

**Information Communication Technology and Agricultural Information Dissemination:
A Case Study of Institute of Agricultural Research (IAR)
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Abstract: ICT as an indispensable tool for information dissemination cuts across every field of knowledge. However the use of ICT poses a great challenge to the extension worker confronted with the burden of disseminating agricultural information to rural farmers because of their high level of illiteracy and the low level of deployment of ICT. The present study is an effort aimed at assessing the level of effort made by researcher at IAR as a foremost Agricultural institution in passing on farm information to farmers using ICT channels. It involved engaging farmers and researchers alike through oral interview in an impact assessment with a view to devising better means of disseminating agricultural information to rural farmers. The finding shows the low level deployment of ICT in information dissemination in this very important segment of the economy and as such leaves a lot of room for improvement.

Keywords: Agencies, backlog, decoding, genetic, modernizing, post harvest, transcending

INTRODUCTION

Information Communication Technologies (ICTs) have changed the lives of individual, organization and indeed entire nation, no country and communities are been left untouched by “information society”. The value of information can never be under estimated because of it used for decision-making. Information can be said to be figures, facts, graph, images, that are processed and organized into meaningful form, it can be said to be message from a sender to one or more receivers (Claude, 1998). Information has been identified as one resources required for the improvement of agricultural production, it is defined as the data for decision making and a resource that must be acquired and used in order to make an informed decision making and a resource that must be acquired and used in order to make an informed decision. Those who posse’s appropriate and timely information will make a more rational decision than without.

According to Davin (1976) every individual whether literate or non-literate needs information in order to make decisions thus every sector of the population engaged in agriculture needs information. Communication is the exchange of meanings between individuals through a common system of symbols. Our existence depend on communication in many ways that we can easily enumerate without our initial backlog of genetic messages we would not be who we are and without the internal communication of our bodies we

could not live and functions as we do. Living therefore is largely a matter of communication and many people make their living by communicating with others: broadcasters, politicians, advertisers, teachers-and librarians who are involved in communication in a special way.

Technology is the application of scientific knowledge to the practical aims of human life, or as it sometimes phrase to the change and manipulation of human environment, the development overtime of systematic techniques for making and doing things. Information Communication Technologies (ICTs) are those technologies that can be used to interlink information technology devices such as personal computers with communication technologies such as telephone and their telecommunication networks. Michiels and Vancrowder (2001) defined ICTs as range of electronic technologies which when converge in new configuration are flexible, adaptable, enabling and capable of transforming organizations and redefining social relations. ICTs therefore, are an expanding assembly of technologies that can be used to collect, store and share information between people using multiple devices and multiple media.

It has come to be accepted that agricultural development in Nigeria depend upon the small scale farmers who form the bulk of the farming community and that for agriculture to really develop these small scale farmer must know and understand what constitutes progress in agriculture. The extent to which

these farmer progresses depend largely upon their access to accurate and reliable information: the type of information they use to solve their problems. In essence then, the dissemination of information about farm practices is an important aspect in the adoption of the practices. Dissemination of farm information can be said to be as important as the development of the technology itself. Any technology no matter how promising, that does not reach the farmer can be said to be useless to the farmer.

Farmers on their own part need to know how to increase their yield, how to use new techniques and the findings of contemporary agricultural research and how to operate in changing market and credit situation. Mass media, commercial and government agencies and agents as well as the personal contact have assumed a major function of disseminating information about farm matters with other farmers, friends and relatives. Agricultural information is necessary if farmers have to advance beyond their present level of production, a steady flow of accurate, understandable, factual information links the scientist with the farmer through the various sources that communicate such information, particularly the extension service. Information about agricultural practices speed the adoption of improved practices by getting information about the practices to large numbers of people engaged in agriculture. Information effectively communicated to the farmers can help meet farming emergencies by giving farmers timely warning about market disease and other rapidly changing conditions.

While modernizing agriculture requires many activities such as supplies, market services, new technology and information and so on. This project sees farm information as essential ingredient in agricultural development, not merely as a facilitating influence and regards agricultural information as information sufficiently tested to establish its utility as a part of the technology base for farming at the time and under the circumstances in which it is being used. A large number of innovations are available and are being communicated to the rural people and through variety of channels. It is obvious however, that the information being communicated does not reach the farmer as evidenced by the farmers' generally inadequate knowledge, understanding, skill and sometimes-negative attitude relating to change. This leads to rural farmers to either delay or take no action at all about suggested innovations (Singh, 1981).

BRIEF HISTORY OF INSTITUTE FOR AGRICULTURAL RESEARCH (IAR) A.B.U ZARIA

The institute for Agricultural Research was established in 1922 as the headquarters of the defunct

department of the Northern provinces. It is to be responsible for the northern state of Nigeria in cooperation with the Ministry of Natural Resources of each state and with other agricultural research station in Nigeria including those of the federal government. Majority of farmers in Nigeria live in rural areas where infrastructures necessary for access to information are lacking or minimal. For example, services such as electricity, telephone, motor able roads are very uncommon, in addition majority of farmers cannot read and write in any language, thus the only viable means of communicating information to farmers is by personal contact with extension officers.

The change in global perceptions and direction to sustainable development entails the proper dissemination of improved and modern technologies, the innovations and adoption of this technology gave reasons for the development and establishment of National Agricultural Research Institute (NAERLS) which IAR is one. The Institute for Agricultural Research (IAR), Samaru's functions include among others:

- Carry out agricultural extension liaison with relevant and state ministries, primary agricultural producers, industries and any other use of agricultural result within their zones in collaboration with the National Agricultural Extension Research Liaison Services (NAERLS)
- Provide laboratory and other technical services to farmers, agro-based industries and others needing these services
- Intensifying efforts at educating farmers to derive the benefit of high yields of improved varieties since inception, the agricultural extension services have been carrying out its activities through training, organizing seminars/workshops, conference, monitoring and evaluation, audio-visual aids, publicity and exhibition
- Genetic improvement of sorghum, groundnut, cowpea, cotton and sunflowers

How and when information is gathered and used by staff is a critical point in meeting the need of extension clientele and agent. However, new communication technologies offer ways to strengthening the traditional delivery methods by broadening the audience base, having more educators involved and thus improving the timeliness of information.

Statement of the problem: Nigeria is a vast country with different farming systems involving a variety of crop, cereals, legumes, fiber, root and tubers and so on. The agricultural sectors play a key role in the economic

development of Nigeria in the terms of food, foreign exchange from exports, raw materials for industries and employment. Unfortunately information about these practices does not reach the rural farmer on time and may not get to them at all. Perhaps the use of information and communication Technology might instigate this problem. Information specialists and extension officers have the primary responsibility of disseminating agricultural information to user population. They are expected to collect all relevant agricultural literature and make it available through various methods such as current awareness services; selective dissemination of information, translation services. ICT is seen as an important means of achieving such a transformation when used as a broad tool for providing local farming communities with scientific knowledge. Against this background, it is clear that farmers need new improved technologies to transform the traditional agriculture and increase production above the level of traditional technique.

Majority of Nigerian farmers are small scale farmers using traditional methods to grow complex mixture of crops. The farmers are poor not because they are small but because they do not have access to and ways to convey valuable information to them in order to improve their productivity. Information Technology can be of assistance by enabling extension worker to gather, store, retrieve and disseminate a broad range of information needed by farmer thus transforming from extension workers into knowledge workers.

Agricultural extension systems in most developing countries are underfunded and have had mixed effects, much of the extension information has been found to be out of date, irrelevant and not applicable to small farmers' needs, leaving such farmer with very little information or resources to improve their productivity. Agricultural Extension in the current scenario of a rapidly changing world has been recognized as an essential mechanism for delivering knowledge and advice as an input for modern farming (Janes, 1997). However, if we have to escape from the narrow mindset of transferring technology package to transferring knowledge or information packages. With the help of ICT, extension will become diversified more knowledge-intensive and more demand driven and thus more effective in meeting farmers' information needs.

ICT has many potential applications in agricultural extension (Zijp, 1994). It can bring new information services to where farmers as users will have much greater control than before over current information channel. Access to such new information source is a crucial requirement for sustainable development of farmer systems.

Need for communication: Communication is referred to as "the process by which information is passed from a source to a receiver" and communication channels provide the means by which the information is transmitted.

The channels used by farmers are commonly classified as follows:

- **Mass media:** Such as radio, television, newspapers, leaflet and trade lunch etc., from government or commercial sources
- Personal contact with Extension workers and representatives of commercial firms either on an individual basis or in small groups
- Personal contacts with other farmers (Adam, 2002)

Studies that looked at the role of these channels have found that mass media, channels of communication are important in conveying information and creating awareness or changing cognitions, while interpersonal channels are more likely to cause attitude change, further, it has been found that radio reaches the largest audience in most developing countries (Rogers and Nichoff, 2002).

Rogers and Nichoff (2002) however, found that the mass media channels are relatively unimportant in creating awareness while interpersonal technical channels were most frequently reported change agents; especially extension agents play a central role in diffusing new technology.

In a study of Nigerian farmers (Ogiowo, 1999) reported that most farmer in his sample listening to radio even though many of them do not own a radio and that the reprinted word reaches on a small proportion of farmers. He concluded that personal media tend to be more important than former mass media both in terms of total exposure and effective exposure and suggest that the best medium of spreading agricultural information is the radio provided there is close follow-up by chain agents to assure farmers that the information receive is right for them.

Another study reported that farmers consider radio, agricultural bulletins/newsletters and posters as useful means of information on better farming practices (Effionanyi, 1973). Others studying Nigerian farmers source of information have reported on the importance of radio in disseminating information among farmer (Voh, 1984; Kidd, 1978). Similarly, Williams (1999) reported in their respective studies that extension officers, radio and fellow farmers and government personnel, radio and cooperative union staff is the most frequently and regularly used sources of information among farmers. In a study of the strategy for increased sorghum production in Zaria (2004) reported by

extension worker, radio, friends and neighbors, agricultural shows, films and slides in that order is the most important channels reported by farmers.

These studies have revealed that mass media, particularly the radio are capable of providing information needed by farmers, but that their mobilizing effect is yet to be accomplished. Similar studies have revealed that information is being disseminated to farmers through a variety of channels. The studies shows that many farmers are not reached or do not have information about improved practices (Voh, 1984). Examining sources of agricultural information available to Nigerian farmers Orojobi (1980) concluded that radio communication was recognized as accessible and potentially useful. Obibuakku and Hursh (1974) also found that radio was among the most effective means of creating awareness of new agricultural ideas to rural farmers.

UNESCO (2002) found in a regional survey of West Africa that radio was the most widely and most frequently used mass medium. The survey revealed that a number of radio sets use in developing countries was high. In ten years, the report says “the total number of radio sets in Africa has increased by 27%. White (1973) in his study of five mass media methods found that three were positively significantly recognized by farmers and that radio was one of them. William (1999) identified three sources frequently used by farmers in Nigeria; he found that radio ranked 2nd to extension workers as source of agricultural information.

According to McKinlay (2001) certain socio-economic characteristic of the farmers would affect his request for and utilization of agricultural information.

Williams (1999) found that socio-cultural and economic characteristics of farmers were important in the use of certain source of information. In their study of the relationship between farmer’s characteristics and the source of improved farm practices, they found significant relationship between change agents and contact with fellow farmers and farmers characteristics such as education.

Radio and television: These two channels make use of the electronic materials (radio and television sets). These two channels may be suitable for Nigeria situation where there are poor roads for communication. Radio and television can get information across to every nook and corner of the rural areas where it is very difficult to make direct contact.

In the northern part of the country, the RIK broadcast two agricultural programmes, the “Noma Yanke Talauchi” and “Filin Manoma” (in Hausa language that is organized by the institute for Agricultural Research at Samaru through the

Agricultural Extension and Liaison Service (AERLS). Here the farmers are told the operations of the time that need to be done and they are advised to do them at the appropriate time. For example, during the groundnut off season, farmers are advised to destroy the volunteer plant so as to reduce source of inoculum of the resettlement disease-spread by insects called aphids in the following growing season.

Film slide and mobile road side shows: Mobile Road side show can be used (as commercial firms for sales promotion) for extension to inform people of a new innovation and things or operation that need immediate attention. Mobile loud speaker are often used in conjunction with films in Nigeria. It is used to go round the village and invite the people to the venue of the film or slide. The Ministry of Agriculture and Natural Resources (MANR) in the various states with the cooperation of the respective Ministries of Information have been going from village to village to show some agricultural films to people together and after the films, important information of agricultural importance is transmitted to them.

Telephone: It is of great use in Nigeria today because of its presence in the rural areas where farmers are found. It is a quick way of making “contact” with the extension workers or farmers. Whenever we want to, it does not need any traveling up and down. Questions can be asked by farmers and answered by extension worker on the telephone on the spot without wasting too much time especially very urgent questions.

FACTORS AFFECTING THE DISSEMINATION OF AGRICULTURAL INFORMATION

There are number of factors which have been analyzed that make efforts to communicate more or less effective. One obvious factor mentioned here is man’s ability to think and to draw logical inferences.

This is of course something that is of importance for most aspects of human behavior and it’s certainly so for our communication behavior. A 2nd category of communication skills is related to the ability one can have in coding and decoding messages; examples are:

- The ability to read and write (literacy)
- The ability to speak certain language
- The ability to understand not only the language but all symbols of information communication in a particular area

Lack of experience combined with illiteracy restrict farmers’ imagination and make it difficult to

transfer new practices to them. To achieve best results with visual aids in extension with illiteracy for example, the ICT in particular, visual, the oral and the print should all be used together, so that the farmers can connect them in his mind on the spot.

Attitude of information agent: Perhaps one of the largest obstacles in disseminating agricultural information to the farmers is that of attitude and self understanding of the agent himself. "Attitude can be described as "the total of knowledge, beliefs and feeling about a certain subject that help us form an opinion on that subject". In discussing the importance of attitudes for the effectiveness of our communicative behavior, it is useful to distinguish between the attitude that we have towards ourselves and the people with whom we communicate and the attitude that we have towards the subject matter of the communication.

Farmers in our type of economy have limited knowledge and their speech patterns and thinking tend to be different. This tends to restrict their imagination and make their understanding of scientific terms, difficult, particularly abstract concepts. Education is presumed to enhance farmers' ability to receive, decode and understand information. The fact that farmers have low levels of education and that education enhances comprehension should be taken into account, if not; it is unlikely that they will completely understand any new concept or idea.

Information has a remarkable characterizes that marks it out from other resources (money, people, oil, timber) in that its deployment to a particular use does not or need not, reduce its value or content or availability for other uses. Modern ICT provides remarkably powerful and cheap alternative means of dissemination, in so far as information is useful, the low cost of replication and the ease of wide dissemination provide good reason for public institutions to recognize information as an important resource, a public good and a valuable agent for development.

Types of information required by farmers: According to the majority of farmers interviewed the type of information they need generally in agriculture includes:

- Usage of Fertilizer for higher productivity
- Government policy and notices regarding Agriculture
- Crop Diseases, preventive measures and in case of disease curative measures
- Education on what needs to be done at pre-harvest stage and post-harvest stages to ensure productivity and quality with minimum losses

- Advice on fruits and vegetables because there are perishable in nature but provide good opportunities for profit due to great demand in domestic as well as world markets
- Advice on the vegetable crops to be sown, timing of sowing, varieties to be used, areas for growing particular crops, preventive measures for diseases which pesticides should be used, pesticide usage, storage facilities available, measures to be adopted for increase keeping quality during storage

Source of information: According to the respondents, 10% of them get information from discussion among themselves (farmers). To determine the source of information available to the respondents, they were asked to indicate which sources were readily available to them for receiving agricultural information. Most (90%) of the respondents used radio as source of information for improved farming practices (10%) made use of extension bulletin in Hausa language, 10% used television. Radio was widely used because majority of the farmers had radios. Radio is one of the fastest methods of communicating with generality of the farmers. It can reach many people more quickly than other media. It does not require reading ability on the part of the farmers to obtain necessary information.

Knowledge of institute for agricultural research: Respondents were asked if they have any knowledge of IAR. The interview shows that 90% were aware of the institute while 20% are not only aware but had the opportunity to interact with extension agents.

Contributions of institute for agricultural research:

- Improving the income, welfare and productivity of small-holder farmers through increased production and reduction of yield losses
- Simple preservation, storage and processing in the rural setting
- Designed and fabricated many prototypes of machines which can be fabricated locally. Some of the machines are:
 - Manually operated maize Sheller
 - Sorghum thresher
 - Cowpea Sheller
 - Groundnut decorticators
 - Solar crop drier

The design, fabrication and testing IAR prototype equipment are generally directed at reducing human labor, facilitating farm operations and at increasing output.

Effectiveness of the contribution: The institute engages in special project which deals with seed production and multiplication. The provision of improved high quality seeds constitutes one of the most important inputs in agricultural development effort geared towards enhancing crop production in any country. The varieties of cowpea, Soya bean and groundnut released to farmers have been well accepted and sole crop cowpea production is one seen as a very profitable proposition, due to IAR findings and a number of large and small scale farmers are adopting these practices.

Problems of accessibility to information: Studies have revealed that information is being disseminated to farmers through a variety of channels. Yet many studies have shown that many farmer are not reached and do not have information about improved practices (Voh, 1984; Zaria and Mijindadi, 2004). The question is why?

One obvious reason that should be mentioned here is man's ability to think and draw logical inferences. The educational level of the farmer, his age, farming tradition and social group to which he belongs can be obstacles that prevent an idea from being communicated. Education is presumed to enhance farmer's ability to receive, decode and understand information. The fact that farmers have low levels of education and that education enhances comprehension should be taken into account, it is likely that without education they will completely not understand any new concept or idea.

Types of information provided by IAR staff: According to staffs interviewed, the type of information that is provided to farmers includes:

- Information about Crop and Animal Diseases and Preventive Measures
- Fertilizer Application
- Information's on weed control
- Storage of crops
- Disseminating information about improved farm practices
- Information on agronomy and animal husbandry
- Information about the qualities of different plant varieties

METHOD OF DISSEMINATION

According to respondents interviewed 5% of the extension agents agree that farm visit is used to disseminate information, this ensures personal contact between farmers and extension workers. These visits afford good opportunity to discuss matters of interest

more closely. Mass media method according to the findings, 15% of respondents agree to use Radio, Television and Extension Agents to inform farmers about improved farm practices.

Contribution of extension staff to farmers: Extension involves the conscious use of communication of information to help farmers form sound opinions and make sound decisions. The contribution of extension staff to farmers include among the following:

- Giving timely advice to make them aware of a problem.
- Help farmers to make decision in a systematic way, either as individuals or as a member of a group.
- Extensions staffs have help farmers to experiment with new technologies.
- Help farmers to discover, develop and evaluate relevant information for solving problems. This often will include information on new technologies developed at the research institute.
- Teach farmers how to produce crops and animals in the most profitable way, as well as how to organize themselves in cooperatives and other farmers' organizations.

RESULTS

The findings of this study show clearly that the level of information dissemination is not far from what it should be if IAR is to live up to its mandate of making its work beneficial to farmer. There is also the need to translate such findings into other local languages outside Hausa for effective dissemination of new innovations. In line with modern trends in knowledge dissemination, the internet should be explored as a way of reaching high net farmers who can access such right in their homes.

The radio still remains the best mode of reaching farmers in terms of access to research information's so the Institute should liaise with NGOs, States and LGA with a view to working out modalities for making these items (fertilizers, improved seed varieties, herbicides, pesticides etc.) available at subsidized rates to farmers. Others modes of enlightenment such as the use of cooperative bodies should be explored in order to make research findings available to rural farmers.

Farmer needs information on everyone of his family enterprise from the complex matter of production through the marketing of the products. In other words, farm information is an important ingredient in the agricultural development process. The findings also identifies the various channel of communication used by farmers, these include the use

of mass media, particularly the radio, personal contact with extension workers and personal contacts with other farmers. The level of formal education was low among the respondents; i.e., more than 50% of the respondents did not received formal education.

CONCLUSION

The main aim of the research study was to evaluate the use of ICT in agricultural information dissemination. Result from the study had shown that ICT channels had positive impact on the awareness of agricultural information. The reason advanced by farmers for increase productivity were, adequate information from ICT channels about recommended farm practices, increase farm size, use of improved varieties.

Finally, the study clearly showed the importance of using ICT channels in the dissemination of agricultural information and consequently in agricultural development in the state. The relevance of radio, farming programmers, extension bulletins in the local languages and the distribution of transistor radio by the extension programmer in IAR is a step to making communication more effective so as to achieve the intended goals.

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