Moving farmer knowledge beyond the farm gate: An Australian study of farmer knowledge in group learning

J. Millar and A. Curtis

Abstract

Participatory programs are increasingly recognised as effective in assisting rural communities identify issues of concern, determine their needs, and draw in resources to enact social and environmental change. A fundamental assumption of these programs is that farmer knowledge is used and valued in the process of group interaction and social learning. The role of farmer knowledge in group learning in Australia is explored in this paper using case studies of Landcare and Prograze. In both case studies, group activity focused upon building landholder knowledge and skills for sustainable pasture management. Research findings suggest farmer knowledge can remain dormant unless critical factors in group learning and development are addressed. These include experiential learning, integrating information, effective facilitation, group autonomy and building ongoing relationships and learning opportunities. *Eur J Agr Educ Ext* (1997, 4, 2, pp 133-142)

Introduction

In striving to achieve sustainable livelihoods in agriculture, rural communities face a complexity of issues, including maintaining farm productivity, and their natural and human resources. Participatory programs are increasingly being developed to assist individual landholders and community groups identify issues of concern, determine their needs, share problems and ideas, facilitate learning and draw in the necessary resources to enact social and environmental change (Chambers, Pacey and Thrupp 1989; Chamala and Keith 1995; Pretty 1995). In Australia, attempts are being made to incorporate participatory processes into natural resource-management programs (Campbell 1994; Curtis and De Lacy 1995) and research and development for specific agricultural industries (Woods *et al.* 1993; Dunn *et al.* 1996). A fundamental assumption of these participatory programs is that farmer knowledge is drawn upon and enhanced by social learning in groups (Woods *et al.* 1993; Rickson, Nowak and Rickson 1995; Carr 1995).

The knowledge and experience farmers gain from trial and error, personal observation and interaction with others in their local environment can be defined as local knowledge. Studies of farming systems and indigenous knowledge systems in developing countries have identified the important role of local knowledge in rural development (Chambers, Pacey and Thrupp 1989; Reijnert, Haverkort and Waters-Bayer 1992; Thompson and Scoones 1994). Such knowledge relies strongly on past experience, intuition, and the environment (both physical and social) in which it evolves (Kloppenburg 1991). However, there has been less debate surrounding the existence of local knowledge of farmers in industrialised nations. Little attention has been paid to mainstream producers in capitalised agriculture in terms of their local knowledge and capacity to innovate, except within the boundaries of testing or examining constraints to the adoption

*The Johnstone Centre of Parks, Recreation and Heritage, Charles Sturt University, Albury, NSW, Australia*
of technology. Farmers are often seen as either adopters or rejectors of science-based technologies, and not as originators of technical knowledge or innovations (Thompson and Scoones 1994). Until recently, the transfer of technology from researcher to farmer via an extension agent has been the dominant paradigm in Australian agriculture (Dunn et al. 1996). Inherent in this ‘transfer of technology’ paradigm is the notion that farmers have equal access to science-based technologies and the resources to use them, and therefore their knowledge is largely influenced by science and production-driven imperatives (Beal, Dissanayake and Konoshima 1986).

On this basis, one could argue that Australian farmers do not possess local knowledge due to the influence of agricultural modernisation. However, recent Australian studies demonstrate that landholders do possess local knowledge (Fisher 1995; Kersten 1995; Millar, Curtis and De Lacy 1997) and others suggest this knowledge plays a vital role in community initiatives and collaborative learning (Campbell 1994; Carr 1995; Gibson and Bishop 1996). Nevertheless, according to Cary (1993, p. 340),

Taking account of farm-based knowledge about systems of farming and the adaptation and development of technology has a long history in countries such as Australia, but has not been commonly documented in studies of extension practice.

This paper explores the role of farmer knowledge in group learning where group activity was focused upon building knowledge and skills for sustainable pasture management. The case studies included Progazhe, a short term, agency-led, pasture and livestock management course and Landcare, a state-sponsored community-based program dealing with a broader range of land-management issues. Participant observation and group interviewing were used to examine how farmer knowledge and experience was drawn upon and valued, factors influencing this process, and the interaction of scientific and local knowledge in furthering individual and group learning.

Background

The increasing urgency to deal with dryland salinity, pasture decline, and decreasing terms of trade in the wool and beef industries has stimulated research and extension efforts to facilitate sustainable pasture management in southeastern Australia. The Murray-Darling Basin Commission funded Community Grasses project was initiated in 1993 to involve landholders in the research and development of low input perennial grasses for the upland, winter rainfall areas of the Murray-Darling Basin [refer to Figure 1] (Curtis and Millar 1995; Millar, Curtis and DeLacy 1997). The authors were commissioned by the Community Grasses Project to collate and communicate farmer knowledge and experience with perennial grasses (Millar and Curtis 1995), and to investigate the role of farmer knowledge in developing sustainable pasture systems.

Landcare and Progazhe were used as case studies to explore the role of farmer knowledge in group learning. Australia has invested heavily in Landcare as a state sponsored community-based approach to effecting desired changes in natural-resource management (Curtis and De Lacy 1995). Landcare first emerged as a distinct program in the state of Victoria in 1986 and became a national program in 1989 (Campbell 1994). Whilst Landcare embraces all facets of sustainable resource management, it has been the emergence, activities and achievements of voluntary Landcare groups which has captured public attention and distinguished Landcare from previous strategies. There are now over 3,000 Landcare groups across Australia involving more than a quarter of the farming community with considerable evidence of program impact (Curtis and De Lacy 1996). Groups most commonly form around catchment or subcatchments and are involved in a variety of activities such as tree planting, pest plant and animal control, property and catchment planning, riparian management, and educational activities. Landcare was selected as a successful group-driven program where farmer knowledge and experience is believed to play a major role efforts to develop sustainable agricultural systems and protect biodiversity.
Prograze is a pasture and livestock management course for beef and sheep producers in the temperate zones of southern Australia, and is an initiative of the Meat Research Corporation. It is an educational program for producers aimed at developing pasture and livestock assessment skills to improve decision-making with respect to the setting of production targets, fodder budgeting and grazing management (Coultts and Daniels 1996).

Prograze courses are based on groups and are generally conducted by Department of Agriculture extension officers in districts covering the high rainfall (600mm+) areas of Australia. Approximately 3,800 producers completed courses between 1994 and 1997 (Temperate Pastures 1997). Prograze was selected for this research because of the focus on developing sustainable pasture systems, and the growing popularity and success of the program.

The case study approach

A case study approach was chosen to explore how farmer knowledge is used and valued in groups. Participation in a Prograze course and a local Landcare group enabled the researchers to observe knowledge interactions and group learning. Both case studies were located within 50 km of Albury/Wodonga, a large regional centre of approximately 100,000 people, on the state border between New South Wales and Victoria [refer to Figure 1]. The Prograze group selected was not meant to represent a 'typical' case but rather a unique case involving local farmers and district extension specialists. A total of seven meetings were attended from July 1995 to March 1996, with each meeting held over half a day on a different property. Of the twelve farm businesses involved in the Prograze course, six had mixed (cropping/livestock) enterprises and six were mainly grazing properties. Properties were located within a 60km radius of each other.

![Figure 1 The Murray Darling Basin and location of groups](image-url)
Ten farmers attended the first meeting, but numbers dropped to between five and eight at subsequent meetings. Group members were mostly male farmers, with two women farmers, including one couple.

The Landcare group was selected because of the groups’ activities and interest in pasture management. This selection was also opportunistic in that one of the researchers was already attending meetings as a group member. The group had 20 active members, with 60 landholders on the mailing list, most of whom lived in the same catchment. Observations were made from February to October 1996. During this time there were five general meetings, a weeds field day, a pastures course (three evening sessions and a farm walk), and a pastures field day. Minimal government agency influence created the opportunity to explore the importance of landholder-driven projects in terms of meeting local needs and facilitating learning and decision-making. Differences in geographical location, farm enterprises and social settings meant that the Landcare and Prograze participants were at times addressing different issues. The Landcare group had a greater proportion of participants with small properties and off-farm work. There was also more involvement of women in the Landcare group, both on the committee and at field days and courses.

Being able to access a social situation as both a participant and observer allows the researcher to gain first-hand experience with social phenomena (Patton 1990; Berg 1995). Participant observation requires the researcher to carry out detailed descriptions over an extended period, of social settings and activities as well as participants and their interactions. Extensive field notes were taken during participant observation of Prograze and Landcare group activities. These notes were developed into more comprehensive descriptions after each meeting. Major themes or issues emerging from the descriptions were listed and used to guide observations for subsequent observations. A focus group interview (Krueger 1988) was conducted as part of the evaluation of the Prograze course and participants in the Landcare pasture-management course provided a simple written evaluation of that course. The focus group interview and evaluation sheet helped determine how farmers perceived the value of local knowledge and scientific knowledge within the context of what they had learnt. This information complemented the researchers’ interpretation of events and gave feedback to participants and course organisers in return for their permission to conduct observational research. The focus group interview with Prograze participants was held in the absence of the extension officers conducting the course.

Findings

The group context in determining how farmer knowledge was valued and used

The extent farmer knowledge was valued and used varied according to the purpose of each group and the approaches used to facilitate activities. The objective of the Prograze course was to learn about the scientific principles behind pasture and livestock management and acquire assessment and feed budgeting skills to put these principles into practice on the farm. The nature of the Prograze course meant that sessions were structured to deliver a prescribed amount of information over a defined period. The course was essentially directed by agency staff, however, participants contributed to decisions regarding timing and frequency of meetings. Although the value of farmer knowledge and experience to participants and extension staff was articulated and demonstrated at times, opportunities for farmer input and sharing of local knowledge and experiences were limited. Some farmers in the group placed less importance on what they had learnt from each other during the Prograze sessions as it was felt they had "done a lot of that". However, reference was made to an experienced farmer in the group who attended a lot of field days and group events. The comment was that he stimulated a lot of discussion when present, by bouncing ideas around that he had picked up from other farmers or extension and research specialists. “He gets around the traps and isn’t backward in coming forward thats for sure! I always pick up something from him at these days.."
However, there was a gradual transition from passive to active learning as the course progressed. Interactions between group members and extension staff became an important stimulus for the emergence of local knowledge. These interactions were greatest when:

* practical, hands-on activities were used;
* time was allowed for dialogue;
* complexity of issues were addressed; and
* actual on-farm figures were used in setting production targets and feed budgeting.

In contrast, the Landcare group was self-directed with the objective of delivering locally based learning opportunities. Gaining ownership of plans and activities was an important prerequisite to recognising, sharing, valuing and using local knowledge. Members increasingly recognised the range of knowledge and experiences of group members and decided this pool of expertise was sufficient to enable the group to conduct their own field days without the assistance of outside experts. At a meeting following a successful weeds field day, there was tacit acknowledgment of the value of local knowledge within the group, as members shared their experiences with weed control. After the discussion died down, the Secretary of the group said, "there is obviously a lot of knowledge here just in this room and we need to use it".

At the same time, the need for comprehensive pasture establishment and management information was identified. However, a small property owner who had been interested in carrying out pasture improvement for some time, voiced concerns about the difficulties in getting advice on pastures. His experience had been that agency advisors were too busy to respond to part-time farmers; there was a lot of information to absorb; advice was often conflicting and there were few contractors in the district willing to carry out pasture improvement on small areas. The idea of running pasture course to address pasture problems in the locality was floated. As one group member expressed, "It comes down to having to do it ourselves!" Another group member suggested the course be run by an experienced local farmer. It was decided that the interests of landholders would be best served by having the course conducted by a local farmer, rather than an agronomist or agricultural consultant. The group had advanced to using local-farmer knowledge and experience in a more formal setting.

Although farmer knowledge and experience was drawn upon to a greater extent in the Landcare study compared to Prograze course, there was less emphasis on skills enhancement and less evidence of interactions between scientific and local knowledge. Nevertheless, the knowledge interactions between landholders from diverse backgrounds added to the richness of dialogue in the Landcare study. Factors influencing the emergence and use of farmer knowledge in the Landcare study were:

* a determination to use local resources in running activities;
* focus upon addressing the needs and concerns of landholders;
* creating a non-threatening environment for open discussion;
* respect for the diversity of knowledge and skills in the group regardless of property size or years of farming experience; and
* openly acknowledging the value of local knowledge and experience in learning about pasture management.

The interaction of knowledge systems

Both case studies showed that farmers also valued scientific information for providing general concepts or principles and an understanding of why certain practices are recommended. In the Prograze course, farmers benefited from learning how to objectively assess pastures and fodder crops in terms of composition, digestibility and quantity of feed at different times of the year. Course participants benefited from learning how to judge the condition of livestock using condition scores and how to estimate livestock feed requirements at different stages of growth and reproduction. However, it was in the application and integration of this information in whole farm or enterprise perspectives that farmers learned most. It was in these situations that local knowledge came into play, as farmers and
scientists attempted to make management decisions which were both profitable and sustainable for livestock, pastures and crops.

For example, at the fourth meeting of the Prograze course, participants carried out dry matter and digestibility estimations for a phalaris and clover pasture which had been locked up to go to seed, and for an oat crop being grazed by hoggets (two year old sheep). Group members found it difficult to estimate the pasture for dry matter content because of a high proportion and density of clover. Most farmers estimated the oat crop as having a higher dry matter content. However, when the samples were dried and weighed, the results showed the pasture had almost twice the dry matter of the oats. When these results were put through a computer program for calculating animal performance, there was a weight gain difference of 74g per day on oats compared to 177g/day on clover. The farmer who owned the property admitted his sheep would probably do better in the clover paddock. However, he was content that the oats would at least maintain the sheep and said he would rather allow the phalaris to be spelled or possibly cut for hay. The results generated a group discussion on the options available to the farmer, drawing out differing opinions and articulating the decision-making processes of different participants.

The knowledge and experience farmers bring to a group-learning environment was acknowledged as valuable by participants in both case studies for providing a variety of perspectives on the practical, local, scientific principles. As one farmer doing the Prograze course said, "All that farmer experience adds to the pinnacle of knowledge that you get out of it." Farmer knowledge differs from purely scientific or technical knowledge in that it is local in nature and derived from direct experience and observation. Herein lies the limitations of local-farmer knowledge, as it is usually situation-specific, bound in context and difficult to extrapolate to other situations or to explain wider cause and effect (Chambers, Pacey and Thrupp 1989; Kloppenburg 1991). Science, on the other hand, is limited by its reductive, abstract nature in which local context is lost in the pursuit of scientific facts (Kloppenburg 1991). However, when farmers come together and exchange information amongst themselves and with scientists or extension agents, the interchange of knowledge has a synergistic effect. It allows local knowledge to be broadened and strengthened and scientific knowledge to be adapted and moulded to local situations, providing greater rewards and outcomes than if each knowledge system were to remain independent.

Breaking the dormancy of local knowledge: critical factors in group learning

A major factor influencing the extent farmer knowledge was drawn upon and valued was the learning process used in delivering technical information. In the Prograze case study, for example, the time spent on formal delivery of information or passive learning, limited discussion of issues and opportunities for experiential learning. In these situations those with the outside, scientific knowledge are often seen as the 'experts' who impart technical information so that farmers can adopt technologies for use further down the track. This is not to say that transfer of technology or passive learning approaches are always inappropriate. However, a balance must be struck between passive and active learning depending on the stages a group reaches and the complexities of issues being addressed.

In formal settings, farmers may lack confidence in the worth of their local knowledge. Unfamiliarity with scientific jargon may further undermine farmer confidence and their willingness to contribute their local-farmer knowledge (Reijntjes, Haverkort and Waters-Bayer 1992). This was demonstrated early on in the Prograze course. Farmers lacked confidence in their ability to assess pastures using technical terms and this resulted in an over-reliance on extension officers to provide the 'right' answers. Furthermore, evaluation feedback from some of the Landcare course participants who were new to farming and pasture issues, revealed that they felt somewhat intimidated by the vast technical and practical nature of farmer knowledge. However, as landholders in both groups
developed confidence in their ability to understand and use technical and practical information, there was greater sharing of their experiences and local knowledge. The realisation that they had something to offer as participants and adult learners, grew out of social interactions with each other and course providers.

The Prograze study highlighted the value of hands-on learning activities for engaging farmers in individual and group learning. Field activities such as estimating pasture quality and quantity, assessing cattle and sheep, and inspecting fodder crops and pastures created more farmer interest and discussion than information delivery sessions or computer-based sessions. The relevance of the pasture and animal exercises, and the information being applied were major factors influencing the higher levels of participation in these activities. Where the exercises closely matched farmers' situations at home they more readily volunteered their local knowledge and experience. This was highlighted during pasture assessment of a species demonstration run by the local agronomist. One producer at the focus-group interview said that he did not get anything out of the pasture species trial because it had been left ungrazed.

"Who wants to look at a great bulk of pasture that is this high? I would have much preferred if they could have flogged it out down to the ground level a month before we got there, to show which one is going to grow the quickest. It was a well set-up trial but I got nothing out of it."

Likewise with the Landcare group, having practical examples and integrated (holistic) information at the field days and pasture course, heightened interest and interaction between participants. These case studies show that farmers deal with a complex of interactive technologies, rather than discrete technologies, in which "interaction effects are as important as the effects of individual interventions." (Roling 1994, p. 281). It also discounts the notion that farmers are 'adopters' of discrete technological innovations but rather they are in the business of integrating and adapting technical information (Chambers, Pacey and Thrupp 1989; Rickson, Nowak and Rickson 1995). The importance of addressing all factors in farm decision-making cannot be underestimated. For example, in the Prograze course, there was a tendency for course providers to spend a lot of time on single-issue topics such as agronomy or livestock management and less time on integrating subjects such as with feed-budgeting and grazing systems.

If one of the aims of group learning is to maximise farmer participation and use of local knowledge then effective facilitation of group dynamics is necessary (Frank and Chamala 1992; Woods et al. 1993; Roling 1994). These findings demonstrated the importance of allowing time for dialogue and having effective facilitation to draw out farmer knowledge. As more groups develop in partnership with government or private industry, the demand for graduates and advisers to fill the role of facilitators or consultants rather than organisers and experts will increase (Pearson and Isou 1992; Pretty and Chambers 1994; Roling 1994). These findings also raise the issue of whether farmers should be receiving training as facilitators, as more farmers are being employed by government and industries to work in their communities as agents of change (Inall 1992). Curtis and De Lacy (1996) reported that Landcare groups across Australia consistently request additional training in leadership and organisational skills.

Effective facilitation is not the only prerequisite for group-learning situations where farmers are able to contribute their knowledge in a safe, non-threatening environment. The opportunity to develop ongoing relationships beyond formal extension (eg one-off events such as field days) where farmers have repeated contact with extension staff and each other, enhances the learning experience and builds trust between farmers and scientists (Hamilton 1995). Short courses are valuable for getting farmers involved in self-learning and exposing them to a variety of information, opinions and applications. However, the complex nature of farming and long-term monitoring required to make effective decisions or implement planning, means that farmers have educational needs that go beyond what most courses or projects currently provide (Frank and Chamala 1992; Woods et al. 1993). This creates demand for follow-up courses or ongoing discussion groups which can meet these needs.
and which often require access to extension or community education services. Programs such as Prograze can and are being used by Landcare and industry-based discussion groups. In addition, groups who embark on a short term skills course may evolve into an ongoing group to apply what they learn and continue to share experiences and build knowledge.

Conclusion

This study suggests farmer knowledge can remain dormant in groups unless social interaction allows it to emerge alongside scientific knowledge, and assert itself in the building of common understandings. Farmers may undervalue their local knowledge. However, the process of sharing experiences and collectively solving problems, heightens awareness of the value and application of local knowledge. In the Prograze course, farmer knowledge enabled scientific principles to be applied to real farm situations, thereby increasing understanding and shared meaning among participants and advisors. In the Landcare study, local knowledge was the driving force behind learning about pasture management in a practical, holistic sense. The Landcare group progressed from one-off field days and demonstrations to a more comprehensive learning approach aimed at understanding the complexities and day-to-day practicalities of pasture establishment and management from a landholder perspective.

The important point here is that group interaction facilitated the emergence and use of farmer knowledge to further learning, albeit in different ways due to the nature and purpose of the groups. These case studies demonstrate the importance of addressing critical factors in group learning. These include experiential learning, integrating information, effective facilitation, group autonomy, and building ongoing relationships and learning opportunities [refer to Figure 2]. The end result should be group-learning opportunities which maximise farmer participation and use of both local and scientific knowledge in making decisions and finding solutions.

Acknowledgments

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References

EXPERIENTIAL LEARNING
Hands-on activities
Active learning
Using local knowledge
Using real farm figures

INTEGRATING INFORMATION
Dealing with complexity/interaction effects
Applying scientific principles
Whole farm approach

EFFECTIVE FACILITATION
Allowing time for dialogue
Creating a non-threatening environment
Acknowledging value of local knowledge
Addressing needs and concerns of landholders

GROUP AUTONOMY
Self directed planning and learning
Using local resources
Developing ownership of activities and issues

ONGOING RELATIONSHIPS
Continual learning experiences
Training for facilitators (farmers and scientists)
Building trust and openness
Respecting diversity of knowledge and experience in group

Figure 2 Critical factors for farmer knowledge in group learning


Temperate Pastures newsletter No 97/1 February 1997.
