have stated that a reliance on limited approaches for communication has been inadequate in the face of the diversity of the farming community (Vanclay and Lawrence 1995; Rose 1996; Keen and Stocklmayer 1999), leading to calls for more diverse communication strategies (Rose 1996; Keen and Stocklmayer 1999), as well as locally adapted ones (Rose 1996). In Rose (1996) there was a call for complementary information systems across states to avoid duplication. Other research has examined methods through which farmers prefer to learn (Kilpatrick 1996; Kilpatrick and Rosenblatt 1998, cited in VCG 2000; Marsh and Pannell 2000), with Kilpatrick and Rosenblatt (1998) calling for participants to be given greater control in training situations following their finding that farmers prefer information seeking activities to traditional training.

Barriers to the use of information technology as a vehicle for education and training that have been identified include uneven service provision in regional Australia; low levels of internet access, with access highly skewed toward those with higher education levels; lack of content; lack of user demand; a view that internet-based learning is inferior in quality to traditional delivery methods (a perception that is contradicted by research); and questioning of the economics of providing education over the internet (Groves 1999; Groves and da Rin 1999). Groves 1999 argues that many of these barriers are temporary and will be reduced as familiarity with, and penetration of, information technology increases. Bryant (1999) found that a perception amongst some farmers that office work was not 'real' work, the financial cost and time involved in purchasing computers and the time to gain skills constrained the purchase of computers by farmers. Amongst those that do use computers, Bryant (1999) found that a perceived split between 'inside' and 'outside' work explained why some farmers do not integrate computer use in farm management but use them only as electronic forms of book-keeping.

5.7 Conclusion

The research on barriers to participation is limited in its depth and breadth, particularly in terms of understanding who is participating, why and what can be done to address barriers to participation. Little data has been collected on actual farmer participation in learning and change opportunities. Little is therefore known about potential untapped opportunities or problems with current provisioning. Further work is required to increase the awareness of the need to collect participation data. Reasons for and against participation in all forms of learning opportunities need to be further explored. Only in doing this can appropriate education products be delivered in an effective manner.

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7. Appendices

Appendix 1: Existing and potential innovative approaches to creating demand for learning and change

Joint Research and Development Corporation Briefing Paper 2

Existing and potential innovative approaches to creating demand for learning and change

By Amabel Fulton[1], Andrea Clowes[2], David Fulton, Tim Tabart[1], Peter Ball, Scott Champion[1] and Jane Weatherley[1]
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Executive summary

This briefing paper identifies existing and potential approaches to creating demand for learning and change. The paper was developed through a review of the literature (reported in briefing paper 1) and a broad consultation process with more than 60 potential investors, researchers, practitioners and customers.

The paper identifies current and innovative approaches in four key areas:

1. Institutional change and organisational structures supporting learning and change
2. The professional development of farm advisers including their structural arrangement and careers
3. The facilitation of enhanced learning/change processes on farm
4. Better understanding of the barriers to participation in learning opportunities

The broad definition used for each of these areas is presented at the beginning of each section.

Innovative approaches were considered to be those that were not in common use in Australian agricultural extension and which were also considered to be, or have potential to be, effective and efficient. The many approaches and examples described in the report are summarised below.

1. Existing and innovative approaches to institutional change and organisational structures supporting learning and change

Extension policy

- Develop systems for determining who should do what
- Government's role in research depends on type of research
- Government's role in research depends on the stage of technology development
- Government should invest in infrastructure to make markets possible
- Development of extension policy can facilitate change

Improve extension provisioning

- Improve institutional accountability
- Focus on industry development to extend Research and Development
- Have many systems, approaches and institutional structures
- Improve linkages among research, extension and farming communities.
- Encourage partnerships between public and private extension
- Develop research-extension links to support local knowledge
- Institutions will need to change to adopt participatory approaches
- Incorporate technology transfer requirements into Research and Development applications
- Look outside agriculture
- Reward researchers for communication
- Develop the extension research capability

Examples of extension systems displaying positive characteristics

- Changes to the suppliers of extension
- Decentralisation, mixed private and public roles
- Farmer driven provisioning
- Extension by private companies
- Groups of companies-producer associations providing extension services
- Extension providers share-cropping with farmers
- Commodity organisations
- Non government organisations (NGOs) and farmer organisations

2. Existing and potential innovative approaches to the professional development of farm advisers including their structural arrangement and careers

- Use extension policy development to support extension practitioners
- Use client groups to support practitioner development
- Provide in-service training
- Establish the market for professional development of extension practitioners
- Develop useful training guides
- Offer conferences, networking activities and publications
- Focus on developing human capacity

3. Existing and potential innovative approaches to the facilitation of enhanced learning processes on farm

Focus on client needs

- Focus on farmer-led extension
- Use participatory approaches to make research more client oriented
- Plan sustainable agricultural development *with* the local community

Design effective learning programs

- Design a learning program to achieve success, not failure
- Work with all members of the agricultural community to achieve change
- Learn from others bringing about change
- Focus on meaningful benefits
- Have clear goals and good communication
- Use specialist advice to develop programs
- Choose a delivery method that suits the participants
- Create discomfort in a safe environment
- Focus on making an impact
- Use flexible delivery approaches
- Use action learning
- Address social needs
- Understand the people and the system
- Find ways of motivating people

Groups

- Use and value farmer knowledge in group learning
- Farm businesses evaluating and advising one another
- Encourage self-managed farmer learning groups
- Link scientists and producer groups through private consultants

New technologies and publications

- Use of internet for education and training courses
- Extension should provide support for dealing with information overload
- Avoid total reliance on any single information system
- Simulation games
- Use Sky channel
- Produce branded products to meet client's needs
- Develop reports people want to read by talking to the readers

Other approaches

- Following through on benchmarking
- Support youth in agriculture
- Using local people to complement “formal” programs
- Have formal mechanisms for advancing agricultural education and training
- Take a team approach to extension
- Develop and pay high performers to do the extension

4. Existing and potential approaches to overcoming barriers to farmer participation in learning activities

- Address the distance between farmers and science
- Provide access to extension services
- Involve women
- Make information more accessible through the Internet
- Make research reports more accessible
- Use farmer knowledge
- Make science more understandable to farmers
- Help farmers deliver their own extension
- Make participation relevant to clients needs
- Promote agricultural science to rural youth
- Institutions promoting the benefits of training
- Major changes in an industry create demand
- Increase the emphasis on creating a demand for change
- Target all members of the farm family
- Target women
- Continually build awareness of new approaches
- Understand and address clients’ needs
- Education creates demand for education
- Use existing networks
- Understand the customer
- Segment the market

Overall, this report presents many innovative approaches to agricultural extension and change. This list is, however, incomplete. A broader and more detailed survey of agricultural extension in Australia, and of the international literature would illuminate more innovative practices. While this report may serve as a useful list of suggestions for those involved in agricultural extension, more evidence is required to determine whether or not the approaches are effective or efficient, and under what circumstances they would be so.

The contents of this paper, and the three other briefing papers[3], were circulated for feedback, and discussed at a workshop in Melbourne at the end of August 2000.

[3] Briefing paper 1: Summary of relevant recent and current R&D on agricultural extension, learning and change. Appendix 2 - briefing paper 3: Existing and potential innovative approaches to creating demand for learning and change. Appendix 3 - briefing paper 4: Communication of developments in extension research and practice to Australian extension providers

Introduction

This briefing paper aims to identify existing and potential approaches to creating demand for learning and change. The paper was developed through a review of the literature (reported in briefing paper 1) and a broad consultation process with more than 60 potential investors, researchers, practitioners and customers.

The paper identifies current and innovative approaches in four key areas:
1. Institutional change and organisational structures supporting learning and change
2. The professional development of farm advisers including their structural arrangement and careers
3. The facilitation of enhanced learning/change processes on farm
4. Better understanding of the barriers to participation in learning opportunities

The broad definition used for each of these areas is presented at the beginning of each section.

For the purpose of this report, the term extension was used to include any advisory, consulting, technology transfer, research, training, marketing, industry development, learning, change, communication, education, attitude change, collection and dissemination of information, human resource development, facilitation, or self-development activities that are undertaken with the aim of bringing about positive change on farms and in agriculture.

Innovative approaches were considered to be those that were not in common use in Australian agricultural extension and which were also considered to be, or have potential to be, effective and efficient. In some cases further research is required to verify the efficiency and effectiveness of these approaches, and the circumstances under which they would be appropriate. Some of the recommendations and examples have already been presented in some detail in Briefing paper 1. However, to ensure this paper can be used as a stand-alone document, they have been repeated here. In addition, where some reports are relevant to more than one of the key areas, this is reported.

The extent to which these approaches are innovative will depend on the knowledge and experience of the reader. The ‘collection’ of approaches presented here is not complete or systematic. It reflects the ideas presented in the agricultural extension literature in the last three years, plus those of the subjects. It is designed so readers can examine the range of ideas on effective and efficient extension, and selects ideas and approaches that are relevant to the readers’ circumstances.

The contents of this paper and the other three briefing papers were discussed at a workshop in Melbourne at the end of August 2000.

1 Existing and potential innovative approaches to institutional change and organisational structures supporting learning and change

The current Australian institutional and organisational structures supporting learning and change processes include state and federal departments of agriculture and natural resource management; private extension providers; private agricultural businesses; vocational education and training providers; the national training authority; state training authorities; industry training advisory bodies; research and development corporations; Universities; farmer organisations; and other non-government organisations. These existing structures and institutions may have elements that foster learning and change processes (such as their links with industry), and elements that do not (such as the way they reward their staff). The relationships between each of these organisations (e.g., public and private; research and extension) will influence learning and change on-farm.

1.1 Policy issues

Develop systems for determining who should do what

Carney (1998) cites a range of recent papers that deal with the economic characteristics of goods and services, and reports that the common framework is to classify items in terms of two key properties:

Excludability – if individuals don't pay, they don't receive

Subtractability – one person's consumption excludes others from receiving it

Carney (1998) proposes the following framework:

Subtractability	Excludability	Type of good
✓	✓	Private good
×	×	Public good
×	✓	Toll good
✓	×	Common pool good

After Umali and Schwartz (1994)

Only where a good or service is highly subtractable and excludable is it a candidate for private provision. Carney (1998) suggests that if supply of any of the other goods and services is left to market mechanisms there will be undersupply and a loss in economic efficiency.

Government's role in research depends on type of research

Umali and Schwartz (1994) report mechanical technology to generally be highly excludable and extractable and therefore attractive to private providers. Chemical research is next most attractive, followed by biological research. At the end of the spectrum lies agronomic research that is considered neither excludable nor extractable, making that research least attractive to the private sector.

Government's role in research depends on the stage of technology development

Dray and Echeverria (1991) propose that government should play a role in each of stage of technology development (pre-technology, prototype technology and useable technology). They suggest that the government's role is:

"to stimulate the flow of technology in the market and to help overcome the most difficult technological barriers which might otherwise reduce private sector research."

Consequently, pre-technology research requires full government support, prototype technology requires shared private and public supply, and finally with useable technology, government should promote competition for efficient marketing of the product.

Government should invest in infrastructure to make markets possible

Carney (1998) proposes that in order to improve efficiency governments should withdraw from areas where markets function and invest in infrastructure that makes markets possible. Cutting costs within organisations has been achieved by just getting rid of people. But cost cutting without regard for "effectiveness of services" is counterproductive (Carney, 1998). It is often more appropriate to find cheaper ways of undertaking activities, such as building new partnership with other organisations, rather than reducing the workforce.

Development of extension policy can facilitate change

Coutts (1995) in his paper on developing extension policy for an institution highlighted the benefits obtained through collaborative development of policy, having the policy itself and enacting it. Guidelines generated from this Australian work to permit formal extension policy to more effectively play a role in facilitating change were:

- Negotiation/review of extension policy should occur every two to three years. This would limit reactive political content while providing scope for modification if this were to be required by stakeholders.
- The focus of formal extension policy should be on; defining the changing societal reason for the extension function, supporting the structures for undertaking extension, and the constraining conditions requiring management which impact on extensions capacity to function.
- Prescriptive operational imperatives should be avoided at the formal policy level. This moves the monitoring of policy implementation away from establishment of prescribed structures to evidence of processes.
- The focus of extension policy should be on the iterative *process* of negotiation rather than the formal policy document itself. The negotiation and debate with stakeholders is the key to increasing the value and the power of the policy.

1.2 Improve extension provisioning

Improve institutional accountability

Where governments continue to act, accountability should be deliberately pursued. "Advantages in this lie not only with increased efficiency and effectiveness but also strengthening civil society" (Carney 1998). Public sector cost recovery systems can contribute to accountability. When consumers pay for a good, they express and enforce satisfaction of their needs (Merrill Sands and Collion, 1993). Accountability can be improved through strengthening links between rural people and the public sector. There should be incentives for public sector employees for actually meeting the needs of clients.

Focus on industry development to extend R&D

The horticulture industry funds a number of Industry Development Officers (IDO) for their different industries. Van Beek (1998) reviewed the role of these officers and concluded that the emerging regional/State and national networking system fulfilled the needs of industry and government efficiently, effectively and with full grower support. Interviewees reported that the growers 'own' these positions and in some cases the officers help growers do their own research. Officers have also been involved in taking growers on overseas study trips and interstate bus trips.

Have many systems, approaches and institutional structures

Haug (1998) reports that up to 20 years ago, debate was concerned about finding the *"the best extension system*" and *"the best approach"*. Haug (1998) proposes that the debate now recognises the importance of situation specificity and the emphasis is on pluralism with regard to provisioning (institutional structure), financial viability, programmatic strategies, controlling mechanisms, communication technologies, decentralisation, participation and local knowledge systems. Haug (1998) continues that blueprint solutions don't exist, they need to be tailored to national capacities and regional needs. Christopholos and Nitsch (1996) in (Haug 1998) propose that the question should no longer be how the government should manage agricultural knowledge and information systems, but rather how it can support the needs of specific target groups and meet specific objectives.

Interviewees reported that Target 10, a dairy extension program run by the Victorian Department of Natural Resources and Environment (DNRE) highlighted need for a range of mechanism, such as the following:

- an education experience;
- peer support experience;
- on-farm problem solving;
- one on one consulting; and
- a community environment that supports change.

This approach was very similar to the approach used by the Victorian Anti Cancer Council to help people quit smoking.
Interviewees reported a partnership approach being used in Australia. For example, the Victorian Property Management Planning (PMP) team has focused on particular industries and communities. It has seen the opportunities and benefits of a partnership approach with other providers for example with the dairy industry, with Melbourne University and with the meat industry's Edge Network. Woolmark promotes leverage with other programs by using others in agencies that are "on the ground". Other organisations do similarly, seeking to use the best institutions, people and tools available to achieve the desired outcome.

Processes to facilitate cross-industry and cross-sectoral learning have been recommended by Prinsley (1996). McKenzie *et al.* (2000) developed strategies for improving human resource development in the Australian dairy industry, recommending the adoption of a shared national extension vision to achieve an extension system that is learner-centred and demand driven.

Improve linkages among research, extension and farming communities.

Kalim Qamar (1999) proposed that;
"*In order to develop appreciation for the concern of each stakeholder, the researchers, extension agents, and producers need to keep in touch with one another and exchange information experiences, and problems through appropriate organizational structures and administrative practices, personal meetings, and through media and technology- based systems."*

Encourage partnerships between public and private extension

Haug (1998) reviewed some of the leading issues in international agricultural extension. He proposed that there are many opportunities for improved extension provisioning through integrating the activities of the government with other organisations. Haug (1998) highlights some of the potential resources such as the private agricultural supplier's superior links with farmers, and farmers learning from other farmers, as under-utilised resources available to extension. Haug (1998) also cites examples of governments sub-contracting private extension services and purchasing existing services in order to improve provisioning.

Haug (1998) proposes that where a pluralistic extension system operates, the main role of government should be to provide a regulatory framework to ensure low-cost of extension, access, and competition for provisioning and quality of service. Haug (1998) also raises issues of funding, cost sharing, client targeting and delivery channels.

Although extension is about knowledge and development of human resources, and as such, is more involved than just supply of seed or fertiliser, Haug (1998) suggests that fruitful partnerships between private and public sectors could be developed. Likewise, within an appropriate organisational structure, the potential for conflicting interests within such partnerships could be addressed.

Develop research-extension links to support local knowledge

Haug (1998) reports that over the last two decades, local knowledge of farmers and farmers' capacities as experimenters have been increasingly recognised. He suggests that one of the challenges facing extension and research is to interface between modern knowledge and people's knowledge. However, Haug (1998) questions whether current linkages between research and extension are existent or strong enough to allow this to happen. He proposes that there are a myriad of opportunities for building upon peoples knowledge, building formal and informal information systems and recognises that farmers have the ability to conduct their own experiments.

Institutions will need to change to adopt participatory approaches

Duvel (1995, in Haug 1998) suggests that with the change in emphasis in extension away from technology transfer to a facilitative approach where extension is focused on communities rather than individuals, this has implications as far as institutional structures are concerned. For example, Ashbye and Sperlberg (1995) proposed that incorporation of participatory approaches to research and extension would require significant organisational, methodological and attitudinal shifts among all partners involved in public research and extension.

Incorporate technology transfer requirements into research applications

Interviewees reported that the Rural Industry Research and Development Corporation (RIRDC) and the Horticultural Research and Development Corporation (HRDC) ensure that every project that is funded incorporates an extension or technology transfer section. RIRDC also allocates communication funds that are additional to the project funding to ensure that money is available for videos, meetings and web pages. This is done to ensure that outcomes are met. Projects need to show:

- technology transfer strategies
- mechanisms for communicating outputs
- how is the communication strategy to be evaluated
- who is the target audience.

Look outside agriculture

Few new ideas enter the agricultural industry because of the lack of external input into thinking within the sector. Significant gains in innovation and attitude change may be attainable through systematic cross-industry and cross-sectoral programs of activity and other processes (Prinsley 1996).

Reward researchers for communication

Keen and Stocklmayer (1999) reviewed the communication efforts of rural industry research funding bodies in Australia. The key recommendations were the need to:

- clearly define communication expectations and roles
- set consistent communication requirements
- develop evaluation procedures which allow the different approaches to be assessed over time
- better coordinate communication planning across research and development corporations
- increase the involvement of the researchers in the communication process
- work toward incorporating communication assessments in promotion criteria of researchers
- better assess the communication needs of private consultants working for research funding bodies

Develop the extension research capability

The development of a focused research and development program for extension, where issues and priorities are determined by a joint committee of industry stakeholders, is recommended by the Australasia Pacific Extension Network (APEN). It also recommends a designated national centre for extension research with a minimal operating core and a network of contributing research nodes.

1.3 Examples of extension systems displaying positive characteristics[4]

Changes to the suppliers of extension

First world countries such as Britain and France are heading towards complete privatisation of agricultural extension services, while in other countries government has purchased private and non-government services. Carney (1998) suggests that generally, non-government participation in extension is most effective when government retains significant responsibility for the cost of service, and provides training equipment and monitoring. Examples where government involvement has been maintained include Chile, where the government's role is now coordination of private sector provision (Berdegue 1997); and Costa Rica, where vouchers are initially given to farmers to 'pay' for private extension provision, and then phased out over time.

Decentralisation, mixed private and public roles

Carney (1998) proposes, "China provides the most notable model of decentralisation and mixed public and private services". In China, groups of farmers pay for extension advice provided by Agrotechnical Extension Centres (AEC's). These AEC's link national and regional information as well as accessing information from research institutes, universities and individuals. Also in China, farmer organisations receive information from scientists and consultants who are invited to sit on their boards and become shareholders in market based enterprises.

Farmer driven provisioning

The Ugandan farmer driven option is an impressive example of a full alternative to public sector provisioning of extension (Carney 1998). The Uganda National Farmers Association (UNFA) established a 'demand-driven, cost recovery' extension service in a number of districts in Uganda. Upon request for training or advice, UNFA employees (who are often former public service extension agents), provide the service at full cost recovery rates. Carney (1998) suggests that the scheme is quite successful and has been requested to take over extension provisioning in at least one district.

Extension by private companies

According to Carney (1998), input supply companies, providing products such as seed, research and fertiliser are also in a position to provide information with their products. In most circumstances such companies only provide extension to 'market' their own products (Schwartz 1994; Umali and Schwartz 1994). Even so, Crompton (1997) sees such companies as potential providers of extension since they have regular contact with farmers and the existing 'network' required for extension provision. Schwartz (1994) noted this was the case regardless of whether the private company was trying to sell supplies or purchase quality product from growers.

Groups of companies-producer associations providing extension services

Carney (1998) identified that groups of companies sometimes act as publicity arms for their member companies and engage in activities without immediate commercial benefits. The Agro-chemical Industry Association of Zimbabwe's chemical safety program is one such example (Carney 1998). The association aims to obtain inexpensive chemical protection clothing for its farmers. A similar example of this type of activity is the Indian Fertilser Association, which publishes literature and sets up demonstration plots (Umali and Schwartz 1994).

[4] These have been reported in Briefing paper 1

Extension providers share-cropping with farmers

Carney (1998) reports that share cropping arrangements exist in Ecuador, where farmers supply land and labour and the government extension agent supplies advice and inputs. Ameur (1994) reports that farmer arrangements with unlicensed providers from outside the public sector are also common in China.

Commodity organisations

Commodity organisations have been successfully involved in extension of new production techniques and Carney (1998) cites several examples where such an organisation has had significant extension success.

Non government organisations (NGOs) and farmer organisations

NGOs often work in difficult and complex situations where government services are weak or non-existent. They provide services and methodologies for Research and Extension work that are often subsequently adopted by the public sector (Farrington and Ameur 1991). Carney (1998) suggests that farmer organisations, even though they are often both consumers and providers of information are not well positioned as providers of extension because among other problems they lack the financial and human resources that are needed. It is common to find that they are more interested in immediate issues, market access and price than extension (Collion and Rondot 1998). Even so, there are some public Australian exceptions such as the Birchip Cropping Group and the WA Lucerne Growers.

2 Existing and potential approaches to the professional development of farm advisers including their structural arrangement and careers

The Australian agricultural sector is supported by a wide and varied group of farm advisers, described here as extension practitioners. These include public sectors extension officers (including Landcare, Bushcare, Waterwatch etc.) private sectors consultants (on all aspects of farming, including farm management, personal relationships, finances, taxation, business development etc), agribusiness field officers, product sales advisers, stock agents, scientists and more. The professional development of these extension practitioners is linked to their ability to foster learning and change on farms and in agriculture. Their structural arrangements (such as length of contract and opportunities for professional development) and their career opportunities, influence the agricultural sector's ability to support on farm change.

Use extension policy development to support extension practitioners

The implementation of a formal extension policy in Queensland Department of Primary Industry (Coutts 1995) provided some purpose, process and role definition to support the extension practitioners and their activities. However, an initial limitation was a lack of involvement of operational staff in taking the strategic policy recommendations to implementation. This resulted in a need to further develop discussion and ownership and hence commitment to the program. Despite this, the process of formal policy implementation provides a foundation to the practitioner's work environment.

Use client groups to support practitioner development

The local client groups described by Coutts (1995) could similarly support practitioner development by providing evaluation, and program selection and development advice. The author indicated that this concept of client groups allowed for the provision of non-prescriptive strategic direction. This could be a sound tool for use in the development of the practitioner's role and function, as a primary step to developing the skills and training required of the practitioner.

Provide in-service training

The development of the Rural Extension Centre (REC) to provide in-service extension training, and also to facilitate research supporting extension, was an innovative proposal resulting from the QDPI policy development process described by Coutts (1995). The author described the proposal for the centre as indeed central to enabling change to occur. This could refer to change within the organisation and the conduct of its business, and thus by implication change also within the agricultural community. Training of staff to meet new pro-active, participative and adult education orientated directions desired by the organisation was indicated.

Establish the market for professional development of extension practitioners

Straw *et al.* (1996) suggested that training offered by the many organisations that participate in the development of extension practitioners can be enhanced in some important areas. This could include the establishment of the market for the training, and paying more regard to understanding what the employers and extension practitioners wanted, and also how graduates currently performed in their various roles. This approach would then be supported by incorporating key competencies into the present course structures. It was also suggested that there be wider involvement of employers, practitioners and clients in course development.

Develop useful training guides

Veldhuizen *et al*. (1997) presented a guide to the development and training of deliverers in participatory learning and technology development. This guide gathered the experiences of many trainers and practitioners, using an international workshop on training in participatory technology development as its foundation. Activities and underpinning knowledge and philosophy are presented in an operational and experiential context. There is a focus on outcomes and most importantly the guide has been subject systematic review and revision by users.

Offer conferences, networking activities and publications

The Australasia Pacific Extension Network (APEN) provides conference, networking and publication services to extension practitioners. Annual APEN forums allow for a range of subject matter to be offered through concurrent sessions. The process is people inclusive rather than formally structured. APEN branch activities have held a number of seminars on extension, marketing, community education with speakers from health, police, commercial marketing, looking at different methods of community learning and behaviour change.

Focus on developing human capacity

In creating change, the Rural Extension Centre focuses on four areas for development of the human capacity of extension practitioners:

1. Thinking skills (creative, critical thinking, problem solving skills to take focussed action)
2. Skills to provide leadership and give people confidence to manage change now and in the future
3. Awareness of the issues
4. Being dynamic rather than passive

3 Existing and potential approaches to the facilitation of enhanced learning processes on farm

Extension, as defined in the introduction, aims to bring about positive change on farms and in agriculture. This largely involves the use of processes to facilitate learning and change within the agricultural community. These processes, or 'extension methods', include groups, media, field days, education, advice, facilitation, lead farmers, focus farms, demonstrations, videos, publications and more. Extension also includes the process of planning research and extension, from understanding client needs, developing a plan, appointing staff and implementing and monitoring a program, through to evaluating impact.

3.1 Focus on client needs

Focus on farmer-led extension

Haug (1998) reports that *"participation"* is a word that is used a lot in the literature, is ill defined and therefore means different things to different people. He suggests that *"farmer-led"* is a useful alternative and goes on to define this term in the following way;
"In farmer-led extension, agents should participate in farmer-defined activities, farmers being the primary actors"

Haug (1998) reports that in spite of a significant body of literature on participative approaches, extension programs purportedly using such methods are generally still not working well in the field, and he questions why there is still such a gap between extension theory and extension practice. In addressing this question Haug (1998) raises a series of questions such as; is it just a question of time, is there commitment to the participatory approach, or are the issues with power relations that are holding back the success of this approach?

In Australia, the federally funded farm business management training program, FarmBi$, provides funds for farmers to attend training and allows choice in what is selected. Some of the wool industry programs take a different approach to learning. Bestwool 2010 encourages the growers to decide on their priorities for learning and change. Bestprac focuses on the grower determining whom they want to use as a facilitator.

The Sustainable Grazing Systems Program of the meat industry delivers an extension program driven by a producer committee, which develops local on farm issues affecting grazing systems and then develops an extension package for each "area" based around a region demonstration site of field days, on-farm courses (Prograze) and workshops. All of these are developed and organised by farmers.

Use participatory approaches to make research more client oriented

Kalim Qamar (1999) suggested:
"If the technology transferred addresses the needs of its potential users, it has high probability of being adopted. The generation of such demand-driven technology is only possible if the research agenda is drawn on the basis of real-life field problems".
A participatory research approach, where researchers, extension agents and growers have a chance to express their concern is proposed by Kalim Qamar (1999) as a way of ensuring appropriate research is conducted.

Dore (1997) presents the findings of a process of consultation with farmers to review and further develop sustainable agricultural indicators. A draft guide of on-farm sustainability indicators was used in discussion groups with farmer to debate sustainability policies in general, and the various indicators in particular. Comments on the usefulness of each indicator were received from about 180 farm

businesses. This feedback was used in the further development of a set of practical indicators for on-farm use.

In Australia, Woolmark provides avenues for growers to directly access funding for on-farm research through the Producer Initiated Research and Development program (PIRDs).

Plan sustainable agricultural development with the local community

Economic Renewal is a process for organising and conducting a series of community meetings that can lead to sustainable economic development. The process is detailed in a guidebook and has been field tested in many towns since 1986 and is based on practical experience in communities. It takes the approach of integrating economic, community and environmental concerns. Community residents and leaders choose development projects through a thoughtful process that minimises controversy and maximises creativity (Kinsley 1997). The process is carried out by a small team of residents with the help of a larger group of volunteers and sometimes a professional facilitator. The number of participants varies from 25 to 200. It takes between two and six months, culminating in the development of project action plans. This process is being trailed in the Derwent Valley of Tasmania (Tabart 2000).

Dunn *et al.* (1996) have used the Creative Problem Solving Methodology (after Robert Chambers) to improve the process of community consultation between Wagga Wagga City Council and residents/landholders in land use planning, control and development. The work is driven by a desire to avoid conflict and adversarial reactions - to find a collaborative learning way to resolving differences and to help the council meet its community consultation obligations.

In Australia, Macquarie Valley Landcare started with a natural resources management strategy and determined the need for a community strategy. The group formally interviewed 700 people via a pyramid interview technique. The information that was gathered was used to process information sheets on major issues and to prepare a strategy.

3.2 Design effective learning programs

Design a learning program to achieve success, not failure

Alexander *et al.* reviewed the factors affecting the outcomes of 104 learning activities delivered through information technology projects and identified factors contributing to successful and unsuccessful learning outcomes.

Most of the following characteristics were required for a successful learning outcome.

1. The project aims to address a specific area of learner need
2. The project uses a well thought through and informed learning design or strategy
3. The project's integration into the learning experience is well thought through for providers and learners
4. The anticipated outcome is realistic in terms of time and budget
5. Projects involving software development have had this done before the project starts
6. The project has a skilled project manager
7. Providers have access to technical support and expertise
8. There are shared goals within the team and ability to deal with conflict
9. Team members are committed and have adequate time
10. The project is continuously evaluated and re-designed as necessary
11. Learners have adequate access to equipment and support
12. The institution is committed to the project, funds it, allocates time, and rewards those involved

If one or more of the following factors occurred, the chance of success was significantly reduced:

1. Not doing one of 4, 5, 6, 7, 8, 10, 11, 12 above
2. Using technology for its own sake, without sufficient regard for appropriate learning design
3. Failure to plan for implementation
4. Acting on incorrect technical advice
5. Team members thought they were technically competent but were not
6. The project did not prepare learners for participation in new learning experiences such as working in groups
7. The project over-estimated learners willingness to engage in higher level learning activities

Work with all members of the agricultural community to achieve change

The extension program 'Wormplan' reduced drench resistance in the wool industry by worked with agribusiness, rural merchants and private veterinarians to leverage its own extension efforts with farmers (Fulton and Champion 1998). The program was more effective than its counterparts in other states and more efficient in its use of resources. By the end of the program the rural merchandising firms were incorporating the key messages of Wormplan in their advertising copy; private veterinarians were providing fee-based Wormplan services to farmers; rural merchants were advocating best practice drenching practices; and many farmers were undertaking their own monitoring and evaluation of their practices. Quinn (1999) suggests cattle breed societies and seedstock producers can have a useful educative role in encouraging improved farm practice.

Learn from others bringing about change

Programs in other sectors offer us innovative approaches. Many of these are public programs that extension people are the recipients of, such as SunSmart, Keep Australia Beautiful and the introduction of the GST. A less well-known program is Vipassana, an intensive technique of personal insight (Bedi 1999; Meijor 1999). Vispassana has been taught within prisons to inmates and staff, correcting the root causes of addictive and anti-social behaviour patterns and developing beneficial behaviours such as generosity, honesty, compassion and tolerance. Vispassana is seen within the prisons as a holistic means to address an array of interconnected behaviours and has amongst other things increased the effectiveness of other educational activities within the prisons.

Focus on meaningful benefits

The Grains Research and Development Corporation (GRDC) focuses on sustainable profitable solutions. It targets financial benefits to growers and involve producers in research. Meat and Livestock Australia (MLA) uses values-based marketing that concentrates on using clear market signals to drive change. An example of this is the Meat Standards Australia.

Have clear goals and good communication

The Farming Systems Project (South Western Queensland) is a GRDC project that has reached 46% of producers. This project has clearly defined goals, shared vision, strong leadership and a good communication process. These have all helped determine the success.

Use specialist advice to develop programs

The Dairy Research and Development Corporation (DRDC) has used consultants (both communication and agricultural consultants) to help them develop their approaches.

Choose a delivery method that suits the participants

In bringing about change with participants, one interviewee said that they deliver information in a way that it is most comfortable for the participants to be able to hear it. If they do not hear the message, then the process is considered to have been ineffective.

Create discomfort in a safe environment

There is a need to create discomfort, however if this discomfort is created in an unsafe environment, it becomes counter productive. To create a safe environment, participants are encouraged to explore their own awareness. This widens participants' choices and facilitates change.

Focus on making an impact

An approach that the Rural Extension Centre (REC) promotes is to focus on what makes a real difference to achieving specific outcomes. These generally tend to be high impact things. People are also encouraged to stop doing things that don't make a real difference.
Techniques that are used are:

- Systems dynamics
- Change and innovation models (these are both computer based)

Use flexible delivery approaches

Property Management Planning uses a flexible delivery mechanism. The program adopts a co-learning approach that affects and interacts with culture. Property Management Planning invested time and money in training facilitators using Geoffrey Stibbard to introduce hard selling and closing the deal to the team.

Use action learning

Involving farmers directly with learning the tools and processes used in training has been successful for some programs. The Farming Systems project of Grains Research and Development Corporation looks at different ways that people interpret problems, issues and research on farm. Action learning processes are used throughout the workshops to encourage participants to want to use the tools in "real time" on their own properties. A review of the process allows participants to learn from each other, with the subsequent uptake of the program being very successful.

Address social needs

One of the subjects suggested the reasons for Landcare's success was its provision of a social replacement for religion and other declining social activities. Other success factors were:

- It was an internally driven program with high ownership.
- It was based on an immediate need
- It targeted single issues first and developed into more holistic approaches

Understand the people and the system

To achieve maximum leverage from existing organisations and people, providers need an understanding of the problem and the people who influence change. If there is an understanding of how the people, the community and the industry work, and who makes decisions, the issues can be addressed quickly and more directly.

Find ways of motivating people

The Indigenous Land Corporation (ILC) has attempted to decrease welfare dependency. It responds to requests that are basically for money. The Indigenous Land Corporation networks with other agencies and organisations and works on how to motivate people for things other than money.

3.3 Groups

Use and value farmer knowledge in group learning

Groups can use farm knowledge to improve the effectiveness of their activities. One group studied by Millar and Curtis (1999), for example, used farmer knowledge to provide a local, practical and integrated approach to pasture development and management. The group capitalised on the knowledge a local farmer had gained from 20 years of trial and error with pasture establishment by getting him to conduct a pasture management course. In the same study, a more formal grazing management course used farmer knowledge to apply scientific principles to real farm situations and provide comparative information. Millar and Curtis (1999) concluded that in both cases, farmer knowledge established relevance or purpose for activities, and brought practical experience, historical information, an holistic approach and a diversity of views and backgrounds.

Farm businesses evaluating and advising one another

Executive Link® is run nationwide by Resource Consulting Services to assist farm businesses to address the issues that limit the profitability of the business. The program involves the formation of boards of five to six farm businesses that meet for three days, three times a year, for three years to review each other's business performance and proposals and to undertake professional development activities. Kilpatrick and Bell (2000) evaluated this approach and found that through improved communication, the diverse goals of family members were acknowledge and incorporated into better planning and direction for the business.

Encourage self-managed farmer learning groups

VCG (1999b) developed two farmer groups to work on topics of their own interest. After a one-day training and planning workshop and a couple of group meetings, the groups took responsibility for their own management. Participants found the groups to be beneficial and were willing to pay the operating costs of future groups, such as coaching and administration. VCG (1999b) recommended the project required a second phase of training of coaches and administrators, a central point for information about the groups, and accessible support. Promotion via existing networks and endorsement from leaders would assist the uptake of such groups.

Link scientists and producer groups through private consultants

In New Zealand, research institutions facilitate the development of growers groups as a tool for maintaining links between research and production. These are initially run by the research scientists, meeting with growers and agricultural consultants throughout the production season to provide integrated advice and support for decision making. After a period of a year or so, the agricultural consultants take on the role of managing the grower groups, paid for by the growers. The scientists then interact with the consultants to provide assistance with grower advice and support. This system builds the skills of consultants and growers; improves relationships and feedback between researchers, consultants and growers; and allows clear separation of role between researchers and consultants.

3.4 New technologies and publications

Use of internet for education and training courses

Groves and Da Rin (1999) in their report on farmers and the internet, suggested that such technology is ideally suited for delivery of many types of education and training courses as well as for email, chat rooms, bulletin boards, and other information provision. They proposed that, currently, there was no evidence to indicate that there is any difference between the quality of computer-mediated on-line delivery than more traditional means. Furthermore, Internet delivery decreases both social and geographical barriers to participation and costs significantly less than traditional delivery systems. Groves and Da Rin (1999) argue that education and training are becoming increasingly important instruments of rural policy, but Internet access is highly skewed towards those with the highest levels of education in any case.
The electronic newsletter SEA News has been an extremely effective extension medium (in an awareness sense) for David Pannell's research team. Now into its 3rd year and 7tth edition it has over 2000 subscribers, and recorded over 31,000 hits in 1999 (www.general.uwa.edu.au/u/dpannell/sustecon.htm). For the researchers involved, it gives constant feedback from a wide range of people all over Australia, and ensures that research is disseminated as quickly and as widely as possible.

Extension should provide support for dealing with information overload

Kalim Qamar (1999) in his report on effective information systems for technology transfer, highlighted some key issues for improving extension provisioning in an environment which is becoming increasingly cluttered media and computerised information systems. He considered that in the situation where growers were effectively becoming victims of excessive information, support from extension staff actually becomes more important.
"Such support includes activities like farmers training, field demonstrations, monitoring, follow-up and evaluation, and above all building up farmers' moral and confidence, which cannot be provided through any media-oriented or … technology based systems"

Avoid total reliance on any single information system

In order to achieve maximum benefits, Kalim Qamar (1999) proposed that it makes sense to select a range of real-life, and technology based systems, since every approach has both strong and weak points.

Simulation games

An interactive risk management workshop, "Risky Business" is a simulation game used as a tool in farming systems education (Stewart *et al.* 2000). It has been used with various client groups (extension practitioners, researchers, consultants, bankers, farmers, students) for facilitating learning and understanding of the principles of risk management. Participants in the workshops are responsible for managing a rural business. They experience the joys and stresses of decision-making under uncertainty. They learn the principles of risk management in an environment where they have fun competing and cooperating with each other[5]. An example is Salty Business. Agricultural professionals are placed in the role of a farmer and have to "manage" a typical Western Australian eastern wheat belt farm, located in a catchment under threat of dryland salinity, for a number of

[5] If you are interested in finding out more about "Risky Business" you should contact Amir Abadi, Touchstone Consultancy, 041 356 7121 (Email: aabadi@cyllene.uwa.edu.au).

seasons under conditions of climatic, yield and price uncertainty. The workshops provide an enjoyable and effective learning environment for agricultural professionals to gain an understanding about a range of issues (Marsh 1999).

Use Sky channel

Innovative approaches using technology has been successfully used in agriculture. One approach used satellite delivery of a message via sky channel. An insert went into the Ground Cover magazine called "Diseases from Space". A satellite delivery of a studio broadcast by several of the best consultant, extension and pathologist talent was conducted on cereal diseases. This was timed a month before one of the biggest disease outbreaks in recent time.

The panel discussion was broadcast to CRT agents across Australia. The owners had invited clients in for a viewing, a "sausage sizzle" and a discussion with specialist advisors who workshopped the issues. Distant growers phoned their questions in to the panel and heard the answers on television.

Produce branded products to meets client's needs

Branded information products like the "Ute Guides", "Back Pocket Guides" and TopCrop cards have increased the value of the package in the growers' mind.

Develop reports people want to read by talking to the readers

To address the lack of time for reading of research reports by end-users, Agribusiness Marketing Services (1998) developed an information product – the Research Snapshot - which adds value to existing information by highlighting the key findings in a brief user-friendly format. Through consultation with clients, Agribusiness Marketing Services (1998) determined the structure, layout and design elements of the Research Snapshot that are most important to the key clients. These were pre-tested and a writer's guide prepared. The approach has been adopted in the RIRDC Short Reports.

3.5 Other approaches

Following through on benchmarking

New approaches to supporting benchmarking programs are being implemented. This is in response to the lack of a supportive decision-making system to ensure 'better' information results in 'better' decision-making (Worsley and Gardener 1999). The Grains Research and Development Corporation (GRDC) program TopCrop has developed a process to assist producers to implement changes as a result of clearly understanding and interpreting their benchmarking data, as was the Dairy Research and Development Corporation (DRDC) program "Decisions for Action".

Support youth in agriculture

Milstein and Cameron (1998) demonstrated the value of the Young Achievement Australia Program, for the development of rural youth. The program was introduced some years ago to provide Year 11 students with the opportunity to gain skills in enterprise and innovation by participating in the setting up and running of a real business. Milstein and Cameron (1998) found that most participants regarded it as an outstanding feature of their education, several years after completing the program. The authors proposed the course might have value when offered outside the school curriculum to contribute to the development of future rural leaders and skilled farm business managers.

Using local people to complement 'formal' programs

Innovative farmers could be more formally trained and paid by industry, government or other farmers, to act as local community educators. In Western Australia, in the area of rural health, trained paraprofessionals who can mediate between the general community and the professional services, initiate and maintain programs that fill gaps in services, respond rapidly to community crises, work preventively with families and groups, and raise community well-being (Prinsley 1996).

Have formal mechanisms for advancing agricultural education and training

The Virtual Consulting Group (1999) suggests regional boards for the development of agriculture's human resources should be developed. The boards would adopt an advisory, research and planning, coordination and advocacy role that aims at enhancing general education, school and post-secondary retention rates in agriculture. The boards would also links to post-secondary providers to design and implement strategies. In Tasmania, the Tasmanian Board of Agricultural Education (TBAE) oversees the coordination and promotion of agricultural education for the state, having members from all of the public sector education/extension providers (University, TAFE, Department of Primary Industry, Water and Environment and the Department of Education) and from industry (Tasmanian Farmers and Graziers Association, and agribusiness).

Take a team approach to extension

The New Zealand extension approach was team based, with each member specializing in different technical areas, and supporting one another. It had an overall management focus for the services (business management, benchmarking, crop protection, plant protection etc.) Each team member had links with the researchers and they ran and attended forums. Much of the delivery was done on a 1:1 basis and this was complemented by group activities. Extension followed a whole farm and supply chain model. It went from free to a fee for service, which had impacts on staff performance, administration etc.

Develop and pay high performers to do the extension

The High Performance Groups Project included the following innovative techniques:

- They trained group leaders and facilitators in group facilitation techniques;
- They took fully formed groups and put the whole group through a team building process to enhance group performance;
- They took individual farmers and paid them to organize events about new technology.

4. Existing and potential approaches to overcoming barriers to farmer participation in learning activities

Barriers to participation in learning or change opportunities may be factors related to an individual, their spouse, their family situation, and the characteristics of their farm, business, rural community or industry. They may also be related to the content, accessibility or delivery of the learning or change opportunities presented to the farmer. The suggestions presented here relate to approaches used to address these barriers.

Address the distance between farmers and science

Participative research, development and extension (RD&E) aims to increase the relevance of research to farmers, to reduce the social and knowledge gaps between farmers and researchers, and increase the uptake of research findings (Millar and Curtis 1999; Pretty 1995, 1997; Thompson 1995).

Provide access to extension services

The use of groups has in part been a strategy developed as a response to the restrictions to access of one-to -one extension services brought about by the budget reductions seen over the last few decades (Marsh and Pannell 2000, Millar and Curtis 1999).

Involve women

Elix *et al*. (1998) present several examples of Australian best practice strategies to overcome barriers to women's participation in management in corporate business, the public service, government and the agricultural sector, although few of these reports analysed the effectiveness of the strategies being implemented.

Make information more accessible through the Internet

Groves (1999) states that use of the Internet could help overcome barriers to participation in education and training caused by remoteness, and time constraints.

Make research reports more accessible

The production of short research reports as recommended by Hannam and McGregor (1998) is being trailed by Rural Industries Research and Development Corporation to make their content more accessible, however there is no evidence as yet to judge their effectiveness. Indeed, this literature review found them to have many shortcomings as effective communication tools.

Use farmer knowledge

While there are numerous participative research and extension programs, Millar and Curtis (1999) note there are few that involve farmers with the aim of benefiting the research process and research outcomes, rather than seeing farmer involvement as an extension method for the farmers benefit. In pasture research they found that where there is interaction between farmers and researchers as co-operators, it plays an important role in increasing the understanding of pasture systems by farmers, scientists and advisors. There are also few that actively plan to encourage and elicit farmers' tacit knowledge (Millar and Curtis 1999).

Make science more understandable to farmers

DOOR (Doing Our Own Research) is a method for supporting farmers to do their own research in a rigorous scientific manner that creates links between farmers and researchers (Acres Australia 1997).

Help farmers deliver their own extension

Self managed specific interest learning groups enable farmers to cooperatively learn about specific topics which have too limited an audience to warrant delivery by normal extension mechanisms, and at a minimal cost (Virtual Consulting Group 1999b).

Make participation relevant to clients needs

Beer *et al*. (1996) outline a process for strategically aligning an organisation that involved all levels of management. The process was designed so that participation was directly relevant to the achievement of employee's business objectives, overcoming resistance to other similar processes that are not seen as relevant by middle and lower managers.

Promote agricultural science to rural youth

One subject reported that the 'Science Equity' project on Tasmania's northwest coast has seen a University staff member working with schools to develop demand for and interest in tertiary agricultural education. This has included curriculum development of materials with agricultural science flavour for science students in secondary colleges and a summer scholarship program to place high quality students with agricultural industry for periods of work experience. The program has now been expanded through a new program titled "Partnerships in Tasmanian Primary Industry Science". This project involves an alliance between the University, schools and agricultural industry to promote agriculture, develop professional development opportunities and encourage and build a culture of life-long learning amongst agricultural professionals.

Institutions promoting the benefits of training

The Rural Training Council of Australia has developed a web site; they have developed some case studies to help market programs. They also produce newsletters four times per year and have fortnightly updates to let people know what is happening. Consultation with clients allows the needs to be determined more accurately and training packages are developed from this.

Major changes in an industry create demand

Subjects reported that pressure from deregulation has helped create a demand from the processing tomato growers. The number of growers went down from 100 to 40 and the ones who were left were keen to learn. "I don't know of many people who demand change", was a comment from one consultant. "Change is generally thrust upon them where voluntary participation is needed".

Increase the emphasis on creating a demand for change

Some departments reported a traditional lack of focus on marketing and communication plans. Traditionally they focused their efforts on what clients wanted and how it would be delivered, rather than on whether change was needed. The strength was in the technical areas and weaknesses arose in helping people make strategic decisions. Participation could be increased if increased emphasis was placed on creating demand for change.

Target all members of the farm family

Property Management Planning has targeted farm families and encouraged them to participate. They have used images, photos and words to market to women and the younger generation. The program has also used relationship marketing (using local people to talk to local people) to promote trust in the program. In addition, staff show the benefits and the processes that are used in workshop sessions.

Target women

Quite a few sectors have targeted their marketing at women, as they have been keen to learn and be involved. They more specifically wanted to learn about the business side of the farming operations. Generally women have not been targeted in the past, however with women and families, the theme for marketing of some programs and projects, attendance and interest has been high. Dairy Research and Development Corporation has used women to help create a demand for change. This was done in the Women In Dairying Project where women created a demand for themselves and an increasing demand in the family.

Continually build awareness of new approaches

Demand is not great if no one knows that you have developed a new approach. Awareness must be built continually around new approaches. The TopCrop network is very good at creating a demand for change. The marketing approach focuses on growers who voraciously benchmark to achieve beneficial change.

Understand and address clients' needs

Private consultants interviewed as a part of this project said that they need to understand the needs, recognise the opportunities and design a product to meet these needs. The product produced is dependent on needs. They will also work with other co-operators and agencies to create demand. This is fostered by personal relationships

Education creates demand for education

"If you can create a person who is better educated and informed, they will change more readily".

Use existing networks

Dairy Business Focus (DBF) and Property Management Planning targeted the use of network marketing to create demand for the services. Local people were used to build relationships with potential clients. These local people were involved in coordination of the DBF project, which meant that potential participants were dealing with locals. A greater feeling of confidence was built through cooperation and community learning. Creative approaches came from people working cooperatively. The training sector within Horticultural Research and Development Corporation also utilizes networks to help market the courses. They work closely with existing networks and frameworks to market the courses, as they are not the only ones who can deliver these courses.

Understand the customer

The Kondinin Group constructed a high, positive corporate profile that systematically trained their customers and invested in understanding them. This provides success. It is important to understand the cost to market with the first 20% of customers being low cost and the bottom 20% of farmers are high cost. The cost of sales increases as you go down the scale of farmer.

Segment the market

In Victoria, the Department of Natural Resources and Environment (DNRE) has categorised participants and look at extension from a marketing point of view. They categorized farmers into three levels:

A. Interested participants – they will come along to anything
B. Active non-participants – they don't go to anything
C. Interested non-participants – they are the target group.

Group C needs 1:1 contact to encourage them to go to anything. They would not normally go without this encouragement. Strategies to get them to come along could include frequent flier points etc.

5 Conclusion

This report presents many innovative approaches to agricultural extension and change. This list is, however, incomplete. A broader and more detailed survey of agricultural extension in Australia, and of the international literature would illuminate more innovative practices. While this report may serve as a useful list of suggestions for those involved in agricultural extension, more evidence is required to determine whether or not the approaches are effective or efficient, and under what circumstances they would be so.

Appendix 2: Opportunities for research and development to foster the development of human capacity in Australian agriculture

Joint Research and Development Corporation Briefing Paper 3

By Amabel Fulton, David Fulton, Tim Tabart, Peter Ball, Scott Champion and Jane Weatherley, Tasmanian Institute of Agricultural Research

Executive summary

This briefing paper identifies potential opportunities for research and development (R&D) to support the creation of a lifelong learning culture within the Australian agricultural community. The paper was developed through a review of the literature (reported in briefing paper 1) and a broad consultation process with more than 60 potential investors, researchers, practitioners and customers.

The paper identifies research and development opportunities in four key areas, as outlined below, and described in more detail in the report.

1. Research and Development on institutional change and organisational structures supporting learning and change

1.1 A standard set of criteria for predicting, monitoring and evaluating the efficiency and effectiveness of agricultural development services
1.2 Describing Australia's agricultural development systems
1.3 Practical strategies for implementing change within organisations
1.4 Strategies for integrated provision of agricultural development services

2. Research and Development on the professional development of farm advisers including their structural arrangement and careers

2.1 Who are Australia's extension practitioners, what do they do and why?
2.2 Strategies for improving the effectiveness and efficiency of extension practitioners

3. Research and Development on the facilitation of enhanced learning processes on farm

3.1 Processes for enhancing human capacity
3.3 Working with groups – what works when and how to do it
3.2 Designing effective development programs

4. Research and Development on overcoming barriers to farmer participation in learning activities

4.1 A deeper understanding of factors affecting participation in learning/change
4.2 Understanding non-participation in learning/change
4.3 Tools for identifying and addressing drivers and barriers to participation in learning/change

The key principles underlying the Research and Development program proposed are:

- The need for effective, efficient, accountable research, extension and education services
- The need to create research products that are valued by customers
- The need to involve all members of the agricultural community in research, extension and education
- The interdependency of research, extension and education
- An interdisciplinary approach to extension research
- The need to ensure research findings are captured and integrated into daily practice, leading to enhanced human and economic development in agriculture
- The need for continuous improvement of research products
- Identifying, promoting and marketing research and research products that are relevant to industries, organisations and individuals outside of agriculture

The contents of this paper, and the three other briefing papers[6], were circulated for feedback, and discussed at a workshop in Melbourne at the end of August 2000.

[6] Briefing paper 1: Summary of relevant recent and current R&D on agricultural extension, learning and change. Appendix 1 - briefing paper 2: Existing and potential innovative approaches to creating demand for learning and change. Appendix 3 - briefing paper 4: Communication of developments in extension research and practice to Australian extension providers

Introduction

This briefing paper aims to identify potential opportunities for research and development (R&D) to support the creation of a lifelong learning culture within the Australian agricultural community. The paper was developed through a review of the literature (reported in briefing paper 1) and a broad consultation process with more than 60 potential investors, researchers, practitioners and customers. The contents of this paper and the other three briefing papers were discussed at a workshop in Melbourne at the end of August 2000.

The paper identifies these opportunities in four key areas, as identified by the steering committee of the Joint Research and Development Corporation project:

5. Institutional change and organisational structures supporting learning and change
6. The professional development of farm advisers including their structural arrangement and careers
7. The facilitation of enhanced learning/change processes on farm
8. Better understanding of the barriers to participation in learning opportunities

While the authors consider further examination of participative research and extension to be a priority for this research program, this has deliberately not been addressed in this report due to work on this topic being undertaken by the Land and Water Resources Research and Development Corporation (LWRRDC).

Within each of the four areas outlined above, three to four major research and development strategies have been described in terms of their relative strengths and weaknesses; the likely benefits to the customers and the funders; the target market and the advantages of the strategy over what is currently available. An appendix details the strategies that emerged from the literature review, and that were suggested by those interviewed or surveyed.

The research priorities described here reflect the combination of results from the literature review and the stakeholder consultation. The way in which they have been developed reflects some the key themes of the international and Australian literature on agricultural extension. In an effort to make these underlying themes explicit, four are described here: the purpose of extension; extension as one mechanism of agricultural development; the purpose of research; and the key elements of successful research.

This paper considers change and learning as processes in human and economic development[7]. The aim of extension, then, is to use these processes to contribute towards human and economic development in agriculture. Its success, then, is measured in human and economic outcomes, rather than by measuring change per se. The complex nature of agricultural systems means the customers for extension must be considered as all members of the agricultural community (such as farm men and women and their relations; employees, contractors; advisers; salespersons; agribusiness firms; government; researchers; and educators). The urban community also needs to be considered as part of the extension continuum, particularly in relation to rural production and land management where debates and conflicts need to be dealt with in a productive manner. In addition, extension is considered as one of three interdependent policy mechanisms for human and economic development in agriculture: research[8], extension and education[9]. The term “agricultural development” is used here to describe these three mechanisms.

[7] Economic development is used here as incorporating sustainability and environmental management
[8] Research is used here to include applied research and development, not basic research
[9] Education is used here to describe formal processes of institutional learning such as primary and secondary schooling, TAFE and University

For agricultural development services to enhance Australian agriculture's human and economic development, they need to be effective, efficient and accountable. Agricultural development services need to meet the needs of their funders and their customers, be delivered by the most appropriate service providers in a cost efficient manner, and use the latest techniques for ensuring the outcomes of human and economic development are achieved. This applies equally to research, extension and education.

Investment in research is considered as a key to enhancing human and economic development. That is, however, only provided that the findings of the research are captured and able to deliver benefits to society. The priorities identified in this paper place a strong emphasis on ensuring the findings of research are integrated into the daily practice of organisations and individuals. One of the key drivers for this is ensuring research addresses issues of importance to its customers. Once this is achieved, the research needs to be conducted to a high standard. In the case of research on agricultural development, this needs to draw from the international and Australian literature in a wide range of disciplines (such as psychology, organisational change, education, public health communication, marketing, sociology, environmental studies, geography, adult education, management, economics, political science etc.).

The research process does not stop with the publication of results. This paper emphasises the need to follow through the research to create tools and products that extension practitioners and their employers can use to increase the effectiveness and efficiency of what they do. Processes of participation[10], action research[11], interdisciplinarity[12] and continuous improvement[13] are seen as critical for converting research into practice. The research products should themselves be subject to continuous improvement. The recommendations also take a forward looking approach, focusing on what can be done to improve the future, rather than what was wrong with the past. The recommendations do, however, recognise the value of reflecting on the past to prepare for the future.

Finally, there is an emphasis on creating research products that meet a current or latent demand. The topic of research aimed at fostering the enhancement human capacity is relevant to all of Australia's industries, organisations and individuals. There is a huge opportunity for the investors in this type of research to not only play a major role in the advancement of Australian agriculture, but also in the advancement of the broader Australian economy and society.

Many of the themes outlined above appear regularly throughout this document. While not all readers will agree with the recommendations outlined in this paper, we hope that the ideas will stimulate discussion and debate on the topic of extension.

[10] Participation is used here to describe the process of involving all stakeholders in the research process
[11] Action research is used here to describe the process of research by 'doing'
[12] Interdisciplinarity is used here to mean a cooperative team approach by persons or organisations from a range of fields of expertise to achieve a shared outcome
[13] Continuous improvement is used here to mean the process of monitoring and modifying actions based on learning

1. Research and Development on institutional change and organisational structures supporting learning and change

1.1 A standard set of criteria for predicting, monitoring and evaluating the efficiency and effectiveness of agricultural development services

The strategy aims to develop a standard and flexible set of criteria to be used Australia wide for predicting[14], monitoring[15] and final evaluation[16] of the effectiveness and efficiency of existing and proposed agricultural development services[17]. The criteria would be developed through a review of relevant literature; a participative process for obtaining agreement on criteria by funders, practitioners[18] and customers; and by testing of proposed criteria on past and current programs[19]. Example criteria may be the level of stakeholder participation in program design; expected outcomes and performance indicators against these outcomes; level of accountability; and measures taken to optimise participation. The criteria would be simple to determine and meaningful. They would be supported by a set of guidelines for their determination, for their use, and for training organisations and individuals to use them.

The criteria could be used to assess activities[20], individual practitioners, organisations, or combinations of each of these. The information obtained from pre-project analysis could be used to predict who would benefit from the service, who should pay and who should deliver. The information obtained from monitoring projects could be used to redesign programs to make them more effective and efficient. Data obtained from final evaluation of projects could be used for accountability purposes. Programs evaluated using these criteria could be compared to provide evidence to providers and funders of the most effective and efficient mechanisms for service provision.

The target market for the strategy

The target market would be funders and providers of agricultural research, extension and education.

Advantages of the strategy over what is currently available

While there are systems available for evaluating the success of extension delivery, there are no standard procedures accepted or used by Australia's major extension funders and providers. In addition, these systems do not allow comparison between programs, providers or activities.

[14] Predicting is used here to mean the forecasting the possible consequences of particular action
[15] Monitoring is used here to mean the process of on-going assessment of a particular activity
[16] Evaluating is used here to mean assessment of a particular program or activity. It includes prediction and monitoring, and can also be considered as research.
[17] Agricultural development is used here to mean research, extension and education services for agriculture
[18] Unless otherwise specified, practitioners is used here to represent individuals providing research, extension or education services
[19] An agricultural development program is used here to mean a large grouping of a series of small projects
[20] Activities are used here to mean development processes such as lecturing, seminars, groups, field days, demonstrations

The relative strengths and weaknesses of the strategy

The development and application of the criteria would increase the level of evaluation of agricultural services and make deliverers more accountable for their outcomes. The criteria would allow a uniform system of assessment of the effectiveness and efficiency of agricultural development services throughout Australia. This would allow funders, organisations and individuals to better assess the value of their investment in service provision. The criteria would also allow cross-industry comparison of organisational structures; individual practitioner performance and of change activities. In addition, the process would provide an opportunity for continuous improvement of the organisations, individuals or activities being evaluated.

There is a risk that the use of the criteria could be cumbersome and difficult to implement, and that the funders and service deliverers may consider the introduction of evaluation tools into research, extension and education services as unnecessary. These concerns can be addressed in the design of the Research and Development program to focus it on achieving outcomes that are useful and relevant to its customers. Providers may also consider that such criteria may restrict or stifle innovation, but there is evidence that clear systems for evaluation of performance promote, rather than stifle, creativity.

The likely benefits to the customer if the strategy was implemented

Customers would benefit through improved effectiveness of agricultural development services; from the increased transparency of costs and benefits; and from the broader range of services offered due to increases in efficiency of service delivery.

The likely benefits to the funders of investment

Funders would gain a better return on investment in agricultural development programs due to the increased efficiency and effectiveness of service provision. Using the criteria in a predictive manner, funders would be able to make informed decisions about the nature and extent of agricultural development services they wish to fund. The criteria or system developed through the research could be marketed to other industries and sectors seeking improvements in efficiency and effectiveness of service delivery.

1.2 Describing Australia's agricultural development systems

The structure and function of the Australian agricultural development service provision system would be described, made publicly available, and updated annually or biannually. A system would be developed to describe who is doing what (in terms of providing agricultural development services) around Australia. Organisations described would include funders and providers of commercial, non-government and government research, extension and education services. The relationships and information flows between organisations would be described. The Australian system, and forces impacting on it, would be analysed and compared to those operating overseas, resulting in recommendations for improvement. The description would provide a basis for optimizing the functioning of the whole system, not just isolated parts. Over time, the information could also include efficiency and effectiveness reporting.

Cooperating institutions would provide much of the information in the initial phases, and over time the remainder could be gathered through an annual interview process. The information could be captured on a database, or web site, to allow funders, providers and customers to access the latest information on the availability and nature of agricultural development services in Australia.

Advantages of the strategy over what is currently available

The current agricultural development system in Australia is undergoing substantial restructuring. However, the current state of the system is not well understood. While there is some information on individual service providers and their functions, there is no coordinated documentation of agricultural development services in Australia. This would provide benefits to funders, providers and customers, and ultimately lead to improvements in the effectiveness and efficiency of agricultural services.

The relative strengths and weaknesses of the strategy

The strategy provides benefits to funders, providers and customers. Documentation of the current Australian extension provision system would highlight overlaps and deficiencies in provision of services, demonstrate the capabilities of the wide range of organisations involved in agricultural development services, create a broader understanding of the role of extension in agricultural development, and highlight opportunities for collaboration between service providers. The information would assist funders to identify opportunities for points of leverage for gaining the greatest returns from their investment in agricultural development services. It would support continuous improvement in the delivery of services to customers as providers have greater access to information regarding the services offered by others.

The strategy may be difficult to obtain funding for because funders and providers either believe they know how the system works already, or they do not believe that information on how other sectors operate would be relevant to their operation. The task is potentially very large and complex, therefore requiring a manageable level of detail of the description. There is a possibility that rapid change in the provision of agricultural development services may render the information out-of-date quite quickly, so regular updating must be maintained. The competitive environment for service provision and the politically sensitive nature of funding may prevent disclosure and collaboration. Some organisations may prefer that duplication is not exposed so as to ensure their continued survival. Finally, any improvements to the system that are made will be made voluntarily or through funder directives, as there is no onus on service providers to use the information to change or modify their services.

The likely benefits to customers if the strategy was implemented

Customers of the information will be able to find out who is providing what services, where and when. They can be confident of reduced duplication, fewer mixed messages and increased efficiency of service delivery. Service providers will benefit from the opportunity to see what innovation is occurring in Australian agricultural service provision, how they are positioned within the system, and how to contact other service providers and practitioners.

The likely benefit to funders of the investment

Funders will have better information on the full range of service providers and be able to identify opportunities for reduced duplication and increased collaboration. Funders will be working with a service sector that is more knowledgeable of complementary service providers, and thus better able to build multi-disciplinary problem solving teams. There will be increased promotion and accountability of funder and provider services, as those providing services will be acknowledged, while the claims of providers will be scrutinized and discrepancies highlighted.

1.3 Practical strategies for implementing change within organisations

The strategy aims to develop practical strategies for achieving

1. Organisational alignment – aligning the structure, control and incentive systems, corporate culture and management style with the organisation's espoused vision; and
2. Creative work environments within agricultural development organisations.

While there is a considerable body of knowledge pointing out the desirability of such goals, there are few organisations in any field that achieve them, and there is little knowledge of how to bring them about. This strategy would review existing knowledge, develop strategies for achieving these goals, and evaluate these methods in a series of case study applications. The system developed then be made available, supplemented by training material, to organisations providing agricultural development services.

Target market for the strategy

The target markets are organisations providing agricultural development services, plus farm businesses and agribusinesses.

Advantages of the strategy over what is currently available

The rapidly changing nature of agriculture and agricultural service provision means that continuous adaptation will be important and that strategic and organisational change will be increasingly interdependent. Therefore, overcoming the current lack of understanding of how organisational change is to be implemented is critical to the future. To date there have been many recommendations about what changes need to occur to improve organisational effectiveness and efficiency, but very little implementation. This strategy would provide mechanisms for organisations to implement these recommendations.

The relative strengths and weaknesses of the strategy

The strategy would improve the standard of delivery of agricultural development services. It would provide a means for frustrated funders, employees and customers to have organisations recognize and address their needs. This would reduce wastage of both financial and human resources, and lead to organisations that are responsive to change. Service organisations would be better able to undertake continuous innovation and development, and better able respond to the changing environment.

Additional spin-offs would be improvements in the working conditions of practitioners, increased human capacity amongst practitioners. Practitioners and organisations advocating change within agriculture would also be 'walking the talk', having personally experienced change themselves. If this strategy was successful, the product would be in strong demand across many industries and organisations, and the funders and deliverers of the research would be widely recognized for their efforts.

The main threat to the strategy is a lack of awareness that the internal operation of agricultural service organisations is relevant to learning and change within agriculture. There may also be a lack of confidence by organisations that the recommendations for organisational improvement can be successfully implemented. There may also be a lack of willingness by organisations to having themselves exposed to this type of research. These weaknesses could be overcome through a participative research process where opportunities for improvement in service delivery could be identified in collaboration with organisations and practitioners.

The likely benefits to customers if the strategy was implemented

The ultimate customers of this research, the agricultural community[21], service practitioners and organisations, would benefit from improvements in the efficiency, effectiveness and accountability of service delivery by agricultural development organisations. Customers would be able to choose from a group of excellent, inspirational and experienced practitioners and organisations and be confident that the services would meet the customer's needs.

The likely benefits to funders if the strategy was implemented

Funders would benefit from improved return on their investment in agricultural development services. The system would have increased professionalism, with satisfied customers and satisfied practitioners. Funders would have increased confidence that service providers would be able to respond to the funders' needs. The system developed for achieving organisational change would be a product that could be marketed to other organisations and industries.

1.4 Strategies for integrated provision of agricultural development services

The aim of this research would be to identify and implement opportunities for integrated provision of services by appropriate combinations of organisations and individuals. This would draw on the research on organisational and practitioner cooperation, interdisciplinarity and teamwork both within and outside agriculture. Project design tools would be developed for service organisations and practitioners to consider what roles other service providers could play in achieving the desired outcomes. The tools would also provide guidance on how cooperation between organisations and individuals could be achieved, maintained and evaluated. The design tools would be supported by a guidebook and a training package. Ideally, the project design tools would also be used as a policy tool to link the activity of the practitioner or organisation to its goals.

Target market for the strategy

The target markets would be trainers of practitioners, practitioners themselves, policy makers, organisations, and funders of agricultural development.

Advantages over what is currently available

There is little documented or anecdotal evidence of integrated agricultural development programs. This strategy would lead to improvements in linkages between research, extension and education; between research/extension and TAFE; between research/extension and Universities; between private and public research/extension; and between agribusiness research/extension and other research/extension). Within extension there are few design tools available, particularly those that assist with the development of integrated approaches to service delivery. Few funders require service providers to demonstrate use of appropriate design tools or that integrated approaches have been considered, and few service providers presently have the skills to initiate, maintain and evaluate integrated service delivery.

[21] The agricultural community includes those involved in agriculture: farm family members (women, older generation and younger generation), farm employees, agricultural contractors and agribusiness employees etc.

The relative strengths and weaknesses of the strategy

Integrated provision of agricultural development services would lead to increased efficiency and effectiveness of extension, with benefits to the agricultural community, organisations and funders. The development of a project design tool is a simple mechanism for capturing past research and creating an integrated approach to service provision. This provides the opportunities for all players in an industry to be involved in the collaborative delivery of agricultural development services, leading to increased synergy through shared knowledge and understanding, visions and practices. While the design tool would have the greatest impact if adopted by organisations, it could still achieve significant change if practitioners, independent of their organisations, adopted it. It would provide a mechanism for continuous improvement within service organisations, and within industries, shifting the emphasis from activities and outputs to outcomes.

The weaknesses of the strategy are the need for it to address the current barriers to integrated service provision. These barriers exist at practitioner, organisational and funder levels, and may act to dampen demand for the research product. The success of the strategy is dependent on commitment from organisations to use the product.

The likely benefits to customers if the strategy was implemented

The agricultural community would benefit from the increased efficiency of agricultural service provision. They would be more confident of appropriate products and services being provided by the respective providers. Services would be available from a range of providers, at a range of levels of complexity. The agricultural community could benefit from the increased knowledge sharing and consistency of messages between organisations. A more integrated service provision would allow the agricultural community to enjoy more meaningful interactions with informed service providers.

The likely benefits to funders if the strategy was implemented

Increased efficiency and effectiveness of agricultural development services would provide major benefits to funders through decreased costs and increased impact. The integrated approach to service provision would result in co-learning and in greater and longer-term ownership of the changes by the agricultural community. The increased involvement of a wide number of stakeholders would lead to increased awareness of the role of the funder. The system developed for achieving integrated service provision would be a product that could be marketed to other organisations and industries. The strategy itself, if broader than agriculture in its application, could attract a number of others funders to invest.

2. Research and Development on the professional development of farm advisers including their structural arrangement and careers

2.1 Who are Australia's extension practitioners, what do they do and why?

This strategy aims to develop recommendations for improving the human capacity of service providers in agricultural development. The qualifications, roles, practices, structural arrangements, earnings, professional development, access to resources, information being delivered, methods of delivery, relationships with others, attitudes and perspectives of extension practitioners will be described in relation to emerging trends in agricultural service provision.

Factors affecting the efficiency and effectiveness of extension practitioners will be identified. The extension practitioner characteristics will be compared with those expected by the agricultural community, industry, funders and employers, and also with the characteristics of extension practitioners in other countries and in other similar professions in Australia. Such data gathering could be done using external consultants, or internally, by the extension providers and practitioners themselves. Opportunities for improving the capacity of extension practitioners to support learning will be identified.

Target market for the strategy

The target markets would be educators and trainers of extension practitioners, funders and agricultural development organisations.

Advantages over what is currently available

There is currently a lack of knowledge of the characteristics and circumstances of extension practitioners. While there is some anecdotal evidence of high rates of turnover and low levels of satisfaction amongst extension practitioners, there is no documentation of this in the literature. Such a study would result in a concerted effort being placed on the professional development of extension practitioners.

The relative strengths and weaknesses of the strategy

Extension practitioners are a key component of effective agricultural development. The strategy will provide the agricultural industries of Australia with an opportunity to agree on competencies for extension practitioners and to develop strategic approaches to the professional development of extension practitioners. It will also provide a basis for revising job descriptions, the status of service providers, professional development and organisational structures.

A weakness of this strategy may be the resistance amongst employers and others to increasing the status and capacity of extension practitioners. This could be addressed by demonstrating the benefits of improved service delivery to employers and employees.

The likely benefits to customers if the strategy was implemented

The agricultural community would benefit from being able to draw on better skilled advisers to facilitate their own personal and agricultural development. Ultimately this would lead to better outcomes for the agricultural sector.

The likely benefits to funders if the strategy was implemented

Through a knowledge of extension practitioners' characteristics and circumstances, funders will have the opportunity to better meet the needs of extension practitioners. A more secure, innovative and enthusiastic workforce will create benefits in terms of efficiency and effectiveness of service delivery.

2.2 Strategies for improving the effectiveness and efficiency of extension practitioners

This strategy aims to develop mechanisms for improving the effectiveness and efficiency of extension practitioners by addressing their professional development needs, and those of their employing organisations. Examples of possible strategies include development of training needs audits for extension practitioners; national provision of professional development for service providers; development of local discussion groups for extension practitioners; sponsoring of conferences and workshops across industries; enhancement of professional networks; modification of undergraduate education; support for extension publications, resources and libraries; support for post-graduate research training; and national rewards or programs for leading professionals.

Strategies would be developed in response to a review of the literature on extension practitioner characteristics, on professional development programs of other professions, and of factors influencing the effectiveness and efficiency of extension practitioners. The strategies would then be developed and tested in a series of action research projects.

Target market for the strategy

The target markets would be educators and trainers of extension practitioners, extension practitioners, funders and agricultural development organisations.

Advantages over what is currently available

There is currently a lack of knowledge of the professional development of extension practitioners, but the anecdotal evidence suggests there is ample room for enhancing the human capacity of this group of people critical to agricultural development. Strategies would improve extension practitioners' access to extension education, training, networks, research and opportunities for innovation. This would lead to improvements in the delivery of services to agricultural industries.

The relative strengths and weaknesses of the strategy

The development of increased human capacity amongst extension practitioners will lead to increased effectiveness and efficiency of service providers. It is likely this can be achieved by leveraging existing efforts, rather than by creating new services or support structures. The weakness of the strategy may be that it is not as appealing to funders and extension practitioner employees due to a perception that the problems of agricultural development lie with the farming community, rather than all members of the agricultural community. This could be overcome by demonstrating the positive impacts of improving agricultural development services.

The likely benefits to customers if the strategy was implemented

The agricultural community would benefit from being able to draw on better skilled advisers to facilitate their own personal and agricultural development. Ultimately this would lead to better outcomes for the agricultural sector.

The likely benefits to funders if the strategy was implemented

Better trained and developed extension practitioners will be better able to respond to funders' needs. A more secure, innovative and enthusiastic workforce will create benefits in terms of efficiency and effectiveness of service delivery. Many of the strategies developed could be packaged into products and marketed to other professions.

3. Research and Development on the facilitation of enhanced learning processes on farm

3.1 Processes for enhancing human capacity

This strategy aims to examine the effectiveness of a range of processes for enhancing human capacity. It would include processes for learning, for creating a culture for learning, and for learning how to learn. These would include traditional extension processes such as facilitated groups, field days and demonstrations; and emerging processes such as the delivery of learning using information technology.

The research would involve evaluating a range of innovative[22] and effective processes for enhancing human capacity being used internationally and in Australia. Combinations of processes would be examined, not just activities on their own. The research would also examine factors affecting the effectiveness and efficiency of these processes for all members of the agricultural community, such as characteristics of the individuals and the context within which they are operating. The research would describe the range of processes available to service providers, and their relative advantages and disadvantages in a range of situations. A training package would be developed to assist practitioners in using this information.

Target market for the strategy

The target audience would be service deliverers, practitioners, and funders.

Advantages over what is currently available

There is considerable information on relative merits of processes but not detailed information on the extent to which they are appropriate in particular circumstances, nor how to decide this. Many international and Australian innovations in service delivery are not being documented, let alone evaluated. This project would allow these new approaches to be exposed to the broader community, leading to increased awareness and uptake of new ideas within the service sector.

The relative strengths and weaknesses of the strategy

This research would provide information on the effectiveness of particular extension strategies and the conditions under which they are effective. Effectiveness would be considered from the perspective of human capacity development, providing information about learning for all sectors of the agricultural community. There is an opportunity to build the research process into existing or forthcoming extension programs, and thereby leverage the investment in research.

However, there has already been a lot of research in this area and to move the research program forward, it will need to bring together a range of disciplines. In addition, users of innovative approaches may not wish to share their ideas with others, and service providers may be reluctant to have their work scrutinized publicly.

[22] Innovative is used here to mean new to extension practice in Australia

The likely benefits to customers if the strategy was implemented

Customers would benefit from improved service delivery as a result of the effective and efficient execution of a wider range of processes for agricultural development. Customers would also be dealing with motivated service providers who are working in an innovative environment, focusing on continuous improvement for themselves and the people around them.

The likely benefits to funders if the strategy was implemented

This strategy would allow funders to capitalise on the creativity in Australian extension. It would lead to improved effectiveness and efficiency of extension; and increased satisfaction of customers and service providers. Funders would have increased knowledge of the range of processes available and their relative merit such that they were better able to assess applications for funding. The final research product could be sold to other industries or organisations.

3.2 Working with groups – what works when and how to do it

This strategy aims to improve the effectiveness of group extension delivery for research, extension and education, recognizing that groups are very popular and an effective tool for delivery of a range of services. The research would result in detailed guidelines for group formation, maintenance, running, independence, evaluation and finalisation. These would incorporate all the latest research on working with groups, particularly in agricultural contexts, addressing all types of group processes from semi-formal training sessions to facilitated board meetings, and focusing on the range of approaches that can be used in group work. The experiences of Australian and overseas extension providers would be used to inform the work.

The research will provide guidelines to assist practitioners in identifying the characteristics and needs of group members. Topics covered will include deciding whether or not to use a group; methods for group formation, factors affecting group success; evaluating group performance; which group processes to use when; how to resolve conflicts and problems with groups; appropriate complementary techniques for leveraging group efforts (such as one on one follow up, media, internet); and approaches for achieving group independence. The findings would be published in a convenient form such as a guidebook, accompanied by a training package to assist practitioners in the guidebook's use. The strategies outlined in the book would be evaluated through a series of case studies throughout Australia.

Target market for the strategy

The target markets would be agricultural development service providers, both organisations and practitioners.

Advantages over what is currently available

While there is much information on running groups in Australian extension, this is often based on experiences in a specific industry, dealing with specific issues (such as natural resource management). This strategy would bring together knowledge of experiences from a wide range of approaches and contexts, and provide professionals with a bag of tools for the effective running of groups. It would capitalize on the existing group extension effort, and ensure groups were used appropriately, rather than for group's sake

The relative strengths and weaknesses of the strategy

This strategy will formalise all the information on group extension in one, pulling together a range of approaches. This information will be based on evidence and experience, and seek to assist service delivers in research, extension and education to address environmental, productivity and management issues using group work. The recommendations will be simple for individual practitioners to implement, and could be adopted as policy by organisations.

Its weakness is the lack of popularity of planning tools amongst extension professionals and many organisations. In addition, there is a great deal of existing information on working with groups, and this strategy would need to ensure it took this information a step further. It may also be difficult to incorporate all the relevant information in one guidebook while trying to address the needs of all the different providers and customers. The research must be packaged in a way that is attractive for extension practitioners to use.

The likely benefits to customers if the strategy was implemented

Customers would benefit from improved delivery of group extension activities. Group activities would be rewarding, leading to increased interest in participation. Group skills would also be developed in customers, which could then be used in other activities, increasing their self-dependence.

The likely benefits to funders if the strategy was implemented

For funders, a higher standard of group work in Australian extension would increase effectiveness and efficiency of service delivery. It would support the professional development of extension practitioners and result in satisfied customers. The research product could be sold to other industries and organisations.

Designing effective development programs

The strategy aims develop a tool for assisting those involved in research, extension, education, and information service delivery to design effective learning processes on farm. The tool would be used by practitioners, but could also be adopted as a policy tool for organisations. It would take designers step by step through what they need to consider in developing a change program.

The strategy would build on the latest research on designing development programs, drawing on a wide range of disciplines and industries, and on current practices in agricultural extension. The research would use the frameworks and tools developed in other strategies, such as the criteria for effective and efficient extension; strategies for integrated service provision; strategies for optimizing participation; and strategies for enhancing the capacity of extension practitioners to support learning.

The tools developed from this research would be documented in a simple guidebook, backed up by more detailed explanations with references to the latest research on the topic. The product would be evaluated in a series of action research case studies. A training package would be provided to assist practitioners in implementation, and to integrate it into educational and professional development activities. Practitioner and researcher feedback on the model would be used to allow its continuous improvement. The final product could be developed for sale to other industries or sectors.

Target market for the strategy

Practitioners, organisations of agricultural development services

Advantages over what is currently available

There are some project design tools available but most of these require significant adaptation to individual circumstances. The tools do not address the needs of the wide range of providers (research, extension and education) and they do not direct the project designer to the latest relevant research on service delivery. Practitioners need to be able to select from the range of approaches available to allow them to meet their program's goals in an achievable manner.

The relative strengths and weaknesses of the strategy

The strategy would provide benefits to practitioners, organisations and funders of agricultural services. It would be a practical simple tool for improving the efficiency and effectiveness of agricultural development, incorporating many of the latest approaches to service delivery. The product will be designed so that it can be continually developed and refined, building on the experience of those involved in its use. The strategy will help organisations and individuals align their service delivery with their desired outcomes. The tools would address the needs of a wide range of service deliverers.

One of the weaknesses of the strategy is that organisations may have their own processes for planning and be disinterested in considering another. The process of developing the tool could get bogged down, so it would need to start at the simplest level and continually develop and expand. The success of the strategy would be dependent on its adoption by organisations. This could be addressed by using a participative approach to its development

The likely benefits to customers if the strategy was implemented

Customers would benefit from programs designed to meet their needs. These programs would be delivered efficiently and effectively and public evaluation of them would allow customers to compare different programs. The use of the tools would be part of the process of the continuous professional development of extension practitioners.

The likely benefits to funders if the strategy was implemented

Funders could be confident that programs for the delivery of agricultural development were well designed, incorporating recommendations from past research. Overall there would be an increase in the efficiency and effectiveness of extension.

4. Research and Development on overcoming barriers to farmer participation in learning opportunities

4.1 A deeper understanding of factors affecting participation in learning/change

The strategy aims to fully explore the factors affecting participation in learning/change. It would build on the existing international and Australian research on drivers and barriers to participation in learning in agriculture and other industries. It would also examine the research and practice relating to approaches to enhancing and/or overcoming these. The strategy would examine participation in all forms of learning opportunities: self-directed or personal (such as reading, surfing the net and using an adviser); higher education (TAFE and University); and extension education (workshops, conferences, seminars, field days etc). The process of 'participating' would be observed and explored in detail to assist in the identification of factors affecting participation in all forms of learning opportunities. Recommendations would be presented to assist service providers in understanding the participation process, and in identifying what strategies can be used to encourage enhanced participation by the customer group.

Target market for the strategy

The target market for the strategy would be organisations and individuals providing agricultural education, extension and research services.

Advantages over what is currently available

The current literature on barriers to participation in learning in agriculture is limited in its depth. The relative importance of drivers and barriers has not been well documented. This research would seek to overcome these limitations.

The relative strengths and weaknesses of the strategy

The strategy would identify the root cause of factors affecting participation in learning or change. Project designers could then address the causes, rather than the symptoms, of non-participation. An understanding of the relative importance of different factors affecting participation then allows resources to be focused on points of highest leverage.

A weakness of the strategy may be that funders and practitioners consider they already have a good understanding of the factors affecting participation in learning, and thus not consider this strategy a worthy investment. The extent to which barriers are addressed by service deliverers could be evaluated as the first part of the project. Another weakness may be that participation in learning or change is already occurring to a high level in Australian agriculture, and in these circumstances increased participation may be difficult to achieve. The strategy will help to elucidate whether or not this is the case.

The likely benefits to customers if the strategy was implemented

Customers would benefit through more relevant, accessible learning programs, and ultimately, increased participation in learning opportunities. Practitioners and organisations would benefit from increased participation in activities and programs. This would lead to enhanced confidence and competency amongst service providers. Overall there would be an improved culture for enhancing lifelong learning.

The likely benefits to funders if the strategy was implemented

Funders would benefit through increases in the efficiency and effectiveness of their investment in agricultural development resulting from optimal participation in learning. This would lead to faster uptake of appropriate technologies and approaches by customers. The information generated from this program would be of relevance to a wide range of industries.

4.2 Understanding non-participation in learning/change

The strategy aims to develop recommendations for facilitating change amongst non-participants in formal processes of learning or change. The research would seek to identify the characteristics of non-participants and factors affecting participation in learning, such as their needs; their education history; current involvement in learning/change; attitudes; family and cultural circumstances; and opportunity for participation in learning. The impacts of non-participation on the individuals and their businesses could be examined. Working with these people, researchers would seek to identify mechanisms by which their learning could be enhanced.

Target market for the strategy

The target market for the strategy would be organisations and individuals providing agricultural education, extension, information and research services.

Advantages over what is currently available

The current literature on participation in learning in agriculture focuses on participants, rather than non-participants. While there is much discussion about non-participants, there is little information on who they are, or why they are not (apparently) participating. This research would seek to overcome these limitations.

The relative strengths and weaknesses of the strategy

The strength of the strategy is that it would provide a means by which agricultural development efforts could be directed to a broader audience, rather than just those currently participating in learning. It would provide information on what levels of participation should be expected, and the reasons for this. The strategy would also help in the identification of appropriate mechanisms for enhancing learning/change across the whole spectrum of the agricultural community.

A weakness of the strategy may be that the reasons for non-participation are extremely complex and therefore difficult or expensive to address. This may lead to alienation amongst funders, customers and practitioners if their expectations for immediate improvements in participation in learning/change have been raised. Nevertheless, is may also indicate the level of return on investment that can be expected from working with non-participants.

The likely benefits to customers if the strategy was implemented

Customers would benefit from increased opportunities for learning, and from the better understanding of their needs by funders and service providers. Non-participants would feel less alone; less excluded from the learning loop(s) and be more aware of the impacts of not participating in learning.

The likely benefits to funders if the strategy was implemented

Optimal participation in learning would lead to increases in the efficiency and effectiveness of the investment of funders in agricultural development. This would lead to faster uptake of appropriate technologies and approaches by customers. The information generated from this program would be of relevance to a wide range of industries.

4.3 Tools for identifying and addressing drivers and barriers to participation in learning/change

The strategy aims to develop tools to assist organisations and practitioners to identify the drivers and barriers operating for their particular customer group. This target group may be operating at a local, industry, state or national level. A range of options for enhancing participation in learning could be detailed with respect to their appropriateness for addressing particular participation issues.

The organisation or practitioner would choose the appropriate options and then be guided through the process of design, implementation and evaluation of those options. The tools would be designed to optimise all forms of learning opportunities: self-directed or personal (such as reading, surfing the net and using an adviser); higher education (TAFE and University); and extension education (workshops, conferences, seminars, field days etc). Action research would be used to evaluate the effectiveness of the tools in a range of circumstances.

The strategy would build on research on drivers and barriers to participation in learning; and on the research and current practice for enhancing and/or overcoming these. Data on the effectiveness and efficiency of the tools could be collected and centrally analysed or reported to allow continuous improvement of the toolkit.

Target market for the strategy

Service providers (organisations and practitioners), any organisation or individual with a specific group they wish to involve in learning.

Advantages over what is currently available

Anecdotal evidence suggests that currently it is difficult for project designers to systematically identify barriers to participation and to then select appropriate mechanisms for increasing participation in learning opportunities. There is little data on what levels of participation should be expected, and under what circumstances these should be expected. Currently there is no central source of information on barriers to participation.

The relative strengths and weaknesses of the strategy

The strategy has strengths in its practical nature for assisting in optimizing participation. It allows practitioners to use the outcomes of extension Research and Development in their everyday work. The strategy considers barriers to all types of learning, not just externally provided learning. By allowing comparative analysis of data collected by users of the toolkit, the strategy will assist in gathering more information on participation, leading to continuous improvement of the toolkit. In itself, the toolkit will be a stimulant to encourage people to address barriers, leading to increasing participation.

One of the weaknesses of the strategy may be the lack of a market for the toolkit, either because service providers are already using effective tools, or because they do not perceive a need for such tools. In addition, there may not be sufficient information currently available on barriers to participation in learning for the strategy to be able to produce an effective tool kit. Linking this strategy with strategy 4.1 and 4.2 - aimed at understanding factors affecting participation and non-participation - would address these weaknesses.

The likely benefits to customers if the strategy was implemented

Customers would benefit through more relevant, accessible, meaningful programs, and ultimately, enhanced learning. Practitioners and organisations would benefit from increased participation in activities and programs. This would lead to enhanced confidence and competency amongst service providers. Overall there would be an enhanced culture for lifelong learning.

The likely benefits to funders if the strategy was implemented

Funders would benefit through increases in the efficiency and effectiveness of their investment in agricultural development resulting from optimal participation in learning. They would be in a position to obtain both data on participation in programs, and feedback regarding client needs. The product generated from this program could be marketed to a wide range of industries and organisations.

Research and development opportunities identified

1. Research and Development on institutional and organisational structures supporting learning and change

Ideas from the literature review

- How do Research and Development activities align with the objectives of Research and Development organisations?
- What are some practical methods for achieving strategic alignment?
- What are the benefits of integrating service provision?
- Investigate what/who drives change in current organisations in provision of extension education - what does the institution do to achieve these changes?
- Implementation of best practice extension
- How to develop new models for extension to operate better both within and between organisations
- Evaluation of how well the current system is working - identify gaps in provision
- Evaluation of the benefits or otherwise recent changes in extension (ask clients)
- Ask who does Research, Development and Extension currently serve?
- What have been the changes in the amount of provisioning as a result of recent provisioning change?
- Develop a standard system for evaluating the effectiveness and efficiency of extension Australia wide
- Develop action research mechanisms for communicating between parties within the agricultural system
- How do we use the concepts of effectiveness, efficiency and accountability in extension policy, program evaluation and practitioner evaluation?
- Evaluate current intra-organisational operations
- How to integrate this learning into extension education and extension training
- Bring people from other disciplines to contribute to our understanding of organisational change
- What do private providers actually provide? To whom?

Ideas from interviews and surveys

- We need research into institutional structures and pressure points, i.e., the education structure and how to change it.
- We need to build continuity between research in universities, applied work by practitioners and the user groups (the farmers).
- Specific research and development on achieving change and innovation at three levels - 1. Systems, 2. Processes and 3. Practices. Currently most of the research is done on what people do (their practices). The research is not focused on looking for greater leverage. This could focus on the whole system and processes. (**Processes -** is a sequence of steps / techniques and tools that are designed to achieve an outcome. **System -** is a whole connection and interrelationship between different elements).
- Research should not be done only on extension, but the whole learning system, our education system and whether this system assists people and enhances their learning skills).
- We need to focus on a monitoring and evaluation system to improve what we are doing.
- Current attitude and paradigms by all participants especially funders and managers of Research and Development.
- Research on demographics, lifestyles, geographic distribution, age groups, women's involvement and corporate agriculture is needed.

- How do we improve the linkages between the public and private sectors?
- Effective ways for community representation to have an impact on policy development and program planning and implementation**.**
- Innovative ways to evaluate the extension components of particular projects and programs in their relationship of the financial, social and environmental outcomes.
- Development of industry specific models that integrate research and extension from the inception of research projects.
- Monitoring and measuring ultimate impact of our extension programs – how to measure and over what timeframe
- Monitoring and evaluation –there is a lack of resources and a lack of expertise to properly evaluate or projects.
- Agency structures and systems – documentation of the success or otherwise of various state agency experiments with structure and approach
- Measuring the size of the transaction costs in current and alternative extension systems
- How can the widespread adoption of public good services be achieved in an increasingly commercialised extension environment?
- What is the relative effectiveness and efficiency of private versus public sector extension services?
- Farmer involvement in technology generation and research
- Making the service more accountable
- What is the actual relevancy and impact of the service?
- How the extension organisation learns and responds in reaction to its changing environment
- Appropriate evaluation of existing programs
- Determining the community spin-off when working with individuals to improve farm profitability
- Influence of extension staff work on social fabric and organisational culture
- What is the purpose of extension?

2. Research and Development on the professional development of farm advisers

Ideas from the literature review

- What professional development do farm advisers want?
- What are advisers expected to do?
- What training and professional development is available to advisers?
- What training and competencies do advisers currently have?
- What competencies should they have?
- What roles do advisers perform?
- Who are the advisers?
- How are advisers employed?
- How are advisers' skills recognised?
- What is the depth of advisers' resources?
- Developing trust with clients
- What information is delivered and how?
- What are the client perceptions of providers (so they trust farm advisers)?
- What are the best delivery methods for the professional development of farm advisers?
- Develop tools to help identify professional development needs and address them
- Ways of evaluating farm adviser performance (effectiveness, efficiency, accountability)
- How does research link to extension?
- Skills audit on farm adviser's
- How do farm advisers evaluate the value of their information?

Ideas from the interviews and surveys

- Training of extension staff and their development.
- We need to look into the opportunities of training farmers as facilitators.
- What is the level of skills in selling of the Australian extension officer?
- We need research into our professional identity.
- Looking at the assumption that if you provide better information, you will achieve change. This assumption is strongly held by Research and Developers.
- How do we effectively train people and provide them with linkages between programs as well as providing them with a career path?
- What do we do to prepare graduates to participate in an extension environment with farmers who are generally older and cynical?
- We need research into a better course design for universities
- New ways of getting information out to growers.
- We need to research alternative approaches to extensions.
- How do we, as Research, Development and Extension professionals learn from each other (more collaboration and less competition)?
- Innovative ways to support and enhance the skills of extension practitioners
- Ways that extension practitioners learn and how they impart knowledge and support to farmers.
- The impact of people with little background in technical issues attempting to provide the information. Under the purchaser provider model, the traditional departmental extension officer is being replaced by TAFE's in some areas.
- Identification of how extension is being carried out at the moment - what tools are being used, what are the characteristics shown be extension officers. How can these be effectively used to develop more effective extension programs; what planning and evaluation processes are being implemented, identification of the strengths and weaknesses of this process and recommendations of how to improve the status quo.
- External and internal appraisal of major weaknesses and strengths of extension staff and their projects, using a mixture of approaches including self-appraisal, personality profiles and appraisal by colleagues in other streams
- Influence of extension staff work on social fabric and organisational culture
- The researcher and extension providers interaction with the clients

3. Research and Development on the facilitation of enhanced learning processes on farm

Ideas from the literature review

- What training is needed for course deliverers to enhance learning eg, managing learning skills?
- Ask farmers how effective programs have been?
- Barriers to effective evaluation
- How can evaluation be used to improve delivery?
- Develop a framework for evaluation of what worked and what didn't and have an agreed set of benchmarks so there can be a comparison across circumstances
- Are growers needs being addressed by extension?
- How can farmers be assisted with identifying their own needs?
- Motivation and attitudinal factors which affect learning processes
- What processes are needed for environmental vs. productivity learning?
- How can you bring about change?
- What environmental factors promote learning and how can you combine these eg. aspects of field days?
- How to design an effective change program - what processes and with whom
- How to run groups - what to use and when
- What do non-participants have to say?
- Why make the transition from non-learning life to learning life?
- Are we providing a service to the right people?
- What is the potential for service delivery by agribusiness as a toll for change?
- What is the role of information technology in farmer learning?
- What is the effectiveness and appropriateness for groups?
- What do extension designers and providers know about facilitating change?
- Develop tools to help providers use extension research findings

Ideas from the interviews and surveys

- How to increase the rates of adoption, manage change and the key factors that makes change happen?
- How do we incorporate new techniques and encourage farmer participation?
- We need to look at the way that people learn in a group setting.
- We need to identify what works for whom and in what circumstances. Then we could build on that. This means that we may move away from one dominant approach per program. We should not throw away the old to only focus on the new, but rather we should build on both.
- We need to identify the keys to communicating value chain information. What are the "prods" that switch people on?
- What are the rates of adoption of messages and ideas and how do you attribute change to programs?
- We need research into new ways of operating – different change processes and extension.
- What is the correlation between training and profitability?
- How effective are leadership programs and international study tours?
- How do we achieve change and innovation efficiently and effectively?
- What is the current impact of extension? We should look at the higher order changes over a period of time.
- We need to look at the effect of intervening in people's lives and giving them better decision-making skills. Is this a good thing or not? We could have a control group who had no intervention except market forces. The research could look at the impact of our intervention.

- We could do an analysis of the cost to people adjusting out of agriculture without the assistance of a counsellor.
- We need to look at the capacity of the community to change. Can we fundamentally change with normal extension activities, or do we revert to the "old practices" after the training, or after we are put under a bit of pressure?
- We need to find better means of evaluating what we have done and meeting our accountability requirements.
- We need to look at how people learn and what motivates farmers to learn.
- We need to identify the approaches to enhancing the relationships between natural resources issues and Research and Development Corporations.
- Development of industry specific models that integrate research and extension from the inception of research projects.
- The role/value of regulation as part of the extension component of a program/project to change on-farm knowledge and behaviour.
- Approaches to on-farm learning that takes into consideration off farm (or remote) impacts of farm practices (eg. nutrient management in catchments, tree clearing vs. downstream salinity, etc.)
- Roles for using modern communication technology to inform and support farmers in learning and decision-making.
- Appropriate ways for groups to work together to implement on-farm practices that deal with issues (erosion, weeds, pest animals, salinity, etc.) that require neighbour coordination and action to achieve effective outcomes.
- Identification and testing which of the newer approaches to data collection and analysis, and to program evaluation, can be applied effectively to extension
- Research on how best to support farmers and farmer groups in their efforts to keep up with change and learning
- Study of farmer training schemes (Recognition of Prior Learning and others now been funded). How can we make these better before they spoil the market?
- The extension methods most likely to lead to farmer awareness and adoption of change in today's farming environment
- Monitoring of success and failures
- Description of the theoretical models that describe 'best practice' extension in various situations, and documentation/evaluation of extension activities where these principles have been followed
- We need a review of extension policies to explore potential solutions to problems arising directly from the increased commercial imperative affecting agricultural extension.
- Combination of adult learning/change management/sociology disciplines to address sustainability issues
- A lot more pilot testing of approaches which involve a wider selection of rural and regional communities
- Look more at customer driven extension models rather than the classic extension theory models
- Evaluation of programs and activities to identify good practice
- Farmer involvement in technology generation and research
- Look more at a multi-way flow model with links between funders, researcher, extension specialist and producer
- Methods, tools, skills, leadership and competence for achieving change
- How farmers learn and want to learn
- How farmers in specific animal industries and regions learn and what constrains them from adopting new technology and techniques
- Research on the range of landholders objectives for land management
- Research on the range of landholders' socio-economic circumstances
- The effect of public land/environmental management policies on different types of landholders
- Means of targeting of extension programs to specific groups of landholders
- Individual landholders decision-making processes and information gathering behaviour
- Reasons for non-adoption of critical technologies in major industries

4. Research and Development on overcoming barriers to farmer participation in learning activities

Ideas from the literature review

- What drives participation?
- Who is participating and who isn't in learning?
- Development of a framework for how to get farmers to participate
- How relevant is the information to farmers - is it conflicting?
- Elimination of old ideas - is that a barrier?
- How could extension officers identify the barriers and implement and select approaches?
- How do extension officers design and implement programs to address barriers?
- How can extension officers contact the people that are not contacted now?
- Evaluation of extension provision EEA
- How do you get participation in formal education?
- How do you package relevance/make things relevant?
- What are the barriers to formal learning?
- Is it worthwhile contracting the non-participants - what return on investment is required for participation?
- What is the driving delivery and is this creating barriers?

Ideas from the interviews and survey

- What factors affect rural people's ability to manage change and what is the change agent in this situation?
- How do we get farmers to be more interested in learning?
- How does our target audience learn and what do they need?
- We could study behavioural change and what enables change.
- How do we improve engagement, manage attitudes, time constraints?
- We should find out if farmers want "receipts" or if they want solutions.
- What modes of delivery do we need to overcome barriers of participating? Do we need to look at weekend delivery, different technology, and partnership relationships on and off the job (between employees and providers)?
- We need research on the barriers to adoption from the lessons learnt by other extension efforts.
- Define how to acknowledge "heroic failure" in extension so such failures are seen as valuable learning lessons to be acknowledged rather than hidden.
- We need a better understanding of the market.
- We need to do some market research and describe innovative approaches to encouraging participation.
- We need to research things that relate to ethnology and learning systems.
- We need to research the social areas that underpin extension, including effective communication.

Below are other items that were suggested from the survey.

- Is extension a worthwhile investment?

A few people commented that they did not think research into extension and extension itself was needed. Some specific comments included:

- Do we need research on extension, or an increased focus on engaging business managers in participation?
- We don't need any more research into extension. We have glossy reports from every state department of agriculture and Research and Development Corporations that always come back to us saying we need 1:1 extension to achieve change.
- Defending the extension process – we need better means of evaluating and meeting accountability requirements. Most of the rest is there.
- I am not sure that we need an active extension program. People make the assumption that extension is a good thing. There has been some excellent work, but my understanding of it and other work is that the relationship between education, training and profitability is not strong especially for small, asset-based farmers.

Other issues and comments.

- Generally any research that is done has to be practical and have application. Every researcher has to understand that things have to be applied and that they will be applied differently on every farm. The research also has to be flexible, it needs to have synergy across the many boundaries, and the people doing the research need to have good people skills.
- These projects or studies should not be done as a one off project. We need to come back in twelve months and look at a longitudinal study. At the end we need to find out what has worked and what has not. We could learn a lot by studying the things that are not successful.
- Every extension issues should be addressed jointly, because extension is about people and how they learn. This will bring economies of scale and synergy through collaboration.

Appendix 3: Communication of developments in extension research and practice to Australian extension providers

Joint Research and Development Corporation Briefing Paper 4

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Introduction

This briefing paper proposes an overall strategy for the communication of developments in extension research and practice. The strategy is directed at users such as Australian agricultural development providers but could be valuable for a wide range of public and private organisations in other sectors. The objective of the strategy is to enhance human and economic development in agriculture through improving extension in Australia. The paper was developed through a review of the literature (reported in briefing paper 1), a broad consultation process regarding the state of Australian extension with more than 60 potential investors, researchers, practitioners and customers. The contents of this paper and the other three briefing papers[23] were discussed at a workshop in Melbourne at the end of August 2000.

The communication strategy is outlined, followed by a description of the advantages of the strategy over what is currently available; the target market; its relative strengths and weaknesses; and the likely benefits to the customers and the funders.

The strategy reflects current themes in agricultural extension present in the international and Australian literature. It aims to be exemplary of effective, efficient extension in its own right. The key principles underlying the strategy in this document are:

The need for effective, efficient, accountable research, extension and education services

The need to create research products that are valued by customers

The need to involve all members of the agricultural community in research, extension and education

The interdependency of research, extension and education

An interdisciplinary approach to extension research

The need to ensure research findings are captured and integrated into daily practice, leading to enhancing human and economic development in agriculture

The need for continuous improvement of research products

- Identifying, promoting and marketing research and research products that are relevant to industries, organisations and individuals outside of agriculture

A proposal for the communication of developments in extension research and practice to Australian extension providers

The strategy aims to improve the efficiency, effectiveness and accountability of extension in Australia by supporting extension providers (organisations and individuals) to implement developments that will value-add to their current and future extension efforts. It does this through building the relationships between extension research, extension practice and extension education, as well as between extension, research and education, industry and farmers within agriculture, and, as a whole, facilitating communication between all parties. This is achieved by working both with the individual extension and research practitioners, and also with their employing organisations and funders.

The strategy involves the creation of a demand-driven agricultural development industry that is seeking services to assist research, extension and education organisations to improve their effectiveness. Such services may be related to the organisational structures and functioning; the development of extension practitioners; the improvement of processes for facilitating change on farm; and the implementation of strategies for increasing farmer participation in learning opportunities. Examples of such services could be:

[23] Briefing paper 1: Summary of relevant recent and current R&D on agricultural extension, learning and change. Appendix 1 - briefing paper 2: Existing and potential innovative approaches to creating demand for learning and change. Appendix 2 - briefing paper 3: Opportunities for R&D to foster the development of human capacity in Australian agriculture

1. Services for institutional and organisational structures supporting learning and change

- evaluation of the effectiveness of extension services
- up-to-date information on extension provision in Australia
- advice on strategies for improving organisational effectiveness
- information on the latest research and practice on this topic
- development of policy to support extension / learning and change
- social impact assessment
- reviewing research, development and extension proposals
- supporting positive change in organisations

2. Services for the professional development of farm advisers including their structural arrangement and careers

- evaluation of the effectiveness of organisational support for extension practitioners
- provision of information on extension practitioners in Australia
- advice on strategies for supporting extension practitioners
- brokering of training programs
- updating of education and training programs
- information on the latest research and practice on this topic
- conferences and networking opportunities
- expert support for scientific researchers

3. Services for the facilitation of enhanced learning processes on farm

- evaluation of the effectiveness of extension processes
- advice on strategies for developing extension programs
- information on the latest research and practice on this topic
- reviewing extension proposals

4. Services for overcoming barriers to farmer participation in learning opportunities

- evaluation of the effectiveness of strategies to overcome barriers to participation
- information on the latest research and practice on this topic

Provision of information on the latest extension research and practice in Australian and overseas would depend on services such as:

- feedback from extension practitioners to extension researchers
- extension research and development
- continuously updated annotated bibliography of international and Australian research extension and
- a national extension library

How would the strategy be funded?

Funding bodies could invest in base-level project to make the information accessible and to market the services to potential customers.

Customers (such as state departments; formal training providers; private consulting firms) could purchase higher-level services at different levels of investment to receive different levels of service according to their needs. For example, the lowest level of investment would purchase information services; a middle level of investment would provide information and consulting services, and the highest level of service would provide information, consulting and collaborative research and development services. Alternatively, services could be purchased directly. For example, research corporations could purchase social impact assessment services; individual practitioners could purchase training brokering services; extension organisations could purchase evaluation services.

Who would provide the services?

Individuals, groups of individuals, organisations or groups of organisations, could provide services. For example, a network of extension researchers could have a contract to provide an annotated bibliography. Private consulting firms could have contracts to assist with training needs audits. The Australasia Pacific Extension Network could act as a training broker, and the Australian Institute of Agricultural Science and Technology could be funded to increase private sector involvement in professional development activities. A consortium of lecturers of under-graduate extension courses could be funded to develop a national curriculum for extension, available through web-based delivery. All extension deliverers could be funded (within their projects) to provide feedback on performance to extension researchers (in accordance with nationally agreed evaluation criteria). A private consultancy could be funded to publish this information, plus that from the annotated bibliography and other projects, on a national web site for extension.

How would the strategy be coordinated?

The strategy could be coordinated by an individual, a board of governance (perhaps having members from all the investors), a non-government organisation, or through the manager of the proposed Joint Research and Development Corporation program.

Advantages of the strategy over what is currently available

The current linkages between Australian extension research, practice and education are weak. This is due to lack of funding for extension research and education, and a lack of commitment by extension funders and providers to increase the effectiveness and efficiency of extension. This strategy, plus the development of a Joint Research and Development Corporation program on agricultural extension, would lead to significant benefits for Australia.

Target market for the strategy

The strategy would target funders, providers and practitioners in agricultural development. The services created would also be relevant to agriculture in other countries and to other sectors such as agribusiness, mining, manufacturing, government and service industries.

The relative strengths and weaknesses of the strategy

The approach of a demand-driven system ensures that the services (and research) that are provided directly reflect the needs of customers and funders. The basic level of investment in the program would ensure customers were aware of the potential benefits of using the services available. The strategy is focused on the implementation of change and development of human capacity, rather than the production of information. It builds existing structures and networks, rather than trying to create new ones. It involves all members of the research, extension and education community, and it allows for continuous innovation and improvement of services.

The likely benefits to the customer if the strategy was implemented

Customers would benefit directly from increased efficiency and effectiveness of their extension; improved human capacity; increased employee satisfaction; and continuous improvement of their staff and business.

The likely benefits to the funders of investment

Funders would benefit through increased efficiency and effectiveness of extension services and through the creation of services that would be in demand both within and outside agriculture.