

Research Application Summary

Use of information and communication technology in the dissemination of agricultural information in Public Agricultural Research Institutes in Uganda

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Abstract

The objective of this study is to identify and analyse challenge of use of Information Communication Technologies by public agricultural research institutes. It involves questionnaire interviews with 328 respondents and use of secondary information sources. Information generated will be used to strengthen information management and dissemination pathways.

Key words: Agricultural knowledge system, information flow pathways, National Agricultural Research Organisation

Résumé

L'objectif de cette étude est d'identifier et d'analyser les défis de l'utilisation des Technologies de l'Information et de Communication par des instituts publics de recherche agronomique. Il consiste en des entrevues constituées de questionnaires avec 328 répondants et l'utilisation des sources d'information secondaires. L'information produite servira à renforcer la gestion de l'information et les voies de diffusion.

Mots clés: Système de connaissances agricoles, voies de circulation de l'information, National Agricultural Research Organisation

Background

There is scarcely a field of human activity today that has not been touched by the dramatic changes in Information and Communication Technologies (ICT) that have taken place in the last 10-15 years. Agriculture and agriculture-related natural resource management are no exceptions. Information and the technologies that facilitate its use, exchange, and reliability have been important aspects of agriculture and agriculture-related natural resource management for centuries (Winrock International, 2003).

Information and Communication Technologies (ICTs) are crucial in facilitating communication and access to information for agricultural and rural development. Since agriculture is the

priority sector in most sub-Saharan African countries, it is one of the potentially beneficial areas for the application of ICT for economic transformation. Development of networks and use of low-cost ICT enhance timely access to accurate and reliable information. This therefore calls for investment on part of national government to support ICT development (Kapange, 2009).

Understanding the place of ICT in developing country agriculture depends on four key concepts; that knowledge is an increasingly significant factor of production; that all actors in the agricultural sector are part of an evolving Agricultural Knowledge System (AKS); that ICT accelerate agricultural development by facilitating knowledge management for AKS members; and that ICTs are essential coordinating mechanism in global trade (Winrock International, 2003).

Various forces are at work to change agricultural extension from a process of technology transfer (research institution to farmer) to a process of facilitating a wide range of communication, information, and advocacy services (demand-driven, pluralistic and decentralized extension). The focus of this change is on the improvement of overall rural livelihoods versus a specific focus on agriculture (Richardson, 2005). Nonetheless, some recent ICT are offering new opportunities to increase the timeliness and availability of critical information, improve its quality and relevance, and offer more cost-effective methods for empowering and ensuring feedback from previously marginalised communities. In addition, the emergence of global agricultural production chains interlinked by digital networks has important implications for the livelihoods of those presently outside the system (Winrock International, 2003).

The vast store of information on agriculture has been built up in the world over many years with the ultimate aim of increasing agricultural production. Therefore, improved information flows to-from-, and within the agricultural sector is a prerequisite for effective agricultural development. The combination of old and new information and communication technologies of broadcasting, telecommunications, the internet, CD-ROM, satellite and cable have created abundant applications of IT to facilitate access to information (Kaaya, 1999).

ICT can help mobilize science and technology for agriculture by linking agricultural specialists into virtual communities and

accelerating agricultural research exchange between developing and developed countries. They can help develop trade opportunities for farmers by linking smallholders into increasingly globalized production chains. Finally ICT can support taking the long-view, with tools for understanding and planning the future needs of today's economic and land use decisions (Winrock International, 2003).

Making agricultural research relevant to the needs of farmers is paramount for sustainable use of ICT-based delivery systems, and that networking among information and ICT service providers is critical for using the lessons learned in bringing about a transformation of agricultural extension. Effective ICT application in the rural developing world faces significant hurdles, especially in the provision for off-grid or remote access (Oryokot, 2003)

The renewed interest in ICT for development arises because of the opportunities that digital technologies enable; the ability to record text, drawings, photographs, audio, video, process descriptions, and other information in digital formats means that exact duplicates of such information are possible at significantly lower costs than before. Moreover, digital and analogue communications networks such as telephones and the Internet can transfer that information rapidly over large distances-around the globe if necessary.

Considerable progress in involving farmers through client-oriented and demand-driven research approaches is in sight. As a result, researchers are becoming facilitators (rather than leaders) and learners, while others are becoming teachers and learners. Poor subsistence farmers, given access and able to use Internet, will pose a constructive challenge to researchers for more current and accurate solutions and research agenda set-up, tapping directly into the latest technological innovations (Kapange, 2009).

This paper describes a survey to be conducted in ten (10) Public Agricultural Research Institutes (PARIS) under the policy guidance of the National Agricultural Research Organization (NARO) located across the different agro-ecological zones in Uganda. The objective of the study is to identify and analyze the challenges of ICT Use in the dissemination of agricultural information by the PARIS.

The specific research objectives are to (a) determine the level of ICT adoption and utilisation in the dissemination of agricultural information by the PARIS, through the research-extension linkages to the farmers, (b) identify the ICT use constraints in the dissemination of agricultural information by PARIS through the research-extension linkage to the farmers, and (c) determine the relationships among ICT use and ICT challenges in the dissemination of agricultural information by PARIS.

Agriculture plays a vital role in economic and social development and is a key source of livelihood worldwide. In Uganda, it is a key sector of the economy, contributing up to 21 percent of GDP at market prices in 2007/2008, with 48 percent of exports, 30% traditional exports (coffee, cotton, tea, and tobacco), and 18% non-traditional exports and providing a large proportion of the raw materials for industry (UBOS, 2008). Agricultural growth has remained lower than expected, with real growth in agricultural output declining from 7.9 percent in 2000/01 to 0.7 percent in 2007/08 (UBOS, 2008).

As one of the landlocked countries in East Africa, Uganda's economy is predominantly agrarian; consisting of 6,810,000 ha of land under agricultural activities and cultivation. The sector provides employment to 85% of the population; contributing between 32-38% of export earnings, and in addition generating 44% of the GDP. Almost 90% of food security comes from agricultural production (World Development Report 2008). However, subsistence cultivation is still the pattern, whereby 70% of the area under cultivation is used to produce locally consumed food crops (Aregu, 2008).

Access to information has been identified as the cornerstone to successful farming in the 21st Century (Weiss *et al.*, 2000). In today's agricultural industry, survival depends on having an edge on information related to the market, efficient allocation of available resources and use of new or innovative farming practices (Fedale, 1987).

In some circumstances access to information has been found to speed up the adoption and diffusion of new technologies more than even by availing subsidies to the farmers. For example, Margarita *et al.* (2006) observed that an equally effective way to promote technology adoption in the farming sector was through the provision of information and not subsidies. Saltiel *et al.* (1994) also observed that access to information played a big

role in the adoption of new agricultural innovations. However, Wallingford *et al.* (1996), noted that the emphasis should be on the determination of information needs and preferences of the users in order to come up with effective outreach programmes. Information is a necessary input in the research process in the sense that a researcher must have access to previously recorded knowledge (i.e., information) about the researcher's area of investigation. This knowledge helps the researcher to choose appropriate research topic and gives the researcher standards to compare and judge the quality of work. Further, it offers various methodologies and techniques to appropriately select and address problems facing the farming communities and develop appropriate agricultural technological packages (Kaaya, 1999).

Information input to the research process also enables researchers to avoid repetition of what has already been done elsewhere and thus save time and other scarce resources, as well as sustaining professional reputation of researchers. Information is also the major output of the research process in form of recorded research, results and their dissemination to various users. If research results are not recorded and disseminated, then research loses its validity.

Thus, improved information flow to-, from- and between researchers is necessary for an effective research system, which in turn is a prerequisite for agricultural development. There are, therefore, two sides related to agricultural information: the input, and the output of information to and from the agricultural research process (Kaaya, 1999). The ultimate beneficiaries of agricultural information generated by the research system are the farmers.

Farmers need information on generated technologies from the research system to apply them for agricultural production. The generated technologies may include optimal planting and harvesting times, appropriate methods of pest and disease control, appropriate soil erosion control measures, processing and storage methods, and so on. Farmers also need marketing information so as to make appropriate decisions where to sell their farm produce. Marketing information has a major effect on whether a farmer's production is profitable or not. This kind of information not only helps farmers make profitable decisions in the short term on when and where to market produce and what price to expect, it also sometimes helps farmers decide on what to produce (Kaaya, 1999).

The opportunities offered by the ICT should be captured through a process that takes into account the contributions and the local needs of all parts of global society. ICT for instance, allows the capture, processing, transmission, storage, retrieval and display of text, images, video, graphics, animations etc (World Bank, 2003), implying that almost all information needs of the agricultural and development process could be improved.

Literature Summary

Access to ICT provides information on prices, markets, technology, and weather. Community-based telecenters have the potential to empower rural communities and facilitate socio-economic developments in agriculture. It uses selected ICTs (e-mail, Internet, phone, radio, TV, print) to accelerate the wider delivery of appropriately packaged agricultural information. Mobile phones, mushrooming in East Africa and several other regions are increasingly becoming affordable, and they help overcome rural isolation and make communication easier. The wireless technologies that have entered remote rural areas have reduced reliance on costly fixed telephone infrastructures. These, put together, provide close linkages between players (Kapange, 2008). However, ICT interventions do not have to be specific to agriculture in order to enhance rural livelihoods or contribute to improved agricultural production (Richardson, 2005). The importance of information and communication technologies to agriculture is not new, and many traditional methods of managing and communicating information will continue to be critical to developing country agriculture (Winrock, 2003).

Study Description

The study area covers the ten (10) Public Agricultural Research Institutes (PARIS) out of the 15 located across different agro-ecological zones in Uganda. The population consists of three categories i.e. the eight (8) National Agricultural Research Institutes (NARIS), the seven (7) Zonal Agricultural Research Institutes (ZARDIS) across the different agro-ecological zones, and 73 farmers and 12 extension agents involved with on farm and adaptive or applied research. The respective PARI activities shall be selected randomly.

A sample of 243 Researchers/Technicians shall be randomly selected out of the 6(Six) National Agricultural Research Institutes and the 4 (four) Zonal Agricultural Research and Development Institutes. In addition a random sample of 73 farmers and 12 extension agents will be interviewed giving a total sample of 328.

Primary and Secondary sources of data shall be utilized to obtain information on the selected variables. Data obtained from the Structured Questionnaires shall be augmented by the systematic analysis of secondary information sources, i.e., technical reports. Stratified researcher administered questionnaires consisting of open and closed ended questions based on the research objectives will be used to collect data from the PARIS and farmers/extension agents. Descriptive and inferential statistical methods shall be used to analyze the data to be collected. Data obtained will then be converted to numerical codes representing the attributes or measurements of variables (Mugenda and Mugenda, 2003) while SPSS 2003 shall be used for the subsequent data analysis. Data will be analyzed using Regression and Correlation techniques to analyze the various relationships between/among the variables on ICT use in the dissemination of agricultural information.

Research Application

In 1995, the National Agricultural Research Organisation (NARO) formulated the NARO Information and Communication Strategy with the help of ISNAR to institute and harmonize the use Information and Communication technology (ICT) within the Organisation. Substantial ICT strategies have been developed but their role and contribution to the dissemination of agricultural information to the relevant stakeholders such as the National Agricultural Advisory Services (NAADS) has not been assessed. The survey shall yield invaluable information and knowledge related to ICT challenges in the generation and dissemination of agricultural information through the Research -extension linkage to the farmers. The information generated will provide baseline information for further studies on ICT use in Information Dissemination in Uganda.

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