

Mapping and understanding farmers indigenous Agricultural Knowledge and information systems and the implications for contracted research and extension systems

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Abstract

Farmers, both male and female have indigenous knowledge systems, which do not mesh well with the more formal research and extension information networks. The purpose of the study was to develop and test a methodology that can be undertaken by field level staff. Tools were developed to determine farmer information networks, disaggregated by wealth and gender. Additional tools were developed to analyse farmer information delivery preferences, the type of information flowing through the information links, the frequency of use and the perceived quality of information. Richer and progressive farmers had information networks that went outside the confines of the community. Information was obtained from the radio, extension workers, private enterprise (buyers and sellers) and vernacular language newspapers. This group of farmers are suspicious of family and friends. Poor farmers agricultural information network was confined to their relatives, friends, the church, the local women's group and the radio, and very rarely the extension worker. For both groups delivery of good quality technical and marketing information remains a problem. The merits and problems of the different information mechanisms are discussed. Little or no institutional memory exists at the community level. Most farmers prefer to "learn by doing"; contrasted with the service providers who preferred the classroom delivery mode. Farmer indigenous knowledge and information systems have implications for both contracted and delivered research and extension services. In policy terms, richer farmers have reasonable links with local government officials, are very market oriented. The market may be able to deliver information to this group, but market traders are viewed with suspicion. Delivery of information to the poor, who are food insecure and rarely interact with the market, is a problem. Alternative less market oriented information delivery mechanisms must be developed, and incorporated into an information and communication strategy. How the different formal knowledge and information systems can link with farmers knowledge and information systems is discussed.

Key words: Information networks, Delivery mechanisms, market oriented

Introduction

Farmers of both genders have and utilise an indigenous knowledge system (Röling 1986 and Röling 1990). The coverage of their indigenous knowledge system is frequently restricted and does not mesh well with the more formal research and extension information networks. A key objective of both the NARS (NARO, Universities and other research institutions) and NAADS is to disseminate research and extension information. This information is disseminated through their own information networks. Yet if both institutions can connect to and interact with the indigenous information network; will have significant implications for information service providers and for the further dissemination of research information. Nevertheless for such systems to work efficiently the transaction costs on both sides of the communication divide must be minimised.

The study was commissioned by the Client oriented Agricultural Research and Development Project (CoARD) with the objective of developing and testing methodologies, disaggregated by wealth and gender, to determine the extent of the indigenous information network and to discuss the implications for the information service providers in Uganda.

The purpose of the study was to develop simple methodologies, which can be used by community based extension workers, private service providers and other sub-county based staff to assess farmer indigenous information networks (disaggregated by gender). The methodologies developed were conducted by Research staff that work at the research/extension linkage level, in conjunction with extension agents. In a Ugandan context, Staff from Serere ARDC conducted the methodologies, in conjunction with the Sub-County NAADs Coordinator and other MAAIF extension staff.

This paper will briefly outline the methodologies developed, but will focus on the analysis of indigenous information networks as well as the implications for research and extension in general. As stated in the introduction, linking to the indigenous information network is a goal of NAADS, NARO and other NARS members. The study was undertaken in Soroti District (Kamod and Bugondo Sub-Counties) and in Lira District (Ogur and Apoka), Uganda.

Materials and Methods

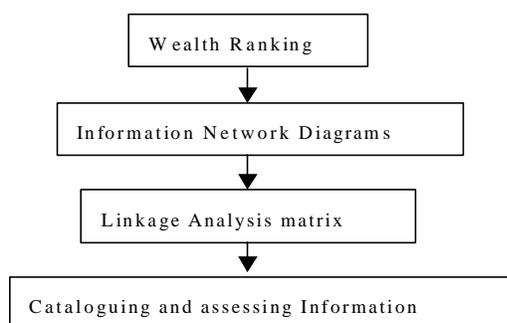


Figure 1. Figure giving an overview and sequence of the different methodologies used

Other criteria were applied, the methodology had to be simple, easy to use and farmer friendly. The tools had to be completed in less than 3 hours. Facilitators with limited extension and community facilitation experience must be able to use these methodologies with the minimum of prior training. The methodologies used must be preceded by some assessment of wealth; wealth and access to resources has a significant impact on the indigenous information network. Figure 1 outlines the process, which consists of 4 methodologies.

Wealth Ranking

All meeting participants, from both genders were asked to write their names on a card. The cards were collected in to one pile. A member of the group was asked to read the name and show the card. The whole meeting decided in which pile the card went. Once all cards had been assessed, a check of each individual pile was made to ensure that all names belonged to that group. Each card pile was given a name e.g. "Female headed household and orphans". Once the names of the groups had been agreed, the meeting discussed the characteristics through which the group was identified. A wealth ranking should take about 2 hours and will be participative involving all meeting members.

Information Network Diagrams

Using the wealth groups identified from the wealth ranking; the objective was to describe and map the individual wealth group information networks. This methodology is rapid and easy to use, it is a very visual way of determining the principle information sources and the less important information sources being used by farmers.

The different wealth groups are asked, in no particular order to list all the information sources that they use. This can be done by drawing and filling in boxes on a flip chart paper. With all the information sources listed, the facilitator will identify the 10 most important information sources in order of priority.

Through this methodology an information network diagram was generated (see Figures 2 – 5). The boxes on the periphery denote the information sources, the size of the arrows denote the importance of the information source. These diagrams were popular with farmers as it was a very visual representation of where they obtain their information. To develop the information network diagram took about 1.5 hours, it was strongly linked with the completion of the linkage analysis matrices (see below).

Linkage Analysis Matrix

The purpose of the linkage analysis matrix was to analyse the different linkages in terms of:

- Information quality,
- Frequency of use,
- Timeliness of receipt of information given/received
- Reliability of information given/received.
- Is the information link set up for one way or two-way information flow?

Gathering information on the above criteria was undertaken. It does not prevent other users collecting additional information on; control, the type of information (or services) given/received and information flow. Completion of this matrix tool takes about 3 hours. The methodology is flexible; facilitators can collect information on the 5 most important information sources and the 5 least important information sources. Such a combination will include extension agents and/or service provision will throw up the reasons why information does or does not flow, steps can be taken to overcome blocks, to better facilitate information flow.

Cataloguing and assessing information

Information delivered and media used

Currently information is being delivered through a range of different media. A methodology was developed to assess whether the media was appropriate for the information being delivered. Farmers will have preferences for different media and how the information is delivered as well as assessing the strengths and weaknesses of the different media.

Information comes in many different forms, but for the purposes of this study the information types was classified and is shown in Table 1.

Information types and their definitions are important, for guiding farmers. It was essential that farmers fully understood the different information types. Two matrices were developed to assess the appropriateness of current informa-

tion delivery systems and a second matrix to compare the current information delivery system with the farmer preferred information delivery system. The methodology was gender disaggregated.

Results and discussion

Overview

Whilst the work was undertaken in Uganda, determining information networks is applicable in Uganda as it is elsewhere in the world. In this respect, clear and significant differences in access to resources are seen,

Information Networks

The different information networks are given in figures 2 – 5, which are disaggregated by access to resources and by gender.

The information network diagrams reveal that, as expected, there are differences between the rich farmers information networks and the poor farmers information networks. The information networks of poor female and poor male farmers are broadly similar. Information networks do not appear to be gender differentiated. The poorest groups rely on farmer-to-farmer information networks, frequently confined to the boundaries of the community. This will restrict the entry of new information into the community information circuit.

Wealthy farmers have a wider range of information sources, including government officials, newspapers and private enterprise (e.g. Dunavant Cotton and/or Mukwano). Wealthier farmers do use the family and friends information network, frequently information from this source is deemed untrustworthy, notwithstanding the considerable competition between these farmers.

Table 1. Table showing the information classification system developed by the AKIS study

Type of information	Definition
Awareness information	Information associated with mobilisation, sensitisation and the raising of the profile of crop or technology
Technical information	Information which explains a specific technique or function
Marketing information	Information associated with sale and purchase, particularly market price an outlet
Financial information	Information on record keeping and running a farm as a business
Value-added information	Information on processing, crop storage and packaging
Monitoring information	Information on feedback loops, monitoring activities and evaluating the results of activities

Table 2. Table showing the key differences between the 3 wealth groups identified in Bugondo parish

Less Poor	Poor	Female headed Households and orphans
<ul style="list-style-type: none"> • Have at least 1 team of oxen and a plough • Have sufficient land (more than 6 acres) • Are food secure • Has no problem with school fees. 	<ul style="list-style-type: none"> • Food insecure for 3 months • Do not own oxen or plough • Have little land • Children receive education up to UPE • Have large families, poor family planning • Clothing and bedding is of poor quality 	<ul style="list-style-type: none"> • Have a labour constraint • Food insecure (Max 6 months) • Do not have a balanced diet • Children do not go to school, cannot pay school fees

If the utility of the information sources are scored according to importance and expressed graphically; Graph 1 shows that 4 information sources within the sample frame of 4 Sub-Counties are the most popular.

According to Figure 2, there are 4 commonly used information sources:

- **Farmer to farmer linkages:** As expected the poorer groups (female headed households and poor male farmers) are most reliant on this information source. The rich farmers, in spite of reservations also place heavy reliance on this information source.
- **Local Government officials:** Richer farmers appear to use this information source extensively, probably because they are drawn from the same social group. The female-headed households have limited use of this information source; accessibility may be a problem, but having the time, a mechanism and the social status may be significant contributory barriers.
- **Extension Staff:** When compared to the aggregated totals of the farmer-to-farmer and local government information sources are deceptive. On the contrary, all groups, to varying degrees, use this information source. As the graph shows, this source is used and accessed irrespective of wealth or gender grouping. It was universally agreed, and repeatedly emphasised that the extension officer is a known source of good quality agricultural information.
- **Radio:** all wealth and gender groups use this information source consistently. The female-headed households own,

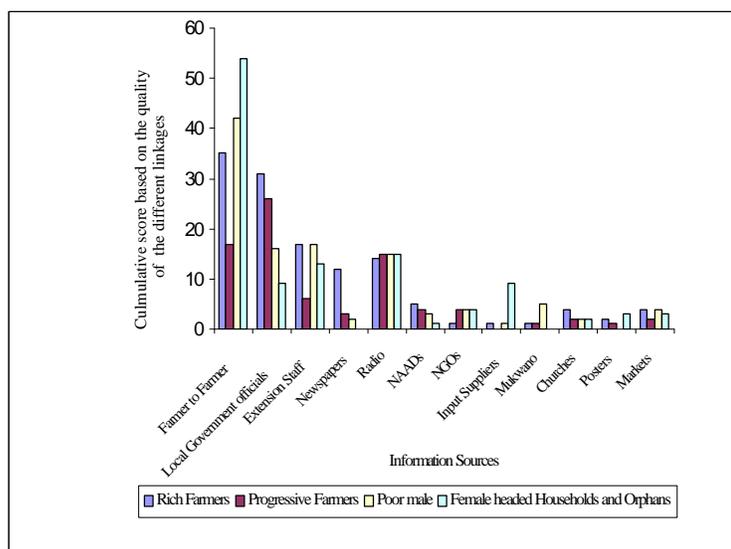


Figure 2. Graph showing the importance of different information sources, based on a semi-quantitative analysis. The data has been disaggregated by gender and wealth

or have access to radios and do ensure that they are provisioned with batteries. Questions remain over who controls the radio; a tension exists between adolescents who wish to listen to music and the adults who wish to

listen to programmes of substance. Nevertheless all the radio stations interviewed do have 30 min agricultural programmes, frequently compiled unaided by an agricultural professional. Other agricultural programmes include those sponsored by private enterprise; occasionally agricultural programmes are sponsored by other organisations such as the Ministry, the privatised extension service and researchers. The broadcast schedule is often unknown, so the chance of listening to key agricultural broadcasts are random. Many stations broadcast to a fixed weekly schedule, thus over time broadcast times will become known.

Public meetings are cited as important information sources. The timing of these meetings is critical. Early in the day will preclude many poorer farmers and women, all of who may be undertaking agricultural work. Likewise meetings held after 15.00 will exclude women, as they will be fetching water and involved in food preparation. For the poorer groups, meetings represent important information sources and an opportunity to exchange information on a one-to-one basis, an opportunity that they rarely have.

Other information sources include NGOs, Church organisations, health centres and posters. NGO coverage at the sub-county level and below is sporadic. The NGO have neither the staff nor the resources to obtain the type of concentrated and focused coverage necessary. Church organisations have good grass root information networks, there is frequently an agricultural “spot” at some point in a church service, lasting for about 15 mins, representing an important information source for poorer farmers.

Dissemination of different Information types

This section will focus on 3 basic information types:

- “Awareness information” – information disseminated by a service provider to increase farmers recognition and/or create a demand for new crop varieties, new techniques or new markets.
- “Technical Information” - information disseminated by a service provider on improved husbandry practices for livestock, crops, fishery and forestry.
- “Market Information” - information disseminated by a service provider on commodity prices at different locations or on the formation of producer associations and other market related activities.

Analysis of the different information types

Awareness information; Radio is the principle media used. Radio owners are frequently males (Head of Household); women often listen to the radio during food preparation. As previously cited, tension exists between the youth who wish to listen to music and adults who may wish to listen too more meaningful broadcasts. Radio is supported and reinforced by messages and announcement from local leaders and where appropriate extension workers. These are not as universal as the radio, extension agents are in some cases

rarely seen, as are ministry officials from agriculture, but possibilities exist with other ministries such as health or education. Possibilities also exist with the privatised extension and research systems. In the Ugandan context, NAADS has a network to the sub-County level; steps are being taken to extend the information network to the community level through the use of community based facilitators.

Depending on wealth class, awareness information is conveyed by Churches, newspapers (the richer farmers find the agriculturally related “pull-outs” of vernacular newspapers useful). Several key respondents emphasised the need re-inforce awareness messages by using a multi-media approach; radio in combination with posters and/or meetings with flyers. The rapid spread of mobile phone technology into the rural areas should not be under-estimated.

Technical information; Farmers prefer to learn by doing, demonstration of technical information is preferred. The farmer field school approach was repeatedly commended. The extension agent, when located nearby was a very useful source of high quality technical information. Where the extension agent was located some distance, information was only delivered periodically and was frequently not timely. Nevertheless technical information was received from multiple sources, which included radio, neighbours, print media and local markets.

Farmers suggested that technical information be demonstrated, but it must be supported by easy to understand print media. Preferences for workshops and study tours (or exposure visits) were expressed.

Marketing information; many farmers complained that there was an absence of good quality, reliable and independently sourced market information. Obtaining information from traders was considered to be untrustworthy and unreliable. Farmers considered that the traders regularly cheated them. For the poorer farmers, the principle sources of market information were family, friends and immediate neighbours. In some countries market information is broadcast either through the national broadcast service, courtesy of the Ministry of Agriculture or through private enterprise sponsored broadcasts. Richer farmers often listen and react to price information received. Mobile telephony should not be discounted.

All farmers expressed a massive demand for reliable market information. Much is talked about marketing information; disseminating commodity price information from different markets does give farmers information about the price differentials. But the key issue is how farmers respond to this information? One option is to organise into intra-group associations (for the marketing of produce). This takes a degree of leadership and organisation; it demonstrates a degree of maturity and sophistication. The ability of farmers to achieve and maintain the required quality standards will be a determinant. Do the costs of meeting

and maintaining the required quality standards justify the additional premium?

Implications for Extension and Research

The research undertaken and the implications drawn come from a Ugandan development context. The need to map farmer information networks, modes of communication and to bridge the gap between research systems, extension systems (publicly funded or privatised) is the same, either on a regional basis or globally. Nevertheless, the explanation of farmer information networks will require contextualisation. Some adaptation to suit local cultural conditions, economic norms and local management systems will be required.

For both research and extension, a ready-made information dissemination system already exists, albeit for the poorer farmers it is very restricted and will be difficult and costly to link up with. However, richer farmers have a wider and more diverse indigenous information acquisition network. Many of the richer farmers have developed links to local councillors, local government staff, private enterprise (Mukwano and some Cotton ginners) and the field extension worker (Private Service provider?). These individuals do have periodic access to newspapers (vernacular).

In Uganda, a privatised extension system has been promulgated, through an act of parliament (NAADS Act 2001), new sub-county level institutions have been established (sub-county Farmer Forums – SCFF); these institutions are linked to farmer interest groups. These institutions form an important information nexus. Farmers will be contracting service providers to seek information about different crops, markets and husbandry methods. It is important that the SCFF are aware of this role and ensure that mechanisms are put in place to connect producers or farmer groups with information sources/providers. The Ugandan Agricultural Advisory Service design caters for this information flow at the sub-county, the constraint being the ability of the service providers to link up with researchers and other information sources. How can the NARS link with the DNc/SNCs? There is a liaison officer at the zonal ARDCs, funds must be available for regular face-to-face meetings, and email links are essential for any follow-up and backstopping activities.

Work was undertaken in 4 sub-counties from 2 Districts, the social, economic, cultural, financial and environmental circumstances differ between the Sub-counties. Individual communication strategies and approaches will need to be developed on an individual Sub-County basis; but will such an approach facilitate the flow of information between the different institutions? It is evident that within any communication strategy links to research must be articulated and operationalised.

Special attention will need to be paid to linking poorer farmers; their information networks are restricted as well as their ability to respond to the information received. NAADS coordinators and SCFF are lynchpins for extending information through the sub-County structure, a systematic and poverty focused information dissemination network or system will need to be developed that is congruent with local conditions (Guide to Rural Economic and Enterprise Development – Nov 2003). Initial transaction costs may be high and particularly high for the poorer farmers. To ensure that the dissemination process or mechanism is on target and focusing on poorer farmers, obligatory information dissemination “poverty checks” must be an integral part of the monitoring and evaluation process.

The study did investigate the level of intra-community information flow. This was found to be restricted, information suitable and accessible to rich farmers, is inaccessible and often irrelevant to poorer farmers. This calls into question the “trickle” down approach. Without doubt some information does move between rich farmers and poor farmers, but the quantity and quality of that information is very difficult to determine. It must be assumed to be very restricted. The research systems and extension systems, whether privatised or still in the public domain will need to consider, within the boundaries of their communication strategies to determine how to disseminate poorer farmer focused information, which has a degree of utility to richer farmers.

There is clearly a strong demand for micro-finance. Globally, there has been a rapid development of micro-finance initiatives and micro-finance institutions. In Uganda, there are more than one MFI in each District centre, these institutions do not make loans to any agricultural initiative on account of the poor rates of return, high risk and the repayment period is out of synchrony with the Agricultural year. Such a handicap will compromise the development of a subsistence farmer to a more commercially oriented production.

At a grassroots (Sub-County) level, the capacity for institutional memory is low. Extension agents and/or Service providers, who undertake sub-county level contracts, submit periodic reports to the Sub-County chief and the Sub-County NAADS Coordinator. What happens to these reports is not known; they are probably shelved in the Sub-County office. It is evident that some type of community-based library is required. Allowing key farmers and other to gain immediate access to relevant information, without having to wait for the service provider (or extension agent) to visit. The systematisation of a sub-County based information store is likely to be expensive, but the sub-county farmer forum will have responsibility. There will be capacity problems, which will require training, backstopping and follow-up.

Farmers reiterated their preference for an inter-active approach to information dissemination. Farmers prefer a “learning by doing” approach. Hence means of communication, which involve elements of this approach,

are preferred, for example study tours, exposure visits and practical demonstration. Other media, such as radio proved to have almost universal listenership, regardless of wealth. Questions of who controls the radio and thus which social group listens to what remain. Tension exist between youth who wish to listen to light entertainment (pop) and adults who may wish to listen to broadcasts of substance.

An analysis of the different types of information reveal that farmers prefer “awareness” information to be delivered by radio, but reinforced through meetings and other media, such as posters. Technical information was best delivered through a “learning by doing” approach, but supported by other media, such as flyers, leaflets and brochures. For marketing information, there is an almost inexhaustible demand. Local sources involving traders are treated with caution. The dissemination of market information is a critical extension function. It satisfies a key farmer demand. Both research and extension must coordinate activities to satisfy the demand for market information. At present, the Ugandan privatised extension system (NAADS) has contracted vernacular radio stations to disseminate collected and analysed market information. This is currently being evaluated.

How can the research and extension systems access indigenous information networks? Within the Ugandan context, NARO and other research institutions have on-farm trials run out of the ARDCs, these provide initial potential links. Researchers must not only write up results of these trials suitable for a scientific or technical audience, but must seek ways to “package” the research information in a way that is accessible to rich and poorer farmers. Financial resources will need to be made available for this activity. Ideally this information can be translated into local language, which can be fed into farmers’ indigenous knowledge networks through suitable entry points, such as the SNC, the chairperson of the SCFF and church organisations.

This will require a small change of practice within the research system. An integral part of a research programme will be the development and field-testing of extension materials. Moreover research scientists will need to work closely with the extension system in articulating problems. Again the need for significant cultural change is recognised. Scientists based at the research/extension interface will take a lead role in this process. Unsolvable problems (at the interface level) should be passed up to the research stations.

The media used needs careful consideration. Different media better conveys some information. Moreover, both research and extension need to consider multi-media approaches, with a primary media supported by secondary media, with which to convey and reinforce information.

Given the need to sustainably access indigenous farmer information and knowledge networks additional capacity building will almost certainly be required. The requirement will be for community based extension workers, community development officers (non-agricultural extension workers)

and the extension agents to use methodologies outlined in this paper to articulate the current farmer information networks. Decisions will need to be made on how to access the different entry points. Training will be required to build capacity in draft information that is presented in a farmer friendly format, appropriate to differing needs. It is anticipated that this can be undertaken at a generic level, with sub-county specific “repackaging” undertaken by service providers and SNCs.

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