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Research article

ASSESSMENT OF AGRICULTURAL KNOWLEDGE AND INFORMATION SYSTEMS (AKIS) IN EXTENSION INFORMATION DELIVERY IN NIGERIA

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ABSTRACT

Röling (2000) argued that research and extension should not be seen as separate processes involving distinct institutions which must somehow be linked. This perspective on research, extension and adoption as activities that occur within a network offers new insights into the way in which technology transfer occurs, and new ideas as to how to increase the rate of adoption.This paper therefore, assessed the Agricultural Knowledge and Innovation/information Systems (AKIS) in extension information delivery. The paper aimed at identifying the actors in the dissemination of extension information to farmersdirectly or indirectly with the *know-how* in agriculture, assessing the roles and chain of interactions between one actor and the other in the system, and to examine the implications of the information linkages within and between the actors. It is recommended that, scientists, specialists, extension workers, consultants and producers should be seen as participants in a single Agricultural Knowledge and Information System (AKIS).

1.0.INTRODUCTION

Nigeria has diversified agro ecological conditions which make it possible for the farmers to produce a wide range of agricultural products. With latitude and longitude of 10^{o} North and 8^{o} East respectively, Nigeria has an area of 923,768 square kilometers, including about 13,000 square kilometers of water. Nigeria is the most populous country in Africa and the 8^{th} most populous nation in the world with about 140 million citizens (NPC, 2006). Approximately, about 70 million are rural dwellers. Most rural residents are engaged in smallholder semi-subsistence agriculture (Ajibolade, 2005). This diversity in agro ecology, ethnicity, population density and infrastructure expresses itself in the various farming systems found within the region which influences local agricultural knowledge and information systems (AKIS) (Daugherty *etal.*,2000). Many different organizations and actors are involved in developing and disseminating agricultural knowledge and skills in different parts ofNigeria, leading to a broad range of opportunities and needs for information transfer. The concept of linkage implies the communication and working relationship established between two or more organizations pursuing commonly shared objectives in order to have regular contact and improved productivity. Daugherty *et al.*, (2000) contends that linkage is a term used to indicate two systems which are connected by messages so as to form a greater system. He argues that if the barriers between two systems are permeable enough for messages and responses to flow out of each to the other, then a link has been created between the two. From this viewpoint, agricultural research and extension services are two systems which are linked by information flow and feedbacks. Therefore, for agro technologies to be relevant to local needs of extension workers and farmers,the adaptation of the recommendations of local conditions and provision of feedback to researchers about the innovations that have been developed is paramount. Effective communication links between researchers and extensionists are vital in the modification of technological recommendations andinitiating further research. Such links enable new technologies and management practices to be suited to local ecological conditions. The participation of extension workers in adaptive research trials allows them to become familiar with the technologies they are expected to promote and also helps to ensure that the sociological dimensions of farming are not neglected. The relationship between key actors in the research–extension linkage system is illustrated by Figure 1.The overall aim of research and extension in Nigeria has being to help the farmers increase their agricultural productivity in order to accomplish their felt-needs by facilitating their well-being to eat better food and put more money in their pockets for further production and other purposes. This is because, agriculture as the back bone of the economy requires every individual's contribution in accelerating her

development through a pathway that ensures proper identification of farmer's farming problems and opportunities in generating proper development and evaluation of appropriate agricultural innovations that farmers can adopt (Arokoyo, 1998). Even though, it had been recognized that adoption of improved technologies could lead to increase agricultural productivity and high income for farmers, there had been some bottle necks militating against the attainment of the objectives. Some of which include inconsistency in agricultural policies, insufficient funding and inability of extension workers in taking research technologies to farmers due lack of logistics to mention but few (Chikewendu*et al*., 1996).Therefore, the aim had been to find an appropriate institutional framework for research-extension-farmer linkage system (REFILS). The overall goal of REFILS was to integrate the efforts of research and extension in collaboration with input and marketing agencies in identification of major agricultural production constraints and to develop sustainable, technically feasible, economically viable and socio-culturally acceptable alternative production technologies which could meet the needs and capabilities of the resource-poor farmers without destroying the natural resources. There is no doubt; the REFILS process has come a long way in Nigeria (FAO, 1995).

In trying to grasp the complexity of innovation in agriculture, social scientists developed a new paradigm in agricultural extension: Agricultural Knowledge and Innovation Systems (AKIS) otherwise known as "*knowledge systems thinking*". The basic idea of AKIS's thinking is that, an agricultural knowledge system should be made up of many actors, organizations or institutions (sometimes individuals) who deal directly or indirectly with the *know-how* of agriculture (Röling, 2009).This system allows the research institutes, extension services and farmers to develop the technical knowledge that farmers apply in their farms. Also, the ministry of agriculture, local government, NGOs, aid organizations, and agricultural education institutions and universities equally contribute their roles in the AKIS.Looking at agricultural *know-how* as a system, the AKIS model permits to think about the effectiveness of actors in agriculture. Increasingly, policy makers and those implementing policies began to recognize farmers as actors who needed to be taken seriously in the governance of knowledge. Farmers' expertise is considered as a valuable source for knowledge development. However, the system still recognizes research as a major motor for innovation (Fair and Shah, 2006).The aim of this paper therefore, is to assess the Agricultural Knowledge and Information System (AKIS) in the extension information delivery to farmers.

OBJECTIVES OF THE STUDY

The broad objective of this paper was to assess the Agricultural Knowledge and Information Systems (AKIS) in the extension information delivery to farmers. The specific objectives were to:

i. identify the various actors involved in theAgricultural Knowledge and Information System (AKIS)

ii. assessthe chain of interactions between one actor and another in the AKIS.

iii. examine the implications of the information linkage system in AKIS

2.0.METHODOLOGY

This paper was written based on the selected relevant literatures in assessing the Agricultural Knowledge and Information System.(AKIS).

4.0.IDENTIFYING THEVARIOUS ACTORS INVOLVED IN THE AGRICULTURAL KNOWLEDGE AND INFORMATION SYSTEM (AKIS)

According to Röling(2009), AKIS is made up of many actors which include;organizations or institutions (sometimes individuals) who deal directly or indirectly with the *know-how* in agriculture.There are three basic stages in describingan agricultural knowledge and information system. The first is to identify the individuals and organizations that form the system. Identifying the members of an agricultural knowledge and information system is not a simple task. The task is complicated by the need, for instance, to draw a boundary defining the membership of the system or network in order to keep the information within feasible limits. The second stage is to identify the links between the members of the system. The task of identifying links may be complicated by the need to restrict the information flowto some of the members in order to keep the information manageable. This again is a boundary problem.The third stage is to characterize the nature of the relationships between members who are linked together (relationship content). A number of issues are involved in the measurement of relational content (Roling, 2009). Research institutes, extension services and farmers usually develop the technical knowledge that farmers apply in their farms.Also, the Ministry of Agriculture, local Governments, NGOs, aid organizations, and agricultural education institutions and universities have significant roles to play in the AKIS.

4.1. THE CHAIN OF INTERACTIONS BETWEEN ONE ACTOR AND THE OTHER IN THE AKIS

An Agricultural Knowledge and Information System (AKIS) is a network made up of organizations and people who are linked by commercial, professional or social relationships (Röling, 1990). Such a network may consist of producers, researchers, consultants and extension professionals with a common interest in a particular production technology. Röling (2009) argues that the effectiveness of technology transfer through an AKIS depends critically on the existence of a system of incentives for network members to communicate with each other and to develop, manage and adapt the network as technology transfer proceeds. Most of the external actors reported here, particularly government institutions, interact directly with rural communities. However, there is little interaction between organizations and institutions themselves, even though they have similar objectives and indeed have underpinned the development of the AKIS paradigm (Roling, 1990). Some analysts call for the deconstruction and reconstruction of the whole system of agricultural development and support into new coalitions or platforms of actors (Jones *et al.,* 2005). Although, this may be too radical for most governments, it does raise questions of missed opportunities for collaboration and cost-sharing in research and dissemination and of networking and pluralism in the supply of innovations and extension services. Liberalization, structural adjustment and the increasing role of NGOs and other organizations increase the complexity of agricultural development, and offer new opportunities for research, extension and training (Wasserman and Faust, 2001). The establishment of task-oriented networks and task forces is often considered the most effective way to tackle such complex issues with many different stakeholders (Arokoyo, 1998). The World Bank Rural Action Plan advocates drawing the many concerned actors together in more effective partnership, and recommends pluralism in the supply of research and extension services to develop more cost-effective, equitable and efficient agricultural development (Arokoyo, 1998). The AKIS paradigm amongst others, offer tools that could assist government and non-governmentalorganizations in such networking and the review of their roles in today's agricultural systems.

Even where research institutions have developed expertise with participatory approaches, it is not possible for them to work directly with more than a tiny percentage of the country's smallholder farmers. The formation of strategic alliances with other development agencies to address agricultural issues of mutual interest is one way in which government research organizations could substantially increase their impact. Such alliances

would involve working with representatives of the 'farmer-congregations' of these agencies. Increased focus on the formulation of research outputs and technical information materials for farmers, emphasizing, trying-out and experimentation by farmers' groups, and the development of teaching and training-of-trainer materials for intermediate users would be necessary to assist those agencies in facilitating participatory learning throughout their congregations. In this way, government research institutes could capture pivotal roles for themselves in the agricultural knowledge and information systems of the future (Jones *et al*., 2005).

From the information cycle below, the ministry of agriculture is responsible in formulating agricultural policies for extension service department and organizing relevant trainings and workshops for the effective transferof the polices into meaningful strategies which guides the research institutes in the formulation of research materials by utilizing the necessary extension methods and research results. Research institutes on the other hand interact with the market value chain actors and consumers directly in a view to have rapports over the value chain demands and requirement. The NGOs and farmers organization also work in collaboration with the value chain and consumers actors. The local government's authorities are also expected to take over progressively the responsibilities of the State government to provide an effective extension service, mobilize the farmers in accelerated agricultural and rural developments through cooperative organization, local institutionsor communities and provision of rural infrastructure to complement the efforts of research and extension services etc. In addition, the local government in connection with the Agri-business actors may take the responsibility of extension agents by meeting up with farmer's needsas the closest to the grass root. The ministries of agriculture at both State and Federal levels again organize the activities of agricultural extension services by ensuring a variable agricultural extension delivery service through provision of a virile effective extension service. Above all, the AKIS linkage system makes provision for direct interactions of each actor with the farmer possible at every stage in the linkage system.

Fig 1: The chain of interactions between one actor and the other in the AKIS.

IMPLICATIONS OF AKIS

Röling (1990) believe that the nature of the links between the people and the organizations in the system have a critical impact on the effectiveness of technology transfer. Ideally, these links are conduits for the dynamic, two-way exchange of information, knowledge and skills between people and organizations.The effectiveness with which an agricultural knowledge and information system empowers producers (farmers) to innovate and improve the productivity and sustainability of their enterprises depends on the people's and organizations' participation in the system (system membership). It also depends on the way how the people and organizations are linked in the system (system structure) and on the nature of the relationships created by these links (relational content). If producers are not members of the system and if links are not established between producers and researchers, then research activities will tend to move in directions dictated by the interests of researchers (Röling, 1990). If the links between researchers and extension staff do not involve relationships which facilitate the exchange of information between these two groups, then the translation of research findings into farming practice will be limited. The greater the overlap in the interests of researchers, extension agents and producers the stronger the incentives to create relationships that promote the exchange of information and knowledge. Consider, for example, producer groups

involved in self- directed learning projects. With this type of project, producers identify the research problem themselves. They also manage and undertake the research, drawing on outside expertise as required. The commitment of participants to the success of the project will be high because they have control over the project and they believe the potential benefits will be substantial. Hence, personal and commercial incentives arise in this type of project to prompt producers to initiate, develop and maintain relationships with researchers, extension agents and other professionals. When the public sector is involved in technology transfer, the overlap in the interests of producers, extension agents and researchers may be limited and this may substantially lower the effectiveness of the research and development process (Roling, 2009). There are many reasons why the overlap of interests may be limited. Many of these reasons are products of differences in the organizational objectives of individual government departments, agencies and public organizations. These differences are reflected in different rewards and incentive systems. For example, career advancement within the university system is based on scientific publications and not on the uptake of new ideas by producers. Other reasons for the limited overlap of interests relate to the way organizations are (or are not) linked together. For example, if research finishes at publication while extension starts with recommendations, then a gap occurs in the research and development process. This gap will be reflected by the absence of links between research institutions and extension organizationsto slow the rate at which new ideas are developed into commercial practice. In short, despite the existence of an array of public sector research and extension organizations and producers, the differing goals of these organizations, and the differing incentives faced by individuals within them may impede rather than facilitate technology transfer (Fair and Shah, 2000).

5.0.CONCLUSION

Based on the findings of this study, the need for learning through direct interaction with researchers and extensionists by farmers and other actors should be emphasized. Even where research institutions have developed expertise with participatory approaches, it is not possible for them to work directly with too many smallholder farmers. The formation of strategic alliances with other development agencies to address agricultural issues of mutual interest is one way in which government research organizations could substantially increase their impact. Such alliances would involve working with representatives of the ‘farmer-congregations’ of these agencies. Increased focus on the formulation of research outputs into technical information materials for farmers,

emphasizing, trying-out and experimentation by farmers' groups, and the development of teaching and training-of-trainer materials for intermediate users would be necessary to assist those agencies in facilitating participatory learning throughout their congregations. In this way, government research institutes could capture pivotal roles for themselves in the agricultural knowledge and information systems of the future. For this strategy to work effectively the co-operation of all actors in the system is paramount in assisting the farmers to increase their productivity and income and eventually improving their overall well-being, is required. Otherwise, the effectiveness of what has been put in place would be diminished.Also, scientists, specialists, extension workers, consultants and producers should be seen as participants in a single Agricultural Knowledge and Information System (AKIS). There is no doubt, AKIS network would take go a long way in Nigeria if all the principal actors continue to play their respective roles as expected.

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