

## Gatekeeper 66

# Understanding Farmers' Communication Networks: Combining PRA With Agricultural Knowledge Systems Analysis

Ricardo Ramirez

## Introduction

There are multiple sources of innovation and information within a given farming system. In addition to the formal research institutions, input suppliers, traders and private individuals all demand and supply information.

Farmers' capacity to control their environment is the result of the resources at their disposal; among these, knowledge and skills are key components. In order to understand a farming system, it is just as important to understand its communication networks as it is to understand its environmental situation or changes in its market place.

Farmers and farmer groups are stakeholders in a rural community, just as much as municipal authorities, public servants, private for profit and non-profit organisations, salesmen, traders, bankers, researchers, women's groups, private entrepreneurs, religious groups, etc. These stakeholders interact constantly, seeking to negotiate and create opportunities to fulfill their needs and pursue their interests. In these negotiations information is exchanged on prices, market opportunities, technology and practices, policy changes and politics. Much of the information travels freely, but some may also come at a price. These seemingly invisible patterns of communication and information exchange constitute an integral part of a farming system. Indeed, some argue that they constitute part of a broader system: an agricultural knowledge and information system (Röling, 1988). In terms of agricultural development, the different stakeholders can together be perceived as a social organisation; and it is their joint action which enhances or limits the development of innovation (Engel, 1994).

This paper describes an approach for identifying the communication networks which exist in agricultural systems, and for assessing their performance in order to recognise and remedy bottlenecks in the system. The paper draws on fieldwork conducted in the Philippines, Peru and Ethiopia<sup>1</sup>.

## Agricultural Knowledge and Information Systems

The traditional Transfer of Technology (TOT) model is being eclipsed by newer models which acknowledge the overlapping of researchers, outreach workers and farmers (Christoplos and Nitsch 1993). Rather than focus on the technology itself, the new approach recognises that information and knowledge provide a common denominator among farmers, extension workers and researchers.

The notion of agricultural knowledge and information systems (AKIS) was developed in the late 1980s by researchers at Wageningen Agricultural University in the

Netherlands. The AKIS model describes the two-way flow of information and knowledge among the research, extension organisations and farmers. In this sense, the AKIS goes against the existing linear information dissemination systems which were developed in most national agricultural research systems under the transfer of technology model.

The best extension systems in the world develop where farmers are organised and able to lobby for the technical assistance which they consider priorital (Röling, 1988). It is the demand capacity of farmers that dictates the quality and effectiveness of the extension support. The opposite process, whereby extension systems conceivably strengthen farmers' production systems through technology, is more a myth of the TOT model than an observable reality.

In the AKIS perspective, the two-way exchange of information is crucial for effective generation and transfer of relevant technology. As a consequence, the role of extension has been reformulated from a one-way TOT persuasive channel into a two-way channel for requests and answers which facilitates the learning process for farmers, extension staff and researchers. But the change from disseminating to facilitating requires staff with fundamentally different attitudes, skills and knowledge. From the point of view of the AKIS, and of participatory research, the facilitator can be described as a broker of information demands and supplies. The model is aimed at supporting decision making, problem solving and innovation in a given country's agriculture (Röling, 1990).

The nature and structure of an AKIS are not static; they differ according to site and level of analysis. In terms of change through time, farming systems' 'evolvability' and flexibility are critical characters for survival (Lightfoot et al., 1993) and therefore contribute to the evolving nature of an AKIS. In addition, the extension organisation is only one among the many actors in the AKIS and therefore the role of a field worker and the organisation must be flexible; flexible enough to exploit the strengths and maybe overcome some of the weaknesses of an existing AKIS (Christoplos and Nitsch, 1993).

## Investigating Local Agricultural Knowledge and Information Systems

A number of research approaches have been suggested for investigating the elements, strengths and weaknesses of an agricultural knowledge and information system at a local, regional or national level (Garforth, 1993; Röling, 1990; Brunold and Scheuermeier, 1996). However, they tend to remain researcher-controlled and allow limited participation by the different stakeholders, and they do not promote the operationalisation of the model. Rapid Appraisal of Agricultural Knowledge Systems (RAAKS), a methodology pioneered by Engel and Salomon (1994) provided a concrete starting point and an operational method with steps to follow. RAAKS is best described as a management tool for understanding an agricultural knowledge system in a participatory manner.

Following the growing trend in participatory analyses, the research in the Philippines, Ethiopia and Peru explored network analysis from the user perspective, ie. mapping the AKIS from the farmer level up. The process borrowed heavily from RAAKS but

was made more visual and, therefore, accessible to farmers by using PRA techniques.

This approach allows researchers, field workers and rural communities jointly to identify the networks of information exchange, bringing these actors together in a closer learning and planning process. The approach followed three stages:

1. mapping of actors and linkages;
2. analysis of linkage performance; and
3. action plan to modify roles and improve linkages.

The experience in the Philippines reached the last stage, while those in Ethiopia and Peru were limited to the first stage.<sup>2</sup>

### **Stage 1. Mapping Actors and Linkages**

The various activities which are followed during this stage are listed below:

1. Identification of farmer group and presentation to farmer group of study goals;
2. Farmer group draws community map highlighting major production systems, enterprises, infrastructure and tenure;
3. Ranking of major enterprises;
4. History of innovation: description of the major changes for each enterprise in last 10 to 30 years and identification of the actors responsible for each major change (Box 1);
5. The research team draws a linkage map; for each linkage, the farmer group verifies each actor/linkage drawn;
6. Verification and discussion with farmers on the basis of the linkage map;
7. The research team follows-up the leads identified from the farm level and interviews tradesmen, input suppliers, private and public technology transfer workers, municipal officials, researchers, etc. (see Box 2)

The first stage begins with a mapping exercise done with farmers. This exercise allows the group to illustrate for the researchers the layout and boundaries of their community and it yields an initial broad visual description of resource use.

The history of innovation merits special attention as it yields information linking the history of change in a community with the institutions and organisations which have influenced that change. This history of innovation exercise serves as the basis for identifying changes in the production systems over a certain time period. Enterprise by enterprise, the farmers are asked to describe the major changes which have influenced the production and marketing patterns throughout the last 10 or 30 years. Each change is written in, indicating the source (name of person or institution) of the new information item, seed variety, input or technique, and the approximate date. This constitutes the identification of major actors at the community, municipal, and regional levels of analysis (Box 1). It is one approach to stakeholder identification based on a community's memory of change.

### Box 1. A History of Innovation: Ethiopia

In the case of Ethiopia we chose to use a 30 year time-frame to capture the impact of the last two major political transformations which have affected rural policies directly. It became evident that two waves of new information and technology had taken place, influencing many aspects of crop and animal husbandry. Both waves of innovation were traced to two bilateral aid projects which had dominated agricultural innovation for years.

While this finding was not new to the rural community, the lack of impact from other governmental services became evident and could be described visually.

Once the above stage is exhausted, the research team offers to feed-back and confirm its understanding of the information by producing a linkage map. This offer tends to be welcomed with curiosity. A linkage map is drawn step-by-step (see activity 5 above), and researchers discuss each linkage with the group as it is drawn. First linkages within and among communities are drawn (the lower level on Figure 1); then come linkages with municipal 'actors' described by the farmers: agricultural technicians, inputs salesmen, middlemen and tradesmen (the middle level on Figure 1); finally come the linkages with provincial, regional and national actors - agencies of line ministries, state colleges and universities, research stations and industry - the top level on Figure 1.

In one community in the Philippines, the discussion after completing the map indicated the power of farmer participation in diagnosing agricultural and development problems. The map allowed the participants to verify who they had trusted and received support from, who they had failed to contact, and whose functions needed review (Figure 2). In essence, the discussion provided both the farmer groups and the outsiders with an understanding of actors' goals or mission statements; of the information needs and supplies of each major actor in the farming system. The map allowed for the identification and analysis of major linkage mechanisms and communication channels among actors. The map became the language through which the villagers and the outsiders could understand each others' perspectives.

In the training exercise in Cajamarca, Peru, the linkage maps which emerged showed how some NGOs promoting ecologically sound agriculture were working in isolation from the national research stations which were also searching for low-input options for farmers. The efforts by local mayors working towards the same goals were also disconnected from these organisations' programmes. Lastly, the farmers seemed more closely linked with the middlemen who in turn had no apparent interest in these alternative production approaches. These initial findings showed the need for a broader consultation among different stakeholders which, in the field of sustainable agriculture was traditionally limited to a narrow group of like-minded NGOs. In contrast, there seems to be a rich heritage of multi-stakeholder negotiation and planning experience in the field of watershed management. Peru is in fact cited as one country with particularly relevant experiences (Dourojeanni, 1990).

Interestingly, in the Cajamarca area, the mayor has convened a forum on a regular basis to co-ordinate action among local government, NGOs and other organisations. This mesa de concertación is a platform for joint planning, very much in line with the concept of platforms for agroecological planning (Röling, 1994).

### Understanding Linkages Higher Up the System

In the Philippines case, on the basis of the major actors identified, the research team moved up the system following up the informants or 'actors' identified by the farmers. Following farmers' leads, the study team interviewed village organisations, municipal agricultural technicians and officers, input tradesmen and middlemen, provincial agricultural officers, regional representatives of government departments, and a select number of national-level officials (see Box 2 for an example).

### Stage Two: Analysis of Linkage Performance

While the linkage map illustrates the linkages among the most important actors, it says very little about the relative performance or importance of the linkages. A further stage is required in order to identify the key linkages and to understand why and how they perform. This analysis helps to propose improvements in the roles and relationships among actors identified in the last stage.

In the case of the Philippines, the major linkages identified were analysed using the following six criteria:

1. actors' awareness of other actors' functions in a linkage
2. relevance of other actor's services;
3. timeliness of other actor's services: if the information input is programmed to coincide with the availability of other inputs, then the service is timely;
4. accessibility to other actor's services: if an extension worker is able to visit farmers regularly this can enhance the relevance and timeliness of the service;
5. communication media through which link is mediated;
6. control over the initiation and management of a linkage: when farmers have demand capacity over the services in their area, the other criteria listed here can be better ensured.

The Philippines case was a first attempt to systematically assess linkage performance (Figure 3). The criteria in the matrix were chosen to serve in future as qualitative criteria by which to define new and desirable functions and linkages among actors. In this example, the criteria served as a basis to recommend a revised role for the agricultural technicians. They also provided the framework to give meaning to the field-level findings, and, on that basis, to articulate improved roles and linkages.<sup>3</sup>

Other work in the Philippines (Lawrence, 1995) used indicators to describe change in the information systems used by different stakeholders. These included: amount of information, diversity of sources, relevance, satisfied demand, credibility, complementarity of information sources, linkages between information sources, access by users, direction of information flow, democratic control, and use of indigenous knowledge. While there is no quantitative indicator of linkage performance, in essence an effective link contributes to both actors' learning process while responding to the immediate needs of their job or economic activity. Clearly, the findings of this kind of appraisal may only be logically derived from the linkage matrix and are therefore necessarily location specific.

The above describes the rationale for stage three - the action plan to modify roles and improve linkages. However, the effort was a rough beginning and it only used the matrix as a tool for understanding the performance of the major linkages identified. Clearly, a weakness of the exploratory experience in the Philippines was the limited time we included for preparing an action plan. In future, this third stage

needs to borrow more tools or 'windows' from the RAAKS, which proposes several steps for action and intervention planning:

Knowledge management analysis: what can be done by whom to fulfill the objective(s)?

Actor potential analysis: who has the mandate/means to cooperate in effectuating the changes deemed necessary for successful performance of the system? How can solutions be negotiated amongst key actors?

Intervention planning: who is going to do what? (Engel and Salomon, 1994).

### **Figure 3. Matrix for Analysing Linkage Performance, Barangay Mamala, the Philippines**

#### **Lessons Learned**

#### **Farmers are a Major Source of Information**

In all communities where the approach was tested, the extent to which agricultural knowledge from the research system had reached the users was found to be, at best, limited and in most cases inadequate (Box 3). Farmers' primary source of information, particularly in terms of new seed varieties, was other farmers. In general, the farmers' needs were not met by the agricultural technicians' services, nor were the programmes handed down to the technicians for transfer to farmers adequate to their needs.

However, in the Philippines, the technicians were described as trustworthy in some communities. In one community farmers indicated that while the function of the ATs was of limited practical use in terms of technological input, their contribution to community organising was important. One group of farmers recommended that ATs become trained in problem identification. Some ATs themselves recognised the need to improve their skills and redefine their roles.

#### **Box 3. Information Sources in Guisguis, the Philippines**

Guisguis is located in the Sariaya municipality. Farmers grow both perennials (coconut, banana) and annuals such as paddy. A linkages map was prepared with farmer groups. In terms of the actors involved in the supply of information on new technology, farmers indicated that the agricultural technician (AT) visits them once or twice a year, mostly regarding the supply of certified seed paddy. No advice for paddy production had been given in the last six years. The main source of information has been other farmers who have provided the new seeds of varieties that they have found useful and are currently cultivating. Input/output price information also comes mainly from other farmers but technicians give information once in a while as well. One important observation is the intensive intercropping of bananas and coconuts, a practice they began as a result of their own observations of this practice in other communities in the municipality.

The team realised that this was the first time outsiders had had such an in-depth discussion with the farmers. As one farmer dramatised, the technicians' training method had consisted of a lecture, with farmers having to take notes all the time, and had offered little value. It is apparent that in the case of Guisguis information transfer is very weak.

## Rethinking the Role of the Extension Worker

This study provides ample evidence for the need for a new role for agricultural extension workers; one where the major function is information brokering, not transfer of technology. A problem solver, rather than a conveyor of standard recipes, is required. This was especially evident in the Philippines, where the farmers themselves proposed this shift in functions.

Among the new skills needed is the ability to be an effective communicator. A professional communicator will need professional and financial incentives. For a policy decision to be taken in this direction, the following is needed:

- Redefinition of the roles of extension staff as information brokers, facilitators, capacity-builders and problem-solver
- Determination of the terms of reference for extension staff
- Design of new training curricula with a strong focus on communication and facilitation skills
- Establishment of incentives to provide stature for the new professionalism

The role of several of the private sector actors appeared to be complementary to the public one (Box 4), and there is ample room for improving its linkage function between research and farmers.

### Box 4. A Joint Analysis of Options and of Opportunities

While sitting around a linkage map in the Philippines we asked the farmers to compare the services of the private farm contractor (who was introducing pineapple production by providing a package comprising credit, regular technical advice and an assured market) with that of the public sector agricultural technician (AT). While they trust the latter's commitment, they felt the impact was small and suggested that the AT's service needed to resemble the private contractor's. We commented that the contractor's price for pineapple would already include a discount to cover the cost of that advice, in other words they would be paying for the advice. This generated an excited discussion after which we asked whether one day they would be willing to subsidise the AT's service.

The cautious answer: Yes! but conditional to the AT working for the barangay's (community) interests; and the payment calculated according to their real capacity to pay. In their words, the AT should become a problem solver to deal with their priorities, and not a messenger from the researchers.

## Improving Horizontal Linkages

It is telling that most of the institutional linkages mapped were vertical. A glance at the linkage maps (Figures 1 and 2) reveals the fact that there are precious few horizontal linkages at the municipal level; and those at the regional level are more

protocolary than functional. It is at this level that both public and private sector delivery systems tend to function, and therefore it is at this level that there is room for improvement.

Horizontal linkages would entail collaborative arrangements between public and private sector institutions to strengthen their relative advantage in specific information areas. For example, in the case of the Philippines, if the pesticide supplier had received the Department of Agriculture materials on pest identification and product recommendations, the supplier would have been able to respond to farmers' needs in a professional and scientific manner. A municipal facilitator equipped with diagnostic and communication skills could establish and improve such linkages on a regular basis.

In Ethiopia, the exercise took place at the community level in the presence of the Development Agents (extension workers). Their presence meant that they appeared quite prominently as a major player in the linkage map, even though there was little evidence of the impact of their work. In contrast with the Philippines, there were few actors at the municipal level who could have offered similar information services to the communities. One can speculate that this picture is the result of rural policies in Ethiopia over the last three decades which left little room for the development of rural institutions not linked to the public sector.

## **Shared Control is Key for Effective Linkages**

The six criteria used to assess linkage performance described above are also useful guidelines for improving linkages. Of the six criteria, linkage control is certainly the most important; it raises issues of power relations among actors and institutions which cannot be disregarded. If and when this criterion is adequately dealt with, it would appear that the others also improve. In one example from the Philippines, the relationship between the farmer co-operative and the private farm contractor is mediated by a contract; while this does not in any way ensure an equal footing, it does clarify the rights and responsibilities of both signatories. In the contract, the other criteria (awareness, relevance, timeliness, etc.) have been negotiated outright.

In the Philippines, the job descriptions recommended for a new agricultural facilitator (former AT) included criteria such as relevance, timeliness or control in terms of functions, and would conceivably lead to a realistic and professionally rewarding job.

## **Engage as Many Stakeholders as Possible from the Start**

The Peru experience demonstrated the power of stakeholder analysis when there is representation and involvement from different types of actors. The experience in Cajamarca with the mesas de concertación sets an important precedent for these different actors to come together as emerging learning groups.

## **Applicability of the Approach for Different Actors**

Clearly, this approach is valuable in different ways for the wide range of stakeholders involved:

## Farmers

For farmers, the visual nature of the approach helps them to visualise and understand communication networks and provides a basis to improve information exchange. As such it should provide farmers with the following benefits:

A common language that enables them to identify information demands and channels on an equal footing with outsiders. This can enable a dialogue with individuals from different levels of organisations that work with or service the community, particularly in the agricultural activities.

A general understanding of the pattern of change that has taken place over a certain period, a 'history of innovation'. While it can be argued that in fact farmers are already aware of their situation, it is not always the case that farmers systematically analyse the number of positive/negative interventions that they could recall. This was evident during the field visits. It was only when farmers began to discuss among themselves the interventions over time, that some of the changes that have taken place became evident.

An understanding of the sources of intervention and information provided, and the roles played by different actors.

An opportunity to identify potential improvements to the existing system.

## Agricultural Extension Staff

The extension staff are a potentially important link between the farmers and other more distant sources of information. However, at present their effectiveness is limited, and to a large extent absent, in the cases researched in the Philippines and Ethiopia. An interaction with the farmers using this tool can help the extension staff as follows:

This approach allows them to identify who the other individuals are who provide information both at the community and municipal levels, and their functions. Conceivably, this could allow them to negotiate revised job descriptions with their supervisors. Most field workers would welcome jobs which are more professionally rewarding and serve their clients effectively (Christoplos, 1996).

The role of farmers as decision-makers in the production process becomes evident. The sources and type of information obtained by farmers become clear. These findings give the extensionists renewed respect for and confidence in the farmers with whom they work.

The information can help extension staff prioritise the needs within and among communities. They can also identify the progress of interventions and analyse their effects.

A systemic undertaking of this approach by the extensionists can be the cornerstone for the development of a strong research and development base that will serve the immediate requirements of the farmers.

## Agricultural Research Staff

Most researchers make a genuine effort to determine and understand the problems facing farmers. Their underlying purpose is to approach their activities in a problem-solving manner, and consequently generate adaptive research programmes to solve such problems. However, the techniques researchers rely on for identifying the problems in the field are few and not well used. Using this approach with agricultural research staff will provide a good basic framework to identify problems.

The active participation of farmers in mapping the different actors and their roles will provide the researchers with information on alternative sources of interventions. Moreover the approach can help researchers translate farmers' problems into researchable issues:

It can help researchers obtain information on field problems and networks. Understanding the networks of actors that serve the farmers will help the researcher obtain the co-operation of the different actors. For example, the private sector traders who provide seeds and agricultural chemicals could become involved in promoting adaptive trials along with local research station staff.

Most researchers are commodity oriented and their appreciation is mostly from a cropping systems perspective. Interaction with farmers provides them with an 'holistic' environment into which the research activities must be integrated, making the research agenda of the more relevant to farmer demands.

## Policy Makers

The approach is also relevant for regional agricultural policy makers, as the information obtained from farmers, extension staff, and researchers will help make agricultural programmes more pragmatic:

The programmes would better reflect farmer demands and enable effective implementation.

It is likely to give policy makers an insight into the possible new roles for extension workers, providing a rationale for redesigning their role as brokers of information.

The approach may enhance the quality of extension planning, by providing a framework for consultation with different stakeholders.

## Conclusions

This paper has outlined the power of an approach for understanding the information-related potentials and constraints which exist in any farming system. Mapping networks of information exchange with the participation of its actors provides them with immediate charts of possible action. Existing patterns of access to information point to the services which are already working well, as well as those which could be established or abolished. The experiences in the three countries point towards the need for involving stakeholders in analysing their own networking. In this sense, the short-lived PRA experiences would best be incorporated into iterative planning processes to allow all parties to negotiate interests and relationships as they evolve. Relative to other stakeholder analysis methods, in this approach actors are identified on the basis of a history of innovation. As such, the linkage maps which emerge are visual representations of a collective memory about actors who brought about change.

The methodology on its own cannot give final answers, but it provides entry points. It calls for a process whereby extension workers, along with other rural actors, become facilitators to identify and assess problems and explore solutions through networks.

## Acknowledgements

The Philippines experience was the result of a team effort by FAO staff and consultants including: Robert van Poelje, Nora Quebral, Martin Bostroem, Virginia Cardenas, Nimal Ranaweera, R.B. Singh, Diosdado Carandang, and R.S. Singh, and the input by members of the Mamala I, Guis Guis and Dolores barangays, and of barangays in Laurel municipality, the Philippines. During project preparation advice and insight was received from John Dixon, Clive Lightfoot, Ralf Kwaschik and Brian McCall. The Ethiopia field work was possible thanks to the work of Alice Carloni, Betru Haile, Wolde Selassie, Tesfaye Negussie, M. Rossi, and the people of Lemu Chemeri, Arsi, Ethiopia. The Peru experience was possible thanks to the inputs by the GINCAE and GIAREC working groups, Edith Fernandez-Baca, Norma Canales, Sonia Salazar, María Fernandez and Paul Engel. The information inputs and encouragement received from Niels Röling and colleagues at the Department of Communication and Innovation Studies, Wageningen Agricultural University, is also acknowledged.

## References

- Brunold, S. and Scheuermeier, U. 1996. **Using agricultural knowledge systems: From an institutional approach to a functional extension model.** European Journal of Agricultural Education and Extension 3(2): 75-84.
- Christoplos, I. 1996. **Poverty, pluralism and extension practice.** Sustainable Agriculture Programme Gatekeeper Series 64. Sustainable Agriculture Programme, IIED, London.

Christoplos, I. and Nitsch, U. 1993. **Changing extension paradigm**. IRDC Currents 6: 22-26.

Dourojeanni, A. 1990. **Procedimientos de Gestión para el Desarrollo Sustentable (Aplicados a Microrregiones y Cuencas)**. Documento 89/05/Rev. 1 Instituto Latinoamericano y del Caribe de Planificación Económica y Social. ILPES, Santiago de Chile.

Engel, PH. and Salomon, ML. 1994. RAAKS: **A participatory action-research approach to facilitating social learning for sustainable development**. In: Systems-Oriented Research in Agriculture and Rural Development. Papers of the International Symposium, Montpellier, France 21-25 November, 1994.

Engel, P.H. 1994. **Facilitating Innovation: An Action-Oriented Approach and Participatory Methodology to Improve Innovative Social Practice in Agriculture**. Published PhD Dissertation. Department of Communication and Innovation Studies, Wageningen Agricultural University, The Netherlands.

Garforth, C. 1993. **Communication Models in Extension Research**. Unpublished BAES seminar. The University of Reading, Reading, UK.

Lawrence, A. 1995. **The neglected uplands: Innovation and environmental change in Matalom, Philippines**. AERDD Working Paper 95/11. AERDD, The University of Reading, Reading, UK.

Lightfoot, C., Pingali, P. and Harrington, L. 1993. **Beyond romance and rhetoric: Sustainable agriculture and farming systems research**. NAGA, The ICLARM Quarterly. January: 17-18.

Röling, N. 1994. **Platforms for decision-making about ecosystems**. In: Fresco, L.O., Stroosnijder, L., Bouma, J. and van Keulen, H. (Eds.) The Future of Land: Mobilising and Integrating Knowledge for Land Use Options. John Wiley and Sons Ltd., Chichester, UK

Röling, N. 1990. **The agricultural research-technology transfer interface: A knowledge systems perspective**. In: Kaimowitz, D. (ed.) Making The Link: Agricultural Research and Technology Transfer in Developing Countries. Westview Press, Boulder, Colorado.

Röling, N. 1988. **Extension Science: Information Systems In Agricultural Development**. Cambridge University Press.