The role of networks of practice and webs of influencers on farmers’ engagement with and learning about agricultural innovations

Sue Oreszczyn*, Andy Lane 1, Susan Carr

Department of Design, Development, Environment and Materials, Faculty of Maths Computing and Technology, The Open University, Walton Hall, Milton Keynes MK7 6AA, UK

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A B S T R A C T

Drawing on the UK research project, ‘Farmers’ understandings of GM crops within local communities’, this paper considers the application of the concepts of communities of practice and networks of practice in the agricultural context. A brief review of theories about communities of practice and networks of practice is given and some of our findings are discussed in the context of those theories.

Farmers were found to be a particular type of network of practice, characterised by a weak organisational framework but with a relatively stable network of other communities of practice (or networks of practice) they interact with, which we have called a ‘web of influencers on practice’. Together, farmers’ network of practice and their web of influencers on practice represent the whole environment in which learning may occur, and so provide insights into their social learning system. Most farmers have to work at the boundary of their network of practice and their web of influencers, which creates a significant load on their knowledge management. This is in contrast to other networks of practice where only some members take on this boundary brokering role. The paper concludes that these theories (on networks and communities of practice) provide a useful lens through which to view farmers and their practice, highlighting important points for policy. However, in such contexts these theories need to be extended to include the role of a broader ‘web of influencers on practice’.

* Corresponding author. Tel.: +44 1908 653433; fax: +44 1908 654825.
E-mail addresses: s.m.oreszczyn@open.ac.uk (S. Oreszczyn), a.b.lane@open.ac.uk (A. Lane), s.carr@open.ac.uk (S. Carr).
1 Tel.: +44 1908 332233.

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1. Introduction

In recent years there has been a growing interest in communities of practice (CoPs) and networks of practice (NoPs) in connection with informal knowledge gathering, notably in the fields of education and both knowledge management and innovation within organisations, but also in fields such as healthcare and computer science. They have been used both as an analytical framework and as a tool to intervene in organisational management (see, for example, Koliba and Gajda, 2009). Thinking about the processes of learning and knowledge generation in practice originated in the work of social anthropologists at the University of California, particularly the work of Jean Lave and her work on apprenticeships. Although the idea of communities of practice has been around for many years it was first made explicit by Lave and Wenger in their work on apprenticeship and situated learning (Lave and Wenger, 1991). Around the same time the notion of networks of practice originated in the work of Brown and Duguid (2001) who applied the term to the relations among groups of people with looser connections than expected in a CoP. Amin and Roberts (2008) note that since the original work by Lave and Wenger, interest in communities of practice has risen exponentially, as evidenced by no publications on the subject in 1990 to over 543 publications in the year 2007 alone.

Although Wenger (1998) developed a theoretical basis for thinking of CoPs, and Brown and Duguid for NoPs, part of the appeal of these concepts is that they may also be viewed from a very practical viewpoint. These concepts are currently being used to think about learning, knowledge generation and situated practice across a variety of settings, attracting the interest and enthusiasm of many professions and practitioners (see Hildreth and Kimble, 2004; Wenger et al., 2002). The interest in these concepts as a practical approach to thinking about ‘real world’ situations, rather than simply being seen as academic devices, is demonstrated by the way that publications on these ideas include not just academic papers, books and monographs but also trade and magazine articles.

Yet Koliba and Gajda (2009) note that more remains to be learned about the way CoPs function and the same may also be said of NoPs. This paper considers the application of theories about
communities of practice and particularly networks of practice, to an agricultural setting. Focusing on our research findings on farmers’ influencers and understandings about new technologies, it attempts to reveal ways in which these theories may be useful in thinking about farming practice and ‘real world’ situations that farmers face when implementing new technologies. The paper first discusses some of the literature relating to theories about CoPs and NoPs. Key concepts from these theories that we used to inform our work are then discussed in light of our findings from our research project ‘Farmers’ understandings of GM crops within local communities’. This research used three progressively more interactive phases to explore farmers’ network of practice, their social learning systems and wider influences on practice, particularly in the context of the introduction of GM crops and new agricultural technologies. From our findings we conclude that not enough consideration is given to the impact of the wider context in which CoPs and NoPs are operating.

2. Development of the ideas focusing on communities of practice and networks of practice

2.1. Communities of practice

Lave and Wenger (1991) define a community of practice as “a set of relations among persons, activity and world, over time and in relation with other tangential communities of practice” (p. 98). In simple terms, communities of practice are groups of people who share a common pursuit, activity or concern. Members do not necessarily work together, but form a common identity and understanding through their common interests and interactions. Many different communities of practice exist and we may all be members of several, for example, through our work or hobbies. They are informal and self-managed. For some communities of practice we may be a core member, whereas for others we may sit on the periphery.

Lave and Wenger’s work formed part of a wider move in the literature on learning, away from theories of the individual as a learner who internalises knowledge ‘transmitted’ or discovered through interactions with others, to learning as participation in the social world. That is, away from theories involving cognitive processes to those involving social practice. Thus, theories about CoPs are useful for understanding the social processes of learning and identity formation, local practice, tacit learning, sense making and indigenous knowledge (John, 2005). As Wenger notes, “Practice does not exist in the abstract. It exists because people are engaged in actions whose meanings they negotiate with each other” (Wenger, 1998, pp. 72–73). Therefore an individual’s learning is ‘situated’, i.e. it does not simply occur in their head but as a result of their participation in the social world (Lave and Wenger, 1991), where people are constantly interacting with one another to share experience and understanding to produce new understandings or new knowledge. Participation in communities of practice is therefore viewed as an essential aspect of practice-based learning (Barston and Tusting, 2005).

Communities of practice are repositories of explicit or formal knowledge as well as the less tangible tacit, informal knowledge, and hold the key to any form of change process (Brown and Duguid, 2001). They are inherently stable and it is this stability that allows learning within and around the community to take place (John, 2005). Wenger identifies three aspects of communities of practice that work together and that may either hinder or enhance learning:

- Mutual engagement: members come together because they are engaged in actions whose meaning they negotiate with one another. They develop shared practices and are linked through their mutual engagement in such activities.
- Joint enterprise: members work together, explicitly or implicitly, to achieve a negotiated common goal, which may or may not be officially defined.
- Shared repertoire: a common history and culture is generated over time by shared practices, stories, tools, concepts and repeated interactions. Writing, routines, rituals, ways of doing things and so on become a common repository.

2.2. Networks of practice and wider influences

There has been a growing academic interest in what happens beyond communities of practice, in the networks within which a community of practice may sit. Podolny and Page (1998) define networks as “any collection of actors that pursue repeated enduring exchange relations with one another and, at the same time, lack a legitimate organisational authority to arbitrate and resolve disputes that may arise during the exchange” (p. 59). Social network theory views relationships in terms of nodes (individual actors) and ties (the relationships between actors). The power of social network theory is the way that the attributes of the individual actors are viewed as less important than their relationships (or ties) with other actors (Whelan, 2007). This is distinct from theories about communities of practice, which focus on an individual’s competences and practices. Many networks are viewed as having a structure whereby at the core are those members who are closely tied to each other and at the periphery are members who have more ties to core members than to each other.

In relation to innovation, Deroian (2002), drawing on the work of others, argues that individuals are embedded in a relational network and the opinion of potential innovation adopters is thus subjected to social influence. Through interactions with other potential adopters, opinions on new technologies are formed and shaped. Therefore, much more is involved than simple information transmission in the adoption of an innovation; it involves revisions of judgements, discussions in a wider practice related or socio-economic system, and an individual’s receptivity to influence.

In the context of communities of practice, theories about social networks have been developed by Brown and Duguid (2001) to include networks of practice. The concept of networks of practice is distinctive in that it recognises that there may be people beyond an organisation within which an individual is situated, who share their practice or may influence that practice through their own practices. However, like CoPs, members often participate in several networks of practice (Hustad and Teigland, 2005).

Networks of practice have the same features as communities of practice (their subset) but may have weaker ties. What binds the network together is shared practice, and extensive shared practice leads to extensive shared know-how (Brown and Duguid, 2001, 2002; Hustad and Teigland, 2005), although some of that know-how may come from exchanges with others outside the network. Members of a network of practice may never meet or know each other yet they share a common culture and activities and are capable of sharing knowledge and identity. Members of professions are cited as one such example. In organisations, networks of practice are often seen as offering a competitive advantage as they are capable of combining knowledge in new ways by drawing together different communities of practice to promote knowledge sharing and creation (Hustad and Teigland, 2005; Whelan, 2007; Vaast, 2004). These ideas have been taken up by a number of authors in a variety of contexts; although Whelan (2007) notes that there is...
a lack of a clear conceptual framework for networks of practice. Networks of practice, and particularly a wider set of context dependent influencers on practice, became important concepts for our research with farmers and we return to these concepts and how they might apply in the farming context later, in Section 8.

2.3. The importance of boundaries

Over time the ‘shared history of learning’ (Wenger, 1998) which characterises communities and networks creates informal boundaries between those who have participated in that community or network and those who have not. Such informal boundaries are often unspoken and may be created through sharing practice with people who are either included or excluded according to their competences. The sense of identity people gain from belonging to a community or network of practice is important as this is a key factor in a person’s decisions about who to associate with and how to deal with boundaries. Boundaries are consequently an important feature of communities and networks of practice.

New opportunities for learning and fresh insights often occur at the boundaries of communities or networks of practice, although how effective such learning or knowledge sharing is and whether it is a one-way or two-way exchange will vary depending on how boundary-spanning interactions operate. Shared boundary objects, such as a common language, a shared process or shared tools, can also act as bridges so long as they are not misinterpreted. However, Wenger (1998), Hustad and Teigland (2005), and Tagliaventi and Mattarelli (2006), all note that it is often difficult for knowledge to cross boundaries, even within an organisation, as they are areas where there is more likelihood of conflict. Further, while a number of different networks of practice can co-exist, the sense of belonging that comes from mutual engagement, joint enterprise and shared repertoires within a single network of practice can make knowledge flows between networks difficult (Tagliaventi and Mattarelli, 2006). This is particularly the case where different technical languages evolve making it difficult for different professions to communicate and share practices. It is therefore important to engage with the differences that may occur at boundaries as well as with the common ground.

The need to deal with differences as well as commonalities emphasises the importance of the role of those people able to provide connections across boundaries. The importance of those able to successfully span boundaries has been identified by a number of authors and has been reviewed by Williams (2002). Wenger (1998, 2000) distinguishes between different boundary spanning processes. Boundaries may offer one-way or two-way connections involving different types of boundary agent. They may involve ‘brokers’, important as boundary spanners — caring for one boundary; roamers — those creating and moving knowledge as they move around several boundaries; outposts — those who explore new territories and bring back new ideas; and pairs — brokering through relationships between two people of different communities. Similarly boundary agents may have a formal, possibly regulatory role for some communities, while many others act informally. The relational approach to knowledge that Wenger adopts, focusing on the way that knowledge is shared within and across community boundaries, emphasises not only the way in which knowledge is important for all those involved (Osterland and Carlile, 2003), but also the complexity of knowledge flows. Rather than being a simple one- or two-way flow, it involves iterative, reflective, continuing interactions. We return to the importance of boundaries, and of boundary spanners, in relation to our own research findings, in Section 7. Meanwhile, the following section notes how the concepts discussed so far apply to rural contexts.

3. Networks, knowledge, innovation and learning in the rural context

A number of related theories have been used to highlight innovation and learning in the rural context. In the context of rural change, there has been an interest in network theories for improving understanding of the complex nature of rural development, and in developing a network paradigm that offers an alternative to conventional linear approaches. For example, Murdoch (2000), considered how network approaches to rural development, have provided valuable insights into how the rural resource base is affected by the arrangement of rural resources. He notes that ‘horizontal’ network approaches have particularly highlighted the importance of rural networks in learning and innovation, and the importance of flexibility, diversity, trust, facilitation and capacity building. However, as Lockie (2006) notes, while European programmes such as LEADER, which are set within a network paradigm, have attracted attention from academics, less attention has been paid to networks in agri-environmental environments.

Nevertheless, in a practical agricultural context, a number of authors have drawn on actor network theory for example, Morris (2004), to consider agri-environmental policy implementation; Noe and Alroe (2005) to consider farm enterprises; Lowe et al. (1997) to investigate farm pollution in Britain; and Burgess et al. (2000) to consider the differences between how farmers and conservationists constructed farmers’ identities. Further, ideas about networks and learning have been particularly prevalent in the management of Australia’s rural environment. Although not without their limitations, network forms of organisation have become central to Australian agri-environmental governance (Lockie, 2006).

The work of Sligo and Massey (2007) notes the importance of not isolating informal social relations from the more formal. Their research considered socio-spatial knowledge networks in farmers’ learning and how interpersonal social networks were mediated through risk and trust. Exploring how, why and where farmers acquire the information they need and how that knowledge is understood and subsequently used, they found that farmers “sieve their incoming data through a fine mesh of perceived credibility and trust” (p. 181). Carolan (2006), using a phenomenological approach, also considered trust, examining the way that social relations of trust and knowledge are shaped and contested within and between agricultural social networks.

This work on networks is closely related to work on social learning in the rural context. Social learning has been a significant theme in the literature on agriculture extension over recent years, and may be described as the process of iterative reflection that occurs when we share our experiences, ideas and environments with others (Muro and Jeffrey, 2008; Blackmore et al., 2007; Keen et al., 2005). These more participatory models are placing emphasis on how agricultural and environmental knowledge may be co-constructed through interactions with relevant stakeholders (for examples, see Leeuwis and Pyburn, 2002; Allen et al., 2002; Roling and Wagemakers, 2000; Millar and Curtis, 1999; Vanclay and Lawrence, 1994).

This increasing body of literature being gathered on agriculture and environmental management concerned with participatory practices, social learning, knowledge and rural networks, indicates the potential for interest in facilitating communities and/or networks of practice. In our research we drew on these concepts to help us consider the interactions between farmers and those in their wider context.

4. Our research: farmers’ understanding of GM crops within local communities

Farming is an increasingly complex business employing a wide range of technologies and practices that require the continual
The adoption of new agricultural technologies is viewed by many farmers as essential in order to remain competitive as a business. However, new agricultural technologies are being developed that not only influence on the relationships that farmers have with other farmers, as in the case of the introduction of genetically modified (GM) crops. In many cases these varied relationships are influenced by differing interpretations and understandings of the knowledge around new technologies and practices by the different parties. While the management of knowledge over the last decade has become a significant issue for all sectors of the economy, little attention has been given to exceptionally small and medium sized enterprises such as those run by farmers (Hutchinson and Quintas, 2005). Moreover, policy debate surrounding the science and acceptability of new technologies, such as GM crops or more recently biofuels, has focussed on the policies and practices of national governments and international organisations or on the acceptability of GM products with consumers, rather than on farmers as the primary users of these new technologies.

Our research was therefore concerned with obtaining a more complete picture of the introduction of a new technology and has been focusing on farmers’ understandings of GM crops, in the context of new technologies more generally, and of farmers’ networks. The research aimed to get away from polarised arguments for or against GM crops by focusing on the context of decisions about employing new technologies by those who will potentially use them, i.e. non-organic, larger scale commodity crop growers. Our research considered both practices and influences on those practices, particularly their wider networks that influence their decisions about running their farm and their adoption of new technologies. Many theories on learning have been proposed, some individually focussed, some more group focussed (see Appendix A in Blackmore, 2007). However, the starting point for our research was the individual farmer. We were interested in the farmers’ own view of their network of practice, and in how individual farmers felt they related to others outside their network. Consequently, in thinking about our research, and as discussed earlier, we drew on theories about situated learning (Lave and Wenger, 1991), communities of practice and social learning systems (Wenger, 1998, 2000; Wenger et al., 2002), and networks of practice (Brown and Duguid, 2001, 2002) in relation to the farming context, a very particular context where there is a weak organisational framework but a strong working identity.

A further concern for our research was that it should be grounded in farming practices so that as far as possible the findings would be relevant and useful to both those who were being researched and those who may use the research. Therefore, the research adopted an interactive relationship-building approach that grounded the research in the decisions farmers need to make in managing their farms. The following sections first describe our approach and methodology and then consider our findings in relation to theories about communities and networks of practice.

4.1. Our research approach

Working in a participatory way with users of research is now a recognised practice in many areas of research, particularly in those where lay people and science necessarily interact, such as healthcare, development studies, agriculture and conservation. These approaches arose out of experiences of failure of existing practices to deliver the desired outcomes, and the unintended effects of innovations. More recently approaches emphasise the importance of research with people rather than research on people, and of learning by both the researcher and those that the researcher involves in the research (e.g. see Stirling, 2005; Leeuwis and Pyburn, 2002; Cerf et al., 2000). They emphasise iterative reflection on shared experiences, with the researchers placing themselves as far as possible within the system of interest rather than being an external observer of the system.

Our research was distinctive in researching, in a novel way, GM crops in the context of new technologies more generally and from the point of view of the practitioner, i.e. the farmer. Although our research drew on theories about communities of practice, networks of practice and social learning systems as a theoretical framework, we felt it important that our research should be grounded in farmers’ actual experiences and everyday practice and so accessible not only to academics, but also to informed lay people and particularly to those who may use the research, such as policy makers. The research engaged potential users of the research from the outset and for the duration of the project. Over the three years, the three successive phases of the project used an increasingly participatory, relationship-building approach with participants, to ensure that our findings were relevant to users. Our approach and methods were developed from previous research using grounded theory (Oreszczyn and Lane, 2000), cognitive mapping (Tait et al., 2001; Oreszczyn, 2001) and scenario workshops (Oreszczyn and Carr, 2008) for researching people’s different perspectives, and are set out in full in Oreszczyn and Carr (forthcoming).

As part of the Economic and Social Research Council’s Science in Society programme, we were placing GM crops in the context of farmers’ decisions about new technologies more generally. We were also particularly concerned to move away from the polarised debates about whether farmers are for or against GM. We wanted to study farmers who had had experience of growing GM crops in the UK and those who may have chosen to grow them if they became available and of the type of crop that might be given the go-ahead for commercialisation. We wanted to understand through the three phases first, their experiences of these crops, second who and what their main influences were and third what were the wider issues and influences involved. Each of the three phases involved the use of interactive mapping techniques to capture and represent the main findings in a holistic manner. The following sections provide brief details of the three phases. Full details of each phase, including findings, may be found in the reports for each phase (Oreszczyn, 2005, 2006; Oreszczyn et al., 2007).

4.2. Phase 1: main issues in introducing GM crops

The purpose of Phase 1 was to identify, from a farming perspective, the main issues concerning the introduction of GM crops and other new technologies and some of farmers’ social interactions with others. Phase 1 therefore centred on questions concerning what farmers saw as the advantages and disadvantages of new technologies generally and, for farmers who had grown GM crops, what their experiences of this particular new technology were.

The research involved seeking a purposeful sample to identify farmers with experience of GM crops and some without. As we deliberately sought farmers with practical experience of GM crops, and no GM crops are grown commercially in the UK, this limited the sample to those farmers who had participated in the government’s Farm Scale Evaluations (FSEs). The only way to identify those farmers and ensure their participation was with the help of SCIMAC – an organisation supported by a group of industry organisations along the UK farm supply chain. The basis for selecting the non-FSE farmers was that they farmed close to the FSE farmers and had

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1 Organic farmers were not included as they are not currently permitted to grow GM crops by the authorities that certify their organic status.
farms of a similar farm type. For this half of the sample local National Farmers Union (NFU) representatives provided us with names of farmers willing to participate in the research.

Thirty lengthy, loosely-structured, tape-recorded, telephone interviews (in addition to one preliminary face-to-face interview with a key farmer on our advisory panel) were conducted with farmers. The interview tapes were fully transcribed and sent to interviewees for checking and to add further information if they wished. Key themes were drawn from the interview data and cognitive maps of individuals’ views were also drawn up from this data (see Fig. 1 for an example). Cognitive mapping is a technique used to structure, analyse and make sense of people’s accounts of issues (see Ackerman et al., 2004). The mapping software, Decision Explorer, was used to aid this analysis. Cognitive maps capture the connections and linkages between the topics in an individual farmer’s thinking. A draft report, suitable for a lay audience, on estimated savings on both but beet saving around £54/hect by using gm provided the basis for the interactive mapping exercise was then carried out, whereby participants were also asked whom they would like the information to be disseminated to, to gain further information about who may be in their networks of practice.

4.3. Phase 2: the main influences on farmers’ use of new technologies

The purpose of the second phase was to address questions about influences on farmers concerning the introduction of new technologies to help run their farms as a business, and the extent to which farmers engage in learning about new technologies. Twenty farmers in three regions of the country were selected from the original group of telephone interviewees for face-to-face visits. Of these, we were able to visit 17, 11 of them involved in the Farm Scale Evaluations. Wherever possible (in six cases) the farmer was interviewed together with someone else involved in farm decisions, for example, the farm manager, the farmer’s agronomist or a relative, so as to gain some additional insights into the part played by others in farming decisions.

At the start of each interview the cognitive map drawn from the initial telephone interviews in Phase 1 was discussed with the farmer and any corrections or additions to the map were made. An interactive mapping exercise was then carried out, whereby

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Fig. 1. An example cognitive map of a farmers view.

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4 This project focused on non-organic, larger scale, commodity crop farming, although the farmers interviewed were varied in terms of what they grew and their farming approach.

5 Banxia software, http://www.banxia.com/demain.html
farmers were asked to place the influences on their farm business decision making on a circular grid on a large sheet of paper (A1, flip chart paper). The grid consisted of concentric circles labelled with an arbitrary scale from 1 to 6 moving outwards, with ‘Running the farm as a business/Farm decision making’ at the centre. Influences viewed as having a larger impact on farm decisions were placed closer to the centre of the grid (on a labelled Post-it note) and those having less effect were placed towards the outer edge of the grid (the scale merely provided a framework for ordering influences, not for providing quantitative data). In this way a map of the total landscape of influences on their decision making was drawn up by the farmers themselves (see Fig. 2 for an example).

During the mapping exercise the participants were also asked why a particular influence was being placed where it was, and notes on these responses were made. Once the initial influence map was completed the participants were then asked how the map would change if they were just thinking about new technologies, such as GM crops, and how influences have changed over the last 10–15 years. New Post-it notes were added or existing ones moved on the grid in response to their answers. With the help of the notes on the placement of the influences on the grids, the information from the maps was transposed into foreground, mid-ground and background influencers (see Table 1). A second report was produced and sent to the participants for comment before being more widely distributed.

4.4. Phase 3: wider issues and influences on new technologies in agriculture

The aim of this phase was to bring together farmers, members of their support networks and other decision makers (agricultural advisers, agricultural scientists, agricultural companies, agricultural policy advisers and government policy makers) to explore ways of supporting farmers to learn about, select, and implement new technologies and scientific developments that could benefit their farm business.

This phase drew on the findings from the other phases of the project and the findings from a workshop with farmers and key members of the farmers’ network of practice and the ‘influencers on practice’ established from Phase 2.

The workshop attracted 25 participants including 10 farmers involved in earlier phases of the research (all previous participant farmers were invited). It used a further mapping technique — Harman Fans (Harman, 1979) — to engage participants in an action-research style process to explore potential futures for agriculture. Like the cognitive mapping technique used in Phase 1, Harman Fans can be used to display complex findings in a relatively simple way that nevertheless provides a more complete picture, showing connections and interactions between issues and enabling a temporal analysis rather than simply drawing out themes. A workshop report was produced and sent to the participants for further comment before being more widely distributed.

As noted earlier, since the original work by Lave and Wenger interest in communities and networks of practice has grown and consequently the concepts have been expanded and developed. Some authors have expressed concern that, over time, the original concepts of communities of practice have been used and developed but in many cases have become generic formulas or are “formulaic distillations of the workings of CoPs and instrumentalist applications seeking to maximise learning and knowing” (Amin and Roberts, 2008, pp. 353–354). They argue that the original, and important, emphasis on context, process, social interaction, material practice, ambiguity and disagreement is being lost to a homogenised form which does not take account of the diversity of situated practice. In the following sections (5–7) we discuss our study in light of thinking about CoPs and particularly NoPs, that is more closely allied to the original ideas put forward and which we felt particularly relevant to our work with farmers. These sections draw from a synthesis of the findings from each of the three phases of our research and we introduce the new idea of a ‘web of influencers on practice’ that seems particularly relevant to farmers.
Table 1
Farmers’ influencers taken from the mapping exercise in Phase 2. (NB. Not all influences were relevant to all farmers.)

<table>
<thead>
<tr>
<th>Individual influencers</th>
<th>Mid-ground influencers</th>
<th>Background influencers</th>
<th>Outside influencers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountant</td>
<td>Bank manager</td>
<td>Business Advisors</td>
<td>NGOs</td>
</tr>
<tr>
<td>Agronomist</td>
<td>Contractors</td>
<td>Farmers abroad</td>
<td>(Friends of the Earth, Greenpeace, etc.)</td>
</tr>
<tr>
<td>Business partner</td>
<td>Farming neighbours</td>
<td>Solicitor</td>
<td></td>
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<tr>
<td>Employees</td>
<td>Farmers’ merchants</td>
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<tr>
<td>Family members</td>
<td></td>
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<tr>
<td>Farm owners (where applicable)</td>
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<td></td>
<td></td>
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<tr>
<td>Contacts at research organisations</td>
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<td></td>
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<tr>
<td>Individuals from seed companies</td>
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<td></td>
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<tr>
<td>Wife/partner</td>
<td></td>
<td></td>
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<tr>
<td>Influential organisations</td>
<td>Discussion group</td>
<td>Buying group</td>
<td>(e.g. CLA)</td>
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<tr>
<td>Development in the Eastern Region (ADER)</td>
<td>Farming press</td>
<td>Business Associations</td>
<td>Company information</td>
</tr>
<tr>
<td>Department of Environment</td>
<td>Internet (by younger family members)</td>
<td>Environmental/landscape</td>
<td>Environmental Agency, Environmental lobby groups</td>
</tr>
<tr>
<td>Food and Rural Affairs (Defra)</td>
<td>Seed companies</td>
<td>agencies e.g. Natural England,</td>
<td>working with farmers e.g. Game conservancy, RSPB, Farming and Wildlife Advisory Group (FWAG)</td>
</tr>
<tr>
<td>European Union (indirectly in terms of directives, regulations, etc.)</td>
<td>Business Link</td>
<td>Health and Safety Executive</td>
<td>Land agents</td>
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<tr>
<td>Public Research institutes e.g. Rothamsted Research, John Inness Centre, etc.</td>
<td></td>
<td>Local council</td>
<td>Local council</td>
</tr>
<tr>
<td>Royal Agricultural Society of England</td>
<td></td>
<td>National Farmers Union (NFU) (National and local)</td>
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<tr>
<td>National Institute of Agricultural Botany</td>
<td></td>
<td>Specialist niche cropping companies (for those growing specialist crops)</td>
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<tr>
<td>The Arable Group</td>
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<td>Local community</td>
<td></td>
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<tr>
<td>Supermarkets</td>
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<td>Media</td>
<td></td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Significant historical changes</td>
<td>Ministry of Agriculture Fisheries and Food (MAFF)</td>
<td>National Farmers Union (NFU) – National</td>
<td>Supermarkets</td>
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<td>ADAS</td>
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<td>Employees</td>
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<tr>
<td>National Farmers Union (NFU) Local</td>
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</tbody>
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5. Farmers’ community of practice, network of practice and web of influencers on practice

Farmers do not have a strong formal organisational framework. They operate as distributed small businesses. In Wenger’s terms, they are a distributed community of practice (Wenger et al., 2002), in that they cannot rely on face-to-face meetings and interactions as their primary vehicle for connecting with members. Although all communities of practice are distributed to some degree, the diversity of views, needs interests and priorities is usually greater in highly distributed communities (Wenger et al., 2002).

It was clear from our study that the farmers had a shared identity. They had common concerns and showed a remarkably similar set of views on new technologies and GM crops in particular, whether or not they were involved in the FSEs. This was particularly evident in Phase 2 which found that whereas their individual sets of influences may differ, there was strong overlap between the sets of influences and fairly consistent trends over the most and least important influences (Oreszczyn, 2006), see Table 1. Yet while farmers may have many aspects in common, there is also a great deal of diversity, for example, organic farmers differ from non-organic farmers, dairy farmers differ from arable farmers, etc. Thus, as Wenger notes, there may be communities within communities. Although farming sub-communities may have different needs, they still share a strong farming identity. Being part of a sub-community connects members to other sub-communities and also to the wider, larger community. The distributed nature of farm businesses means that, like professions such as solicitors or dentists, they may therefore be more accurately described as a network of practice (Brown and Duguid, 2002, 2001) as explained in Section 2, rather than a community of practice. The aspects of practice that they share, such as mutual engagement and shared repertoires (see Section 2), bind their network together. The benefits that might be gained from such an informal network as they relate to farmers, according to the theoretical literature reviewed earlier, are summarised in Table 2. They include, for example pooling resources and expertise; strengthening their ability to impact on policy; and enabling them to meet challenges in the future.

Yet, our research found that farmers did not feel that they learned directly from their interactions with each other. Farming neighbours and farmers’ discussion groups, where farmers can gather and exchange ideas and views, were both considered not to be particularly influential by most of the farmer participants in our research. Indeed it was notable how many other people and organisations who are not farmers contribute to the learning and knowledge management of the individual farmers. Our research showed that for the farmers in our study there is a yet wider ‘web of influencers on practice’6. That is, a wider group of people and organisations are influencing farmers’ practices rather than only influencing their views and attitudes. This includes all of the influential environment of other communities and networks of practice within which the farmers’ own network of practice operates and interacts and is of crucial importance to farming practice.

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6 We use the term web to indicate the less structured but still interconnected nature of this wider group as compared to the idea of more structured networks.
Table 2
An analysis of the short- and long-term value of network of practice membership for farmers.

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<tr>
<th>Benefits to individual farmers</th>
<th>Short-term</th>
<th>Long-term</th>
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<tbody>
<tr>
<td>Help with challenges</td>
<td>Expand skills and expertise</td>
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<tr>
<td>Access to network of other farmers and their expertise</td>
<td>Networking means keeping abreast of new developments</td>
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<tr>
<td>Equipment sharing</td>
<td>Strong sense of professional identity</td>
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<td>Confidence in approaching a problem</td>
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<td>Better understanding of new techniques</td>
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<tr>
<td>A sense of belonging</td>
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<tr>
<td>Social contact</td>
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<tr>
<td>Disparate voices are brought together to strengthen the farmers voice (e.g. in policy making)</td>
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<tr>
<td>A pool of resources and expertise to draw on</td>
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<tr>
<td>Sharing brings economic benefits, Sharing of tacit knowledge</td>
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<tr>
<td>Co-operation and an improved understanding of one another’s needs</td>
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Benefits to farming community

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Thus, together, farmers' communities of practice, networks of practice, and the wider web of influencers on practice within which they sit, represent the whole environment in which learning may occur.

Farmers are a very particular case as a network of practice as they are producing both a public good and are private enterprises. Enabling their practice means that they necessarily draw on a wide network of people, including those who are not part of their professional or practice community (or network), yet are significant influencers on that practice. Farmers have to cope with what people want yet they are working increasingly in isolation from their local rural communities, not by design necessarily, but because of the pressures of their work and the demographic changes in their neighbourhoods. Thus their social learning draws first on the many informal learning opportunities in their own network of practice but also strongly on their web of influencers on practice. Although individual farmers each have their own distinctive set of influencers on practice, there is a strong overlap with the influencers of other farmers. There are fairly consistent trends over the most and least important influencers. Further, the membership of this web of influencers appears to be relatively stable over time. For example, family members, employees, agronomists, research institutes are all trusted and respected members of farmers’ web of influencers. As contexts change so relationships and the influence of different members of the web of influencers change. For example, while Defra (which succeeded MAFF as the government department with responsibility for agriculture) has always been an influencer, today it is a strong negative influencer whereas MAFF in the past was a strong positive influencer (Oreszczyn, 2006).

6. Farmers' relationships with influencers on their practice and their impacts on practice in the context of new technologies and GM crops

As noted above, farming may be a more geographically isolated occupation than many other occupations, but farmers are regularly interacting with a wide community of individuals and organisations in their social learning systems. As Sligo and Massey (2007) also note, farmers as both practitioners and managers need to seek information on a diverse range of topics from a diverse range of people. Table 1 (shown earlier) presents a list of the people involved in their 'web of influencers' identified in Phase 2 of the project and whether they were foreground, mid-ground or background influencers on farmers' decisions about what they do on their farm. The following sections discuss the relationships individual farmers have with other people and their impacts on practice, from the farmers' point of view.

6.1. Farmers’ relationships with other farmers

Although there are no GM crops being grown commercially in the UK at present, many actors, particularly industry representatives, believe that it will ultimately happen (Oreszczyn, 2004). The potential use of new technologies in the UK, such as GM crops, has highlighted the changing nature of relationships between farmers. New technologies are a potential source of discord between farmers, as well as scientists or policy makers, yet they also have the potential to enhance or divide farming communities, i.e. to strengthen or weaken farmers’ network of practice.

Generally, the farmers in our study felt that they had good relationships with other farmers, although they did not feel they particularly influenced their decisions about running their farms. The farmers said they generally took an interest in other’s farming practice, particularly if they were experimenting with something new. Those involved in the FSEs found their neighbours, who were not in the evaluations, particularly interested in what they were doing. This interest was more collaborative than hostile, as indicated by one farmer who said: “It did exactly what they said it would. Yeah, and myself and the neighbours could hardly believe how simple the technology was.”

The policy of co-existence (measures to ensure that GM, conventional and organic farming systems can take place alongside one another) means that farmers will have to co-operate more so as to ensure their cropping choices do not adversely affect one another. Our research also suggested that this kind of active farmer collaboration, over what type of crops they actually grow, was not normal practice. However, our research also found that during the Farm Scale Evaluations farmers saw no difficulty in notifying their neighbours about what they were doing, i.e. growing GM crops, and in some cases they welcomed the increased contact that this brought. This indicates the potential for this new technology to strengthen links between farmers and enhance their network of practice.

However, GM crops could also create divisions between those who do not wish to use the technology and those who do. The farmers in our study were very aware of this and one noted: "If any of my immediate farming neighbours had raised a real issue then I wouldn’t have done it. But I went to see them all and spoke to them about it and to a man and woman they were quite interested". Yet, the introduction of GM crops elsewhere has shown that a new technology can lay farmers open to litigation. Some farmers therefore included solicitors on their influence maps as important for legal advice when thinking about introducing new technologies. This is something new to farming. In the past farmers have had a culture of co-operation on issues of conflict, as the previous farmer quote suggests, rather than resorting to litigation. These new technologies are changing the context, as one farmer participant expressed it: “We feed the nation, we are all working in the same way, but now we are fighting our own corner”.


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6.2. Farmers’ relationship with government

The UK Government department responsible for agriculture, the Department for Environment, Food and Rural Affairs (Defra), was generally perceived by the farmers in our study as being very influential on farm decisions, but not in a positive way. As one farmer noted “At the moment they are totally ruling my life”. Farmers were unanimously very frustrated by Defra. It was seen as a key driver in what farmers are currently doing, but through the imposition of rules and regulations, rather than the provision of welcome or useful information, advice or guidance. Farmers in our study felt there were increasingly unrealistic expectations made of them. Increasing regulation meant increasing costs, and farmers were finding it progressively more difficult to satisfy regulators. As another farmer commented “Each time an inspector visits the farm they need something extra”.

Furthermore, rules and regulations were not necessarily perceived as being based on common sense, or were not felt to be the easiest way to achieve desired goals. The lack of understanding or knowledge of farm level practices in those making the rules was an important issue for many of the farmers, as noted in the following conversation:

F: The measures that are being imposed on the industry and various schemes to comply with the new single farm payment are in many cases nonsensical and irrelevant in terms of good farm and land management, they’ve been made up by people who really don’t understand what they’re talking about.

Q: Non-farmers in other words?

F: Non-farmers and probably based on scientific work that is being taken completely out of context.

And another farmer commented:

“As with all these sort of things we get snowed under with crop compliance, crop assurance, welfare issues. Unfortunately they tend to be invented by someone with a clip board and we just tick box them and these people haven’t got a clue what’s going on. You can have all the guidelines in the world that you like, but in truth, if you don’t get out and find out what people really do, they mean absolutely nothing.”

Government was felt to be sending out conflicting policy signals, increasing the administrative burden on farmers and constraining their ability to take on board innovations. Policy changes tend to be based on a short time-scale whereas, by its very nature, farming and the adoption of new technologies are long-term activities. Farmers need time to adapt and change and to do this they need clear and consistent policy signals about the future of agriculture. Farmers doubted government’s ability to plan strategically for the future of agriculture. Their dissatisfaction is demonstrated by one farmer who commented that Defra really stood for the “Department for the elimination of farming”. Another commented “Government is always five years behind”.

Furthermore, the farmers in our study were struggling to deal with the amount of information directed at them. They felt government departments lacked operational knowledge and were populated by people who did not understand farming practice. This made them ineffective in terms of providing useful information. A crucial concern was that any information or advice should be independent and therefore trustworthy. Thus, rather than looking to government for advice, the farmers were turning instead to other, more trusted and respected organisations such as public sector research institutes, particularly for information about new technologies.

Past Government reorganisation had effected a major change in farmers’ web of influencers. Farmers felt that Government was more influential on farmers’ thinking in the past when the Ministry of Agriculture Fisheries and Food (MAFF), and predecessor to Defra, existed. Unlike Defra, MAFF was viewed as having served the interests of farmers. Advice provided by them had been respected. As one farmer explained: “There is a bigger gulf and it’s getting worse since they changed from MAFF”. To be successful, farmers have to constantly adapt and change to the demands of society about how land should be used. They face demands from retailers, consumers/public and government. New technologies were viewed as having the potential to help meet these demands, for example for better food quality or improvements in environmental sustainability, but for this potential to be realised requires policies and regulation that enable the farmer (for example, by advice and support for marketing) rather than further empowering the regulator.

Furthermore, the small size and dispersed nature of most farming businesses makes it difficult for farmers to spend time engaged in strategic thinking on the direction of their industry. The workshop exercise in Phase 3 of our research provided participants with an opportunity to think strategically about the future. As in other industries, there is a need for horizon scanning and thinking about longer-term policies. While a limited amount of this type of activity may be done, for example by the National Farmers Union, it was apparent that there is no single body or organisation that gives priority to synthesising information, looking at the potential of new technologies in general, and developing clear long-term directions for agriculture.

6.3. Farmers’ relationship with scientists

As noted previously, the farmers in our research wanted trustworthy, independent information and advice, backed up by robust science about new technological developments. For this, they turned to the public sector research institutes and particularly to trusted scientists in these institutes. Yet, they noted, independent scientific research funded by government is now mainly carried out for the scientific community and for supporting policy making rather than for farming practice. The farmers in our study, particularly in the Phase 3 workshop, noted that scientists do not necessarily understand the practice of farming, and research is frequently carried out on experimental research farms rather than on working farms, or by hiring small plots on working farms; a point conceded by the agricultural scientists participating in the workshop. Further, there is little direct engagement by scientists with farmers over the design and reporting of trials. Even where research is done for farmers, it does not arise directly from the needs expressed by farmers. Little public funding is now available for near-market research or participatory research directly relevant to farming practice and to how farmers might change what they do. The funded research that is going on is not necessarily set up to provide farmers with the help, support and information they require at the ground level (Oreszczyn et al., 2007).

In the past a government-funded Agricultural Development and Advisory Service (ADAS) provided a link between government, research organisations and the farm. ADAS was staffed with trusted advisors who knew what was happening at the ground level. Their advice was free and farmers would use them as a sounding board. Now their advice costs more than most farmers are willing or able to pay and only one farmer in our study said they would use their services. As one farmer commented: “MAFF was staffed by people who understood the industry. MAFF and ADAS knew about farming, they knew farmers in the area and then it was turned into Defra and they cut the bridge, which resulted in no communication with the
farmers, they lost the connection with farmers.” The loss of freely available intermediaries, such as ADAS, means that there is a disjuncture between government policy and the ground level, which is aggravated by the way farmers currently feel about Defra.

Thus there appears to be a large gap in the research, advice, training and support available to farmers. Where once there was co-ordinated support, strongly oriented to farmers’ needs, now it is considered by the farmers to be piecemeal, expensive, and up to the individual farmer to seek it out and decide its relevance for them. This is becoming apparent at a time when new developments in agriculture are increasing the complexity of farming practice. While this may not be a problem for large-scale business-oriented farmers and co-operatives, it is potentially difficult for those farmers who are less pro-active and who work alone.

6.4. Farmers’ relationship with citizens, consumers, and supermarkets

The farmers in our study were feeling pressure from expectations that they would deliver an attractive landscape, a countryside rich in biodiversity and cheap, quality healthy food. The lack of connectivity between farming and the consumer, and the need to improve the image of farming and of GM crops, were key issues. It was generally acknowledged that farmers were not very good at marketing and promoting what they did, a point that was particularly raised in the Phase 3 workshop. Marketing is a specialist activity for which farmers are not trained. As they cannot afford to employ marketing people, it is left to those few farmers who are successful at it. Existing initiatives to promote a good image of farm produce were seen as disparate. Better co-ordinated and more widespread initiatives were needed, yet who would deliver these needs, now it is considered by the farmers to be piecemeal, expensive, and up to the individual farmer to seek it out and decide its relevance for them.

This is becoming apparent at a time when new developments in agriculture are increasing the complexity of farming practice. While this may not be a problem for large-scale business-oriented farmers and co-operatives, it is potentially difficult for those farmers who are less pro-active and who work alone.

7. Promoting learning

7.1. Recognising the importance of informal learning

It was noted earlier that theories about communities of practice emphasise the importance of informal and experiential learning and tacit knowledge. The importance of informal learning was particularly apparent among the farmers in our study. We found that formal education and training, beyond initial training when farmers were young, did not feature as something that farmers wanted or that they perceived as particularly needed, despite specific requirements for skills development in, for example, quality assurance schemes. Nor is this type of formal ‘continuing professional development’ something they could easily participate in because of time pressures they already face in running their businesses. Instead, farmers’ strong web of influencers on practice gives them access to a rich knowledge and information environment, some of which is formal and some of which is informal.

Formal knowledge passed to farmers through organisations such as Defra, or from companies, tended to be viewed with suspicion by the farmers. The perceived lack of knowledge by Defra about how their farms work in practice was noted earlier and a comparable view of company knowledge was summed up by one farmer when he commented that: “In many ways they (companies) tend to come up with a solution and it takes them a while to decide what it’s a solution to.” It was the less formal knowledge and practical advice provided by individuals, for example, their agronomist, individuals within companies or research institutes and others directly involved in their business, such as their business partners or employees (see Table 1), that they trusted and respected, together with their own practical experiences, that played the more significant role in informing farmers’ decisions. Farmers drew strongly on this less formal and more personal advice which they used in conjunction with their own experiential knowledge.

New products could mean farmers have to learn new management techniques, or they may have to adjust existing practices. Several of the farmers were experimenting with new or novel crops, particularly those that may be grown as a result of climate change. For some of those involved in the FSEs experimenting with the amount of herbicide they applied to the GM crops was perceived as necessary, as one farmer commented: “they (those running the FSEs) suggested that you use a very high level of the herbicide, but they did leave it up to you. So I didn’t do that because in the real world of farming when you have to buy the stuff you use the absolute minimum that you can get away with. And certainly with this technology you would use a small amount and if you had to go back in with another small amount you would do that. But unfortunately they were suggesting that you use huge amounts, 4 litres, which nobody in the real commercial world would do because there is no point.” Thus, as also noted by Hutchinson and Quintas (2005), knowledge sharing and informal knowledge creation through problem solving based on experience are important aspects of what farmers do, although mostly done individually rather than collectively. The farmers in our study were responding to changing circumstance and new technologies by experimenting and by adapting; in so doing they were drawing on this informal, or tacit, knowledge and using their experiential learning.

Efforts to promote learning from outside the farm setting therefore need to recognise the importance of farmers’ informal knowledge. Yet informal knowledge and experience is not generally
used to help shape agricultural research or policy. The development of innovations is dominated by product innovations, rather than by process innovations that farmers need in order to improve their practices using the product innovations. Further, our research found that new technologies such as GM crops are increasing the amount of formal knowledge that farmers, as small businesses, have to absorb and synthesise. At the same time, the need to comply with a steadily increasing number of regulations and other restrictions on their practices is reducing the scope for their informal or tacit knowledge to be employed.

7.2. Improving connections, using co-ordinators

As Wenger et al. note, in distributed communities members’ spatial separation means that there are fewer opportunities to negotiate on issues, which can pull the community in many different directions. Thus such communities usually have to invest more time in reconciling needs and dealing with competing pressures. Building trust and personal relationships is more difficult. For distributed communities, Wenger et al. (2002) advocate a model that provides diversity and connection. Local co-ordinators connect local sub-communities to the wider community. Global and local co-ordinators act as facilitators creating links that tie the local groups into the global community. These co-ordinators enable small group connections, allow for local variation and provide whole-community connection. They avoid hierarchy by providing horizontal relationships rather than hierarchic channels of information. Rather than conveying information and managing knowledge, co-ordinators connect people and broker relationships. In this way substantial freedom is allowed in the local communities, while sufficient structure is provided to support global community development. Flexibility is important to accommodate variations in local cultures and organisation. Once relationships are established people can contact each other directly. This was once how the National Farmers Union operated. However, its role is much weaker now that it no longer negotiates directly with Government on farm subsidies, and as noted earlier it is no longer necessarily viewed as influential by farmers. Similarly, the farmers studied were clear about the weaker relationship with representatives of Defra compared to members of the former extension service, ADAS.

7.3. Improving connections, using the Internet

While mobile phones have become very important to the smooth running of farm businesses, from our research it was apparent that other methods suggested by Wenger et al. for fostering distributed communities or networks of practice, for example, teleconferences and web-based discussions, would not suit farmers, at least for the time being, since few of our farmer participants made extensive use of the Internet. For the farmers in our study the Internet was still a relatively new technology, and its use was often left to the younger generation, or to farmers’ wives or secretaries. A typical view is that expressed by one farmer who said: “I must admit it’s all left to my daughter to do that sort of thing. Occasionally we get on it, but I wouldn’t say that we were regular users, we probably ought to use it more, we are using it more as we go down that track”. Another remarked “I have failed miserably because I have not trained myself, but there is a lot of information on the Internet and it’s the way things are going”. Many of the farmers in our study did not feel comfortable with using the Internet and commented that they preferred to be out on their farms rather than sitting behind a desk. As Vaast’s (2004) work on electronic communications notes, while this type of communication in theory can widen the community to which people feel they belong, it can also contribute to the exclusion of some members, such as those who do not feel comfortable with the medium or who do not have adequate access to it.

Yet, as the quotes above suggest, there were indications that Internet use was evolving and that the next generation of farmers could find it an important tool, with the potential to facilitate farmers’ network of practice and to serve as an important connection across the boundaries of different communities of practice. For example, one farmer who did use the Internet commented: “I use it for daily emails and information. For weather forecast which is specific for this farm, machinery, flowers, earworm with potatoes, so looked up on the internet to see how they managed them in the States.”

7.4. Improving connections, through organisations

Our research also found that it is farmers’ interactions with a stable set of web of influencers on practice, and in particular key influencers which tend to bind together farmers’ network of practice, rather than formal training or a particular organisation. As noted earlier, what distinguishes farmers as a network of practice rather than a community of practice is that they are distributed businesses. However, unlike other professions, such as solicitors or dentists, farmers have no strong formal organisational structure providing a cohesive professional community in which to operate. Other professional communities require formal training and membership to a professional body, which help to forge a strong foundation for their members’ identities within their community of practice or network of practice. Furthermore, these professional bodies may also act as brokers, with the ability to cross boundaries between professional practice and the wider community and act on behalf of their community of practice in this role. On the other hand, as noted previously, farmers’ identities are more strongly defined through their informal learning. For example, many have been brought up on farms or within a farming community and are often working as family businesses with more than one generation having a hand in running the business. There is a wide range of different farming organisations farmers can and do belong to and while the National Farmers Union may be viewed as the main representative body for farmers (akin to a professional body), our research identified this as an organisation that has declined in significance for farmers over the years. One consequence of this is an inability for farmers as a community to adequately negotiate practice with farmers’ major influencers — government and the public.

7.5. Improving connections through boundary spanners — key influencers and especially key individuals

Our research identified the way that key people, rather than organisations, played an important role in farmers’ network of practice. As noted earlier, farmers identified their own key influencers (members of other communities or networks of practice) within their web of influencers that they trusted and respected, who they felt they could work with, and who provided connections between farmers’ network of practice and the wider community. These were identified by the farmers as foreground, individual influencers (see Table 1), and were distinct from the influential organisations that represented more organised influences which, as also noted earlier, did not necessarily hold the same kind of respect. These key influencers are examples of brokers who are able to span the boundaries between the farming network of practice and other communities or networks of practice in farmers’ wider web of influencers. Brokering between boundaries is a job that should not be underestimated. Furthermore, meaning across boundaries requires an understanding of how meaning is negotiated within the different communities. It entails providing a participative connection that involves processes of translation,
coordination, addressing conflicts, mobilising attention, and negotiating alignment between perspectives. It also requires legitimacy sufficient to enable influence on the development of a practice (Wenger, 1998). Currently knowledge across the boundaries between policy, research and practice in the farming context tends to be one way. For example, boundary objects such as farming guidance and research reports tend not to be discussion documents. Boundary brokers ideally need to interpret practice in both directions, for example, between government policy research and farming practice at the ground level, rather than simply gathering and transmitting information to farmers.

While boundary spanning is inevitable, it does not necessarily easily arise organically from a distributed community of practice or a network of practice (Wenger et al., 2002; Brown and Duguid, 2002). Furthermore, to be efficient (in terms of the number of people who devote their effort to it) and effective (in terms of the benefits it brings to the network of practice) it may be better if it is organised formally. Currently as individual and isolated businesses without a strong organisational framework, farmers themselves are largely responsible for their own individual brokering at boundaries and for obtaining access to the wealth of information that surrounds them. Many individual farmers gathering information for themselves is not as efficient or effective as appointing certain people to carry out that role for the community of practice as a whole. This role may therefore need to be formally structured, as was the case in the past when farmers had access to the services of government-funded Agricultural Development and Advisory Service (ADAS).

The question is how to establish the appropriate balance between the initiatives coming from the network of practice and from the web of influencers on practice. Getting the appropriate balance is important. For farmers, the web of influencers on practice has a very big impact because of farmers’ public role in maintaining the British countryside for biodiversity and landscape reasons. This role means that farmers are not operating in a ‘normal’ commercial environment. They are subjected to extensive regulation, restrictions and public scrutiny regarding how they practise what they do. Further, as noted earlier, the structure of the industry is such that, unlike other industrial sectors, they are unable to carry out their own research and development (R&D) for new technologies and there are no major players among the farming community from which spillover R&D can occur. Farmers therefore have limited power individually, and large-scale collaborations are difficult. In cases such as this where the predominant perceived knowledge resides with the influencers rather than the practitioners, and particularly where the network of practice has both a public and private role, boundary brokers are more likely to arise from the web of influencers rather than from the farmers’ network of practice.

8. Conclusion

Our research involved researching with a group of farmers and members of their web of influencers on practice to gain a richer understanding of their views about the impacts of new technologies and particularly of GM crops. Rather than viewing farmers as either in favour of or against new technologies such as GM crops, the iterative relationship-building approach we used allowed us to explore in depth some of the thinking that lay behind the views of a group of farmers who may decide to use such new technologies should they become available to them. Although the in-depth nature of the research necessarily limits the number of participants, there are findings from the research which may be more widely applicable.

Farmers have to cope constantly with significant amounts of new knowledge about matters (e.g. regulations, new products, etc.) that impact on their practice (e.g. regulations reducing the scope for informal knowledge to be deployed). The evidence from our research suggests that farmers’ learning about new technologies and new practices occurs in a complex social learning system. The farmers in our study placed great reliance on their own individual resources and experiences to make sense of new technologies and practices, i.e. they used their experiential learning about their own practice in the context of their own farm, although many felt this reliance was being stifled by increasing rules and regulations. They also interacted with a large number of other practitioners, both fellow farmers in a broad network of practice (rather than a narrower community of practice) and others in agricultural support organisations in a web of influencers, i.e. they used their situated learning about farming practice to mediate with the information and advice they were receiving, in general, off the farm. The form of this complex social learning system raises several policy issues.

Firstly, in our research we noted how farmers, in their practice and decisions about new technologies, are drawing on not only a wide but also a relatively stable set of web of influencers. Within this much broader ‘agriculturally related’ community, key individual influencers, rather than organisational influencers, are important for promoting farmers’ learning, particularly those able to cross the boundaries between networks and communities of practice. It appears that the current agricultural support framework for farmers’ decisions about new technologies is fragmented and piecemeal. Government-sponsored intermediaries who are qualified in and knowledgeable about agriculture would improve the links between government policies, scientific research and farmers at the grassroots.

Secondly, no organisation is adequately thinking ahead from the farmers’ perspective about what new technological futures might occur and what they might mean for farmers in practice. An enabling environment that is responsive to farmers’ needs, with clear, consistent and long-term policy signals about the future of agriculture, to allow them time to adapt to changing demands is required. This also requires improved connections between farmers and consumers, through initiatives such as improved marketing; and improved connections between policy makers, regulators, scientists and the supermarkets, through greater awareness amongst them of the practicalities of farming — of what farmers can and cannot do — and greater recognition of their informal and experiential learning.

Our research used communities and networks of practice as a framework for thinking about farmers’ understandings and decision making about new technologies in general and GM crops in particular. We found that theories about rural networks, although useful, do not take account of the basis for meaningful interaction in the same way that theories about communities or networks of practice do. For example, they do not adequately take account of the subtle culture repertoires (van der Ploeg, 1993) which come from farmers’ temporal and spatial interactions as they engage in their practice. We conclude that theories about communities of practice, and particularly those about networks of practice, provide a useful lens through which to view the particularities of the farming community’s identity, knowledge, and learning. They have proved useful in highlighting a number of features that are significant to farmers’ practice and that raise implications for policy. However, the distributed and independent nature of farming businesses and the number of entities and bodies that they deal with all the time require extending these ideas to encompass, and place emphasis on, the relationships that farmers have with their wider web of influencers of practice. We have therefore extended theories about networks of practice, in the context of farming, to include webs of influencers on practice. This
web of influences has a more direct and enduring role in influencing their practice than might be evident in other communities or networks of practice, because of the way that knowledge and learning, rather than just information and viewpoints, is developed and/or exchanged around the boundaries between them by the people involved. In particular, all farmers have to act at both the core and periphery of their network of practice placing greater weight on boundary spanners from other communities or networks of practice. We have also provided an overview of how these theories highlight particularly important aspects of farmers’ social learning system.

Our research also highlights areas for more research. The importance of key individual influencers, or boundary brokers, for promoting learning among farmers is an aspect that warrants further research, particularly on what makes them key. For example, is it because they understand the practice of farming better than other people in their organisation, and/or that they interact with the farmers in a particularly unique or more participatory way? Future work, in the context of social learning among farmers, might usefully link theories about communities and networks of practice with the new, emerging developments in network theories coming from the field of communication studies. Furthermore, since much of the work on communities of practice and networks of practice has been developed in the within-organisation context, it would be useful to consider how these concepts might be more widely applicable and useful in the wider rural context and, conversely, also whether our concept of ‘web of influencers on practice’, developed in a rural context, might apply in other situations.

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