

Crop Management Innovation and the Economics of Attention

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A review of projects promoting low external input technology (LEIT) is used as a basis for examining the institutions that support farmers' access to information. The review shows that the aspirations of LEIT projects for reaching resource-poor households, stimulating information flow, and building social capital are often not achieved. Rather than focus on the generation of more information, the paper examines the management of one of farmers' scarcest resources, attention. Farmers' attention is often divided among many short-term, technology-specific projects, and donors make insufficient investments in learning lessons from these scattered experiences. More robust rural institutions are required to help generate and make available relevant information in ways compatible with farmers' limited attention resources.

Introduction

Both plant breeding and crop management research have profited from the development of farmer participatory approaches over the past quarter century. In some respects crop management is more amenable to participatory approaches because it necessarily involves local-level experimentation and iterative adjustments. The following discussion focuses on one type of crop management project, aimed at promoting low external input technology (LEIT). LEIT is not a perfectly defined category, but includes the use of locally available biological or mechanical inputs for improving soil fertility, soil and water management, crop establishment or pest management. LEIT may be promoted as a way of lowering or eliminating farmers' dependence on input markets, or as part of integrated agricultural technology development. Although there is no strict link between LEIT and participatory methodologies, the majority of LEIT projects utilize farmer-centred approaches and promote the development of local knowledge.

LEIT's strong connections with farmer participation make it an appropriate theme for discussion, and the observations should be relevant for examining more general farmer-participatory methods for agricultural innovation. Because crop management research makes particular demands on the development and transmission of information, this discussion is concerned with information management. The following section takes a brief look at information and at the resource consumed by information, attention. The next section presents a summary of results from a review of LEIT projects. This is followed by some implications for the management of information and attention in farmer-centred technology development. The final section presents a few conclusions.

The economics of attention

There has been considerable emphasis given to the importance of information in agriculture. We are often told we live in an information economy, but Simon (1971:40) observed that "in an information-rich world... a wealth of information creates a poverty of attention". Hence it is appropriate to focus on the management of attention, which is the scarce resource. This point has been explored by many others, often focusing on information overload and the battle for the attention of consumers and businesses (eg, Davenport and Beck, 2001). In this discussion, the phrase "the economics of attention" is borrowed from a book by Lanham (2006), and although his theme of digital information is far removed from the concerns of agricultural development, his focus on the motives of the receiver of information and the interplay of style and substance has considerable relevance for our interests.

“Information overload” may seem an odd way of describing the environment of resource-poor farmers. The farmer may not suffer the same burdens as someone whose e-mail in-box is overflowing, but there is a great deal of information available to her at the local level, various development projects and programmes invite her participation, and commercial inputs and markets compete for her attention. Rather than looking at how to produce more information, it is appropriate to consider ways that allow farmers more efficient access to information and that improve their ability to share knowledge. Thus the economics of attention invites us to examine the mechanisms that allow people to manage and take advantage of the information that is available.

If we consider the transmission of information that supports the promotion of LEIT, or any other type of technology, a classification of three types of learning is a useful start (van der Veen, 2000). Learning may be “reproductive” when it involves information that already exists, or “communicative” when it involves the generation of new information. These two types of learning are not perfectly distinct because there will always be uncertainties about when “just the facts” will suffice or when adjustment and exploration are required. Although this classification emphasizes group learning aspects in the latter cases, there are opportunities for adapting and generating new information outside of formal group processes; and on the other side, much learning of factual information is best done with the help of peers (Brown and Duguid, 2000).

The third learning category identified by van der Veen is “transformative”, where new approaches and viewpoints are developed and transmitted that re-orient the motives for seeking information. Lanham points out that information involves both substance and style, and there would seem to be parallels between his concept of style and transformative learning. Style in this context is not some superficial, cosmetic hook on which to hang serious information. Choices of attention involve human motives, and although the economists’ utility functions may attempt to tell us how goals are pursued, they don’t explain how the goals are chosen. The concept of style may seem foreign to discussions of agricultural technology, but van der Ploeg (1993) has written extensively about different styles of farming and the resulting heterogeneity of the countryside and Richards (1989) reminds us that farming can be compared to a performance.

Thus the information transmitted by efforts to promote LEIT may be of three types: straightforward information on crop management, guidance on how to develop such information, or motivation for generating this information (often related to a style of farming). The next section reviews how these types of information are managed and utilized for LEIT.

The performance of LEIT

This section presents some conclusions about the performance of LEIT, drawn from a review of the literature and three case studies (Tripp, 2006). The discussion focuses on: who adopts LEIT, participation in learning about LEIT, the time and labour implications of the technologies, and how LEIT projects influence the experimental and organizational skills of their participants.

It should be emphasized that many of the innovations promoted by LEIT projects can play important roles in farming systems. Although the following discussion is at times critical of the extent of uptake of LEIT this should not be interpreted as a judgment about the technologies themselves. In addition, it is clear that the mode of technology generation often has a significant effect on the breadth of uptake, and participatory techniques are often much more successful than top-down strategies. But the purpose of the review was not to assess particular technologies or delivery methods but rather to document the dynamics of LEIT utilization.

The review showed that the patterns of uptake for LEIT are not dissimilar to those of conventional technology. Although there is some variation among cases, it is difficult to find instances where the most resource-poor farmers are the principal beneficiaries of an LEIT project, despite the pro-poor focus of many of these efforts. The same farmers who would be expected to take up seed and fertilizer technology (the better-resourced and those with better links to agricultural markets)

are those who are most likely to take an interest in LEIT. Those households where farming is for subsistence and that have a range of other income sources based on off-farm labour are generally less likely to be attracted to LEIT.

This is not a surprising result from the standpoint of the economics of attention; the smaller the proportion of household income derived from farming, the fewer the incentives for pursuing information related to agricultural innovation. If “Farmer First” was a rallying call for addressing the needs of the rural poor, it may have to be amended to something like, “Rural households that balance a range of off-farm income sources with farming and only occasionally bring produce to market – First”. This is not to say that technology generation should only be aimed at “real farmers” (and diverse household incomes have been a feature of many farming systems for centuries). Although households may not be dedicated exclusively to farming, agricultural production is a key element of subsistence income for many and anything that can improve or stabilize that income would be welcome. In addition, it is often these small, mixed enterprises that are more likely to contribute to soil erosion or to misuse pesticides or other chemicals. But more thought needs to be given to the range of incentives and aspirations of rural households and to the efficiency of the methods used to intervene on their behalf.

Not only did the study find that poorer, subsistence-oriented farm households were less likely to take up LEIT, but also that they were usually less likely to participate in activities that introduced or generated such technology. A technique such as farmer field schools (FFS) is an important innovation, but it usually requires that farmers devote a half-day each week during the cropping season to meetings and activities. Some observers call for shortening the FFS curriculum, but there are concerns that this would compromise the communicative learning that takes place. Thus the dilemma is how to identify methods that engage farmers in technology generation and yet do not demand so much time that only a minority of the farming community can take advantage of them.

The concern about the time investment required for learning about some types of LEIT is related to a broader question about so-called “information-intensive” technology. As Lockeretz (1991) has observed, it is important to distinguish between technologies that only require time for initial mastery and those that require a continual investment for activities such as monitoring and adjustment. The likelihood of farmers being able to take advantage of the more demanding examples is conditioned by the efficiency of the modalities that introduce the technology and the ability of farmers to obtain and manage the information needed for the continued performance of the technique.

The time to learn and manage a new technology also needs to be distinguished from the time to actually implement it. Although LEIT has a reputation for being labour-intensive, the study showed that these technologies are sufficiently diverse that such generalizations are not helpful. But the study showed that in nearly all cases the distinction between technologies relying on external inputs and those based on farm labour is of decreasing relevance because farm labour is itself often a purchased input. As rural populations increase, average farm sizes decrease, and income sources diversify, hired labour is an increasingly prevalent input on even many of the smallest farms.

Thus the decision to invest in labour-demanding technology may be based on access to cash (and thus often on market links) rather than on the status of household labour supply, and in this sense LEIT is like any other technology. But farmers still need adequate information to encourage them to invest. The introduction of LEIT often depends heavily on farmer participation. We have seen that the time requirements of this may be problematic, but there are other challenges as well, particularly with regard to the skills that farmers bring to the table.

Farmer experimentation is a prominent feature of many participatory techniques, but it is helpful to recognize different types and purposes of experimentation. In many cases the experimentation is designed to build farmers’ confidence. In FFS in irrigated rice, farmers often do experiments

that illustrate that leaf damage early in the season does not warrant insecticide application. Although the results of the “experiment” are already well-established, farmers’ involvement helps deliver the message, through communicative learning. But given the time involved in such activity, it may be asked if there are not more efficient ways of presenting this information that might reach more farmers. (This particular example is the basis of a lively debate between supporters of FFS and those managing more conventional extension campaigns for “No early spraying”.) In other cases the experimentation is more truly exploratory, as farmers are expected to adapt techniques, such as conservation tillage, to their own conditions; or farmers are encouraged to experiment more broadly on their own accord. The study of LEIT showed that there are relatively few examples where LEIT projects have led to a significant amount of independent experimentation. While no one would argue against strengthening farmers’ experimental capacities, it is not clear if such projects are the best way to go about this.

Even when experimentation is done on behalf of a wider community of farmers, this does not resolve the problem of how to deliver the techniques or principles that emerge. Many LEIT projects put considerable faith in the process of farmer-to-farmer technology transfer, but the study showed that this is not as common as often assumed. Farmers of course observe each others’ practices and exchange information; many examples of the rapid diffusion of new crop varieties attest to the fact that seed and information are often transmitted quite rapidly. But there is much less evidence that the information required for LEIT (whether it is the rationale for lowering insecticide use or the techniques of soil conservation) is transmitted very effectively between farmers.

The hopes for more effective communication among farmers are also linked to the aspirations of many LEIT projects for building social capital, in particular the assumption that participation in the development of LEIT (often as part of a group) will lead to permanent farmer organizations dedicated to further technology generation. This has rarely been the case, however. Farmer groups formed under one project may be inherited by a succeeding project, but sustainable, independent farmer organizations do not often emerge from the experience of collaborative technology generation.

Finally, the study found that despite the fact that many LEIT projects not only provide access to specific technologies and methods but also promote a low-external input philosophy (an example of transformative learning), there are few instances in which such projects are responsible for the emergence of consistently “green” farmers. Farmers who take advantage of the substance of LEIT are less likely to also adopt a style that makes environmental concerns the major determinant of decisions about input use.

Thus the review of the performance of LEIT concludes that although there are a number of examples of adoption and adaptation of these techniques, they are not widely used, particularly by the most resource-poor farmers; learning about them may involve a considerable time investment; they often require additional managerial skills but the actual labour for implementation is increasingly likely to be hired; despite the communicative type of learning associated with much LEIT the experience does not significantly strengthen experimental capacities or social capital; and despite the distinct style of many LEIT efforts, farmers rarely cite environmental awareness as a primary motivation. Lack of space dictates that these conclusions ignore considerable variability in experience; they are stated as baldly as possible in order to stimulate debate about what can be done to improve communication of the practices, methods and motivation associated with LEIT.

Analysis

This examination of the weaknesses of LEIT projects focuses on the economics of attention, the view that there is not a shortage of information but rather a deficiency of modalities and institutions that allow that information to be accessed and acted upon. This should not be taken to mean that further crop management research and on-farm development are unnecessary and

that the proverbial shelf is full of technologies and methods. But it indicates a need to come to terms with the unacceptable experience of hundreds of unconnected projects engaging farmers, promoting innovations and producing reports, without achieving much measurable progress on the ground. The following discussion examines the role of public research and extension, the use of a range of communication media, the place of farmer organizations, and the role of donors.

The Farmer First initiative (from which many LEIT programmes draw inspiration) grew from dissatisfaction with the quality and responsiveness of conventional public research and extension, and there are still debates over whether the ultimate goal should be reform or rather substitution by civil society or private alternatives (Farrington and Bebbington, 1993; Chapman and Tripp, 2003). One of the limitations of LEIT projects is their tendency to focus on a small number of technologies or techniques, for a limited period of time. Farmers need information about a much wider range of options and it is inefficient for them to have to seek this information among many competing suppliers. In addition, agricultural technology development is almost always incremental, and continual adjustments and innovations are required. Public research, extension, and university outreach programmes could offer more centralized sources for information. Although any mention of “extension messages” is extremely unfashionable, there is a great deal of basic information that farmers should have access to and it is reasonable to consider what types of intermediaries might serve as repositories for this information. It goes without saying that the effectiveness of such organizations is dependent on political conditions that promote responsive and accountable public service.

There are a number of communication technologies that can be enlisted to make better use of scarce attention resources. Computer-assisted learning, expert systems, and similar innovations are often discussed, but their immediate relevance for resource-poor farmers needs to be examined. More mundane possibilities, such as periodicals and FM radio, may deserve investment. A farmer magazine in south India provides not only factual information about innovations but also offers a forum for debating the performance of technologies and alternatives (Padre et al, 2003). Radio programmes can also offer opportunities for this type of discussion. Such media can be used for the development and transmission of information related not only to agriculture but also to a range of economic endeavours and political concerns of relevance to rural residents.

The favourite strategy for communicative learning is farmer groups, a feature of most LEIT projects. Farmer groups can serve many useful purposes; they are an efficient way of delivering information, a cohort of participants stimulates learning, and the development and testing of new information and ideas is often best done in a group context. Nevertheless, groups also have limitations for information management. Groups can be dominated by a few people or develop rigidities that limit critical thinking. In addition, the use of groups for learning and reflection often requires continual access to outside facilitation (van der Veen, 2000).

The issue of sustainability is particularly important. The review of LEIT experiences found few examples of sustainable farmer groups based solely on technology generation. A farmer field school may be very useful, but it needs to exist within a more robust institutional environment. There is a growing consensus that farmer organizations are a vital element for rural development, although heightened expectations and donors’ desire to provide external assistance can jeopardize their progress (Chirwa et al, 2005). Most successful farmer organizations address the economic or political priorities of their members. For households with less participation in agricultural markets other types of rural organization may be called for, but institutions that promote farmer voice and interaction can provide incentives that direct participants’ attention to agricultural innovation.

If there are currently insufficient mechanisms that help farmers devote attention to the information that is available about crop management, then donors who provide support to efforts in agricultural technology generation need to reconsider their priorities. The challenge is exceptionally difficult, because helping build the institutions required for a better allocation of

farmer attention is a much less attractive task than promoting many small, self-contained projects, each featuring a particular innovation or technique, accompanied by the vague notion of “scaling up”. But without a concern for the coherence of the information that is on offer or the modalities that would contribute to its efficient access, the chances that innovations will be widely adopted are slim.

The review of LEIT showed that donors responsible for funding these individualized efforts devote very little time to collecting information about actual performance or long-term outcomes, and hence have little opportunity for thinking about the sustainability of their investments. A preoccupation with style in the development industry means that many LEIT efforts that begin life as pragmatic attempts to resolve specific problems survive by adopting whatever rhetoric is in fashion. Mosse (2005) provides a description of the career of participatory research in a large project in India and illustrates how “participation” becomes subject to reinterpretation by various actors.

The communication of motivation and style (transformative learning) may be as important as the provision of factual information and methods, but it is probably not the first thing an external intervention should attempt. Farmers are more likely to be persuaded by the beliefs and convictions that underlie something like LEIT after hands-on experience rather than by overexposure to ideology. Bebbington (1992) discusses the tensions in Ecuadorian peasant groups who debate the alternatives of “traditional” and “modern” styles in their approach to technology (but with much broader political implications). Donor projects would often do better to allow farmers to develop and dictate their own styles and to concentrate more on facilitating access to information and techniques. If it is important to respect and strengthen indigenous knowledge and methods, it is also reasonable to allow room for local styles of farming.

Conclusions

This review of the performance of LEIT projects has been used to suggest that a re-examination of strategies promoting farmer-centred technology development is in order. A relatively disappointing degree of uptake, particularly among poorer households, indicates that larger issues need to be addressed in order to provide an environment where farmers can efficiently acquire information about options and methods. This does not mean that innovative efforts at technology generation are unimportant, nor that all resources should be devoted to long-term institutional development. But it does mean that business as usual, with a continual stream of disconnected projects and no thought to the broader context that governs the efficiency of farmers’ access to information, is not acceptable.

There are no simple solutions to the challenge of furthering the goals of a Farmer First approach (building on local knowledge and aspirations, supporting processes of knowledge generation, and empowerment) and at the same time promoting sustainable institutions that economize on farmers’ attention. Resource-poor farmers have little time to devote to technology generation. Access to multiple sources of information is important and farmers should be able to identify trusted and comprehensive guidance. Farmers need to build their own skills at generating technology, but they also need to learn to whom they can turn for advice. Farmer organizations can develop the skills of their members but they should also exert pressure on service providers. There are different styles of farming and modes of learning; the benefits offered by formal organizations need to be complemented by appropriate mechanisms that support individualized learning.

Donors and governments need to review their priorities. How much focus should be directed to ad-hoc farmer groups and how much to supporting strong, broad-based rural organizations? How much should be invested in farmer field schools and how much in basic rural education? What should be the balance between civil society technology development projects and developing farmers’ capacities to demand better service from public research and extension? How much should be spent on sophisticated IT projects and how much on developing media that provide

opportunities for engaging rural residents? And how much should donors devote to pursuing their own portfolios of short-term projects rather than providing incentives for people to work behind the scenes to ensure that strong local institutions have a chance to emerge?

These choices are not easy ones, but this review indicates that we must improve the economy of attention. Location-specific, farmer-centred activity that generates innovations, methods and motivation remains important, but long-term success depends on sustainable institutions that allow farmers more efficient access to information and that support their ability to share knowledge.

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