APPRAISAL OF THE COMMUNICATION STRATEGIES OF THE NATIONAL AGRICULTURAL EXTENSION AND RESEARCH LIAISON SERVICES, ZARIA, KADUNA STATE

BY

GODFREY IFE ONAGWA, BA, MA, MPCS
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BEING A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY IN DEVELOPMENT COMMUNICATION

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DECLARATION

I declare that this thesis entitled ‘Appraisal of the Communication Strategies of the National Agricultural Extension and Research Liaison Services, Zaria, Kaduna State,’ was carried out by me in the Department of Theatre and Performing Arts of Ahmadu Bello University, Zaria. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree at this or any other Institution.

Godfrey Ife ONAGWA	....	....
	Signature	Date

CERTIFICATION

This thesis entitled "APPRAISAL OF THE COMMUNICATION STRATEGIES OF THE NATIONAL AGRICULTURAL EXTENSION AND RESEARCH LIAISON SERVICES, ZARIA, KADUNA STATE" by Godfrey Ife ONAGWA meets the regulations governing the award of the degree of Doctor of Philosophy in Development Communication of the Ahmadu Bello University and is approved for its contribution to knowledge and literary presentation.

....	....
Professor Ogah Steve Abah	**Date**
Chairman, Supervisory Committee	
....	....
Dr Emmanuel Jegede	**Date**
Member, Supervisory Committee	
....	....
Professor Emmy Unuja Idegu	**Date**
Member, Supervisory Committee	
....	....
Professor M.I. Umar Buratai	**Date**
Head of Department	
....	....
Professor K.I. Bala	**Date**
Dean, School of Postgraduate Studies	

DEDICATION

This Thesis is dedicated to my fellowship with Jesus Christ

And to my union with Victoria Bolade Onagwa

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ABSTRACT

NAERLS has the national mandate of coordinating and planning agricultural extension activities in the country, as well as providing leadership role in the management of adopted villages. But in 2007, the Federal Government declared a state of emergency on the nation's agricultural sector, basing this on ineffective extension service provision and very low agricultural productivity due to poor production practices. Thus, this study examined the extension communication strategies of NAERLS, using its adopted villages as case study, and in the light of Federal Government's drive to improve agricultural productivity nationwide through a communication-anchored agricultural sector. The aim of the study was to enhance agricultural productivity in NAERLS adopted villages through the deployment of an effective communication strategy. It employed both quantitative and qualitative methods to study 104 respondents, comprising 82 farmers from three selected adopted villages (Tudun Iya in Katsina State, Nwogi in Niger State, and Okolo in Oyo State), 20 staff of NAERLS, and 2 policy makers. The instruments for data collection were 3 sets of questionnaire, 2 sets of Key Informant Interview and naturalistic observation. The questionnaire items were designed in three-point Likert scale of degree of Highly, Moderately, and Poorly; or of frequency of Always, Occasionally, and Rarely, with statistical values of 3, 2 and 1 respectively. Thus the weighted mean value was calculated to be significant at 2.0. The results showed, among others, that NAERLS practised group, mass-mediated and individual extension communication approaches, but with the group approach being the foremost; access to NAERLS communication channels was low for the selected villages; however, it was higher in Tudun Iya than in Okolo and Nwogi. Communication approaches, channels and messages were also found to be uniformly used for the various adopted villages without consideration for audience peculiarities and needs. The study also found that impact of the Institute's extension activities on farmers' productivity low; and that farmers were not adequately and sufficiently involved in the agricultural communication matters and initiatives. Moreover, the study found significant level of communication barriers to technology adoption in the selected villages. Other barriers to technology adoption included the top-down approach to agricultural technology development, and issues regard to insufficient funding and government's policy inconsistency. Despite the finding on adequate level of trust by farmers for the competency of NAERLS as agricultural communication partner, the absence of a working strategic communication guide created an apparent gap between NAERLS extension tenets and actual field practice; this gap led to the production and dissemination of media packages in a largely unorganized form. Based on the findings, a participatory communication strategy was designed for the study institute for deployment in the study location to enhance agricultural productivity. The strategic communication design was done with active participation and contribution from key stakeholders. The study therefore recommended, among others, that NAERLS should deploy the communication strategy designed by the study to enhance agricultural productivity in the study locations; and that the Federal Government, through the working of key stakeholders, should formulate a pluralistic policy that will legislate for the leadership, funding and coordination of the nation's extension activities.

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CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to the Study

A major concern in the last four decades in Nigeria has been on how to develop the agricultural sector for self-sufficiency in food production. One important reason for this concern is, perhaps, the realization that despite the huge investment in agricultural development and the substantial progress that has been recorded in agricultural technology generation, the desired impact is not being achieved due partly to ineffective technology transfer mechanisms. The desire to strengthen food production, processing and storage in the country led to the introduction of numerous agricultural development projects and programmes, with technology transfer, food security and increased economic activities as the main focus.

Nigeria has over 170 million inhabitants to feed daily, in addition to about 75 million neighbours that depend on it for food and other essentials. Its huge population alone places a heavy burden on its endowments, in the effort to overcome the problem of food insecurity for this ever-expanding population. There are also challenges of deteriorating natural resource base and growing exposure to climate change risks in the form of drought, floods and diseases. All these combine in a complex fashion to anchor an unimaginable scale of poverty. Thus, scholars have posited that agriculture should be accorded top priority in the country's quest to grow its economy and reverse the poverty tide, since it is one of the most input-responsive sector of significant economic importance.

In 2009, the federal Government of Nigeria began a project termed Agricultural Transformation Agenda (ATA), which directly builds on its national economic transformation initiative, popularly called Vision 20:2020. The Federal Ministry of

Agriculture and Rural Development (FMARD, 2011) stated that ATA is sequel to the dwindling performance of the nation's agricultural sector in both domestic and international trade over the years. For instance, as at 1961, Nigeria was the leading exporter of groundnut, with a world share of 42%; it had 27% of the world's palm oil exports, 18% of cocoa, and 1.4% of cotton. Today, Indonesia and Malaysia lead in palm oil, Cote d'Ivoire and Ghana in cocoa, while Mali and Burkina Faso in cotton exports. The argument is that these competitors have maintained their dominance through the establishment of strong extension systems, linking farmers to markets and providing support information, improved planting materials, credit facilities and rural infrastructure. Consequently, the annual economic loss to Nigeria is estimated to be well over US$10 billion (about ₦2 trillion).

Nigeria has the largest national agricultural research and extension system (NARES) in sub-Saharan Africa, with seventeen (17) commodity-based research institutes, a specialized national agricultural extension institute (ie, NAERLS), thirty-seven (37) Agricultural Development Projects (ADPs), three (3) specialized universities of agriculture; more than fourteen 22 federal and state colleges of agriculture, as well as departments agricultural extension in more than sixty (60) regular universities (FMARD (2012). Despite this, however, the country remains food-deficient and food insecure. This begs the question: Why has this large agricultural research and extension system (NARES) not been able to engineer a sustainable agricultural development that ensured national and household food security, improved rural livelihoods and a competitive agricultural sector?

It is noteworthy that Nigeria has made several efforts at establishing basic institutions that support agricultural development and gathering and dissemination of scientific information. Such agricultural extension efforts included extension outreaches in 1912 at Moor Plantation, Ibadan; schools of agriculture at Ibadan and Samaru in 1924; a forestry school at Ibadan and veterinary training school at Vom in the late 1920s (NAERLS, 1996). The major work of these outreach centres was the promotion and distribution of new planting materials, especially cash crop seedlings such as oil-palm, cocoa, rubber, cotton, and groundnuts. The prominent methods of extension education were farm demonstration centres and personal visits to farmers. And although much scientific information was accumulated during this period, agricultural extension performed below expectation largely due to the inability to effectively disseminate adoptable/adaptable agricultural innovations to farmers (Atala, 2009). Agricultural communication or extension was originally understood as the application of scientific research and knew knowledge to agricultural practices through farmer education. But its current definition has expanded to include a wide range of communication and learning activities organized for rural people by professionals from different disciplines, including agriculture, health and education (Atala, 1992). Research is so intrinsic to extension that an extension specialist or extensionist in many countries is usually a university (academic) staff who develops and delivers educational programmes to assist people in specialised farm settlements, community and youth development.

Agricultural extension in Nigeria is said to have started in 1893 with the establishment of a Botanical Research Station in Lagos by the British colonial power (Atala and Abdullahi, 1988). Thus, colonial agriculture made the foundation of agricultural extension in Nigeria. But the features were advisory services, concentration on export crops and top-down/paternalistic approach. The development of extension services in Nigeria can be categorized under two general blocks of time: the colonial and post-colonial eras.

In its rudimentary form, agricultural extension in Nigeria started during the colonial occupation by the British. During this period, the primary agricultural interest of the British colonialists was sourcing for agricultural raw materials for the British growing industries. In this respect, the pioneer agricultural development initiatives were for the purpose of promoting production of export crops such as cocoa, rubber, cotton and groundnuts for home industries. These initiatives include the following: the establishment of a Botanical Research Station in 1893 at Olokemiji in Lagos; acquisition of a large track of land at Moor Plantation, Ibadan for cotton production for the British textile industries; establishment of the Department of Agriculture in the Southern part of Nigeria in 1910, in the northern part in 1912 and for the federation in 1921, for administration of development projects (Williams, 1978); establishment of agricultural development schemes for the production of agricultural commodities and skills acquisition by farmers, such as the Kware irrigation scheme near Sokoto town in 1926 and the Niger Agricultural Project in 1951 at Mokwa, for the production of groundnuts for export and sorghum for local consumption, which housed 163 families (Agwu and Anyaeche, 2007).

The colonial extension services were geared toward demonstration of better farming techniques, increasing productivity in agriculture and developing agricultural marketing through introduction and enforcement of regulations and standards in export crop production. Technical advice (rudimentary extension) was provided to large-scale farm managers. Extension to small-scale subsistence crop farmers was rare even in times of food crisis. It is noteworthy that the dominant approach to agricultural extension in modern Nigeria, Transfer of Technology (TOT), is an endemic colonial heritage (Igunu, 1993). This persuasive or paternalistic approach was most forceful in the Training and Visit (T&V) system of the 1970s and 1980s and it was a top-down approach that delivers specific recommendations to farmers about the practices to adopt.

Nigeria's initiatives in extension development are periodized in decades. The 1960s is considered the decade of independence, in which basically government organized departments/ ministries of agriculture at regional/state and federal levels. The local government authorities played little or no role in provision or promotion of agricultural extension services. The decade was essentially a period of diverse top-down extension and it witnessed the emergence of commodity-based extension services to facilitate achievement of commodity production targets of development plans. To address the needs of small-scale farmers, various schemes were initiated with support from foreign donors. These schemes were basically farm settlement schemes, such as the ones introduced by the then Western, Eastern and Mid-Western regions in 1960, 1962 and 1964 respectively. The Young Farmers Clubs also flourished in Western Nigeria in the early 1960s (Jibowo and Sotomi, 1996). Because the method of extension was largely ad hoc in nature, having little guidance on contents, presentation and execution, the various schemes failed (NAERLS, 1996).

The 1970s was considered the oil-boom decade, which also led to a boom in agricultural development programmes/projects initiated to tackle post-Civil War (1965-67) food crisis and increasing food demand that could not be solved by the existing systems and levels of production. The oil-boom phenomenon was a catalyst for many agricultural/ development programmes. These chronologically included the National Accelerated Food Production Project (1972), the River Basin Development Authority (1973), the Agricultural Development Projects (1975), Operation Feed the Nation (1976), and Agro-service Centres (1977). Although all agricultural development programmes/projects had varying levels of extension contents, the greatest landmark in agricultural extension development in Nigeria was the World Bank-assisted Agricultural Development Projects (ADPs), which were first introduced in 1975 at Funtua, Gusau and Gombe as enclave projects. The enclave ADPs steadily expanded and became state-wide and later nationwide projects in the 1980s. They provided farm machinery, farm inputs, credit facilities and extension services to farmers. According to Arokoyo (2009b), the ADP initiative gave a strong boost to agricultural production and extension in the country, so that agricultural extension underwent the greatest spread and intensification amounting to a major paradigm shift in extension management and professionalism.

Along with the ADP framework were concepts that were critical to responsive and productive extension work. These included the Research-Extension-Farmer-Input Linkage System (REFILS), which emerged from the observation that in the operation of the T&V system, farmers were experiencing problems related to technology generation, availability of farm inputs/ marketing, and extension messages. The solution to this was to forge a viable linkage system of the major stakeholders. There was also the Unified Agricultural Extension System, introduced (in 1993) in the face of dwindling support for the ADP system. It entails having one village extension agent (VEA) responsible for disseminating technologies in all areas of agriculture, from crop and animal production to farm mechanization and food processing.

However, the extension approach was fundamentally directive and paternalistic, with government taking authoritative decisions on what and how to extend or deliver to farmers. Consequently, critical issues of client participation, empowerment and programme sustainability were not addressed. The role of extension was that of being advisory on agricultural matters and on input supplies. Method of information dissemination was predominantly to narrate ‘stories’ from land preparation to harvesting for a particular crop, such that the extension agent and/or farmer tended to forget as the season progressed (Ajayi and Gunn, 2009). Even with ADP system, with targeted ‘progressive’, ‘well-to-do’ farmers (Ramirez, 1994:51), majority of farmers remained unintegrated in the development process; hence, the system largely failed.

Okunade (2006) refers to the 1980s as the decade of intensification of the oil-boom projects, since the euphoria of establishing ADPs continued into the early 1980s, sustained by increasing food demand and oil fortunes. The many projects that were established included the Green Revolution programme (1980), the School-to-Land Programmes (1980), the Agricultural Credit Guarantee Scheme (1980), the National Agricultural and Cooperative Bank (1981), the Accelerated Development Area Project (1982), the Multi-State Agricultural Development Projects (1986), the National Directorate of Employment (1986), and the National Agricultural Insurance Scheme (1987). These were also not end-user or demand-driven initiatives. Rather, they were government conceived, designed, executed and assessed programmes.

The 1990s was a decade of sharp decline in top-down projects, including ADPs, as it marked the end of the World Bank's financing of the ADP system. The only high stake projects left were the National Fadama Development Project (NFDP) and the Sasakawa Global 2000, both established in 1992 (Chinaka, Okoye, Akinpelu, Chinaka and Asumugha, 2011). The end of the World Bank funding of ADPs in 1995 marked the collapse of the T&V system, leaving only piecemeal projects funded from other sources. This situation, together with growing concern for sustainability and equity, gave birth to participatory methods and techniques that led to gradual replacement of top-down extension processes. Extension orientation was shifting to facilitation for empowerment, which is educational and participatory. The facilitation for empowerment methods involved are experiential learning and farmer-to-farmer exchanges. Thus, knowledge is gained through interactive processes and participants make their own decisions. The best examples are the Farmers Field Schools (FFS) and Participatory Technology Development (PTD). Thus the late 1990s witnessed the birthing of diverse bottom-up extension.

Akinola, Aja, Tarfa and Amapu (2007) stated that the objective of the National Fadama Development Project is to sustainably increase the incomes of farmers, pastoralists, hunters, gatherers and service providers, among others, through empowering communities to take charge of their own development agenda and reducing conflict between Fadama users. The basic strategy is a community-driven, socially inclusive development approach with strong emphasis on stakeholder participation at the community level. The Sasakawa Global 2000 programme in Nigeria started initially in Kano, Kaduna and Jigawa states and soon expanded to other states the following years. Its aims are: increasing productivity and reducing poverty among smallholder farmers. The central approach is solving the problems of small farmers participatorily, using Management Training Plots (MTP) of between 0.25 and 0.50ha; where the farmer's field serves as the 'classroom' for demonstration of improved crop production methods and provides opportunity for hands-on training for both the farmers and the front-line extension staff.

The 2000s is the decade that witnessed diverse bottom-up extension approaches. Projects of the 2000s show a clear shift from the technology transfer/adoption projects of the earlier decades to bottom-up approaches. These projects include the Poverty Alleviation Programme (2000), the Root and Tuber Expansion Programme (2001), the National Special Programme for Food Security (2003), the National Economic Empowerment and Development Strategy (2004), and the Community-Based Agricultural and Rural Development Programme (2007). The Community-Based Agricultural and Rural Development Programme (CBARDP), for example, is a demand-driven/participatory poverty alleviation programme. Farmer groups or cooperatives identify and prioritize their needs and problems and then suggest solutions to the problems. Then, assisted by the extension agents of the programme, they embark on the community development activities that would solve their own identified problems, alleviate their poverty and empower them sustainably.

In the effort to boost agricultural productivity, the Nigerian government also introduced university-based rural and agricultural extension development projects in Nigeria. The initial general aim was to extend research-based knowledge, practices and technologies to communities in the vicinities of university campuses, as well as develop a model of rural development for large-scale application (Musa, 2004). These attempts include the Isoya Rural Development Project of the Obafemi Awolowo University, Ile-Ife; the Badeku Project of the University of Ibadan; the Guided Change Project of the Ahmadu Bello University, Zaria, and the Onabisi Onabanjo University, Ago-Iwoye. It was in this regard that the Agricultural Extension and Research Liaison Services (AERLS), Ahmadu Bello University Zaria, was established in 1975 as the mainstream extension arm (Federal Government of Nigeria, 2009); it was given a national mandate in 1987 to coordinate research and extension among research institutes, ADPs and ministries of agriculture for the benefit of farmers and national policies in agricultural development and extension.

The modern trend in agricultural extension practice, however, is such that attention is being paid to participatory communication approaches, as well as their contents—which implies more normative approaches. The approaches are based on the context, felt needs and empowerment of farmers at their divergent levels. The main concern is that change must be structural, occurring at multiple levels in order to achieve these ends. The focus for this study is thus the communication for empowerment of farmers in NAERLS adopted villages, the output of which would be the construction of a participatory communication model for the institute under study, towards the effective achievement of such ends.

Alongside the introduction of the university-based extension systems was the mandatory establishment of three adopted villages by each agricultural research institution at the beginning of 2000. An adopted village is the laboratory, or place of first contact; where the technology meets the farmer for the first time and the first field experiment is carried out. This practice seemed to somehow fizzle out because of the lack of coordination. But in 2007, the federal government decided to resuscitate the project and mandated the newly formed Agricultural Council of Nigeria to implement and monitor it. NAERLS had establish seven (7) adopted villages: two at its headquarter in Zaria and the other five located at five agro-ecological zones of the country (Southwest, Southeast, North Central, Northeast, and Northwest). By this scheme, the success of an agricultural technology among the national farming population depends on its success with farmers at the adopted village level; and since NAERLS is the coordinating institution on national agricultural extension, its adopted villages are taken as the ideal models for adopted village management for the country.

1.2 Statement of the Research Problem

In 2007, exactly twenty years after NAERLS was given the national mandate on extension in the country, the Federal Government of Nigeria declared a state of emergency on the nation's agricultural sector. The government hinged this on several problems, among which were ineffective extension service provision, low agricultural productivity due to very poor production practices and, therefore, over-dependent on imports (FMARD, 2011). Low agricultural productivity was linked to low levels of input supply and utilization, as well as other factors, such as inadequate government expenditure in research and development and rural infrastructure. For example, average fertilizer use in Nigeria is 13kg/ha, compared to the world average of 100kg/ha and 150kg/ha for Asia. Also, only 5% of farmers have access to improved seeds, while agricultural mechanization intensity stands at only 10 tractors/100ha (compared to 24/100ha for Indonesia) (FMARD, 2012). The consequences are food insecurity, a growing import rate of 11%/ annum and a very high unemployment rate.

Besides, despite having one of the largest national agricultural research and extension systems in Africa, Nigeria was declared food insecure and agriculturally nation (FMARD, 2012). What is not clear is how NAERLS demonstrated its leadership role in extension communication; or how the Institute played its role in developing and/or evolving viable extension methods and approaches for the national extension system? This study, therefore, examined the extension communication strategies of NAERLS in the light of the institute's efforts to influence agricultural technology uptake of farmers in Nigeria, using its adopted villages as study locations. Moreover, the Federal Government's drive to improve agricultural productivity nationwide through a robust people-centred, market driven and communication-anchored agricultural sector makes the study compelling.

1.3 Rationale of Study

Agricultural extension systems are often built on the philosophy that the purpose of gaining and disseminating new research-based information is to ensure it is appropriately used in reaching decisions, making changes, or taking other specific actions designed to improve agricultural outcomes. Hence, the goal of dissemination is utilization. However, facilitating the utilization of research-based information is a complex process, with barriers in dealing with the steps necessary for implementation and in ensuring that recipients have the skills, attitudes, and awareness levels needed to benefit from research outcomes.

Although the issue of low adoption of technologies in agriculture has been widely discussed, and several studies have been conducted on the adoption of innovations in Nigeria, very few, if any, of such studies provided an empirical basis for in-depth inferences on the enhancement of agricultural productivity in the country, using the communication activities of such a leading extension institution as NAERLS. In general, such studies (Buhari, 2005; Audu, 2003; Olowu, 1993; Madukwe, 1995; Orji, 1991; Zaria, 1984) have focussed on factors affecting adoption of innovations and sources of farm information; none attempted detailed and systematic analysis of communication approaches towards developing more effective dissemination strategies as institutional frameworks for improving productivity.

There had also been studies on agricultural innovation adoption to communication channels, which mainly suggested that certain socioeconomic and institutional factors impact heavily on adoption rates and levels, and that different communication channels do have differential impacts on innovation adoption (Voh, 1986; NAERLS, 1996). Such channels as radio, television and the print media, including extension guides, leaflets and posters have been used over the years either independently or in combination to promote adoption of innovations. Also, there had been studies on the use of radio and television as sources of information among farmers in Nigeria (Yazidu, 1973), but there has not been much work detailing farmers' participation level, as well as the inherent and extraneous barriers in NAERLS communication activities, and as these affect farmers' productivity in its adopted villages.

There is, therefore, the need to evaluate the extension communication activities of NAERLS in its adopted villages with the goal of strengthening them towards evolving a people-oriented, farmer-centred delivery system for enhancing farmers' productivity. As stated earlier, NAERLS has the national mandate on extension methodologies, hence, the findings from this research would be a catalyst in the deployment of relevant, effective and efficient people-centred communication strategy that is tailored towards meeting the needs, opportunities, field problems/challenges and solutions of farmers in the study locations, as well as those in similar farm settlements across Nigeria.

1.4 Aim of the Study

To enhance agricultural productivity in NAERLS adopted villages through the deployment of an effective communication strategy.

1.5 Objectives of the Study

1. Examine approaches used by NAERLS for agricultural extension communication in its adopted villages and determining their impact on agricultural productivity.
2. Evaluate the extent to which NAERLS involves farmers in the adopted villages in agricultural matters and initiatives.
3. Examine the communication barriers to adoption of agricultural technologies by farmers in adopted villages.
4. Determine how agricultural communicate\on can be made more effective in influencing the uptake of innovations to enhance agricultural productivity among farmers.
5. Design a communication strategy/ framework for NAERLS as one of the research outputs.

1.6 Research Questions

1. What are the existing approaches used by NAERLS for extension communication?
2. How have the existing approaches used by NAERLS for extension communication impacted on factors of production of farmers in the adopted villages?
3. To what extent does NAERLS involve farmers in its adopted villages in agricultural matters and initiatives?
4. What communication barriers prevent farmers in NAERLS adopted villages from adopting disseminated agricultural technologies?

5. What are the measures for improving agricultural communication towards influencing the uptake of innovations among farmers?

1.7 Significance of Study

Both government sources and empirical research have termed the Nigerian extension system as being generally ineffective, inefficient, top-down and supply-driven, compounded by structural, organizational and managerial defects (FMARD, 2012; Philip and Itodo, 2012). This is because the basic ingredients of modern extension provision, which encompasses people-centred development driven by participation and community ownership are largely lacking in the system. Extension service provision has grown from mere information sharing to development interaction between the agent and his farmer, where they both role-play information 'source' and 'receiver' in a mutually respectful atmosphere. Indeed, any extension posture that does not treat the farmer as an equal stakeholder in the communication process cannot evolve sustainable agricultural development.

Yet it is agriculture that is predicted to provide the growth that the country needs to lift its population out of poverty (FMARD, 2012; Arokoyo, 2009b). To achieve this, agricultural researchers and extension specialists would be vital, from the grassroots to those who can change the direction of the nation through well-informed policies. Thus NAERLS, which is at the core of the nation's extension system, would have to play its part effectively, engendering the needed growth in agricultural productivity, first, among farmers in its adopted villages and, second, for the general farmer population in Nigeria. Therefore, the outcome of this study would go a long way in providing support for NAERLS and the Nigerian government in their efforts at building an efficient, market-driven extension system for the country.

Consequently, the outcome of this study would be of immediate direct benefit to the study institute (that is, NAERLS) and farmers in at the study locations. The findings and outcome would be of long-term indirect benefit to key stakeholders in the Nigerian agricultural extension and research system, especially Agricultural Research Council of Nigeria, the Federal Ministry of Agriculture and Rural Development, and the thirty-seven (37) state agricultural development projects (ADPs). Finally, the results would serve as information base for short and long-term strategic planning and intervention programmes, while the entire work would be a ready material for subsequent research in extension communication and rural development in Nigeria.

1.8 Delimitation of Study

Although the findings of this study can widely be applied to agricultural development and extension service provision in Nigeria, the study area is limited to the expansive agricultural work of the National Agricultural Extension and Research Liaison Services (with headquarters in ABU, Zaria and its zonal offices in the 6 agro-ecological zones of the country) in relation to the selected adopted villages. Also, the study is limited to the appraisal of the institute's communication activities and as these affect agricultural productivity of farmers in the adopted villages.

Moreover, being a case study of NAERLS, the conclusions might be influenced by certain internal and external factors. The first of the internal factors is the institute's communication mandate—NAERLS works within the framework of a mandate given to it by government. It is only proper that the results are measured against the backdrop of this extension communication mandate with regard to performance in the same field. The second internal factor likely to affect the conclusion is the fact that Nigeria has no operational agricultural extension policy with which to compare/measure the results.

1.9 Operational Definition of Terms

1.9.1 Agricultural innovation

In general terms, Engel (2009:56) defined an innovation simply as that "process by which social actors create value through knowledge." With specific regard to agricultural innovation, Hall (2011) defined it as the process of creating and putting into use a combination of knowledge from many different sources. This knowledge may be brand new, but it is usually a new combination of existing knowledge, and it involves a process of constant learning and adaptation. An agricultural innovation also occurs through interactions between multiple stakeholders, such as researchers, extension agents, policy makers, agro-input companies, etc. One key feature of this definition is that it is not only the process of creating but also includes that of putting into use. In supporting this, FAO (2012) differentiated between innovation and invention, stating that even though the two refer to 'new techniques', an agricultural invention becomes an innovation only after farmers have put it to use. In other words, an agricultural invention is any new farming technique that has not been put to use; while an innovation is any new technique that is being put to use by farmers.

However, in the context of this research, unless where otherwise stated, an agricultural innovation is any new technique, practice, activity, machinery, attitude that is disseminated through the means of extension communication efforts to farmers and other actors along the value chain, and that is intended to enhance agricultural outcomes. This usage also excludes whether or not the invention is in use by farmers.

1.9.2 Communication/Extension/ Extension communication

Extension is a field commonly used in agriculture, health and education. It was first used to mean the extension of university knowledge to people outside the walls of the university. It was developed on the belief that university teaching and research should not be restricted to students on campus but should be extended to people everywhere, especially those who could benefit immensely from the scientific outcomes. Thus extension is a form of adult education for the educationally disadvantaged (Chamala and Keith, 1995). From this general understanding grew agricultural extension; defined as the process involving the conscious use of communication of information to help farmers form sound opinions and make good farming decisions (van den Ban and Hawkins, 2005). This definition subsumes communication as the core of agricultural extension.

Rogers' (1956) simplified definition of communication is that it is the process of transmitting ideas, information, and attitudes from a source to a receiver for the purpose of influencing with intent. In a more complex form, Froemling, Grice and Skinner (20011:17) defined communication as:

> A process of transmitting ideas, information, attitudes (images which we have formulated for ourselves) by the use of symbols, words, pictures, figures from the source (who is the originator of the message) to a receiver, for the purpose of influencing with intent.

From the above, communication is considered a process through which senders and receivers of messages interact in a given or defined context. Consequently, unless where otherwise stated, extension, extension communication, agricultural communication are used interchangeably in this study to mean all planned, development-support communication activities for assisting farmers to achieve higher and better agricultural outcomes. This is supported by the National Agricultural and Forestry Extension Service (2005) has used ‘extension’ to mean widely differing communication systems, and stated that the two issues that help define the type of extension are: how communication takes place, and why it take place.

1.9.3 Communication channels/media

In modern communication parlance, channel and medium are often used interchangeably. In traditional discourse, however, the two concepts are clearly differentiated. Medium is defined as the ‘means of communication’, while channel refers to the ‘means of message transmission’ between the sender and receiver (Qasim, 2013:2). A sender conveys his message to the receiver by some medium (such as written, oral or verbal) over some channel (such as electronic or print). Hence, medium is said to be a broader term including appropriate channel for achieving effective communication. But in line with current trend, this research uses the two (channel and medium) interchangeably to refer to both the means of communication and that of transmission.

1.9.4 Extension agent/ specialist/ technologist

In the literature, too, the concepts are often given different definitions and characteristics. Indeed, there is a wide variety of views on the nomenclatures of persons employed by different bodies to perform the role of change agents while working with rural communities. But the underlying fact is that their activities crystallize in improved livelihoods of such rural people. FAO (2012) defined an extension agent as:

> He who attempts to arouse people to recognize and take interest in their problems, to overcome these problems by teaching them how to do so, and then persuade them to act on his teaching, so that they ultimately achieve a sense of satisfaction and pride in their achievements.

On the other hand, the National Agricultural and Forestry Extension Service (2005) defines an extension technologist as one employed by a state or other body to work with researchers to increase crop yields, prevent erosion, eliminate blights or pests, etc through the development and application of appropriate technologies. The extension specialist is however described by the New Jersey Agricultural Experiment Station (2015) as a person who generates research-based information and solutions in the areas of agriculture, food and nutrition, environmental sciences and national resources, and youth development. The various definitions also placed an extension agent in government-owned organization, while the extension specialist is situated in a research-based institution. Also, an extension technologist is associated with both public and private extension organizations. In Nigeria, the ADP system uses the 'extension agent' title, while the public extension system, to which NAERLS belongs, uses extension specialist and extension technologist as job designations—mainly, extension specialists are academic staff, while technologists are non-academic.

In this study, therefore, unless where otherwise indicated, extension agent, extension specialists or extension personnel shall be used interchangeably to mean persons whose primary role is to achieve a transformation of attitudes, behaviour and social and economic organizations among farmers. The terms would uniformly refer to change agents that are multi-purpose, serving as links between farmers and other stakeholders in the agricultural sector.

CHAPTER TWO

REVIEW OF RELATED LITERATURE AND THEORETICAL FRAMEWORK

2.0 Introduction

This chapter presents a review of related literature. The main focus of the review relates to studies previously carried out on the key concepts/variables of the study; that is, agricultural activities in Nigeria, agricultural extension, extension approaches, development communication, channels for disseminating agricultural innovations to farmers, as well as on Andragogy and Participatory Communication Model, which are the theoretical frameworks on which the study was built. The justification for the selected concepts in the review is the fact that they concern the key variables around which the study was conducted.

2.1 Agriculture in Nigeria

Agriculture is generally held to consist of crops and livestock production, agroforestry and aquaculture. The agricultural products of Nigeria can be divided into two main groups: food crops, produced for home consumption, and export products. The World Bank (2005) pointed out that, prior to Nigeria's Civil War, the country was largely held to be self-sufficient in food, but imports of food increased substantially after 1973 due to what is now widely described as the oil boom—when the national attention shifted from agriculture to the oil industry because of the huge export prospect. This period, even raw materials that were otherwise sourced locally were imported. Thereafter, bread, made primarily from US wheat, replaced domestic crops as the cheapest staple for much of the urban populace (Badu-Apraku, Menkir, Fakorede, Ajala and Ellis-Jones, 2011).

The most important food crops are yam and cassava in the south and sorghum (Guinea corn) and millet in the north. Maize is the foremost cereal crop in the country and it cuts across the north-south divide. Generally, Nigeria is a country of importance with regard to agricultural production. The 2014 estimates of the National Agricultural Extension and Research Liaison Services and Federal Department of Agricultural Extension (2014:86) showed that yam production in Nigeria was 26.1 million tons (67% of world production); Cassava, 58.1 million tons (highest in the world and 20% of global agricultural production); cocoyam, 6.8 million tons; and sweet potatoes, 2.9 million tons. Also, estimates for major crops were (in thousands of tons): sorghum, 12,473; millet, 9,257; maize, 12,947; rice, 10,191; groundnut, 4,023; palm oil, 992; sugarcane, 975; palm kernel, 675; soybean, 855; and cotton lint, 97.

However, the dominance of smallholders in the agricultural sector and the lack of farm labour due to urbanization have held back production. Despite that the country is said to have had the potential to produce over 300,000 tons of cocoa beans per year, for example, production only amounted to 155,000 tons in 2009. The production of rubber, which is the second-largest non-oil foreign exchange earner, fell from 155,000 tons in 1991 to 120,000 tons in 2009 (World Bank, 2011).

Table 2.1: Nigeria's agricultural indices (2013)

Item	*Indicator*	*Position in the world*
Agricultural growth	147	13th of 149
Agricultural machinery > tractors	32,000	62th of 190
Arable and permanent cropland	43,850 thousand hectares	11th of 148
Arable land > % of land area	33.5% of land area	18th of 199
Arable land > hectares	30,500,000 hectares	9th of 199
Crop production index	109.7 %	92th of 182
Fertilizer consumption > metric tons	340,200 metric tons	38nd of 169
Fertilizer use	10.8 kg	85th of 138
Food production index	123.1 %	77th of 182
Grains > Corn production	8,300 thousand metric tons	12th of 117
Labour share	37.4%	62th of 149
Livestock production index	114.8 %	57th of 181
Tractor concentration /hectare	1	115th of 147
Tractors	28,000	78th of 147
value added > annual % growth	13.4 %	7th of 164
Workers per hectare	0.5	79th of 148

Source: World Bank's Development Report (2013)

The data in Table 2.1 emphasised the import of place of Nigeria in global agricultural production. However, despite that it is eleventh in ownership of arable and permanent cropland, it is ninety-seventh in crop production index. Often, it is argued that agricultural productivity and exports in the country decreased from the 1970s upward, partly because of the discouraging effects of low world prices, and partly because of the shift away from agriculture to crude oil exploration (Agbamu, 2011; Ayange, 2009).

In terms of employment, agriculture is an important sector of Nigeria's economy, engaging about 68% of the labour force (World Bank, 2013). Despite that the nation's diverse climate, from the tropical areas of the coast to the arid zone of the north, makes it possible to produce virtually all agricultural products that can be grown in the tropical and semitropical areas of the world, Nigeria's production system seems largely unprofitable. NAERLS/FDAE (2013:196) aptly described the system thus:

> Agricultural holdings are generally small and scattered; farming is often of the subsistence variety, characterized by simple tools and shifting cultivation. These small farms produce about 80% of the total food. About 40.7 million hectares or 33% of Nigeria's land area, are under cultivation.... Moreover, despite abundant water supply, a favourable climate, and wide areas of arable land, productivity and profitability are restricted owing to low soil fertility in many areas and inefficient methods of cultivation.

Indeed, the Federal Government recognises the economic benefits of improved agricultural productivity; hence the introduction of several projects and initiatives to make agriculture a competitive sector. Both history and literature have shown that there are no cases of successful national economic development which were not preceded by a drastic rise in agricultural productivity (Audu, 2003). Therefore, the various governments of Nigeria decided to address the needs of small-scale farmers by introducing various productivity-enhancing schemes. Some of these initiatives, mainly extension-based, have been discussed above. In earlier times, they included farm settlements, introduced by the then Western, Eastern and Mid-Western regions in 1960, 1962 and 1964 respectively; the Young Farmers Clubs in the early 1960s; the National Accelerated Food Production Project (1972), the River Basin Development Authority (1973), the Agricultural Development Projects (1975), Operation Feed the Nation (1976), Agro-service Centres (1977), the World Bank-assisted Agricultural Development Projects (ADPs) in the early 1980s and the adopted village project of the National Agricultural Research Project (NARP) (1992) (NAERLS, 1996).

In recent times, the schemes included the Agricultural Transformation Agenda, Agricultural Extension Transformation Agenda, the e-Wallet initiative of fertilizer distribution, and the Adopted Village Project, among others. The government also introduced farmers' cooperatives, agricultural lending, and value-chain agricultural development to encourage industrial agriculture. Despite these government's interventions through extension schemes, Nigeria was ranked in 2013 as the ninety-second of one-hundred and eighty-two nations with regard to agricultural productivity (World Bank, 2013). It is remarkable that Arokoyo (2009a) had alluded the poor performance in agricultural productivity to ineffective agricultural extension, which are largely ad hoc in nature, as well as the exclusion of farmers in agricultural technology design and dissemination activities.

2.2 Agricultural Communication

Agricultural communication or agricultural extension is development-support communication in the context of agricultural development planning and implementation, in which adequate action is taken of human behavioural factors in the design of development projects and their objectives (Ayange, 2009). Development-support communication has been recommended by FAO, UNDP and communication scholars worldwide for linking all agencies involved in planned development works in the agricultural sector, such as political executives, agricultural policy planners, development administrators, agricultural subject specialists, field workers, opinion leaders, media representatives, researchers and rural farmers. These actors continue to be the final delivery point and consumers of agricultural information. Thus the route of communication envisaged here is both vertical and horizontal, that is, between institutions, and between institutions and persons connected with agricultural development.

Generally, where and when the first extension activity took place are not known, but experts often point at ancient Chinese civilization. The concept ‘extension’ is described as ‘guidance’ (Arabic *al-ershad*), ‘lighting the path’ (Dutch *voorlichting*), ‘advisory work’ (German *beratung*), ‘simplification’ or popularization (French *vulgarisation*), ‘improving skills’ or ‘capacity building’ (Spanish *capacitacion*), or ‘to promote’ (Thai *song-suem*) (Ajayi and Gunn, 2009:12). But in development discourse, extension was first used to refer to adult education programmes in England in the second half of the 19th century. These programmes expanded or extended the work of universities beyond the campus, or into the neighbouring communities.

The definition of extension has changed over time. According to Gumucio-Dagron and Tufte (2006:57), the definitions that emerged in modern times, for example, include: programmes to help rural families help themselves (1949), out-of-school education for rural people (1965), bringing scientific knowledge to farm families (1966), educational procedures in improving farming methods and techniques (1973), use of communication to help people form sound opinions and make good decisions (1974), and helping farmers identify and analyze their production problems and become aware of the opportunities for improvement (1982). Atala (2009:16) added to the list of definitions, when he stated that:

> Extension or agricultural communication has come a long way, both in definitions and practice. Such definitions include the fact that it is a professional communication

> intervention to induce change in voluntary behaviour emerged in the 1980s; as an organized exchange of information and purposive transfer of skills, and the facilitation of interplay and nurturing of synergies within an information system was popular in the 1990s; and recently [in 2000s], as a series of communication interventions to induce innovations which help resolve identified agricultural problems create market opportunities.

Atala's (2009) observation above show some clear departure from earlier ones given by Gumucio-Dagron and Tufte (2006) with regard to the 1940s and 1950s. They showed the gradual shift from the 'helping a farmer' concept to that of 'identification of field problems and creating market opportunities' concept. This presents a more professionally productive relationship between participants in extension communication.

Moreover, the evolvement of agricultural communication is also reflected in the historical development of human societies—from the time of enlightenment to modern times. The Age of Enlightenment (or Age of Reason) was that era from AD 1620 to AD 1780 in which cultural and intellectual forces in Western Europe emphasized reason, analysis and individualism rather than traditional lines of authority. During that period, the thinking was that the 'common man' was, to some extent, living in the dark and that there was a need for well-educated people to 'shed' some light on their situation by means of educational activities (Leeuwis, 2008:23). This early conception of extension was, therefore, somewhat paternalistic. In line with this, some definitions were given, such as:

> Extension is a service or system which assists farm people, through educational procedures, in improving farming methods and techniques, increasing productivity efficiency and income, bettering their levels of living, and lifting social and education standards (Maunder, 1973:3).

The stress of Maunder's definition is on assisting and educating farmers, hence placing the extension relationship in a rather 'father-child' or 'teacher-pupil' arrangement. Also, Swanson (1987:4) defined the concept as:

> Extension is an ongoing process of getting useful information to people (the communicative dimension) and then assisting those people to acquire the necessary knowledge, skills and attitudes to utilize effectively this information and technology (the educational dimension).

It is noteworthy that when the above definitions were formulated, there was a firm belief in the potential of science as an engine of modernisation and development, and there was genuine concern that everybody should be able to pick the fruits of science. There was a general belief on the positivism of science—that is ‘it was all good for all people at all times’ (Kennedy, 2003:16). This belief led to the assumption that by adopting science-based innovations and practices grounded in science, farmers would benefit almost automatically. Interestingly, Arokoyo (2014) explained that this belief on science still persists today among extension service providers, who view farmers in the extension interaction merely as beneficiaries of agricultural information.

This conception continued into the late 1900s, when concerns for the adoption and diffusion of science-based innovations began to take centre-stage. In the context of diffusion, however, it was also discovered that farmers could gain a lot from each other’s experience and knowledge (Van den Ban, 2005); thus the emphasis changed slightly from ‘education’ to supporting decision-making and/or problem-solving. The definitions that emerged included:

> Agricultural extension is assistance to farmers to help them to identify and analyse their production problems and to become aware of the opportunities for improvement (Adams, 1982: xi).
>
> Extension is a deliberate and systematic attempt by means of the transfer of knowledge and insight—to help and/or develop someone in such a way that the person is able to take decisions in a specific situation with a maximum level of independence, consciousness and conformity with his own interest and wellbeing (Van Gent and Katus, 1980:67, translated from German by Leeuwis, 2008: 24).

In more recent times, therefore, the need for such redefinitions and counter-definitions made Roling and Wagemakers (1998), Sulaiman and Hall (2002) and some others to exclude or abandon the notion of 'extension' altogether, feeling that it had misleading connotations. Some universities even began to rename their Extension Science departments to Communication and Innovation Studies. This researcher agrees with the school of thought that 'extension' tends to portend a misleading connotation— as it implies a beggarly posture or a master-servant relationship in which one 'extends' a helping hand to a disadvantaged neighbour. Consequently, many other definitions gained prominence in recent years, among which is one that the researcher agrees much with. This is that by Leeuwis (2008: 27), in which he stated that 'agricultural extension':

> [Is] a series of professional communicative interventions amid related interactions that are meant, among others, to develop and/or induce novel patterns of coordination and adjustment between people, technical devices and natural phenomena, in a direction that supposedly helps to resolve problematic situations, which may be defined differently by differently actors involved.

Several ingredients of this definition make it rather more precise than those available in literature. For example, by defining extension as a professional activity, it shows that it is practised by trained personnel who are somehow paid and/or rewarded for it; as an intervention, it means that it draws heavily on communication as a strategy for furthering aspirations. Also, the fact that it is a process involving series of communication interactions and that these take place amid other interactions, the definition leaves the window open for the valued contribution/ participation of other actors. Moreover, the statement that extension aims to develop and/or induce innovation emphasises that we cannot simply look at extension as a 'dissemination of innovation.' Also, the inclusion of a 'multi-actor problematic situation' indicates that the solving of such situations usually depends on the activities of several interconnected actors, who may in fact have different views of what the problem is, and what criteria the solution should meet.

Agricultural extension has certain areas of focus. Kolawole (2011) and Leeuwis (2008) highlighted eight sets of challenges that extension communication continually address. First is the set on increasing food production and food security. Statistics showed that despite the appreciable improvements in food production and security in the 1990s (Zijp, 2008), more than a billion of the earth's seven billion people are still undernourished. The second area involves poverty alleviation, income generation and future prospects. Sasakawa Africa Association and Sasakawa Funds for Extension Education (2013) reported that there are over 1.2 billion economically active people in the world whose livelihoods depend, at least in part, on subsistence farming. The majority of these have incomes of less than one US dollar a day. Also, about sixty-seven percent of Nigeria's 170 million people are mostly engaged in subsistence agriculture.

Despite the country's rich natural and human resources, the United Nations stated that, in 2006, over 76 million (or about 52%) of Nigerians lived in absolute poverty (Ogundele, 2012). While studying local knowledge utilization and sustainable rural development in Nigeria, Kolawole (2007) found that, as modern agricultural production and rural livelihoods increasingly become susceptible to climate variability and change, and as most rural smallholder farmers practise rain-fed agriculture, the uncertainty of onset and scarcity of rainfall (drought) is leading to reduced yields and life is becoming more precarious.

The third area of extension concern is sustainability, ecosystems and natural resource management. This area mainly deals with soil degradation, erosion, water pollution, excessive use of chemicals, waste of water, decreasing ground water tables, destruction of natural habitats for wildlife, and limited animal welfare. According to Leeuwis (2008:5):

> This had led to a call for agriculture to become less exploitative and more sustainable, which means that agriculture will have to be carried out to make the best use of available resources and inputs, and regenerate conditions for future production (eg, soil fertility, resilience of the ecosystem, and water availability).

It is remarkable that Madukwe (2008), who studied the peculiarities of unregulated extension practice in Nigeria, outlined the environmental disasters that often occur in an uncontrolled agricultural environment to include the above-mentioned concerns.

The fourth area of extension involves globalization and market liberation—as the exchange of goods, people and idea is becoming narrower due to huge changes in communication and transport technologies. Federal Ministry of Agriculture and Rural Development (FMARD) (2012) and Igbokwe (2011) have made conclusions to the extent that one of the greatest challenges of rural Nigerian farmers is the lack of access to markets for their goods. Moreover, the value chain approach to agricultural development that Nigeria's Agricultural Extension Transformation Agenda (AETA) currently promotes builds on the philosophy of aggressive market creation.

The fifth concern is multifunctional agriculture. In connection with the societal debates on environmental issues and sustainability, agriculture has been found to have many more functions than the production of food and non-food plants or animal products. In this conception, UNDP (2007) explained that farmers may or may not 'produce' clean air, beautiful landscapes, biodiversity, attractive space for recreation, clean water, a healthy soil, or animal welfare, but they may 'produce' many other things which they are not directly rewarded in financial terms. Some of these products are regarded as what to be delivered free of charge by farmers. In societies where farmers are required to maintain landscape, recreational and/or other natural values, there are often new arrangements, such as certified value-added marketing chains for nature-friendly foods, through which farmers can be rewarded financially for the production of non-agricultural functions.

The sixth area of concern is agrarian reform. In Nigeria, as well as some other countries in Africa, cultivated hectarages and production yields are increasing annually, facilitated by technological development and agro-economic policies, such as Agricultural Transformation Agenda (ATA), Agricultural Extension Transformation Agenda (AETA) and Growth-Enhancement Support Scheme (GESS); and this trend continues due to market liberalization and efforts to reduce over-production (National Agricultural Extension and Research Liaison Services and Federal Bureau of Statistics, 2013).

The seventh area is on food safety and value chain management— especially for processed food and meat, as well as feed and fodder on which animals are raised before being slaughtered. In a continental study, FAO (2007) found how cattle in Europe were given compounds that contained bone materials from diseased sheep, so that they developed a dangerous disease called Bovine Spongiform Encephalopathy (BSE) or mad cow disease. BSE is a fatal disease that causes degeneration of the brain tissue in the affected cow and can be transferred to humans when they eat certain parts of that animal. Misapplication of certain chemicals also resulted in residues of pesticides and other toxic components in vegetables and milk products.

The eighth set comprises knowledge intensity, knowledge society and commoditisation of knowledge. It is noteworthy that many of the seven challenges mentioned above can only be tackled if the agricultural sector develops and uses appropriate mechanisms for better adapting knowledge and information (such as on localised agro-ecological processes, market developments, risks, etc). Hence, the first seven sets of concern draw their support from the eighth set.

In 2009, there was a prediction that extension in Nigeria would witness increasing concern and attention to democratic, human rights, and environmental sustainability principles as indications of increasing prominence and eventual dominance of bottom-up extension approach; and that:

> The financial support difficulties in extension and the need for alternative sources of funding, cost effectiveness and sustainability would lead to an increasing role of the private sector in extension provision; and increasing attention to practical relevance of agricultural disciplines and promotion of outreach activities such as the current 'adopted village' projects as predictors of increasing role of universities /colleges in agricultural extension (Osuala, 2009:17).

These concerns are now being addressed by today's Agricultural Transformation Agenda of government, which stresses that to achieve food sufficiency and improved socioeconomic status of farmers, agricultural extension provision must be private sector-led, ICT-driven and knowledge-based (FMARD, 2012). Besides, the government and its various agricultural institutions are into several multi-sectoral, bilateral and multi-national extension partnerships to boost agricultural extension. Some of such partnerships have led to the release of new varieties and hybrids, such as disease and drought-tolerance maize and sorghum and make these available to farmers, in some cases, free of charge (NAERLS, 2011). Whenever such varieties and/or new methods of farming are developed, the agricultural sector often needs a voice to disseminate the information/ knowledge to farmers, to facilitate them to make informed choices with regard to profitable agricultural activities. This is where extension communication comes in.

Anyange's (2009) review of the economic impact of agricultural extension established a significant and positive effect on Nigerian rural farmers. The 2009 World Bank's workshop on agricultural technology transfer in sub-Saharan Africa, however, found that research and extension in Nigeria have not contributed enough to lifting agricultural productivity for its rural farmers (World Bank, 2009). Also, Ngongi (2009), who studied the impact of extension research on agricultural productivity stressed that African scientists, including those of Nigeria, have not been realistic in their extension approaches for eliminating hunger and poverty in the continent. Indeed, with climate change, rising food prices and a burgeoning global population, the demand for agricultural extension approaches to become more efficient and productive is becoming greater than ever. In the midst of these complex challenges, agricultural research and communication stand at a crossroads. Thus, Arokoyo (2009a) held that agricultural extension service provision in Nigeria needs to re-strategise and/or re-invent itself, not just because international and national donors and collaborators are seeking result-oriented research and extension services, but also because it is imperative that agricultural research and extension are accountable to farmers and their farming activities.

2.2.1 Approaches in extension communication

Communication for innovation can take many forms, not just in terms of the methods and techniques used but also with regard to the wider intervention purposes, which again relate closely to the assumed nature of the situation needing improvement. For example, depending on the situation, an identified field problem may be regarded as the lack of adequate technology, conflict over collective resources, lack of organizational capacity, or as an individual farm management issue—in such a case, the practice of communication for innovation, as well as the theories on which this is based, will have to differ accordingly.

Consequently, there are mainly two approaches to classifying extension: the first follows the path of institutional approaches to societal problem-solving, while the second is based on specific project goals. Proponents of the first include van den Ban et al. (1998), Leeuwis (2008), Muntaqha (2007) and Ayange (2009), while those of the second are mainly World Bank (2001), FAO (2002; 2008) and Mody (2002). The classification based on contribution of communicative interventions to societal problem-solving (Table 2.2) has extension at three levels: individual, group and mass.

The individual approach presents advisory communication using horizontal knowledge exchange; the role of the extension service provider comprises that of a consultant, counsellor, source of experience and facilitator. Also, the role of the farmer includes that of active problem owner, learner and, to a lesser extent, source of experience. The group approach, on the other hand, focuses on innovation generation, conflict management, group development and capacity building; its goals are to build coherent innovations, manage pre-existing conflicts and strengthen the position of farmers groups. The farmer within this approach is an active communication participant, as well as active stakeholder in the communication processes. The mass-mediated approach emphasizes persuasion and information transfer processes; where the role of the extension provider is that of a social engineer, and that of the farmer as unsuspecting receiver of innovation (Table 2.2).

Table 2.2: Institutional extension approaches and their characteristics (adapted from Leeuwis, 2008:30)

SN	*Strategy/ approach*	*Intervention goal*	*Role of Extension agent*	*Role of client/ farmer*	*Key processes involved*	*Basis of legitimation*
1	**Individual approach**					
	Advisory Communication	Problem-solving Enhance problem-solving ability	Consultant counsellor	Active problem owner	Problem-solving Counselling Learning	Active demand
	Horizontal knowledge exchange	Knowledge exchange Diffusion of innovation	Source of experience Facilitator	Active learner/ source of experience	Networking Problem- solving	Active demand Public interest Limited resources
2	**Group approach**					
	Generating innovations	Building coherent innovations	Facilitator Resource person	Active participant	Problem-solving Social learning	Societal problem-solving Ensuring progress
	Conflict management	Managing pre-existing conflict	Supporting vertical knowledge exchange Mediator Facilitator	Stakeholder participant	Network building Negotiation	Quality interactive mode of working Wish to remove obstacles to progress
	Supporting group development and capacity building	Strengthening the position of group	Organiser Trainer Facilitator	Active participant	Negotiation Social learning Social learning Negotiation	Political' sympathy with group
3	**Mass Approach**					
	Persuasive transfer of (policy and/or technological innovations	Realisation of given policy objectives Predefined behavioural change	Social engineering	Unexpecting receiver (usually initially)	Adoption Acceptance	Democratic policy decision Preceding interactive process

However, Morency (2010:47) pointed out that ‘the mass-mediated approach is not often used in isolation but in combination with any or both of the others, because it lacks the basic qualities that qualify it as a stand-alone extension approach.’ These basic qualities stated by Morency include interactivity and immediate feedback. In support of this categorization of extension approaches, Gachie and Ruault (2010), while studying extension systems in selected African countries, reported that the most common extension method in Nigeria and other developing worlds, and in consonant with global trend in information use and management, is the group or participatory approach. Arokoyo (2009a) stated that the group extension approach is also called training and demonstration (T&D) method, while the individual approach is called the training and visit (T&V) method.

Unlike the classification of van den Ban et al. (1998), Leeuwis (2008) and others above, the World Bank (2001), FAO (2002) and Mody (2003) provided an almost endless list of approaches based primarily on project goals or campaign objectives. The list of approaches, although not exhaustive, seems to be rather comprehensive enough for the purpose of discussion. Also, the distinctions between the types are not absolute—so that they are not mutually exclusive. But the list gives an idea of the possibilities and opportunities that exist for the extension planner and for the policy and decision-makers at various levels. Besides, the presentation below does not follow any particular order of priority, as none of the scholars in this category prioritized any one approach over the other.

According to Mody (2003), the first is the general extension approach, which assumes that technologies and knowledge that are appropriate for rural farmers exist but are not being used by them. The approach is usually fairly centralized and government-controlled. Success is measured in the adoption rate of recommendations and increases in national production. The second is the specialized commodity approach, which groups all the functions for increased production (that is, extension, research, input supply, marketing and prices) under one administration. In the approach, extension is fairly centralized and is oriented towards one commodity or crop and the extension agent has many functions.

The third is training and visit approach, which is also fairly centralized and is based on a rigorously planned schedule of visits to farmers and training of extension agents and subject matter specialists. Its focus is on the agricultural performance of individual farmers, farm families or farming households. Arokoyo (2009a) explained that this approach is the same as the individual approach identified and discussed above. In support of this argument, the World Bank (2001:112) pointed out that:

> Usually with this approach, close links are maintained between research and extension, while field agents are only involved in technology transfer. Its success is related to increases in the production of particular crops or commodities. It is similar to what other scholars call individual extension approach

The fourth concerns participatory agricultural extension approach, which focuses on the expressed needs of farmers' groups, with the goal of increasing production and improving quality of rural life. Generally, the implementation of this approach is decentralized and flexible and success is measured by the numbers of farmers actively participating and the sustainability of local extension organizations.

The fifth is the project approach, which concentrates efforts on a particular location, for a specific time period, often with outside resources. Part of its purpose is often to demonstrate techniques and methods that could be extended and sustained after the project period. Change in the short term is often a measure of success. In recent years, NAERLS has used this for the West African Agricultural Productivity Project (WAAPP), and the Drought-Tolerant Maize for Africa (DTMA) promotional project (DTMA, 2014). The sixth method is the farming systems development approach, whose key characteristic is its systems or holistic approach at the local level. In this approach, according to FAO (2008:83):

> Close ties are required with research and technologies for local needs are developed locally through an iterative process involving local people. Success is measured by the extent to which local people adopt and continue to use technologies developed by the programme.

The seventh is the cost-sharing approach, which assumes that cost-sharing with local farmers (who do not have the means to pay the full cost) will promote a programme that is more likely to meet local situations and where extension agents are more accountable to local interests. Its purpose is to provide advice and information to facilitate farmers' self-improvement. Mody (2003:63) stated that 'success is often measured by the willingness to pay'.

Finally, the eighth method is the educational institution approach, which uses educational institutions that have technical knowledge and some research ability to provide extension services for rural people. Implementation and planning are often controlled by those who determine school curricula. The emphasis is often on the transfer of technical knowledge.

It is noteworthy that, while the classification by the FAO (2008) and World Bank (2001) group is project specific and, therefore, tending to be time-bound, that by Leeuwis (2008), Muntaqha (2007) and Ayange (2009) and others is institutional based and tends to be problem-solving. For this study, therefore, the researcher would use the field problem-specific categorization of extension approaches because it fits more into the study situation. Agbamu (2006) and Batholomai (2007) stressed that this categorization is more suitable for evaluating institutional extension systems. Batholomai specifically stated that there are clear-cut demarcations between each approach and they are more communication inclined.

2.3 Extension Communication and Agricultural Technology Adoption

The ultimate goal of agricultural information dissemination is utilization; hence, the underlying reason for disseminating research-based information is to assure it is appropriately considered for use in reaching decisions, making changes, or taking other specific actions designed to improve outcomes—the goal being adoption. Generally, efficiency in improved production is at the heart of all agricultural activities, as well as the focus of improved agricultural technologies and extension communication. The scope of agricultural production is, therefore, often expanded and sustained through efficient and effective use of new innovations.

Adoption is the decision by a farmer to make full use of an innovation or technology. Adoption studies are often used as an important tool to measure and assess the impact of agricultural technologies as well as the dissemination activities. Analysis of adoption processes also permits investigation of the categories of farmers who have benefited mostly from a particular technology. Adoption of innovation by farmers also occurs over a period of time through an adoption process, which is in stages. This process, according to Okunade (2006), includes awareness stage (when an individual farmer first hears about the innovation); interest stage (the individual having interest in the innovation and gathering more information on it), evaluation stage—he judges the value of the innovation. There is the trial stage, in which he puts practical judgment at a small-scale level; and adoption stage (where he decides to make full use of the innovation).

Moreover, Onyenwaku and Mbuba (1991) and Rogers (1997) observed that farmers do not adopt innovations or technologies at the same rate due to behavioural differences to technologies. On the basis of these differences in behaviour, farmers are categorised as innovators, early adopters, early majority, late majority and laggards (Figure 2.1). Thus, the study of adoption paradigm provides useful insights in the way information diffused among farmers and on those factors which influence farmers to accept or reject innovations (Atala, Arokoyo and Omata, 1992).

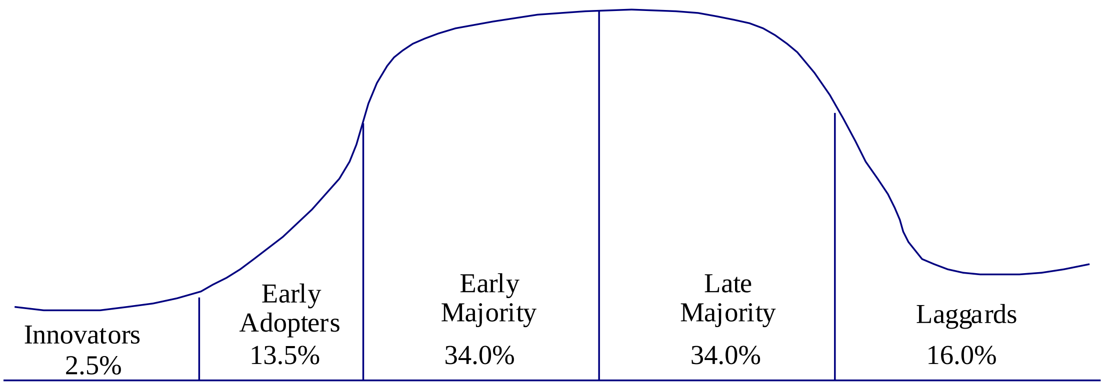

Figure 2.1: Adopter categories and their distribution. Reprinted from Rogers (1983)

The innovators are farmers who are the most inclined to embrace change through the use of new farming technologies. Baba (2002) averred that this group of farmers sometimes clamour for change and pressure researchers to develop specific technologies towards meeting identified field problems. The early adopters, on the other hand, are highly inclined to test new technologies with the aim of embracing it. The difference between innovators and early adopters is that while the former agitate and push for change, the latter wait for the introduction of change and are eager to 'try out' whatever is brought. The largest groups are early majority and late majority, who often embrace new farming techniques only after watching closely the results of trials from early adopters. The laggards are the category which adopts the techniques after a long period of time and when their use had almost become commonplace. Buhari (2005) maintained that innovators and early adopters are often mainly large-scale farmers, while early majority and late majority form the bulk of medium-scale farmers. Consequently, the laggards characterise peasants and small-scale farming.

As earlier mentioned, NAERLS/FDAE (2014) has explained that agricultural practices in Nigeria are predominantly peasantry, with traditional system of cultivation being the dominant practice. Farm holdings are small and the system is characterized by the use of simple tools like cutlasses and hoes. Capital investments are also small, so that modern inputs, such as fertilizers, improved seeds and chemicals, are not widely used by the producers. Consequently, subsistence production and mixed farming are the main features of the system. The crops produced consist mainly of food crops and a majority of farmers operate at smallholder level, with intensive agriculture being uncommon. Thus arise the question as to what needs to be done through extension communication to move Nigerian village farmers from their peasantry to commercial farming level.

The need to provide a valid answer to this question led to hundreds of large-scale studies between 1950 and 1970 across the world. The studies sought to explain why and how people came to adopt (or not adopt) new agricultural innovations and practices for better agricultural outcomes. They were situated where uptake of particular technologies were deemed rather slow or rapid. According to Hansman (2008), typical questions asked included: what are the stages that people go through when considering whether or not to adopt an innovation? Which types and sources of information are important in each stage? What are the differences between people who adopt innovations quickly and those who do it slowly? How do characteristics of innovations and other factors affect the rate of adoption? How does an innovation diffuse through a farming community over time? What is the role of communication between different categories of farmers in the process? What does this all mean for the role of the communicator or change agent in stimulating adoption and diffusion of innovations?

The various results then showed that adoption of innovation by farmers does not happen overnight, but rather that it is the final step in a sequence of stages. The implication of this is that agricultural communication activities should be planned and implemented across a long period of time using varieties of media and message mix to introduce, enforce, reinforce and sustain agricultural technology adoption. This is because ideas vary in the precise number, nature and sequence of stages through which people progress. The most widely used characterisation of stages in connection with adoption of innovations, as propounded by Van Woerkum et al. (1999) and refined by Okunade (2006) builds heavily on normative theories about decision-making and consists of the following: awareness, interest, evaluation, trial, and adoption or acceptance (Figure 2.2).

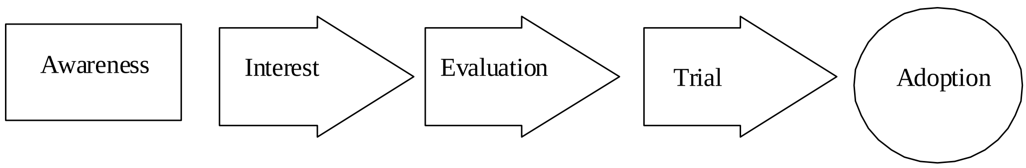

Figure 2.2: Process of Technology Adoption, adapted from Okunade (2006)

The process in Figure 2.2 showed that adoption of agricultural technology begins with awareness creation, for the purpose of soliciting and sustaining interest. Leeuwis (2008) further analysed Van Woerkum et al.'s theory in line with the information needs of farmers. Leeuwis explained that for awareness, the farmer requires information clarifying the existence of tensions and problems addressed by an innovation. To sustain interest, the farmer requires information on the availability of promising solution in that innovation. After interest had been sustained, the farmer moves on to evaluate the technology. But to achieve a considerable fair evaluation, information on the relative advantages and disadvantages of alternatives is necessary. Successful evaluation leads to trial or trying out the technology, in which case the farmer need feedback information from his own or others' practical experiences. A convincing trial may thus lead to adoption or rejection of technology. For adoption to be achieved and sustained, therefore, the farmer requires information that continually reinforces the adoption decision made (Figure 2.3).

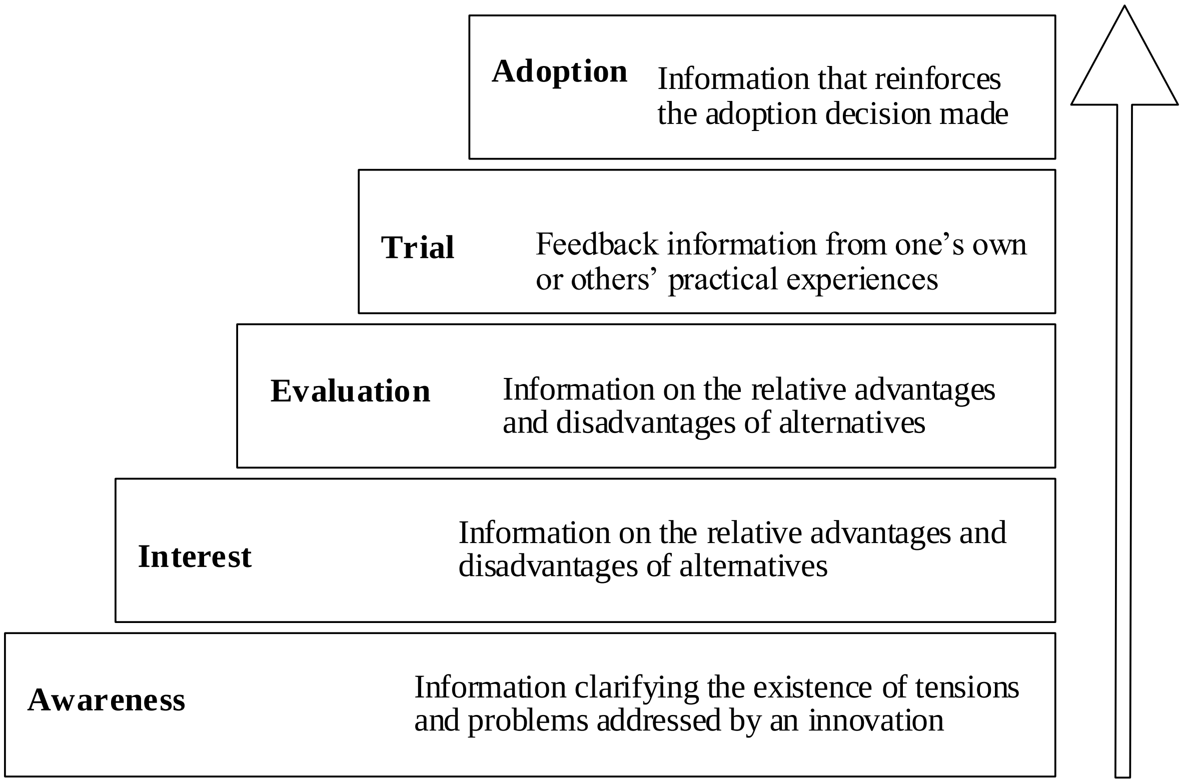

Figure 2.3: Information Need of Farmers at Each Stage of the Adoption Process, Adapted by Researcher from Leeuwis (2008:130).

While reviewing several studies on diffusion of innovation among farmers in India, Dasgupta (2001) found that people tend to use different sources of information in connection with different stages of adoption. Where there were well established mass media, the farmers became aware of innovations through such media. But in later stages, they tended to prefer interpersonal contacts with people in whose competence and motivation they have confidence. Such persons were mainly extension agents—although the farmers considered very importantly their exchange of experiences with colleagues, a position that was also affirmed by FAO and World Bank (2005).

Earlier, Roger (1995:78) had also proposed five stages of adoption which were less inspired by normative decision-making, but which Leeuwis (2008), Singh (2003) and Technical Center for Agricultural and Rural Cooperation (CTA) (1998) said better reflect what happens in practice. The first phase is knowledge about the existence of a new innovation or policy measure, while the second concerns persuasion, which helps to shape attitudes under the influence of others. Decision is the third stage, and this refers to the farmer making up his mind to adopt or reject the innovation or measure being presented. The fourth stage is implementation (of the decision) on the innovation and putting it into use. The fifth stage concerns confirmation, which is the act of seeking reinforcement from others for decisions made, leading to continuation or discontinuation. It is noteworthy that Roger's (1995) and Van Woerkum et al.'s (1999) discourses on the stages of adoption seem similar, as awareness seems to correspond to knowledge; interest to persuasion, evaluation to decision, trial to implementation, and adoption to confirmation. This way, Dagron (2001) and Agbamu (2006) considered both perspectives as one and the same, only differing in nomenclature. Indeed, the two both begin with information for the purpose of 'knowing' or awareness and then end with information affirming continuous use or adoption of technology.

On the other hand, Leeuwis (2008:77) cautioned that:

> ...Not everyone that is exposed to agricultural information would eventually adopt the disseminated innovation; and even among those who adopt, the rates of adoption often differ—that is, innovations are not adopted by farmers at the same time or rate.

This caution of Leeuwis has already been discussed, with regard to how particular innovations are used quickly by some farmers, while others only take them up later (regarding innovators, early adopters, early majority, late majority, and laggards). Besides, there are farmers who never adopt certain technologies at all.

Odoemenem, Erhabor and Olukosi (1999) stated that besides the dynamics and/or complexities of technology adoption among a given farming population, many technologies available to Nigerian farmers are not useful, or do not fit into their farming contexts. In confirmation, Musa (2010:134) observed 46% of technologies disseminated to farmers in Zamfara State, Nigeria, between 2000 and 2009 were rejected because the farmers felt they were not suitable and/or profitable to their agricultural businesses.

Certain other constraints to adoption of technology for improved agricultural outcomes in Nigeria have been highlighted by Orji (1991), Akinola, Aja, Tarfa and Amapu (2007), Nwachukwu (2009) and Agwu and Adeniran (2009) to include unavailability of appropriate technologies, ineffective extension methods, as well as the non-inclusion of farmers in technology development and dissemination activities. In order to promote self-sufficiency in food and crop production and improve the quality of life in the rural areas, the authors advocated a shift from the drudgery of age-long use of traditional physical labour to the use of new technologies. The general belief that improvement in the quality of life is possible and can be made faster through adoption or adaptation of modern technology, such as in medicine, engineering and commerce is also applicable to agriculture. According to Umoh (2006:41):

> Much of the expected development in agriculture in Nigeria would depend on the adoption and participation in diffusion of innovations. The country's smallholder farmers, especially in villages, typically desire to produce to satisfy household food needs or make profit from selling or both. Where the production objective is household consumption, the farmers want optimum outputs; but where it is to earn income, returns accruable to their production efforts become an important measure of

performance. Either of the two objectives requires the adoption of improved production inputs and techniques.

Moreover, adoption of improved technologies and, by extension, production techniques can also be affected by farmers' socioeconomic characteristics, as well as adoption behaviour of farmers towards a new technology. Owolabi, Akinola and Musa (2014), who studied adoption of farm machinery technologies in Kaduna State, found age to correlate with technology adoption, while Okunade (2006) found education, information access, and level of inclusion in agricultural initiatives of extension service providers as being related to adoption practices of women farmers in Osun State.

Similarly, Musa (2004), while studying agricultural technology adoption among farmers in selected adopted villages in Nigeria, found that years of farming experience influences adoption, as 82% of the 420 respondents with more than eleven years of experience were more receptive to adoption practices. He therefore concluded that experience enhances farmers' adoption of farm machinery innovations. In a later study, Musa (2010) found that trust for extension provider as agricultural information source, as well as for government policy on agriculture affect technology adoption.

Adoption of agricultural innovations also often occurs at different levels and for different technologies. Owolabi, Akinola and Musa (2014) had found, for example, in their study on machinery adoption in Nigeria, that there was adoption at different stages/ levels of farm operations, even though the dissemination activities were done for the technologies simultaneously. While ridgers, carts and fertilizer applicators had been well adopted and diffused, with 74%, 64% and 58% respectively, weeders, planters, plow and land levellers were trailing far behind, with 16%, 12% and 8% respectively. Similarly, Njoku (1991) found, among rural farmers in the eastern part of Nigeria, that the more involved the farmer is in the technology development and dissemination activities, the more the chances that he/she will adopt an innovation. Also, households with larger sizes tend to attach greater importance to food security than those that are small in size (Odoemenem and Obinne, 2010), and this 'pushes' the farmer to search for technologies that can enhance yield, income, and standard of living.

Furthermore, facilitating adoption through extension could be a complex process, as many barriers exist, both in dealing with the communication process necessary for implementation and in ensuring that recipients have the skills, attitudes, and awareness levels needed to benefit from the communication efforts. In this regard, significant effective dissemination-oriented literature indicated several indices relating to adoption of technologies, with regard to the dissemination process. These include that: the information provided includes details of content, context, and resources needed before implementation is planned in sufficient detail (Hornik, 2005); the individual needs, opportunities and challenges of information users have been considered to vary according to their levels of use and stages of personal concern demonstrated (Bessette, 2004); information users effectively implement changes if they themselves understand the process and the flow of activities that are involved (Hall and Hord, 2007); programmes and practices are adapted to meet the particular needs, opportunities and challenges of individual farmers (Duarte and Rice, 2000); all the parties involved in the utilization or implementation process are able to contribute to the information generation and dissemination process (Leung, 2002); and users readily accept assistance, information and ideas from information sources they believe to be credible and trustworthy (Agbamu, 2011).

2.4 Concepts in Development Communication

Development communication is a subset of communication which is generally applicable to development projects and issues. Jacob (2009) explained that the term was first used in the

Philippines in the 1970s to designate the processes of transmitting and communicating new knowledge related to rural environments. According to Quebral (2006:32):

> Development communication relates to the art and science of human communication applied to the speedy transformation of a country and the mass of its people from poverty to a dynamic state of economic growth that makes possible greater social equality and the larger fulfilment of the human potential.

The definition above showed that the concept is an art, that is, with its skills and field of professionalism that must be learnt and mastered. It also showed that it is a science, guided by certain theories and principles, just like other science subjects.

Agunga (2007) indicated that development communication is an attempt at informing, creating awareness, educating, and enlightening people so that they can better their lives in every way. In this regard, it includes participatory action for learning and sharing of powers: social (human rights and the emergence of the civil society), economic (egalitarian society) and political (democratization), within specific cultural contexts (Agunga, 2007:12). The philosophy is that, without an adequate two-way flow of information and dialogues between the periphery and centre, real and sustainable development is unlikely to take place.

However, Wilkins (2003:249) stated that development communication generally refers to:

> ...The planned use of strategies and processes of communications aimed at achieving development. The all-embracing focus on development communication has led researchers to examine communication in five general areas: agriculture, health, population, education and environment. Agricultural communication explores ways in which governments can use the diffusion of innovation theories to promote farming techniques. Health communication includes information on health, family planning, HIV/AIDS prevention, and so on. Population, education, and environment communication utilizes strategies of education on these issues. Challenging the status quo in civil society promotes the various kinds of participatory communication for the empowerment of local peoples.

It is noteworthy that among the old paradigms of development communication, especially those sponsored by the US government, mass-mediated messages were mainly seen as a means of 'winning hearts and minds' over to the capitalist way of life (UNICEF, 1996). Such early approaches made a number of erroneous assumptions, and have been largely forsaken in contemporary approaches to development. For example, Rogers (2001) stated that obstacles to development were naively seen as being rooted in developing countries, and not as products of international relations, while modernization was presumed to equate to Westernization, and to be a necessary prerequisite to meeting human needs. Hornik (2005:61) further explained that:

> Development was seen as a top-down process, whereby centralized mass media could bring about widespread change. Producers of development media failed to ask if the audience can receive and understand the messages [*a problem in countries like Nigeria, with hundreds of languages and dialects*], and act upon or want to act upon the messages. (Emphasis mine)

The implication of this conception was that development communication (DC) efforts were seen as mere propaganda and distrusted, and they largely failed in their attempts at developing peoples and societies.

In the late 1970s and early 1980s, a new paradigm of DC emerged, which recognized the process of deliberate underdevelopment as a function of colonialism, the great diversity of the cultures involved, the differences between elite versus popular goals for social change, the considerable political and ideological constraints to change, and the endless varieties of ways different cultures communicate. Even before this, Soola (2003) pointed out that some mass media technologies, especially radio and television, were used as 'magic multipliers' of development benefits. Educational television, for example, was used effectively to supplement the work of teachers and researchers in the classroom in the teaching of literacy and other skills. In agricultural extension, Gumucio-Dagron and Tufte (2006) stated that consumer video equipment and VCRs were used to supplement communication efforts in some small projects. India, as an example of a developing country, demonstrated success in using satellite television to provide useful information to the agrarian portions of their population that were out of reach of terrestrial broadcasting between 1975 and 1976.

MacBride (2001) has argued that the need for sustainable development gave rise to DC—that is, a people-oriented, community-participatory communication, which attempts to voluntarily involve an informed and motivated community while equipping them with the requisite knowledge and training so that they can be equally gratified by the results of such communication encounter. In support of this argument, Gumucio-Dagron and Tufte (2006:16) maintained that "development communication is the active involvement of members of a particular community in all aspects of development procedures, such as planning, decision-making, evaluating, and monitoring".

However, like every other intervention in society, and more because human communication itself is complicated, DC can become complicated. The complications increase when we deal with diverse societies over a large area, such as Nigeria, with its numerous peoples, cultures, belief systems, etc—so that when we try to change behaviour of a village farmer, for example (as a communication recipient) we must bring in many forms of communication skills. Whenever the ground realities prevent the communication message to reach the target audience, there is disconnect between the sender and receiver of such mediated message. As discussed below, cultural barriers, including local rituals and mores, nuances of languages and gender perceptions affect the reception of messages and their impact among Nigerian farmers. The success of any development communication encounter therefore depends on such factors as the credibility of the messenger, the simplicity and directness of the message and its location-specificity, availability/accessibility of channel, as well as respect for mores. Moreover, the nature of DC demands that communicators correctly understand the manmade causes of underdevelopment and poverty and of strategies to reducing them (including literacy, economic empowerment initiatives, and protecting natural resources).

Many scholars associated with DC approaches build on the work of the South American educational theorist, Paulo Freire, who modified the very concept of education, stressing education that leads to awareness. Honik (1997:50) explained that:

> Rather than a 'banking' model in which the teacher makes deposits which the students patiently receive, memorize, and reproduce—a form, he [Freire] argued, that serves only to increase the recipients' dependence on the teacher and to perpetuate their oppressed conditions—Freire suggested a model where education becomes a dialogue in which the teacher and student learn from each other. In this model, the student is enabled to understand better the causes of his oppression and thereby to do something about it. This he called conscientization or consciousness raising.

Freire's model, which combines discussions of nationalism, development and democracy with basic education, argues that for adults, learning to read and write can also be a process of analyzing reality and of becoming critically aware of their situation. To change basic attitudes, Freire introduced the anthropological concept of culture and insisted that people are the makers of their own culture; that change is possible if people work for it (Freire, 1970). Interestingly, this model works perfectly well with Andragogy, the theoretical framework of the current study (discussed below).

Richards (2002) showed that the implication of Freire's model is that people must be put in charge of their own development; that a people needs to define development for and by itself and find its own strategy to achieving such development. This stress on 'local empowerment', however, leads to four participatory approaches to development communication (DC).

The first approach is that of DC from a human rights perspective, which the United Nations has vigorously promoted. This ensures a person's responsible participatory action in society by balancing empowerment through communication with social responsibilities and service to one's own society. The UN Declaration on Human Rights promotes a culture of dialogue and community, or a culture of human rights (Linden, 2008:17). Indeed, the logic of any discourse of human rights affirms that no right is secure unless it is universally respected and implemented. There are three key rights that touch on communication. The first is the right to communication/expression as a basic human right, which points to every human being's basic need to express what he or she thinks about any matter. Thus, to enter into relationships, to establish communities, or to survive, people must communicate. Fisher and Harms (2003:19) summarized this by stating that "genuine communication is akin to food, clothing and shelter". The second is the right to information— that is, everyone has the right to know what affects them in the social, political, cultural, and economic spheres, including a community's plan for development. To this end, Richards (2002) added that to hide information from anyone is a violation of his human right. And third, there is the democratization of communication, which demands that everyone should be given access to information media. Linden (2003), however, stated that in today's global market economy, this is still a challenge—for though public broadcasting systems have taken root in developing countries, a small professional elite control the messages.

The second is DC approach is based on indigenous knowledge systems, which asserts that local people have their own knowledge base, which can be powerful change agent if properly utilized (Warren, Slikkerveer, and Brokensha, 1999). Based on this, Chambers, Pacey and Thrupp (2001) and Scoones and Thompson (1994) stressed the need to direct more research to addressing these indigenous knowledge systems, as their transfer to others could be an ideal tool for massive improvements in areas like agriculture, health, and population control.

The “farmer first” concept, coined by Coldevin (2005:147) showed that, in several parts of the Third World, agricultural scientists are developing complementary research methods, mostly participatory in nature with the support of local farmers and other social agents.

The third approach involves DC based on participatory or liberation models. The term “participatory development communication” is often used to draw attention to an emphasis on two-way communication processes, and to distance them from one-way communication approaches that involve disseminating messages, transmitting information, or persuading people to change their behaviour. Blunt and Warren (1996) gave a more succinct explanation:

> Development communication gives preference to horizontal approaches that encourage dialogue centred on problem analysis and a search for solutions, as well as bottom-up approaches that aim to raise the awareness of decision-maker. In spite of a diversity of approaches and orientations that the concept entails, there is a consensus on the need for grassroots participation in development and on the essential role that communication plays in promoting development.

The implication of the above is that by nature, DC combines vertical and horizontal communication approaches, with an overall aim of getting grassroots participation in development issues. This is well reflected in the FAO (2004:49) slogan: “There is no development without communication”.

The fourth approach to DC emphasizes empowerment. The implementation processes of DC, which are essentially interactive and participatory at all levels, coincide with a fundamental aim of empowerment through knowledge. In this case, Melkote and Steeves (2001) highlighted that people are empowered by an environment that gives them the freedom to express themselves, while White (2004:13) explained that the major theme is ‘development-support communication’, which emphasizes decentralization, access, and participation.

2.5 Communication Barriers to Agricultural Technology Adoption

Communication has been variously defined as the arrangement of environmental stimulus to produce certain desired behaviour on the part of an organism; or the mutual interchange of ideas by any effective means (Oladele, 2007); a process by which an individual transmits (usually verbal) symbols to modify the behaviours of others (Boafo and George, 1998; Hunt and Paulsen, 2001); and the processes by which 'the content of a message is composed, structured and transferred by a sender, and is subsequently received and interpreted by a recipient' (Tiamiyu, 2003:34). As varied as these definitions are, they present a common understanding that information is 'shared' between two or more parties. More often than not, miscommunication takes place when there is a difference between what is shared and what is understood—such difference is referred to as noise or barrier. One focus of the current research is the identification of barriers or noise in the agricultural communication process for disseminating agricultural innovation with farmers in the study sites, with the aim of strengthening this process for better agricultural outcomes.

Communication can occur across vast distances in time and space, requiring mainly that the participants have what Littlejohn (1999) and Wei (2006) called an area of communicative commonality. The communication process is said to be complete once the receiver has understood the message of the sender. In light of this, Arokoyo (2014:13) quipped:

> That a message is spoken or disseminated does not mean it is heard;
> That it is heard does not mean that it has been understood;
> That it has been understood does not mean that the receiver agreed;
> That he agreed to the fact of the message does not mean he has applied it;
> That he has applied the message does not mean that he has retained it;
> That he has retained it does not mean he is satisfied.
> Therefore, an effective communication message is that which satisfies.

Arokoyo's assertion above has added more to the communication barriers. For example, why would a message be heard and understood but not agreed with? Why would it be agreed with, applied but not retained? It also affirms that the goal of every communication context and content, whether agricultural or not, is need satisfaction.

It is also important to note that communication scholars are not generally considered unanimous in their definitions and views regarding the concepts of communication and communication barriers. While Olowu (1993) and Akinleye (2003) defined communication as a process by which people create and share information/ meaning with one another in order to reach mutual understanding, Rogers (1995) and a few early scholars viewed it as a process of sending and receiving messages through channels and devices at a convergence, or as established meaning between a source and a receiver. In general, however, the researcher agrees with Wei (2006:63) that:

> The communicative act is not the mere transfer of meaning, but the achievement of a parallel in the structure of internal meanings and responses of both communicator and receiver, so that the meanings remain in the behavioural systems or cognitive structures of the respective parties.

The implication of Wei's position above is such that the similarity of meanings constitutes the communication and not the mere delivery or movement of information. As a two-way process, communication must have two active participants in the exchange process, swapping roles in order to move towards perceived shared meanings. This way, Soola (2003) and Donsback (2006) stressed that it is a transactional process that involves exchange of ideas between two or more individuals in an attempt to arrive at a convergence in meaning.

But the wide understanding of communication evolved over a period of time. The first major model for communication, by Shannon and Weaver (1949), consisted of three primary parts: sender, channel, and receiver. Using telephone communication, they explained that the sender was the person who spoke into the phone; the channel was the telephone itself, and the receiver was the part of the phone where one could hear the other person. Shannon and

Weaver also recognized that often there is static that interferes with the message, which they deemed noise—the current research refers to this as barrier. In their simple model, often referred to as the transmission model, information is sent through a channel, from a sender/ encoder/ extension agent to a receiver/ decoder/ farmer. This conception simply views communication as a means of sending and receiving information.

The implication of this model for the current research is what Shannon and Weaver (1949) had argued, stating that there are levels of problems for communication within their own theory, which are: technical problem (how accurately the message is transmitted), semantic problem (how precisely the meaning is conveyed), and effectiveness problem (how effectively the received meaning affects behaviour). For the current research, these problems are considered as communication barriers affecting agricultural technology adoption.

Berlo (1960) expanded on Shannon and Weaver's (1949) linear model and created the SMCR model of communication (or the sender-message-channel-receiver model of communication), which separated the 1949 model into clear parts. Even then, 'channel' kept featuring as a key component of the communication process. Berlo's description of the process generally included: message (what is communicated, eg, locally fabricated tomato-juice extractor), source/sender/encoder (by whom, eg, extension agent, minister of agriculture, NAERLS), form (in which form, eg, verbal, nonverbal), channel (through which medium, eg, radio, TV, interpersonal), and receiver/target/decoder (to whom, eg, researchers, farmers) (Fig 2.4).

In like manner, communication has been viewed as a conduit; a passage in which information travels from one individual to another, so that this information becomes separate from the communication itself. A particular instance of communication is called speech act, in which the sender's personal filters and the receiver's personal filters vary, depending on their experience or background— which Ngongi (2009) said may alter the intended meaning of the message content.

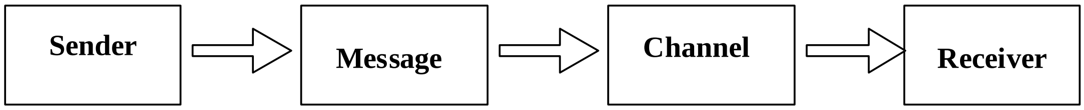

Figure 2.4: Berlo's (1960) SMCR Model of Communication, an expansion of Shannon and Weaver's (1949) linear model

Extension communication is a specialist kind of communication, since the extension agent (or message encoder) is technically far more exposed than the farmer (message decoder). In the presence of 'communication noise' in the transmission channel, reception and decoding of contents may be faulty; thus, the speech act may not achieve the desired effect.

One problem of Berlo's (1960) encode-transmit-receive-decode model is therefore the assumption that the encoder and decoder each possesses background experience that functions as a 'codebook' and that these two 'books' are, at the very least, similar, if not identical. In the case of extension communication, if care is not taken, this creates some conceptual difficulties because of the wide knowledge gap between the extension agent and the farmer. As noted earlier, extension communication is a specialised communication which assumes that one party (extension agent) has more and advantageous knowledge of global agricultural techniques than the other party (ie, farmer) whose farming knowledge, although wide and varied, is more localised to his farming activities and community.

Knowledge and information are essential for people to respond successfully to the opportunities and challenges of social, economic and technological changes, including those that help to improve agricultural productivity, food security and rural livelihood. But to be useful, knowledge and information must be effectively communicated to the people. Effective communication of new research findings and technologies in agriculture, therefore, remains a promising strategy for increasing agricultural productivity and developing people at the grassroots.

Generally, agricultural communication contents include techniques of applying fertilizers, insecticides and fungicides to crops, use of improved methods of cultivation and soil conservation, techniques of planting, harvesting and storage of crops. There are also new technologies of animal husbandry as well as processing and marketing of various agricultural products. For the farmers to adopt the new technologies and put them to use, the new idea must reach their farms and homes with minimal noise or barriers. Consequently, Anyanwu (2002) argued that communication barriers, especially in agriculture, and generally in human development exist at various levels and different stages in the communication process—from the position of the source, encoding, channel, decoding, reception, and feedback, communication noise is present in the entire communication environment (Fig 2.5).

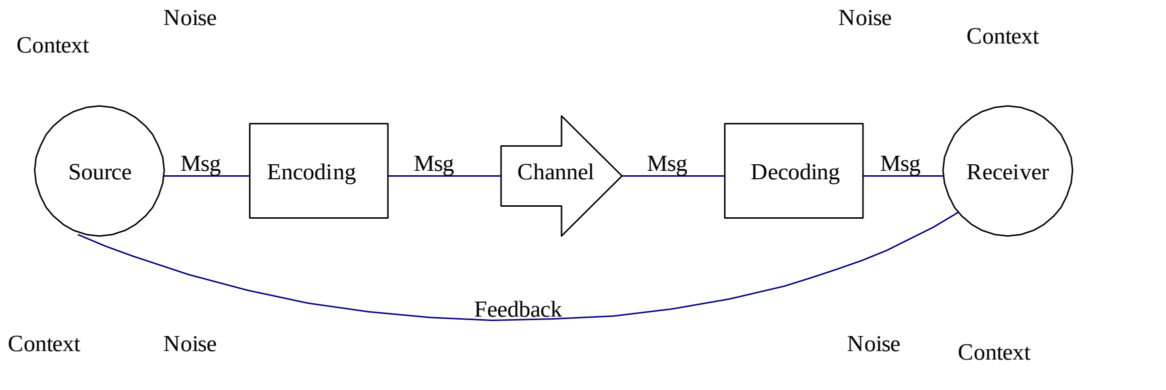

Figure 2.5: The Communication Process, reconstructed by the researcher from the S-M-C-R Model of Berlo (1960)

Figure 2.5 shows the ubiquity of barriers or noise in the communication and implies that the success of extension communication depends largely on the ability of the communication participants, especially the extension provider (in this case) to eliminate or minimise noise in the process. In other words, it is plausible to conclude that the continual presence of noise in a given communication context, no matter how impressive the agricultural technology being communicated and the 'resourcefulness' of an extension work, miscommunication may result. This submission is in tandem with that of Akinola, Aja, Tarfa and Amapu (2007), who studied women integration into agricultural development projects in southern parts of Nigeria and found that communication barriers have shut out 42% of the women in the projects.

This brings to the fore the question as to what constitute communication barriers. FAO (1996) and Arokoyo (2014) stressed that there is a difference between disseminating and communicating—for when one communicates, one is said to be successful in getting an idea across to one's audience. But when one disseminates a technology, one is said to have successfully met the communication participant's felt needs. Notwithstanding, this researcher wishes to use the terms interchangeably for the purpose of discussion. Each time we attempt to communicate or disseminate, we tend to erect barriers that hinder our ability to be effective in the process. Due to the nature of communication (as a cyclical process), the participants are often at risk of barriers or noise. By overcoming these barriers to communication, they ensure that each idea shared is not just heard or seen, but is also interpreted correctly and understood. Smith (2013:15-18) categorized these barriers into seven, while Purjari (2012) classified them into four. But with special regard to agricultural communication and advisory services, FAO (2011) classified them into two.

According to Smith's (2013) classification, the first set of barriers are physical; they are easy to spot, because they are those perceived by the physical senses (doors that are closed, walls that are erected, and noise in a radio or television channel, etc). While most agree that farmers need their personal farmlands, setting up a meeting point (such as town hall or an agricultural research outreach centre) to take care of physical barriers is the first step towards opening communication. Meeting on the farm, apart from a demonstration or trial plot could compromise the communication experience. The second is perceptual barriers, which are internal. Oladele (2007) explained that when an extension agent goes to the field for extension work thinking that the farmer would find it difficult to understand or be interested in the content of his communication, he may end up subconsciously sabotaging his own effort. He might employ a language that is sarcastic, dismissive, or even obtuse, thereby alienating his conversational partner. On the other hand, Abubakar, Ango and Buhari (2009) stated that where a farmer gets suspicious of an extension agent, perhaps in the thought that the latter does not regard his opinion as worthwhile, the communication encounter would be highly unsuccessful.

The third barrier is emotional, and this could be tough to overcome. Fear of making communication blunder; fear of not being language competent; fear of losing your crops, etc can obstruct effective communication. The fourth concerns cultural barriers. Different cultures, whether they are societal cultures of a race or simply the work culture of farmers or extension agents can hinder effective communication. In this case, McPhail (2012) pointed out that extension is far beyond the quick identification of field problems and a hurried packaging of ‘solutions’, but that it involves the careful studying and understanding of the culture of the audience. Although farmers, like everyone involved in profitable ventures, desire quick solutions to their problems, they want such solutions packaged in ways that do not ridicule their cherished cultures and norms.

Agbamu (2011) gave a classical example of an agricultural communication context that was heavily impacted on by cultural barriers. An extension provider disseminated early maturing, high-yielding sorghum variety (SAMSORG 14) to some farmers groups in Niger State, Nigeria. After three years, a team went back for an adoption-evaluation study and found that the farmers had abandoned the variety for their old, late maturing and low-yielding ones. Other qualities of SAMSORG 14 were that it was resistant to major leaf diseases; it was striga-tolerant, and matures between 140 and 160 days, as against the conventional 180-200 days. The evaluation study found that the farmers soon abandoned the technology because it did not take their culture and traditions to cognisance. The new variety had a very short stem, as against the long stem of the old ones—used for fencing farms and houses, as well as for roofing. Also, the new variety had high market value, but poor table value for the farmers. The *tuwo* or gruel (which is a favourite diet among the locals) got sour when kept overnight; meanwhile, the people preferred eating leftover *tuwo* in the morning, as against preparing a new meal—this way, too, they saved some fuel, energy and time.

The fifth barrier concerns language competency. Agriculture is a field with its own terminologies, which if not well managed, the farmer is discouraged to listen with understanding. Such terminologies include: agricultural mechanization, pre-emergence and post-emergence application, integrated systems, OPVs (open pollinated varieties), and so on. The extension agent must therefore carefully clarify his/her terms in each communication context. A clear, direct narrative is preferable to an incomprehensible slew of specialty terms.

The sixth is gender barrier— which is becoming less of an issue in recent years due to the general societal push for the elimination of the male/female dichotomy in development issues. However, in the northern part of Nigeria, where men and women tend to form their thoughts differently, gender issues in agricultural communication are still sensitive matters. Global Forum for Rural Advisory Services (GFRAS) (2012:24), which studied women and gender issues in agricultural extension, explained that:

> Gender barriers are mainly cultural and societal in nature. To be effective with rural people, an advisory service provider must master how to eliminate, and not merely minimize them... In the north of Nigeria, for example, gender issues in agricultural extension is especially emphasized, as it is almost considered a taboo for a male extension staff to be found discussing family welfare issues with female farmers in the absence of their husbands or trusted male relatives.

The seventh concerns interpersonal barrier, which often ultimately keeps us from reaching out to each other and opening ourselves up, not just to be heard, but to hear others. This is considered by Arokoyo (2014) as a very difficult area to change. An agent or farmer could spend his entire life attempting to overcome poor self-image or a series of deeply rooted prejudices about his place in the world. Such an agent or farmer might be unable to form genuine connections with people because he has some false perceptions blocking the way.

For certain convenience, Pujari (2012) classified communication barriers into four: semantic, psychological or emotional, organizational and personal. The semantics refer to language-related barriers. There is always the possibility of misunderstanding the feelings of the sender of the message or getting a wrong meaning of it. The words, signs and figures used in the communication are explained by the receiver in the light of his/her experience, which may create doubtful situations. This could happen when the information is not sent in a language of commonality or of sheared meaning. In other words, the barrier is mainly created through the wrong choice of words, use of words in their wrong sequence, unnecessary repetitions, or inappropriate use of symbols or homophones. For example, 'value' has different meanings in: 'the value of fertilizer application in modern farming is very high,' 'what is the value of one kilogram of maize?' and 'I value our extension interaction.'

Moreover, GFRAS (2012) stated that extension communication also deals with translation work, in which specialist knowledge is simplified for the farmer's understanding. A highly specialised guide by the Nigerian Metrological Agency on rainfall pattern, for example, may be translated and disseminated for the benefit of rural farmers. The information has to be moulded according to the understanding or environment of such farmers, so that if not well handled, miscommunication would occur. Also in the area of semantic barriers is the inappropriate use of technical terms and gestures— such as the moving of one's neck to reply to a question, which may not indicate properly whether the meaning is 'Yes' or 'No'.

Psychological or emotional barriers include premature evaluation and lack of attention. FAO (2001) asserted that the importance of communication depends on the mental condition of both parties, as a mentally disturbed party can be a hindrance in communication. In premature evaluation, the receiver of information may try to understand a message without much thinking at the time of receiving or even before receiving it. This understanding could be wrong and this type of evaluation dampens the enthusiasm of the sender. A farmer who had just lost his entire season's investment to drought may find it difficult to concentrate in a talk that has no immediate palliative solution to his tragedy. Also, a farmer whose wife is in labour in a clinic would be less attentive to explanations on fertilizer application at a training.

Furthermore, there is what is often termed as 'loss by transmission', which Infante, Rancer and Womack (2000:140) aptly explained as:

> ...the fact that messages lose value, worth or truth after passing through many channels; and it is common with interpersonal communication contexts. Poor retention of information means that with every next transfer of information, the actual form or truth of the information changes.

The relevance of the above quotation to psychological noise or barrier is that transmission loss most often results from or is minimised by the state of mind of the communication participant. Other causes are carelessness, time lag, or other form of barrier. But the estimation of Infante et al. (2000) is that with each transfer of oral communication, the loss of information amounts to nearly 30%.

Pujari (2012) also identified organisational barriers to effective communication. Organisational structures can greatly affect the capability of an employee as far as the communication is concerned. Such barriers to communication are: organisational policies, rules and facilities. Organisational policies, for example, determine the relationship between employers and employees, among employees, as well as between the organization and its publics. Part of the organizational policy could be a communication strategy (or plan) for its extension activities. This way, a strategy not well developed can constitute an impediment to performance and achievement.

Organisational rules could become a barrier in communication by determining the subject-matter, medium, etc of communication. An extension staff may, for example, be constrained by organizational rules to produce or disseminate some of the information intended at the initial stage. Also, due to organizational bureaucracy, a lower-level staff may nurture some fears when sending a given extension package to a superior for vetting before dissemination to farmers; he or she could fear that the package might be found faulty or of poor quality. This fear could lead to delay in decision-making and in real-time, on-farm information dissemination. At some other times, barriers could exist in the form of availability of organisational facilities. Griffin (2000:68) stated that "when facilities, such as computers, cameras, translator, etc are available in sufficient quantities and quality, the communication activities becomes timely, clear and in accordance with necessity".

Personal barriers to communication are also identified. These barriers, unlike those mentioned above, are directly connected with the sender and/or receiver and they are divided into two. The first relates to a superiority and/or inferiority complex. On this, the clarification of Infante et al. (2000:145) seems apt:

> Everybody desires to occupy a high office in an organisation. In this hope, the junior employees try to conceal their weaknesses by not communicating their ideas. They fear that in case the reality comes to light, they may have to move to the lower level. On the other hand, top-level employees think that lower-level employees are less capable and, therefore, they ignore the information or suggestions sent by them. They deliberately ignore the communication from their subordinates in order to increase their own importance. Consequently, the self-confidence of the lower-level employees is lowered.

Even though the above explanation related to the relationship between upper and lower level staff, its major highlight is on the so-called superiority complex as barrier to communication effectiveness. Barriers relating to inferiority complex concern subordinates' unwillingness to communicate due to such factors as inadequate incentives. Lower-level extension staff, for example, may not want to communicate to the organisation's management staff any information from the field that they feel is of negative nature; hence, effort is made to conceal such information. German Technical Cooperation (GTZ) (2008:32) explained that "where it becomes imperative to send such information, it is sent in a modified form". Thus, the subordinates, by not clarifying the facts, become a hindrance in communication. Moreover, when incentives to subordinates are ignored because management does not put much importance on their ideas, the subordinates become indifferent towards any exchange of useful ideas.

In specific agricultural extension terms, however, FAO (2011) categorised barriers in communication into two: those inherent in the communication activities themselves and those extraneous to the communication activities of a given agricultural extension provider. Barriers inherent in the communication activities concern the communication channel, content, and context. Arokoyo (2014) related barriers in communication channels to the appropriateness, accessibility and availability of farmers to the channels or medium of information dissemination. In this case, the best agricultural message production and intention cannot achieve its desired result where it is disseminated through channels considered inappropriate, inaccessible or unavailable to the recipients. In like manner, barriers of communication content relate to how information packages are produced, the message content, format and language, while those of context concern time and place of delivery, as well as the target of such message.

2.6 Theoretical Frameworks

This study made use of two theoretical frameworks: Andragogy and Participatory Communication Model. The reason for this is to put the study in a well balanced position to interrogate the variables of extension communication, on the one hand, and farmers in the adopted villages, on the other. While Andragogy addresses the nature and characteristics of the farmer as a participant of the communication milieu, Participatory Communication Model addresses the activities, processes and levels of interactions which effectively fits the farmer into that context.

2.6.1 Andragogy

This study made use of Andragogy as theoretical framework for the discourse. Andragogy is a concept popularized by Malcolm Knowles in his 1970 book, *The Modern Practice of Adult Education*. Knowles' theory of Andragogy was an attempt to differentiate learning in childhood from that in adulthood. As earlier stated, extension communication is a field practised within agriculture, education and health. The term, 'Andragogy', is not new—for European adult educators had used it to refer to both the practical aspects of adult teaching and learning and the academic study of communication and adult education. Knowles (1984:

43), however, contrasted Andragogy as ‘the art and science of helping adults learn’ with pedagogy, the art and science of helping children learn.

The Theory is essentially a model of assumptions about the characteristics of adult communication audience that are different from the traditional pedagogical assumptions rather than an actual theory of adult learning. It is based on humanistic psychology, presenting the individual learner as one who is autonomous, free, innovator and growth-oriented.

The two dimensions of Andragogy, as elaborated by Knowles (1975) are its assumptions about the characteristics of adult learners and the process elements of adult education that stem from these characteristics (Table 2.3). Fidishun (2000:43-45) affirmed that there were only four initial basic assumptions. But he pointed out that Knowles added two additional assumptions in later publications. Therefore, added to the four above are motivation to learn and perspective to learning. For motivation to learn or adopt, he stated that adults are more motivated due to such internal incentives as need for self-esteem, curiosity, desire to achieve, and satisfaction of accomplishment. On the perspective of relevance, Knowles explained that adults need to know why they need to learn or adopt an innovation; and because they manage other aspects of life, they need to direct or, at least, assist in the planning and implementation of their own learning contexts.

Table 2.3: Knowles' Andragogical Assumptions (Knowles, 1984:57)

SN	*Assumption*	*Elements of Adult education that Result*
1	Concept of the Learner	During the process of maturation, a person moves from dependency toward increasing self-directedness, but at different rates for different people and in different dimensions of life. Communicators have a responsibility to encourage and nurture this movement. Adults have a deep psychological need to be generally self-directing, but they may be dependent in certain temporary situations.
2	Role of the Learner's Experience	As people grow and develop they accumulate an increasing reservoir of experience that becomes an increasingly rich resource for learning—for themselves and for others. Furthermore, people attach more meaning to learning they gain from experience than those they acquire passively. Accordingly, the primary techniques in education are experiential ones—laboratory experiments, discussion, problem-solving cases, field experiences, etc.
3	Readiness to Learn	People are willing to learn something when they experience a need to learn it in order to cope more satisfyingly with real-life tasks and problems. The educator has a responsibility to create conditions and provide tools and procedures for helping learners discover their 'needs to know.' Learning programs should be organized around life-application categories and sequenced according to the learners' readiness to learn.
4	Orientation to Learning	Learners see education as a process of developing increased competence to achieve their full potential in life. They want to be able to apply whatever knowledge and skill they gain today to living more effectively tomorrow. Accordingly, learning experiences should be organized around competency-development categories. People are performance-centered in their orientation to learning.

About the same time that Knowles introduced Andragogy, self-directed learning appeared as another model to help distinguish adult learners from children. Not only did Knowles indicate that self-directed learning is one of the key assumptions of adult learning, but he also contributed to the literature with his book entitled *Self-Directed Learning: A Guide for*

Learners and Teachers (1975), explaining the concept and outlining how to implement it through planned communication processes. Knowles (1975:18) said:

> In its broadest sense, self-directed learning describes a communication process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.

The implication of the quotation above is that being self-directed signifies that famers can and should be allowed to participate in evaluating their learning needs, planning and implementing the learning activities, and evaluating those experiences. In cognizance of this, Knowles stated that individuals can be assisted to become more self-directed when given appropriate learning tools, resources, experiences, and encouragement.

For Fidishun (2000:43), 'since farmers are adults and therefore internally motivated and self-directed, they resist change when they feel others are imposing information, ideas or actions on them'. Therefore, the role of the extension agent (EA) is to facilitate his audience' movement toward more self-directed and responsible decision, as well as foster their internal motivation to change. This is reflected in the communication strategy that was developed by this research—as it optimises the EA's role in facilitation and provoking dialogues and encouraging questions and exploration of concepts from farmers; provides regular constructive and specific feedback (both positive and negative); reviews goals and acknowledges goal completion, among others.

There are also life experiences and knowledge that farmers bring to the learning context and content. While studying the effect of different communication methods on seven hundred and eighty adult learners using Andragogy theory, Bartholomai (2007) found that the respondents liked to be given opportunity to use their existing foundation of knowledge and experience gained from life experience, and apply this to their new learning experiences. Thus, the communication strategy to be developed through this research is such that the EA would facilitate or assist farmers to draw on their useful experiences when problem-solving, reflecting and applying farming processes; would facilitate reflective learning opportunities which Leroux (2008:4) also suggested can assist farmers to examine ‘existing biases or habits based on life experiences and move them toward a new understanding’ of a farming innovation presented.

While studying the practicability of the theory among farmers in Pakistan, Kearsley (2010) noted that ninety-three percent of the one thousand respondents were goal oriented information users. Fidishun (2000:13) also found that adults are ready to learn when ‘they experience a need to learn it in order to cope more satisfyingly with real-life tasks or problems’ (see also Knowles,1984:44). To this end, the communication strategy to be developed would give the role of facilitator to the communication package producers so that they provide meaningful learning experiences that are clearly linked to personal, client and fieldwork goals and assessment; ask questions that motivate reflection, inquiry and further research.

The theory is also to the extent that farmers, being adult learners, are relevance-oriented; they desire to know the relevance of the information presented to them to their farming goal and livelihood. One way to help them see the value of their observations and practical experiences is to build trust through regular interaction with them.

As the ultimate risk bearers in the agricultural business and responsible family members, farmers are very practical. Therefore, through practical fieldwork experiences, the EAs must deploy a communication model that promotes on-time field interaction with farmers in their real life situations, with hands-on problem solving where they can recognise firsthand how a particular interaction or information applies to life and the work contexts. Such interactions promote active participation and sustainable development, as it allows farmers to be active communication participants, rather than passive information recipients. The model would provide several practical opportunities in assessment, interviewing, and intervention processes with ample repetition through various media in order to promote development of skill, confidence and competence (Bartholomai, 2007).

Finally, Andragogy theory underscores the importance of mutual respect in the communication process. According to FAO (2004:34):

> Respect for communication participants is demonstrated by showing interest in the needs, opportunities, and problems and/or challenges of each other, acknowledging the wealth of experiences that the other brings into the content and context, regarding the other as a colleague who is equal in life experience, and encouraging expression of ideas, reasoning and feedback at every opportunity.

It is also noteworthy that Kearsley (2010) cautioned against the uncontrolled use of this theory, stating that care must be taken to avoid a complete hijack of the communication process by ‘unprofessional’ clients or opinion leaders with selfish rather than community interest at heart. With the theory and principles of adult learning in mind, the EA is to facilitate the communication/ learning process to move the farmer away from novice to more sophisticated (albeit, profitable) production methods. Such a process facilitates greater integration of knowledge, information, experience and, therefore, adoption, as the farmer, according to Nwachukwu (2009:42), ‘learns to distinguish what is important when assessing and working with EAs and others” and how to prioritise their needs, opportunities and challenges (Roling, 2002).

However, many critics have noted that Knowles' theory and practice embodied his own value system—for as a teacher, writer and communicator in the field of extension education, Knowles was a mere innovator, responding to the needs of the field as he perceived them at the time. Therefore, he himself noted that the theory is a set of assumptions providing one piece of the learner's puzzle. However, the current research holds that, despite their limitations, the ideas of Andragogy provide a practical principle for constructing a participatory model for deployment in any communication context with farmers, who are mainly adults.

The relevance of this theory to this study is, thus, twofold—the first involves the fact that, in Nigeria, there has been a lingering problem of aging farming population, with several studies establishing the average age of Nigerian farmers to be well over forty years. Ayinde (2011), for example, studied the impact of aging on agricultural productivity among cassava farmers in southwest Nigeria and found that the mean age of Nigerian farmers was 54. In Annatte (2014), the average age of three hundred and fifteen farmers in selected sites of northeast and northwest Nigeria was 46 years. Fregene and Adewale (2014), who studied ninety-four fish farmers in southwest Nigeria, found the average age of farmers to be 46years, while another study that determined the effects of demographics on technology adoption among *acha* farmers in north-central Nigeria (Philip and Itodo, 2012) found the average age of farmers to be 46 years. In the core rural areas, this is even more revealing, as the class of farmers also classified as youth farmers (of between ages 17 and 25 years, according to the categorization of FAO, 2004; NAERLS, 2009; FMARD, 2012; and World Bank, 2012) are married and having family responsibilities—which then qualifies them, technically, as adult farmers.

The second concerns the findings that age determines agricultural information reception and utilization as well as technology adoption. Specifically, some adoption studies (Agbamu, 1995; Agwu and Anyaeche, 2007; Odoemenem and Obinne, 2010 and Musa, 2010) in Nigeria have variously established the impact of age on agricultural information reception.

2.6.2 Participatory Communication Model

Early communication theories took the forms of models. This way, Mortenson (1972) defined a model as ‘a systematic representation of an object or event in idealized and abstract form.’ Mortenson further explained that a model of communication is a ‘still picture’ of a moving process (pg 123). Models or strategies are therefore useful in identifying the basic component of the communication process and how they relate to each other. A model aids in conceptualizing processes of interest and in generating questions for richer forms of a theory; it is helpful as metaphor that guides man’s ability to visualize concepts of interest in terms of one another with regard to clarifying complex processes.

The relevance of hinging this study and its output (communication strategy design) on the Participation Model is stressed in the fact that research have shown that to achieve sustainable development among any community of people, the model of communication to be used must radically deviate from the 20th century views of communication matters which were highly mechanistic, treating communication as a machine-like process—an example was the Hypodermic Media Theory or Model that painted communication media as highly powerful in themselves. Of these earlier models, Bowe and Zeldes (2012) and Ayuba and Peters (2012) argued that the most influential was Shannon and Weaver’s (1949) Mathematical Model, developed to help telephone engineers design efficient ways to transmit electrical signals from place to place. The model was essentially a line from left to right, travelling through boxes and depicting an information source through a transmitter (encoder), which transforms the message to a signal, sending it through a channel that is affected by noise. The signal then passes through a receiver (decoder), which transforms it back to message. Although this model also took care of face to face communication, Rogers (1962) maintained that contemporary communication theories must go beyond mechanistic and descriptive frames to embrace explanation, prediction and control of several communication phenomena.

An aspect of the paradigm shift inspired by Paulo Freire (1970) (see above) and specially given cognisance by communication research, such as those by Richards (2002), FAO (2004) and Leeuwis (2008), concerns development communication interventions that emphasize grassroots participation to reinforce the chances of communities to adopt activities appropriate for them. One of the models attached to this paradigm is the concept of participation and interactivity. Burkey (1993) argued that sustainable development among rural peoples is only possible through their participation in local communication. The participatory model is a product of long lasting interaction between researchers, development workers, government agents and local populations. Adhikarya (2004:61) explains that:

> The participatory model or approach involves sharing of knowledge and experience; recognising and encompassing different perspectives; working in teams on practical tasks; the use of visualisation and analytical tools, imagination and drama; an open-ended creative learning process; the development of shared understanding and jointly owned plans or other products; and the capacity for reflection and self-assessment.

The concept of interactivity, with traditional media as its operational instrument, makes possible the endogenous acquisition of knowledge and skills within the framework of a search for solutions and the communication process. The main elements of the methodology of community media are: identification of needs by means of direct contacts with the groups; examination of the problem identified by the groups in the light of local conditions; selection of priority problems by the groups; formulation of a durable methodology for seeking solutions; identification of the amount of information required and access to this information;

execution by the groups of the projects they have designed; expansion towards the outside to make known the points of view of the groups to other groups or to the authorities; and liaison with the communication system to make known their action (Belbase, 1994).

The history of participatory methods in development projects is said to have begun in the late 1970s with the introduction of a new research approach called ‘Rapid Rural Appraisal (RRA), which immediately became popular with decision-makers in development agencies (Roling and Leeuwis, 2001:47). Building on close collaboration with local populations RRAs were designed to collect first-hand data from the local people about their perceptions of their local environments and living conditions in rural areas. RRAs were usually conducted as 1-3 days workshops with villagers in the field and facilitated by small teams of RRA specialists or researchers. RRA methods were specifically adapted to respond to local conditions. Thus communication processes with illiterate persons not used to communication in abstract terms were carefully considered. Visualisation using locally comprehensible symbols, and tools like mapping, diagramming and ranking were introduced. But Sulaiman and Hall (2002) pointed out that one limitation of RRA was that it was extractive, as the role of the local people was limited to providing information, while the power of decision-making about the use of this information was in the hands of others.

During the 1980s organizations work with grassroots people redeveloped RRA and fine-tuned it to Participatory Rural Appraisals (PRA) (Roling and Leeuwis, 2001). PRAs use similar methods and tools as RRA, but the underlying philosophy and purpose changed—for while RRAs aimed at extracting information, often in a single event, PRAs were designed to follow more the peoples’ own concerns and interests; PRA workshops were also usually facilitated by a team of trained persons and took several days. One of the most important principles in PRA was the sharing of results of analysis, decisions and planning efforts among the community members by open and public presentation during meetings. Thus, PRAs strongly supported and facilitated the introduction of more demand-responsive ways of managing development interaction, and process-oriented thinking. This helped build rural people's capacities for analysing their circumstances of living, their potentials and their problems in order to actively decide on changes.

The participatory communication approach has enjoyed increasing influence over the work of development communicators. Its roots in development communication can be found in the early years of the 1970s when many people in the development community began to question the top-down approach of development dominant in the 1950s and 60s which targeted the economic growth of countries as its main goal. During these two decades the success of the developed countries was held-up as the model to aspire to. Development was thought to be triggered by the wide-scale diffusion and adoption of modern technologies. Such modernization was planned in the national capitals under the guidance and direction of experts brought-in from developed countries. Often, farmers in the villages who are the "objects" of these plans would first learn that "development" was on the way when strangers from the city turned-up, frequently unannounced, to survey land or look at project sites.

Mass communication played an important role in promoting "modernization" to the people—radio being a major instrument (Sulaiman and Hall, 2002). National leaders, bureaucrats, and experts broadcast passionately from the cities about the wonderful differences which the adoption of new and foreign ideas would bring to the lives of the people. They talked at length about methods of farming the land, cures for diseases, importance of sending children to school, advantages of having fewer children, desirability of having a stable government, and so on. Government extension workers trained in towns and cities became the front-line communicators repeating to farmers in their fields what they had just been taught. Posters, leaflets and other publications made-up another important instrument used as a part of this approach—known as development-support communication, coined by FAO (Rogers, 1995).

According to Leeuwis (2008) this overall approach to modernizing the developing world eventually ran into problems, as experts began to learn that development was not restricted to just building roads, piping water, increasing farm yields per hectare, or switching farmers over to cash crops. Many agricultural extension projects failed because farmers were reluctant to abandon their time-tested ways for strange new methods. They were also nervous about planting exotic crops which they could not eat but had to sell for money with which to buy food from the market (Arokoyo, 2009a). When piped water arrived, it was frequently used for washing rather than drinking and cooking because the people disliked its flavour. Then they were asked to stop believing in spirits and demons and place their trust in science (which said 'germs' that cannot be seen are the main cause of most sicknesses). They must also remember that 'nitrogen', also invisible, affects the yield of crops. For the locals, however, germs and nitrogen could be other names for witchcraft.

Anyawu (1993:39) noted that overriding the alien information communicated to the people was a bigger problem. Hence:

> ...since development was centrally planned without any consultation with the people, wrong solutions were often pumped down to the communities—for example, high yielding rice varieties were pushed when the real problem was the low price of rice; farmers were given detailed instructions on improving soils of lands that they did not own and which they were at constant risk of being evicted from; mothers were lectured on the bliss of two-child families when fathers were bent on having at least six children to help work the land and tend to their livestock.

Central planning also deprived people of ownership of local development plans, as development became the responsibility of government. Whereas in the past, farmers would collectively maintain traditional water sharing systems, they became side-lined by workers of irrigation authorities who built new channels and dictated the release and termination of water supply. Eventually when the irrigation channels broke down farmers, believing that the system did not belong to them, just waited for these same workers to turn up to repair them rather than fix the problem themselves. If these ‘government people’ did not show up, the system was abandoned.

The expensive failures of the top-down, mechanistic approaches were noticed in the cities and researchers began to criticize them. Therefore, Leeuwis (2008:211) averred that:

> Communicator experts were not satisfied by the arrogant top-down communication which fractured fragile developing communities by undermining indigenous knowledge, beliefs and social systems.

The condition above gave birth to various participatory approaches, which shared the common intent of actively involving people who are the subjects of development in shaping the process. But in most cases, this was where the similarity ended, as people’s participation was defined in many different ways, leading to several unresolved disagreements.

But generally, four different ways of participation can be observed in most development projects claiming to be participatory in nature (Uphoff, 1985). The first is participation in implementation—in which case, people are actively encouraged and mobilized to take part in the actualization of projects. They are given certain responsibilities and tasks or required to contribute specified resources. The second is participation in evaluation—usually, upon completion of a project, people are invited to critique the success or failure of it.

The third is participation in benefit, as people take part in enjoying the fruits of a project. Uphoff (2010) gave examples of this to include people enjoying water from a hand-pump, sharing a truck to transport produce to market, or having village meetings in the new community hall. The fourth and final phase is participation in decision-making— people initiate, discuss, conceptualize and plan activities they will all do as a community. Some of this may be related to more common development areas, such as building schools or applying for land tenure. Others may be more political, such as protesting against corrupt local government officials, or resisting pressures from the elites. Yet others may be cultural or religious in nature—organizing a traditional feast, prayers for an end to the drought, and a big party just to have a good time.

Mafalopulos' (2003) representation of participation, however, appeals more to this researcher, because it shows more aptly the consequence of each participation level. His classification begins with passive participation, then participation by consultation and functional participation, and then ends with empowered participation (Figure 2.6). Mafalopulos argues that what is frequently referred to as participation in many cases is not, at least in a significant way. Figure 2.6 illustrates that the lowest rung of the ladder, which is termed passive participation is merely the representation of an action propelled by and based on 'information shared', because feedback is nearly almost nonexistent. Rogers (1995), Arokoyo (2009a), Leeuwis (2008) and others have argued that the communication cycle is incomplete without a vibrant feedback system.

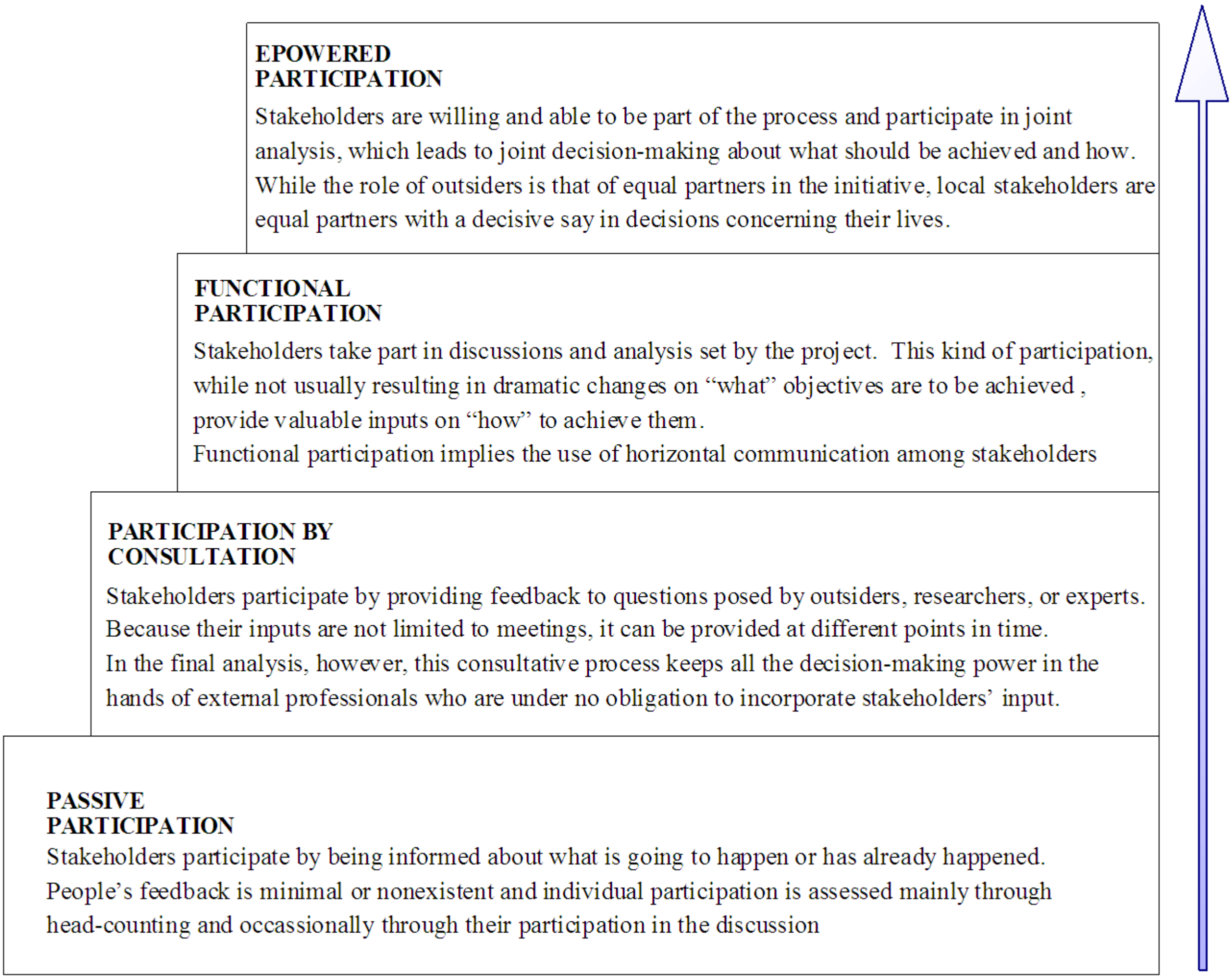

Figure 2.6: Ladder of Participation Typologies in Development Initiatives (adapted from Mafalopulos, 2003:11)

Some development initiatives provide people with opportunities to all these four ways of participation. Many do not, and restrict participation to one or two ways. Most will agree that participation in decision-making is the most important form to promote. It gives people control of their lives and environment. At the same time the people acquire problem-solving skills and acquire full ownership of projects—two important elements of sustainable community development. In fact, the other three forms of participation—participation in implementation, evaluation and benefit— have been criticised as being false participation by Pacheco (2000), Roling (2002), Laogun (2011) and Arokoyo (2014) and other scholars who believe that participation in decision-making is fundamental and indispensable to the approach, have concluded that people are being manipulated through these three forms of pseudo-participation to accept plans made by other more powerful people.

Others who disagree (Chin, 1993; FAO and World Bank, 2005; Leeuwis, 2008; Ayuba and Peters, 2012) argued that the three ways allow people to build-up capacity to participate in decision-making. They also feel that prematurely mobilizing people to make their own decisions and chart their own development can put the people at risk of conflict with powerful interests and jeopardize their safety—in a somewhat roundabout manner, they concluded that groups which mobilize people in this way are actually manipulating them towards conflict.

It is noteworthy also that the participatory approach is not favoured because, according to Chin (1993) and Laogun (2011), it is considered to be a conflict-based model. Moreover, although proponents of participation appreciate more good than bad in the approach, they recognize at the same time that there are limits to the approach. An international conference of practitioners and researchers working in participatory communication announced three caveats (White, 1999:24) at the end of their meeting. The first was that participatory communication processes are not a panacea for development. Such processes are not suitable for solving all problems in all contexts or time frames. The mother whose child is dying of diarrhoea does not want to 'participate'; at least, she would desire first a quick short-term solution and intervention. But participatory processes often unearth 'root-causes' of poverty and oppression and requires long-term goals.

The second caveat is that the apparently opposing concepts of 'participation' and 'manipulation' can be viewed from many perspectives. The interventionist who attempts to 'sell' solutions to a target population may be accused of being manipulative and may also be bringing along a whole set of alien cultural premises. However, the participatory social communicator may also enter a village with a particular picture of reality and set of values, hoping the people will come to perceive their oppression the way he or she sees it. This may be equally manipulative. The third caveat concerns the fact that the price people have to pay for taking part in participatory processes is often overlooked. It is often assumed that the villager, for example, has nothing better to do with his or her time. But for every hour spent participating there is an opportunity cost; that is, the fact that the villager may be foregoing more productive activity in the farm if the participatory process does not lead to benefits, either in the long or short term. Thus, the social communicator should take this into consideration when entering a village community.

Generally, too, the application of the participatory communication model or concept has proven to have a lot of challenges in actual development settings. Wilkins (2000:113) lamented that practitioners are confronted with either “unanticipated effects and problems of the process or criticism of promoting undesirable participation type”. The first challenge concerns the disagreement on what constitute true participation. The disagreement stemmed partly from differences of ideology and partly from the community settings where work was attempted. The ideological debate ranged from those who felt that true participation must put people in charge of making all the decisions, against those who felt that participation at other levels was also valid, and that the process can evolve from these levels towards the ideal goal. The other debates resulted from the wide range of cultural and environmental settings to which practitioners had to respond and adapt. These adaptations created participatory communication approaches which were different enough to cause disagreements among the communicators.

Another challenge is the conflict which participatory communication frequently causes among the people. Leonard (2000:68) stated that “such conflict results from the process's inadvertable effect of adjusting power relationships between those lacking power and those holding power”. By participating, people claim power for themselves, thereby threatening the influence of hitherto power-holders. Conflict also frequently occurs among the people. The community is sometimes split into fractions by disagreements over goals and methods of doing things, and the involvement or exclusion of certain members of the community. This history of conflict has caused many practitioners to appreciate the need for equipping themselves and the people with conflict managing skills.

Successes in participatory communication have proven to be difficult to replicate or up-scale. Ijere (1992) and Melkote (2003) affirmed that this is often a major obstacle to agricultural extension providers interested in extending the benefits of participatory communication to other communities they serve. The challenge appears to stem from a number of factors. The first is the people-embodied nature of participatory communication skills. Some people, such as charismatic leaders, appear to have special attributes which make them highly effective facilitators of the process. These attributes often remain elusive and escape identification or replication through training. The attributes of a community are also crucial to a successful communication campaign. Certain preconditions have been thought necessary for the effective working of the process. Up-scaling problems may also be traced to the special commitment and support given to experimental efforts by a community, but which are seldom available at the same degree in large-scale projects.

Furthermore, among all the conditions for success, Arokoyo (2009b) stated that the type of governance affecting the people may be the most important. People who live in highly controlled states may desire participation very intensely, while at the same time be very reluctant to subscribe to such approaches for fear of reprisal against them, their families and friends. This represents not only a challenge but also a risk for those setting out to promote participatory communication. And finally, the private sector is beginning to affect participatory processes, by offering money, employment opportunities and other incentives to selected members of the community in order to seek desired cooperation from the community which might not be beneficial to it in the long-term. A fertilizer company can offer jobs with high salaries to community leaders in areas where their water bodies would be polluted in order to secure 'community cooperation'. It is the perception of this researcher that this amounts to collusion rather than cooperation, since any aggrieved community member or even extension provider wanting to protest any injustice would necessarily have to first suffer the painful results of conflict with the community leaders. Leeuwis (2008) has concluded that threats from the private sector are difficult to address because their methods are subtle and usually very attractive in the short-term.

2.7 Strategic Communication Design

The ultimate goal of agricultural communication is improvement in farmer's productivity. Improved agricultural productivity is often a consequence of technology utilization, which may mean different things to different farmers—in some cases, for instance, 'utilization' may mean rejection of a product, technique or research finding (Muntaqha, 2007). In the context of this study, the critical element of utilization is that communicated research outcomes are digested and the recipient fits the new information with prior understanding and experience. Nwachukwu (2003) hinted that each communication context is culturally unique; sometimes there are diverse cultures and factors in a single communication context. A participatory communication strategy helps the extension provider to properly fit agricultural messages into farming contexts and thus make the communication encounter to be responsive to farmers' felt needs.

A communication strategy is the selection of appropriate communication objectives and the identification of specific activities and resources for achieving a planned information-sharing campaign. Chambers (2003:40) warns that "isolated ad-hoc initiatives that are not integrated into an organizational communication strategy may cause inflated expectations even in a rational appeal". Indeed, the cognitive dimension of an agricultural message design demands that a project should define up-front its specific, measureable, achievable, realistic and time-bound objectives and translate these into a step-by-step strategic planning as part of that project's life cycle. Boeren (2004:132) highlighted certain salient issues:

> A communication strategy has to be linked to the roots of the organization and must be treated seriously, with everyone involved in the organizational activities, committing to it totally. There is no way that an organization can function well with the outside world if it does not have a sound plan or strategy on how this is done. And depending on the institute, a strategy can take on many different forms, ranging from a one-on-one interaction to a global campaign.

The implication of the quotation above is that a communication strategy does not operate in a vacuum. Fain (2004) explains that it must be keyed into a pre-existing organizational mandate or vision. Indeed, an organization needing a strategy must have an initial mission statement, to determine what it intends to do for the given community. Chambers (2001:55) explained that:

> To have a successful communication strategy, an initial process must be developed to maintain a focus on the original goal. People are in tune with catchy mottos and missions that can be easily portrayed to the public. W.K. Kellogg is a great example of this, with a motto of "helping people help themselves." It is short and concise but still explains what it is trying to do.

Building on the organizational mandate, the communication strategy itself has its aim and objectives. Hosein and Renganathan (2000) explained that the aim and objectives consist of the values, expectations and beliefs that explain the reasons the strategy exists. These points guide the internal employees of the organization on what is expected of them, how to achieve this, and where they are expected to utilize the organization's resources, among others.

Muntaqha (2007) and Rogers (2004) have stressed that effective institutional communication activity begin with a concrete communication plan, which is officially documented. Some scholars have argued that extension communication in Nigeria, including all its components of information gathering and packaging, is often carried out with minimal input from farmers. Arokoyo (2009b) mentioned that extension specialists usually see themselves all-knowing scientists and communication professionals; hence, they aggregate whatever information they perceive to be important at the moment, choose the medium that is convenient, and decide, with the collaboration of a media station, on the time of broadcast. Sometimes, however, choice of media and time of broadcast are determined by the budget and/or fund available for a specific project.

There are several models for or approaches to constructing a communication strategy. The approach of Cook, Lally, McCarthy and Mischler (2012:7-14) stratifies the development of a communication plan into ten (10) steps, which are: one, developing an organizational vision (where there is no pre-existing one); two, organizational mission; three, defining individual programme/ project/unit goals (that is, the aim and objectives of the strategy); four, defining specific means of communication for each programme; five, defining the target audience; six, developing key messages to be communicated; seven, proposing timelines of events; eight, developing an initial plan (that is, strategic preparation for implementing a communication plan—determining the types of tools to use to get certain agricultural messages to the target audiences, considering time, money, and personnel limitations); nine, implementing elements of the plan (that is, choosing the best options for the organization in implementing the plan while considering the timeline created in step seven); and ten, assessing the elements of the communication strategy (that is, thorough evaluation to ensure there are no loose ends).

Cook et al.'s (2012) model was itself a complex expansion of George's (2010) three-stage model, which assumes that an organization needing a communication strategy already had such structures as organizational mandate, vision, mission, etc. Hence, George's model consists of: the planning stage (comprising definition of strategic aim and objectives, and definition of the target audience of the communication); the development stage (comprising drawing up of specific message development path, developing messages to be communicated, developing an implementation plan, including the tools to use to get the messages to the target audiences, time, money, and personnel); and the evaluation stage, which involves mainly the monitoring and evaluation of the communication strategy (Figure 2.7).

Figure 2.7: Strategic Communication Design Process (George, 2010)

George's design model has been criticised for its simplicity and exclusive nature by Pujari (2012) and Smith (2013). For the reason of its exclusivity, it is often considered as non participatory in approach, as other stakeholders in the development process are only involved at the end of the process (evaluation).

A design approach that was prescribed by the Food and Agricultural Organization (2004:82-87) presents a more holistic view of a people-centred strategic communication development. The approach divides the construction stages into four (Figure 2.8): the first is assessment stage, comprises field situation analysis and problem identification, audience and knowledge, attitude and practices (KAP) analyses, as well as developing the strategic communication objectives. The second is planning stage, which comprises the communication strategy development itself, involving participation of strategic groups and media selection and mix. The third is production stage, comprising message design and media pre-testing and production; while the fourth is action and reflection stage, comprising media performances and field implementation, process documentation, and monitoring and evaluation.

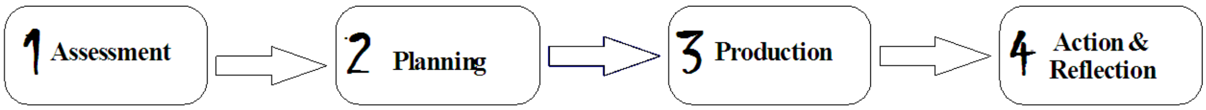

Figure 2.8: Stages in Strategic Communication Design (adapted by Researcher from FAO, 2004)

The FAO's (2004) approach has been used by the global agricultural body to build agricultural knowledge base of farmers and strengthen information systems for rural farmers' development in several developing countries (FAO, 2005, 2006 and 2008). Also, it has been variously adapted by development organizations to design inclusive communication methods for interacting effectively with their partners. For example, the German Technical Cooperation (GTZ) (2008:36-43) adapted it to developing strategies for environmental protection and safety issues in Europe, while UNICEF (2008) modified it a bit to develop messages for achieving social and behavioural change among rural Asian population on health issues. Based on the success stories from the field, the inclusive or participatory nature of the strategy, as well as its agricultural extension and rural development outlook, the FAO's approach was used by the current study to developing a homegrown participatory communication strategy for meeting the felt needs of study population.

A participatory communication strategy is that which considers all communication participants as equal partners in the development process. Instead of attempting to modernize farmers, for example, the strategy attempts to reduce economic inequality by involving people in their own development, giving them independence from a centralize authority and employing technologies that best suit their farming contexts. Boeren and Escamp (1994:56) pointed to the shift in emphasis from ‘economic growth’ to ‘meeting basic needs’. This way, extension communication becomes an important catalyst for change, but not its cause; and extension communication efforts provide farmers with information on change in their society, and thereafter work at this knowledge level to advocate change (Ayange, 2009).

But as discussed earlier, the traditional concept of extension communication was a diffusion of innovations process, from government firm to farms and farmers. This was otherwise called ‘technology transfer’, a fairly mechanical process. In support of the new extension communication paradigm, FAO (2006) and FMARD (2011) advocated for the conceptualization of agricultural extension strategies that support farmer-research-extension-farmer system, different strategies for different contexts and integrated human development approaches.

In this conceptualization, an effective strategy should support a farmer-research-extension-farmer system, which mean that the communication cycle should begin with the farmer rather than in the laboratory. The operationalization of the process must place the farmer first and last. Awolola (2001) calls this the participatory approach to agricultural extension. Implicit in this farmer-first view is technology support (as opposed to mere technology transfer) for the intensification of three main flows of communication: horizontal (between farmers, to develop a consensus on needs and share their own indigenous solutions); horizontal (between farmers and researchers, to facilitate collaborative diagnosis and resolution of unsolved problems); and, only after this, is the vertical (researcher-extension-farmer) information flow.

Second, an effective agricultural communication strategy must use different strategies for different contexts. The content and form of extension information must be sensitive to the range of farming realities, personal and contextual— gender-specific, ethnic, ecological, social-structural, political, and economic. In Zhou's (2008:92) explanation:

> This refers to fundamental systemic changes in the extension approach rather than merely its efficient management. The essence of this is to determine the appropriateness of a given communication message and, sometimes, the timeliness of such message (especially broadcasts).

In support of Zhou's assertion, Sasakawa Africa Association and Sasakawa Funds for Extension Education (2013) stated that only a third of all extension resources are directed toward the vast majority of small and marginal farmers, while a negligible proportion of such resources are directed towards women-focussed strategies, in spite of their varied participation in agriculture. The pattern may not be surprising because there are a few women extension workers, and conversations between male extension workers and women are even considered culturally unacceptable in some Nigerian villages, therefore, occurring infrequently (Muntaqha, 2007). Agricultural programmes that accurately emphasize women's roles, for example, could help women farmers improve their food production capacities as well as better their economic status.

Finally, an effective extension communication strategy must apply an integrated human development approach. Multifaceted humans bring about agricultural and national development. In addition to how-to-do-it tips, the farmer needs holistic structural, long-term re-educational information that links a variety of sectors and issues beyond crops and farm productivity. Roling (2002:40) explained that this means that “relevant overlapping issues along the value chains, such as vulnerability, physical weakness and poverty, must interact with self-esteem, gender identity, caste, class and culture to set mental boundaries on farmer’s aspirations and achievements”. In addition, the farmer might also welcome information on horticulture, forestry, contraception and thatched roofs. Multimedia and mass-mediated agricultural programmes can be organized to deliver this range of expertise to complement the usual extension workers’ interactions.

In conclusion, participatory communication strategy is a tool for minimising barriers to technology adoption or to improve agricultural productivity through increased technology adoption. As discussed earlier, many barriers exist in the context of in agricultural communication, both in dealing with the steps necessary for implementation and in ensuring that recipients have the skills, attitudes, and awareness levels needed to benefit from the research outcomes. With regard to information dissemination for agricultural development, significant effective dissemination-oriented literature indicates that the following are closely related to achieving utilization in the dissemination process: first is that the information provided includes details of content, context, and resources needed before implementation is planned in sufficient detail (Fullan, 2005).

Second, Bradsher (1999) maintained that the individual needs and aspirations of the information users have been considered to vary according to their levels of use and stages of personal concern demonstrated. Third, Hall and Hord (2007) hinted that the information user effectively implements changes if he or she understands the process and flow of activities that are involved. Fourth, programmes and practices are adapted to meet the particular needs of each individual farmer or farming stakeholder. Five, all the parties involved in the utilization or implementation process are able to contribute to the information generation and dissemination process (Leung, 2002). In addition, Fullan (2005:32) explained that, sixth, ‘the user readily accepts assistance, information and ideas from the information source’ he or she believes to be credible and trustworthy.

2.8 The National Agricultural Extension and Research Liaison Services

The National Agricultural Extension and Research Liaison Services (NAERLS) is one of the 18 National Agricultural Research Institutes (NARIs) under the Federal Ministry of Agriculture and Rural Development in Nigeria. The Institute is responsible for development, collation, evaluation and dissemination of proven agricultural innovations and to research on extension methodologies and policy for the nation. The extension and research activities of the Institute take into account the long-term ecological, economic and social consequences of changes in rural life and linkages within and outside the country; and these activities are conducted in partnership with the all national agricultural research institutes in the country and international collaborators.

NAERLS’ head office is in ABU, Samaru Zaria, Kaduna State. The institute is a member of the Agricultural Complex of Ahmadu Bello University. It lies between latitude 9o 5’ and 11^{o} 6’ North and longitude 6^{o} 30’ East, occupying about 25 hectares of land. It grew out of the Specialist Services Section of the former Northern Nigeria Ministry of Agriculture to provide a formal link between the Institute for Agricultural Research (IAR), Zaria, and the Ministry of Agriculture in 1963 as Research Liaison Section (RLS) to ensure that research results get to farmers in adoptable form. According to NAERLS (2007), following the dissolution of the regional structure in 1968, RLS was transferred to IAR and became known as Extension and Research Liaison Section (ERLS). Consequently, the Ahmadu Bello University (ABU) Council, in accordance with Statute 19, separated ERLS from IAR in 1975 and renamed it the Agricultural Extension and Research Liaison Services (AERLS). Thus, AERLS became an autonomous Institute within the Agricultural Complex of the University, under the aegis of the then Federal Ministry of Science and Technology (FMST).

Following the reorganization of research institutes by the Federal Ministry of Science and Technology, a number of changes in the mandates of several research institutes were made in April 1987. In recognition of its contribution to successful extension and research support services in the country, AERLS was given a national mandate, transforming it to the National Agricultural Extension and Research Liaison Services (NAERLS). Its key mandate includes: planning and coordination of agricultural extension; promote dissemination of agricultural research results /technologies; research and develop agricultural extension methodologies; monitor and evaluate extension delivery services nationally; monitor agricultural performance; and provide input to policy and feedbacks to research

The Institute is funded by the Federal Ministry of Agriculture and Rural Development, while it is administered by the Ahmadu Bello University (ABU), Zaria. The symbiotic relationship between NAERLS and these two mother Institutions is such that while the ministry bears the financial responsibility of the institute and all its activities geared towards achieving its national mandate, the University is responsible for the recruitment, promotion and discipline of its staff as well as providing the necessary technical and material support, especially with regard to accommodating the Institute and its members of staff.

The Institute's research and extension activities are organized into 6 programme areas, discussed in the paragraphs below. The first, not in any order of priority, is the Agricultural Performance and Evaluation Programme, which is involved with the monitoring and evaluation of agricultural performance (dry and wet seasons). Its major concern includes identification of field problems that should shape research project formulation. The Programme also provides insights for development of policy briefs and feedbacks to stakeholders. The second is the Agricultural Extension Research Programme, which encapsulates all research efforts related to extension methodologies /processes and practices; adoption studies and extension service development.

The third is Agricultural Economics and Resource Management Programme, whose areas are project impact assessment, policy research, value chain analysis, and agricultural resource use efficiency. The fourth is Extension Training and Outreach Programme, which involves all training projects, such as the packaging and dissemination of agricultural innovations. The fifth is Agricultural Communication Programme, which handles research on audience survey, communication channels/ strategies and development for enhanced effectiveness and efficiency of extension services; application of models for predicting agricultural performance/outputs; and application of modern ICTs and the Internet to extension. The sixth is the Agricultural Information Documentation and Media Resource Centre, which documents all published agricultural information and packages as well as makes them available and accessible to the Institute’s stakeholders.

To effectively discharge its function of coordinating the overall planning and development of extension liaison activities throughout the country, NAERLS established six (6)Zonal Offices, one in each of the six agro-ecological zones of the country– Umudike (South-east), Port-Harcourt (South-south), Ibadan (South-west), Maiduguri (North-east), Badeggi (North-central), Zaria (North-west). These are located in each of the 6 coordinating Research Institutes – National Root Crop Research Institute, Umudike; Institute for Agricultural Research and Training, Ibadan; National Rubber Research Institute Benin (Port-Harcourt zonal office); National Cereals Research Institute, Badeggi; Lake Chad Research Institute, Maiduguri; Institute for Agricultural Research, Zaria.

The Institute coordinates the national extension activities mainly through the Research-Extension-Farmer-Input-Linkage-System (REFILS), which is the interplay of research, farmers and input supply agencies in a cost-effective manner aimed at rapidly increasing agricultural production and productivity of resource-poor farmers. REFILS is a complete linkage system with a structure comprising the peasant farmer, farmers associations, extension field staff, researchers, extension administrators, input developer/ supplier and policymakers. It is a linkage of a complete cycle with roles and activities assigned to each stakeholder within the cycle. REFILS strengthens the traditionally weak linkage between research and extension by making them important partners in technology development and utilization. In a regular REFILS meeting, relevant stakeholders are grouped to discuss and exchange information aimed at solving field problems, enhance production and make inputs for policymaking.

Nigeria is divided into six agro-ecological zones for the purpose of REFILS application. Each zone has a REFILS coordinating research institute whose responsibilities are overall coordination, supervision monitoring and evaluation of REFILS in collaboration with NAERLS. These institutes are Lake Chad Research Institute, Maiduguri (Northeast); Institute for Agricultural Research, ABU, Zaria (Northwest); National Cereal Research Institute, Badegi (North-Central); Institute for Agricultural Research and Training, Ibadan (Southwest); National Roots Crops Research Institute, Umudike (Southeast); Nigerian Institute for Oil Palm Research, Benin City (South-South).

The National Agricultural Extension Review and Planning Meeting (NAERPM) is a major component of REFILS. NAERPM is the largest annual gathering of agricultural extension experts and other key players in Nigerian agriculture. The main focus of the meeting is to review the achievements in agricultural research and extension activities for the current year and plan for the coming year. The key output of the meeting is usually a harmonized calendar of research extension activities; it helps avoid duplication of efforts and wastage of resources while increasing effectiveness of partnership among the stakeholders.

Other REFILS mechanisms are the Monthly Technology Review Meeting (MTRM), a forum where researchers, extension personnel, inputs agencies and farmers interact to review the outcome of previous recommendations, input supply and market situations. There is also the Zonal Steering Committee Meeting (ZSCM), which comprises a number of ADPs and research centres located in a given agroecological zone; and the Zonal Technical Committee Meeting (ZTCM).

2.9 The Adopted Village Project

The adopted village concept was first introduced into Nigeria through the recommendations of National Agricultural Research Project (NARP) in 1997. The concept original birthed by and practiced in India long before that time. According to Akinola, Odu and Baiyegunhi (2013) and Murtala (2015), it was initiated to facilitate the trial of new research findings by scientists under the farmers' environmental conditions. The scheme has the advantages of involving farmers in such trials, either as observers (in the case of researchers' managed plots) or as executors (in the case of farmers' managed plots). This direct involvement of farmers is thus expected to speed up the rate of adoption of such technologies by such farmers. The operational rule, according to Essiet (2013), is that such a village must be less than 25 kilometres from the adopting institution.

Atala and Hassan (2012) stated that adopted village concept is an extension model whereby villages with potential impact (that is, villages where new ideas have been introduced in the past and households in such villages were found to be receptive to adopt the new technologies) are selected to be developed in an integrated manner. This includes socioeconomic and infrastructure development and other aspects of human development. In this case, it is a multidisciplinary approach to community development, involving willing government/ nongovernment agencies, such as research institutes, universities, farmers' clubs, individual rural volunteers, and financial institutions.

The main aim of the adopted village model is to encourage large-scale adoption of improved technologies to empower resource-poor farmers economically, create job opportunities and ensure food security. Specifically, the adopted village project is to: create awareness in the villages and build farmers groups for various development initiatives through different extension methods; facilitate convergence/integration of government development programmes; ensure socioeconomic and livelihood advancement with enhanced credit support and financial inclusion of farmers in such villages; identify capacity needs of the villagers; assist in infrastructure development through participation of local people and institutions; protect the ecosystem and conserve natural resources; and monitor implementation of several development projects, among others. However, due to inadequate follow-up and government support, especially with regard to policy and funding, the adopted village project became moribund not long after introduction in 1997.

In 2005, the World Bank designed the African Action Plan (AAP) as the centerpiece of its strategy to help Africa and its sub-regional groups, such as the Economic Community of West African States (ECOWAS) to reach the MDGs. According to Odoemenem (2010:15), this was "in response to the call by the African Union's (AU) New Partnership for Africa's Development (NEPAD) that the annual agricultural total productivity growth should reach at least 3%, and growth in agricultural GDP to reach the targets of MDGs by 2015". As a contribution to addressing this challenge, the Agricultural Research Council of Nigeria decided to reintroduce the adopted village concept and, therefore, instructed all agricultural research institutes and colleges of agriculture in the country to establish adopted villages, both to serve as field laboratories for agricultural research and extension and also as first-impact villages for improved agricultural technologies (Atala and Hassan, 2012).

As said earlier, Nigeria's initiatives in extension, especially towards improving productivity of smallholder farmers went back as far as the early 1920s. To address farmers' felt needs, various farm settlement schemes and farmers' clubs, which were largely foreign donor-support based, were introduced. But because the methods of extension were largely ad hoc in nature, with little guidance on contents, presentation and execution, the schemes failed (NAERLS, 1996). And from the 1970s, during the oil-boom and post-civil war reconstruction decade, there was increased food crisis, which could not be solved by the existing systems and levels of production.

Consequently, NAERLS began its adopted village project in 2005 with the general objective, as defined by the Agricultural Research Council of Nigeria (ARCN), of improving the economic status and livelihood of selected villages in the six agro-ecological zones of the country through improved agricultural practices. The specific objectives were to: enhance food security and market competitiveness; empower resource-poor farmers; enhance job and self employment opportunities for youths and women; and augment sustainable natural resource management effort of the communities.

NAERLS started this project with seven villages: Two villages managed at the headquarters in Zaria (Nassarawan-Buhari village, Giwa LGA of Kaduna State, and Sakadadi village, Sabon Gari LGA of Kaduna State); one at the northwest zone (Tudun Iya village, in Funtua LGA of Katsina State); one at the northeast zone (Shuwari village, in Jere LGA of Borno State); one at the north-central zone (Nwogi village, in Katchia LGA of Niger State); one at the southeast zone (Lodu-Imenyi village, in Bende LGA of Abia State); and one at the southwest zone (Okolo village, in Ibarapa LGA of Oyo State). As at that time, the south-south zone had not been established. But by August 2013, the number of adopted villages established and managed NAERLS increased to twenty-one (21), of which the headquarter managed ten (10) villages, the northwest, northeast, north-central, southeast and south-south each managing two (2). The newly established village in the southwest developed some issues, so that it was soon discontinued. The new ones were: Kufena, Yansarki, Maigamo, Hayin Gada, Hayin Dogo, Hayin Sambo, Basawa, and Maiwasa villages (all eight in Kaduna State and managed by the headquarter); in Katsina State (northwest) was Kokami village; in Niger State (north-central) was Gbakogi village; Borno State (northeast) had Yerwa village; Imo State (northeast) had Utlu; while Bean and Okaragu villages were established for new south-south zone in Rivers State.

The operational systems in the villages are the same. In a village, three unique farmer groups are set up: male, female and youths. This means that from 2005 to 2013, NAERLS adopted villages had dealings with twenty-one (21) farmer groups in its seven (7) villages. In addition to the main objectives, NAERLS adopted village project facilitates links and empowers farmers to acquire appropriate production information, knowledge and skill, so that their capacities are enhanced to achieve increased agricultural productivity and incomes. It also supports farmers (guides and helps with resources) to build institutions, such as farmers associations and cooperatives. For example, they can facilitate pastoralists to form dairy farmers associations so that they become more organised in the areas of access to inputs, production, marketing and distribution of dairy products. This endeavour would also help the group to prioritise their needs for appropriate extension advisory services.

The adopted village project is also to facilitate the establishment of farm Management Training Plots (MTPs). MTPs are annual activities, in which farmers are trained on new farming technologies/ techniques for both wet and dry season farming. In other words, an MTP is a school farm for the village farmers—it is owned and operated by them, under the supervision of the extension agent, for the purpose of mastery the agronomic practices and thereafter replicating same on a large-scale. A plot could be established for farmers to manage on different irrigation techniques and/or farming systems. In doing so, extension specialists, using different communication techniques, channels and messages, supervise farmers to carry out the different farm management practices along the value chain for various crops and livestock, such as site selection, land preparation, ploughing, harrowing and ridging; selecting improved seed varieties, seed rates, seed treatments, sowing dates, spacing, fertilizer application, weed control, crop protection techniques and harvesting, shelling, bulking, storage and marketing. These are taught to allow farmers master the technology being transferred and to also allow them appreciate the processes. Ordinarily, the results from the field are fed back into the agricultural research system for more refining and/or replication, as the case may be.

Two examples here could suffice. Northern part of Oyo State was recently discovered to have good soil property for the production of watermelon to meet the growing demand of the fruit in the Southwest agro-ecological zone of the country. Radio and television programmes (jingles, documentaries and other formats) were packaged to sensitize and educate the populace, especially on the economic importance of this crop. Thereafter, NAERLS southwest zonal office established an MTP in Okolo village to train farmers on the recommended agronomic practices for watermelon. The results from such demonstration plots helped in the production of high-yielding, better adaptable and disease-resistant varieties for the ecology.

Also, following the unrest in northeast Nigeria from 2009, NAERLS/FDAE (2013) field assessment showed that farming activities were becoming unattractive to the people, mainly because farmers could not afford the security needs of a farm. Most farmers in Shwuari village (one of the adopted villages) were particularly disenchanted from investment in farming, as insecurity drove the youths and able-bodied out of the zone. However, they showed their willingness to go back to farming if they could be assured that other members of the community would be ‘their brother’s keeper’. Thus, NAERLS Northeast zonal office packaged and disseminated media messages on the importance and benefits of community farming. Consequently, an MTP was established in Shuwari to train farmers groups on community fish farming. Three concrete fishponds were constructed jointly with the farmers. The farmers provided the land and labour, while NAERLS purchased the materials for the pond construction. Thereafter, the farmers contributed 30% of the amount budgeted for fish stocking, feeding and other inputs, while NAERLS took care of the remaining 70%.

Moreover, non-farming women groups are also trained on activities that would make them economically self-reliant. Such trainings include marketing of produce for women groups; how to open and manage a bank account and source for finance; fortification of indigenous foods; condiments production; seedlings production; oil extraction; Vaseline and soap production; as well as sensitization workshops on HIV/AIDS and VVF, and literacy programmes.

Usually in each village, there is an Agricultural Research and Outreach Centre (AROC), a building in which farmer groups in the village and extension service providers have their meetings and, especially, trainings. NAERLS often takes priority in constructing, furnishing and equipping AROCs (with such equipment as TV, radio, speakers, DVD players, public address system, chalkboard, chairs, tables, fans, power generator, etc) so that it provides the necessary environment for the various activities carried out therein. Sometimes, available old buildings are renovated and furnished for the purpose of AROC.

The youth groups are reached in secondary schools. One consistent result that has been a cause of concern for many stakeholders in the agricultural sector, especially the policymakers, is the aging population of Nigerian farmers. Therefore, NAERLS adopted village project packages and disseminate agricultural programmes that encourage farming activities among the youths of secondary school age. The Institute organises Young Farmers Clubs and Young Home Makers Club in each school it oversees. The main objective is to sustain and support student’s interest in agricultural science as a course and as a sustainable economic profession or business. MTPs are also extended to these youth clubs. The purpose is to inculcate in the youths new and improved farming technologies. The school would provide a hectare of land, while NAERLS provide the inputs and other resources. Recommended farm management practices are then taught and practised by the students under the supervision of site managers and site facilitators. NAERLS also supplies textbooks on agricultural science, home economics, and biology to such schools in AROC.

By the adopted village concept, NAERLS’ contribution to national agricultural development through technology transfer and adoption processes, as well as in research in extension methodologies are often measured against its success in its adopted villages. However, it is important to note that long before the establishment of adopted villages, the Institute has been playing its lead role in the promotion and eventual adoption of several agricultural innovations in Nigeria. These included: the use of inorganic fertilizer; popularization of improved crop varieties and hybrids, such as maize, rice, sorghum, cowpea and soybean; fattening of small ruminants; integrated aquaculture technologies; use of labour-saving devices, leading to mass production (such as groundnut extraction machines for small-scale farmers and entrepreneurs); use of farmer cooperatives among rural farmers, among others.

By functions and mandate, NAERLS reaches farmers in the adopted villages with agricultural innovations through various media (radio, television programmes/programming (otherwise known as farm broadcasts), publication of extension guides, pamphlets, and posters, as well as the use of interpersonal media such as training, field demonstration and extension visits. From the 1970s till date, the Institute has been involved in the production of the following media packages: over 60 research titles completed and published; over 30 radio programmes (with 12,876 broadcasts) on 24 national and state radio stations in Nigeria in 7 languages (English, Hausa, Yoruba, Igbo, Fulani, Nupe, Pidgin English); 28 television titles (with 5,500 broadcasts and several repeat broadcasts) on 15 national and state television stations in 5 languages (English, Hausa, Yoruba, Igbo and Pidgin English). Other works of NAERLS for enhancing national agricultural development in the country included: the conduct of more than 86 training programmes for about 102,200 trainees, which included extension agents, farmers, policymakers, and NGOs; and 78 special promotion campaigns on agriculture and rural development. There was also the execution of well over 48 donor projects and collaboration with about 18 international organizations (such as CTA, FAO, UNICEF, UNDP, NOKIA, USAID, and UKAIDS) and 23 national institutions (including specialized Federal Government Agencies, National Agricultural Research Institutes, Agricultural Development Projects, River Basin Development Authorities, Faculties of Agriculture, Faculties of Veterinary Medicine, and Federal Colleges of Agriculture).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the materials and methods used for carrying out the research. It deals with the research design, population, sample and sampling methods. It also presents information on the instruments of information gathering, analysis and presentation.

3.1 Research Design

This research lent itself to both quantitative and qualitative methods of scientific enquiry. The main reason for this is to use the best possible way of achieving the aim of the study, which is to enhance agricultural productivity in NAERLS adopted villages through the deployment of an effective communication strategy. The study adopted the use of quantitative and qualitative methods also because of the spread of its sample. Interview, for example, was needed to gather data from NAERLS management as well as government personnel in Abuja for the purpose of achieving good research outcome. Odunsin (2011) has argued that qualitative data help to achieve in-depth understanding of a given phenomenon of interest and what governs such existence or behaviour. The method helps to establish variables within a period of time in order to provide an explanation for how and why they came to be the way they are in their natural state. The research also used quantitative method. Unlike qualitative data, which have no numerical magnitude attached, quantitative data have numerical values, so that they are expressed in numbers and have the properties of ranking and ordering (Fowler, 2009). Also, unlike qualitative data which are discrete, quantitative data are continuous when they measure, taking different values.

The study adopted the case study design. This design was used so as to help the researcher thoroughly investigate the individual case of ‘communication activities’ of NAERLS, which is the study institute. A case study has been explained as a non-experimental research, involving in-depth study of a given social or business unit, a community, a market segment or an institution (Odunsi, 2011). The number of units investigated is often limited, while the number of variables and situations under which they are studied are diverse.

Basically, there are two distinctive characteristics of case study. First is that it allows for the use of a combination of qualitative and quantitative approaches because of the diverse variables often involved. For example, despite that NAERLS, the unit under study, is limited in number, the number of variables or situations under which it is being studied are diversified. Thus the study provided in-depth information on the dissemination activities of NAERLS, employing two data gathering techniques of Questionnaire and Key Informant Interview. Other techniques used in a case study are observation and Focus Group Discussion. The second characteristic is that it is used to solve specific problems and its sample is not usually representative of the whole; hence, its result cannot be generalized (Fowler, 2009). The result is, however, useful for providing background information and specific instances for validating important theories. This way, according to Best (2001), the conclusion of the current study cannot be generalized directly for other organizations in the national agricultural extension and research system or other projects of the study institute, because only the communication activities of NAERLS in its adopted villages were studied.

The rationale for choosing the case study method is that it helped to measure the study variables more accurately than any other method. The variables tested were the institute’s communication activities and indices of enhanced agricultural productivity (such as, high farm yields, and improved farmers’ socioeconomic indicators). Hence, the design helped assess in-depth NAERLS's communication performance retrospectively (that is, communication behaviour and effects) and prospectively (ie, its future propensities) among the selected adopted village farmers.

3.2 Study Population

A study population includes all people or items with the characteristics that a researcher wishes to understand. Since there is very rarely enough time or money to gather information from everyone or everything in a population, the goal becomes finding a representative sample (or subset) of that population. The population for this study, therefore, consisted of farmers in NAERLS adopted villages, staff of NAERLS, as well as stakeholders in agricultural communication policymaking in Nigeria. It is common knowledge that although a researcher almost always has to work with a sample of subjects rather than the full population, the results of such a research usually speak for the population rather than the sample size (Fowler, 2009). As earlier explained concerning the national outlook of NAERLS with regard to its role in research and extension system in the country, one can conveniently state that the results of the study indirectly apply to the Nigerian agricultural communication spectrum. Consequently, the study population includes farmers and extension personnel involved in adopted village projects in the national agricultural extension system.

Berinsky (2008) has stated that, more often, the characteristics of a given population are obvious. For example, some concerns of the current research were whether agricultural communication activities of the study institute were organized in such a way that they have enhanced farmers' productivity; whether there was a standard guiding communication plan for interacting with farmers at the study sites; and how to strengthen the communication activities of the institute for better agricultural outcomes. Thus, in this case, the population comprised the farmers (target audience of extension communication at the study sites) and extension service providers (that is, NAERLS both as an institution and implementer of government initiatives in extension).

3.3 Study Sample

The sample size comprised one hundred and four (103) respondents. The sample comprised 82 farmers (from the three sampled NAERLS adopted villages— 26 from Tudun Iya, Katsina State (NW); 29 from Nwogi, Niger State (NC) and 27 from Okolo, Oyo State (SW); 7 agricultural extension package producers and 8 field extension staff of NAERLS, Ahmadu Bello University, Zaria; 3 zonal officers of NAERLS (from Kano, Badeggi and Ibadan); 2 heads of unit (of NAERLS Adopted Village Unit and Farm Broadcast Unit). The sample also included 2 policymakers (the executive director of NAERLS, and the national coordinator of Agricultural Extension Transformation Agenda of the Federal Ministry of Agriculture and Rural Development, Abuja).

This sample size can be termed quite representative of the population in recognition of Hopkins' analysis of sample significance for case study (Hopkins, 2010:124). Hopkins stated that a case study sample size is significant if it is big enough to 'be sure' that one can detect the smallest worthwhile effect or relationship between the study variables. He then explained that to 'be sure' means detecting the effect 60% of the time; while 'detect' means getting a statistically significant effect, which means that more than 75% of the time one would expect to see a value for the effect numerically smaller than what one observed, if there was no effect at all in the population.

3.4 Sampling Technique

Sampling is concerned with the selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population. Accordingly, two advantages of sampling are that the cost is lower and data collection is faster than measuring the entire population (Berinsky, 2008). The current study made use of probability and non-probability sampling, as well as multistage sampling for drawing up the sample size of 104 subjects.

Probability sampling (the simple random system) was used to select three adopted villages of NAERLS from the six zones for the study. First, the country was divided into two (north, central and south) along the existing six agroecological zones of Nigeria, three each for north and south (these are northwest, northeast, north-central, southwest, southeast and south-south). But because of the import of place of the north-central, which is the largest zone, it was excluded from the probability sampling and was selected purposefully. Probability sampling (PS) was ten used to select one zone each from the north and south divides. The reasons for the use of PS was to allow every unit in the population a chance (greater than zero) to be selected in the sample. Bush (2010:39) maintains that this makes it possible to produce unbiased estimates of population totals, by weighting sampled units according to their probability of selection.

The selection of three of the six zones of NAERLS showed a 50% representation of the total. In each village sampled, farmers were grouped into three clusters of male groups, female groups and youths. Available secondary data from the Farm Broadcast unit and the Adopted Village Unit of NAERLS suggested that these farmer clusters were almost always in the ratio 2:1.5:3 respectively. However, extension packages through different modes (interpersonal, broadcast, print and electronic) are not often produced for the target audience in this proportion. Thus, the farmers in each village were selected based on the existing farmers' groups (male, female and youths). It is worthy of note that these groups comprised farmers along the value chain, such as producers, processors and marketers. Hence, based on the organization /management structure on ground, the sampling was done according to groups.

Multistage and cluster sampling techniques were used to draw out the farming subjects for the study. Multistage sampling itself is a complex form of cluster sampling in which two or more levels of units are embedded one in the other. This was to help guard against vulnerability to sampling error often resulting from randomness of selection, as well as minimise bias and simplify analysis of results. It was also to help the study proportionally represent the subjects so as not to over-represent or under-represent a given subset (or farmers' group). The stages consisted of constructing different level clusters that will be sampled from. Moore and McCabe (2007) and Best (2004) pointed out that cluster sampling generally increases the variability of sample estimates above that of simple random sampling, depending on how the clusters differ between themselves, as compared with the within-cluster variation.

Thus the study first clustered or grouped farmers into male and female, and then further as male crop growers, female crop growers, male livestock/fisheries farmers, female livestock/ fisheries farmers, etc. The second stage comprised a sample of primary units randomly selected from each cluster. Thereafter, in each of those selected clusters, additional samples of units were selected, and so on. All ultimate units (farmers from each group, for instance) selected at the last step of this procedure were then surveyed.

Specifically, the study first grouped the adult farmers by activity clusters of crop growers, livestock and fisheries farmers, and produce marketers. The youths were not grouped according to farming activities, but rather as a whole; that is, as youths who had been formed into an agricultural group and adopted by NAERLS.

Thereafter, proportionate sampling was used to draw the study subjects (farmers) from the clustered groups using the recommended 15% of each subset (Moore and McCabe, 2007). Using this technique, eight (11) farmers were selected from sixty-seven (67) male farmers (comprising 8 crop growers, 2 livestock/fisheries farmers and 1 marketer); ten (10) out of sixty-five (65) female farmers (5 crop growers, 3 livestock/fisheries and 2 marketers); and six (6) farmers from thirty-two (34) youth farmers (4 male and 2 female) from Okolo village. This same procedure was used to select eleven (11) from sixty-two (62) male farmers; nine (9) from fifty-five (55) female farmers; and six (6) from forty-two (42) youth farmers in Tudun Iya village; ten (10) of sixty-seven (67) male farmers, nine (9) of sixty-five (65) female farmers, and eight (8) of fifty-three (53) youth famers in Nwogi village (Table 3.1).

Also, expert or judgement sampling (non-probability) technique was employed in selecting the three (3) heads of NAERLS zonal offices (in Kano, Badeggi and Ibadan), the heads of NAERLS Adopted Village Unit and NAERLS Farm Broadcast Unit, director of NAERLS and the coordinator of Agricultural Extension Transformation Agenda at the Federal Ministry of Agriculture and Rural Development, Abuja (Table 3.2).

Moreover, purposive was used to select 20 subjects, comprising 9 field extension agents, 6 extension communication producers, 3 zonal officers and 2 heads of unit from the lists of NAERLS staff obtained from the institution. It should be noted that every adopted village had a site manager, and two facilitators (for male and groups), who oversaw and coordinated all extension activities in that village. These were purposively selected from the study sites selected. Purposive was also used in selecting all the six package producers that NAERLS had. These producers worked in broadcast, print and electronic information dissemination categories. Purposive was also used for drawing out the two (2) subjects for Key Informant Interview, which were the director of NAERLS and the national coordinator of Agricultural Extension Transformation Agenda (Table 3.2).

Table 3.1: Breakdown of study sample from NAERLS adopted villages (n = 82)

Site and Location	*Men Group*	*Women group*	*Youth group/club*
Akufo			
Iddo LGA, Oyo State			
Total farmers	67	65	34
Sample selected (15%)	***(11)***	***(10)***	***(6)***
Crop growers	46 (8)	(35) 5	Male (21) 4
Livestock/fisheries	16 (2)	(18) 3	Female (13) 2
Marketers	5 (1)	(12) 2	
Tudun Iya			
Funtua LGA, Katsina State			
Total farmers	62	55	42
Sample selected (15%)	**(11)**	**(9)**	**(6)**
Crop growers	41 (6)	23 (4)	Male (32) 4
Livestock/fisheries	17 (2)	15 (2)	Female (10) 2
Marketers	14 (2)	16 (3)	
Nwogi			
Katchia LGZ, Niger State			
Total farmers	67	65	53
Sample selected (15%)	**(10)**	**(9)**	**(8)**
Crop growers	49 (7)	34 (5)	Male (29) 4
Livestock/fisheries	13 (2)	8 (1)	Female (24) 4
Marketers	5 (1)	23 (3)	
Sub-Total of Sample	**32**	**30**	**20**

Table 3.2: Breakdown of Study Sample (n = 104)

Respondents	**Location**	**Male**	**Female**	**Youth**	**Total**
Farmers	3 NAERLS Adopted villages	32	30	20	82
Field extension agents	NAERLS	6	3		9
Ext package producers	NAERLS	5	1		6
Zonal liaison officers	Zaria, Kano, and Ibadan	3	-		3
Unit Coordinators	Farm Broadcast; Adopted Village Project	2	-		2
Policy makers	NAERLS Director and AETA coordinator	2	1		2
TOTAL		**50**	**34**	**20**	**104**

3.5 Instruments for Data Gathering

The instruments for data gathering were questionnaire, Key Informant Interview and naturalistic observation.

3.5.1 Questionnaire

The study made use of three sets of questionnaire as instrument for data gathering. These consisted of a series of questions and other prompts for the purpose of gathering information from the respondents (farmers and extension staff); and the questions were in close and open-ended formats. The sets of questionnaire also had different response scales for the closed-ended questions. Popper (2004) identified four types of response scales for closed-ended questions: dichotomous, where the respondent has two options (eg, with regard to gender, ie, male and female); nominal-polytomous, where the respondent has more than two unordered options; ordinal-polytomous, where the respondent has more than two ordered options (eg, yes, no, can’t say); bounded continuous, where the respondent is presented with a continuous scale (eg, age bracket, ie, less than 20 years, 20-35 years, etc).

The first set of questionnaire, titled Farmer Questionnaire (FAQ), was a 16-item instrument for gathering data on the perception of farmers with regard to the study variables. The second set of questionnaire, titled Extension Specialists Questionnaire (ESQ), consisted 19-item and was designed to gather data on communication activities of field extension specialists, zonal officers and head of NAERLS Adopted Village Unit. In the communication matrix of NAERLS, this group is akin to middlemen or transmitters of agricultural information. They take the already produced and packaged technology or innovation to farmers and then bring feedback where necessary.

The third set of questionnaire, titled Extension Package Producers Questionnaire (EPQ), consisted of 23 items and was used to elicit information from extension communication package producers and the head of NAERLS Farm Broadcast Unit. The reason for this separate questionnaire was that this group of respondents was mainly charged with the actual packaging of communication media for farmers. The group was also laden with the responsibility of liaising with other extension specialists and researchers with regard to feedback or evaluation studies, as well as involvement of farmers in producing communication packages. In other words, they dealt firsthand with the technicalities of message design, production, dissemination, reception and feedback within the institutional framework of NAERLS.

Questionnaire has advantages over some other types of instruments, whether in survey or case study. Some of its advantages, according to Mills (2009) are that the responses are gathered in a standardized way, hence the instrument is more objective especially than the interview method; it is relatively quick for sourcing information; large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost effective way; the results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package; and they can be analysed more scientifically and objectively than other forms of instruments.

3.5.2 Key Informant Interview

The study also made use of Key Informant Interview (KII), a loosely structured conversation with people who have specialized knowledge in extension communication. KII help explore the study variables in-depth. According to Fowler (2009), KII always results in the discovery of information that would not have been revealed in a study, as it provides opportunities for: examining specialized systems or processes (such as factors that affect extension delivery in an adopted village), identifying target populations or issues that one may wish to investigate further; gathering information when barriers (such as policy or bureaucracy) make a study difficult; refining data collection efforts; clarifying the findings of quantitative research; assessing internal organizational development and planning needs, as well as its complex relationship with its internal and external environments; generating recommendations; and mobilizing the organization or population under study for action, as people who are directly involved in data collection efforts are more likely to participate or invest in the given recommendations.

Consequently, two sets of interview schedules were developed. The first comprised 29-item guided questions for interview with NAERLS director. The director coordinates all extension activities of NAERLS and is, therefore, ultimately responsible for the success or otherwise of the institute. The contents comprised issues on mission, vision, collaboration, overseeing, and self-evaluation of institutional achievements.

The second schedule comprised 22-item guided questions designed for interview with the coordinator of Agricultural Extension Transformation Agenda (AETA). This officer is a key personnel in the running and success of agricultural extension mechanism in the country. AETA is the umbrella body for the group that drives the extension agenda of the federal government in its quest to becoming one of the world's twenty economies by 2020. This economic goal is often referred to as Vision 20:2020, a part of which is the Agricultural Transformation Agenda. The major focus of this Key Informant Interview (KII) is to find out how NAERLS has fared in the eye of government with regard to its extension communication activities, as well as the expectations of the government for the institute. Care was taken to ensure that the items in the questionnaire covered the necessary concepts, and that there was no duplication or excessive coverage of any one concept. Besides, most of the interview questions were necessarily different from those for NAERLS director.

Kvale and Brinkman (2008) had explained that KII is best suited for engaging respondents in which it is beneficial to compare/contrast participants' responses in order to answer a research question. The interview schedules are tools by which case study increases the reliability and credibility of the data gathered. It was expected that the data generated from the structured interviews would go a long way in helping to design the needed communication framework for deployment in the study area.

KII is commonly employed in case studies for the purpose of ensuring that answers are reliably aggregated and comparisons made with confidence between the sampled subgroups. It also ensures that data are collected by the interviewer rather than through a self-administered questionnaire. The study developed two interview guides or schedules, grouping topics and questions to be asked in different ways for the two respondents. The expectation on the interviews was for new and somewhat hidden issues to be brought to light for the purpose of enriching the reliability and credibility of the data generated. Hence, the interview guides were constructed such that they only helped focus on the topic at hand without constraining the interviewer or respondents to a particular format. This freedom helped the researcher tailor and vary the questions to the interview contexts and to the respondent.

For data collection using Farmers' Questionnaire (FAQ) in adopted villages and Extension Specialists Questionnaire (ESQ) in zonal offices in Katsina, Niger and Oyo states, letters of introduction were first sent to the respondents (village site managers and zonal officers). After these preliminary contacts and arrangements with the NAERLS zonal officers and site mangers, ten (10) days were used for carrying out the questionnaire administration in the three (3) selected locations, using two (2) trained assistants. Four days were used for gathering information in Okolo and Nwogi villages, while two (2) days were used for the same purpose in Tudun Iya. Availability sampling was used for selecting farmer subjects for questionnaire administration. Availability was chosen because farmers were rigid with their farm schedules. February was the height of dry season farming activities, when it was a bit difficult to get farmers. Despite the formally arranged visits, some questionnaire administration exercises had to be done in the farms.

For data gathering from extension specialists and communication package producers at NAERLS Zaria, three (3) days were used for data gathering. The questionnaire data gathering exercises were carried out between Wednesday 11 and Friday 27 of February 2015.

For the Key Informant Interviews, letters of introduction were personally delivered to the respondents, followed by a brief discussion on the research and its proposed outcomes. Initially, dates for the interviews were set and rescheduled. Finally, one day was used for the first KII respondent (director of NAERLS, Zaria) in his office and two days for the second respondent (national coordinator of AETA) also in his office, at ABU Zaria. The interviews were conducted between Friday 20 and Tuesday 24 March 2015.

3.5.3 Naturalistic Observation

The study also made use of naturalistic observation as an instrument for data gathering. The reason for this method was to corroborate the quantitative data gathered using the questionnaire. Marshall and Rossman (1995:79) defined observation as “the systematic description of events, behaviors, and artifacts in the social setting chosen for study”. Observation enables the researcher to describe existing situations using the five senses, providing a “written photograph” of the situation under study (Erlandson, Harris, Skipper and Allen, 1993). McLeod (2015) and DeWalt and DeWalt (2002) stated that there are three main categories of observation method: controlled, naturalistic, and participant observations. Controlled observations (usually a structured observation) are often carried out in a laboratory setting. The researcher decides where the observation will take place, at what time, with which participants, in what circumstances and uses a standardized procedure.

Naturalistic observation (i.e. unstructured observation) involves studying the spontaneous behaviour of participants in natural surroundings. The researcher simply records what he or she sees in whatever way he or she can. Compared with controlled/structured method, McLoed (2015) stated that it is like the difference between studying wild animals in a zoo and studying them in their natural habitat.

Participant observation is a variant of natural observation, but here the researcher joins in and becomes part of the group he/she is studying to get deeper insights. Participant observation is further divided into overt/disclosed (where the participants know they are being studied) or covert/undisclosed (where the researcher keeps his or her real identity a secret from the research subjects, acting as a genuine member of the group).

The justification for using observation method was that it provided the research a way to check for nonverbal cues on the subject matter, such as expression of feelings. DeWalt and DeWalt (2002) affirmed that the goal of using observation as a method is to achieve a holistic understanding of the phenomenon under study as objective and accurate as possible. They suggested, therefore, that observation be used as a way to increase the study validity, as it helps the researcher have a better understanding of the context and phenomenon under study.

Indeed, validity is stronger with the use of additional instruments with observation, such as Key Informant Interview and questionnaire, or other quantitative methods, as used in the current study. The use of observation was to help answer the descriptive research questions of the study. Although validity is a term typically associated with quantitative research, when viewed in terms of its meaning of reflecting what is purported to be measured/observed, its use here is appropriate. Validity in this instance refers to context validity, face validity or trustworthiness as described by Lincoln and Guba (1994).

DeMunck and Sobo (1998) provided several advantages of using observation over other methods of data collection. These include that it affords access to the "backstage culture" (p.43); it allows for richly detailed description, which they interpret to mean that one's goal of describing "behaviours, intentions, situations, and events as understood by one's informants" is highlighted (p.43); and it provides opportunities for viewing unscheduled events. DeWalt and DeWalt (2002) added that it improves the quality of data collection and interpretation and facilitates the development of new research questions or hypotheses.

According to deMunck and Sobo (1998), there are several disadvantages of observation method, including that sometimes the researcher may not be interested in what happens out of the public eye and that one must rely on the use of key informants. Also, problems related to representation of events and the subsequent interpretations may occur when researchers select key informants who are similar to them. To eliminating this potential bias, Bernard (1994) suggested selecting study subjects who are competent in the topic being studied. Other researchers have noted the limitations involved with using observations as a tool for data collection. DeWalt and DeWalt (2002) noted that male and female researchers have access to different information, as they have access to different people, settings, and bodies of knowledge. Often, observation is conducted by a biased human who serves as the instrument for data collection; the researcher must understand how his/her gender, sexuality, ethnicity, class, and theoretical approach may affect observation, analysis, and interpretation.

3.6 Procedure for Strategic Communication Design

After the data gathering and analysis stages, a preliminary report of the findings as well as draft of the communication design were prepared and presented to a select group of key stakeholders in NAERLS agricultural communication activities. These were presented for deliberation and inputs. The group was made up of fourteen (14) people, comprising: 3 heads of farmers groups (one each from the male, female and youth groups), 3 village site managers, and two (2) extension package producers. There were also six (6) members of NAERLS management; these were the head of Adopted Village Unit, head of NAERLS Farm Broadcast Unit, head of Agricultural Communication Research Programme, head of Agricultural Extension Research Programme, head of Agricultural Extension Planning and Policy Programme, and the Assistant Director (Research and Planning). There were a total of nine sessions with the group. There were three sessions with the farmer groups, extension specialists and extension package producers. But there were six sessions for members of NAERLS management due to their tight work schedules and commitments to other works. Separate sessions were held with the Assistant director and programme heads.

3.7 Validity and Reliability Testing

The test for validity and reliability of the instruments was in various phases. First, the overall sample of the contents being measured was represented, so that items of the questionnaires were checked for accuracy. Consequently, the researcher also identified a broad spectrum of content, whose validity was tested through a pilot study using twenty participants. Content validity was used to assess how well the instruments represented the components of the variables to be measured, as argued by Mill (2009). The final copies of the instruments were the outcome of the pilot test and input from experts.

Fain (2004) explained that a pilot study is a small-scale preliminary study conducted (as phase one of a study) before the main research, in order to check the feasibility of the research design. For the current study, therefore, a pilot was carried out on 3rd December 2013 on members of a similar population. The purpose was to identify and correct possible flaws in the instruments, such as ambiguous instructions and inadequate time limits and the validity of the instrument. Fifteen respondents (7 men, 5 women and 3 youths) were randomly drawn from Sakadadi NAERLS adopted village to test the Farmers Questionnaire (FAQ); four were (all male) were selected, while five (4 male and 1 female) were selected from NAERLS staff for the purpose of testing the Extension Package Producers Questionnaire (EPQ) and the Extension Specialists Questionnaire (ESQ) respectively.

The split-half method, which is the common method employed to estimate reliability for internal consistency of questionnaire, was used to test the instrument. In this case, the items of the questionnaire were split into two halves and the correlations were computed between scores. The scores were compared between the odd and even-numbered items. The reliability correlation coefficient for FAQ, ESQ and EPQ was 0.75, 0.83 and 0.71 Cronbach's alpha respectively. Moreover, the comments and observations of participants were incorporated in the final questionnaire construction.

3.8 Testing of Communication Strategy

After the design process of the communication strategy had been completed, with all the participating stakeholders, it was taken to the field for testing. To achieve full testing of the instrument, the researcher worked with the Drought-Tolerant Maize Promotional Audiovisual (DTMPA) team, to develop a poster campaign on the profitability of farming an improved variety of maize called, Drought-Tolerant Maize. The DTMPA was a running project at the NAERLS which promoted awareness and adoption of that specific maize variety.

The strategy's testing started with a field assessment, which was carried out on Tuesday 10 December 2015 at Nasarrawan Buhari adopted village, Sabon Gari Local Government of Kaduna State. The instrument used was questionnaire and focus group interview among members of maize farmers groups, which comprised 12 male, 6 female and 4 youth farmers. The results showed, among others, that farmers' areas of information need were: disease and striga control (35%), marketing opportunities (20%), access to inputs (15%), coping strategies/ intervention techniques in relation to climate change, especially late/changing onset of rain (15%), maize meal fortification (10%), access to credit (10%), others (5%).

The survey team then decided on a campaign with the objective of ‘raising awareness through the provision of information on the profitability of farming drought-tolerant maize among the selected maize farmers.’ Every step of the strategy was followed. After the production of the poster, postproduction testing was carried out among farmers. Plates 3.1 and 3.2 showed what were taken to the field. These two posters were highly critiqued by the farmers. The messages on the posters were in Hausa. The first (Plate 3.1) said “*Domin samun gwaggabar riba a yayin girbi ku noma irin masara mai jure fari”* (To reap the reward of good harvest, plant drought-tolerant maize).

Plate 3.1: DT-Maize campaign poster used for postproduction testing of strategy. It was highly criticised by farmers because of the figure’s resemblance with an infamous case in the society.

The second poster (Plate 3.2) said, “*Ku noma irin masara mai jure fari don yawaitar arziki*” (For financial security, grow drought-tolerant maize). However, the youth farmers pointed out that the farmer in Plate 3.1 and one of those in Plate 3.2 looked like a Nigerian broadcaster being tried for corruption. The campaign was soon labelled ‘Masara Dokpesi’ or ‘Dokpesi maize’, in relation to the broadcaster that was being arraigned for prosecution by the Nigeria’s Economic and Financial Crimes Commission (EFCC) (Sani, 2015). Although the research team successfully explained that the message had nothing to do with the personality or character of the broadcaster, it was observed that such communication noise was strong enough to derail the intended message.

Plate 3.2: Poster for preproduction testing on the economic benefits of planting Drought-Tolerant Maize variety. The farmers also highly made tremendous inputs before final production

Also, the message in Plate 3.2 was said to be confusing for two other reasons. First, the background of a bank did not compliment work in the farm, so much that the figures (people) did not reflect farming activities or the outlook of an average farmer. In fact, the team had to keep explaining the ‘cashier’ tag placed in front of the third person in poster 2 (or Plate 3.2) as well as his relevance in that communication context. Second, the maize inset was said to mean that each variety of Drought-Tolerant Maize would produce both yellow and white grains. This was an erroneous assumption, because the white varieties were different from the yellow varieties of DT-maize. Moreover, there were suggestions that the messages of both posters should be merged, since they both speak of the reward of planting drought-tolerant maize. Therefore, the final packaging of the materials took these observations to consideration and appropriate corrections were made. Plate 3.3 was the final package for dissemination.

Plate 3.3: The final campaign poster produced after postproduction testing with farmers.

3.9 Instruments of Data Analysis and Presentation

Both quantitative and qualitative methods were used for analysis. The quantitative data collected were first collated and then analysed. The analysis of data for the research questions was done with simple statistical tools of frequency count, percentage, mean, and weighted mean. At the end of each analysis, the calculated weighted mean is provided as a summary of the perception of respondents. The questionnaire items that measured the objectives were designed in three-point Likert scale of degree of Highly, Moderately, and Poorly; or of frequency of Always, Occasionally, and Rarely, with statistical values of 3.0, 2.0 and 1.0 respectively. Thus, the weighted mean value was calculated to be significant at 2.0. The data gathered from the interview and observation sections were analysed qualitatively, using discussion and cross-referencing.

The data gathered for this study were both quantitative and qualitative. The quantitative data were presented mainly in tables, calculated using statistical tools of frequency, percentage, mean and weighted mean. This simple format of presentation is such that even the least statistically significant/ insignificant details are shown. The qualitative data, on the other hand, were presented in prose form, as excerpts and inserts in the discussion section of data presentation.

CHAPTER FOUR

DATA PRESENTATION AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents data analysis and discussion of findings. The presentation of quantitative data is done in tables and figures, while that of qualitative data is done as excerpts. In presenting the data and discussing the findings, qualitative data are used to cross-reference the findings from quantitative data. As earlier stated, the quantitative data were gathered through the use of questionnaire; while the qualitative data were obtained using key informant interview schedules and observation.

Where there is the need to present differing quantitative data, information gathered from the Farmers Questionnaire (FAQ) was presented first, followed by those of Extension Specialists Questionnaire (ESQ) and Extension Package Producers Questionnaire (EPQ). But for the qualitative data, the two sets of information gathered through interview schedules for the NAERLS director and the national coordinator of Agricultural Extension Transformation Agenda (AETA), as well as that from observation, with regard to farmers on the field were used to cross-reference the discussion of findings from quantitative data according to how they concur with or differ to the findings.

Furthermore, for ease of understanding and clarity, the presentation and discussions were segmented according to Research Objectives. For example, 4.2 is for objective 2, while 4.3 is for objective 3 and so on. Data presentation and analysis were also done in the grouping of farmer respondents from the study adopted villages, namely: Tudun Iya, Okolo and Nwogi, as well as NAERLS staff respondents (of extension specialists and extension package producers). Odunsi (2011) and Fowler (2009) have explained that this method of analysis allows for in-depth treatment of data and is particularly advisable in applied research— with some allowance in basic research. At the end of data presentation analysis, discussion was provided for all the objectives in a holistic manner.

4.1 Presentation of Results

4.1.1 Demographic data

Table 4.1.1a: Demographics of farmer respondents

Item	**Adopted village**						**Total**
	Tudun Iya		**Okolo**		**Nwogi**		
	Freq	*%*	*Freq*	*%*	*Freq*	*%*	*Freq (%)*
Age							
Less than 20 years	1	1.3	-	-	2	2.4	3 (3.7)
20-35 years	6	7.3	8	9.8	6	7.3	20 (24.4)
36-50 years	12	14.6	10	12.2	9	11.0	31 (37.8)
51-65 years	6	7.3	7	8.5	10	12.2	23 (28.0)
Above 65 years	1	1.3	2	2.4	2	2.4	5 (6.1)
Calculated mean age in years	*43*		*46*		*45*		*45*

Experience in farming	**Tudun Iya**		**Okolo**		**Nwogi**		**Total**
	Freq	*%*	*Freq*	*Freq*	*%*	*Freq*	*Freq (%)*
Less than 5 years	3	3.7	2	2.4	5	6.1	10 (12.2)
5-9 years	3	3.7	5	6.1	7	8.5	15 (18.3)
10-14 years	4	4.9	1	1.3	2	2.4	7 (8.5)
15 years and Above	16	19.5	19	23.2	15	18.3	50 (61.0)
Calculated mean years of experience	*15*		*14*		*15*		*15*

Monthly income	**Tudun Iya**		**Okolo**		**Nwogi**		**Total**
	Freq	*%*	*Freq*	*Freq*	*%*	*Freq*	*Freq (%)*
Less than 5000	7	8.5	4	4.9	6	7.3	17 (20.7)
5000-15000	11	13.4	8	9.8	10	12.2	29 (35.4)
16000-30000	2	2.4	6	7.3	7	8.5	15 (18.3)
31000-50000	4	4.9	2	2.4	-	-	6 (7.3)
51000 and Above	2	2.4	7	8.5	6	7.3	15 (18.3)
Calculated mean income in Naira	*15,000*		*19,500*		*17,250*		*17,250*

Highest educational attainment	**Tudun Iya**		**Okolo**		**Nwogi**		**Total**
	Freq	*%*	*Freq*	*Freq*	*%*	*Freq*	*Freq (%)*
None	1	1.3	2	2.4	2	2.4	5 (6.1)
Quranic	17	20.7	4	4.9	-	-	21 (25.6)
Primary	3	3.7	7	8.5	10	12.2	20 (24.4)
Secondary	3	3.7	8	9.8	11	4.9	22 (26.8)
Tertiary	2	2.4	6	7.3	6	7.3	14 (17.1)
Calculated average educational attainment	Quranic		Primary		Secondary		-

Source: Survey data (February 2015) at NAERLS adopted villages in Tudun-Iya, Nwogi and Okolo

The demographic data (Table 4.1.1a) showed that majority (37.8%) of the farmers belonged to the 36-50 year age bracket, followed by the 51-65 years bracket (28.0%). The mean age of farmers was 43 years for Tudun Iya, 46 years for Okolo and 45 years for Nwogi. The mean age of farmers for the three villages was 45 years. Also, 61.0% of the farmers had over 15 years of farming experience. The mean years of farm experience was 15 for Tudun Iya, 14 for Okolo and 15 for Nwogi. The mean year of experience was 15 for the three villages. About 35% of the farmers earned between 5,000 and 15,000 naira monthly; followed by the 20.7% others who earned less than 5,000 naira. The average monthly income of farmers was 15,00 naira in Tudun Iya, 19,500 in Okolo and 17,250 in Nwogi. Mean famers' income was 7,250 naira for the three villages.

Table 4.1.1b: Demographic data on extension specialists and package producers at NAERLS

	Specialists		**Producers**	
Item	*Freq.*	*%*	*Freq.*	*%*
Highest educational qualification				
OND/HND/NCE 29	5	41.7	1	11.1
BA/BSc 33	3	25.0	4	44.5
Masters 33	3	25.0	4	44.5
PhD	1	8.3	-	-
Experience in NAERLS				
Less than 5 years	1	8.3	-	-
5-9 years	5	41.7	7	77.8
10-14 years	-	-	-	-
15 years and Above	6	50.0	2	22.2
Experience in extension				
Less than 5 years	-	-	-	-
5-9 years	3	25.0	4	44.5
10-14 years	1	8.3	-	-
15 years and Above	8	66.7	5	54.5
Involvement level in adopted village project				
Very Highly (Village coordinator)	3	25.0	-	-
Highly (Village Facilitator)	6	50.0	-	-
Moderately (Regular Resource Person)	3	25.0	-	-
Not often (occasional visit/field work)	-	-	-	-

Source: Survey data (February 2015) at NAERLS headquarter, Zaria and zonal offices in Kano, Badegi and Ibadan.

The demographic data on extension specialists and extension package producers (Table 4.1.1b) showed that while 8.3% of the specialists were male and 16.7% female, 88.9% of the producers were male and 11.1% female. Also, the result showed that the largest percentage (41.7) of specialist respondents had Diplomas (HND/OND) and National Certificate in Education (NCE) as highest educational qualification, while the highest percentage (44.5) of extension package producers was obtained for bachelor's and master's degree holders. With regard to work experience in the institute under study, half of the specialist respondents (50%) had worked for 15 years and more, while 41.7% of them had between 5 and 9 years of experience. For the extension package producers, the number was divided between those who had worked for 5-9 years (77.8%) and those who had worked for 15 years and above (22.2%). Pertaining to work experience in general extension, 66.7% of the specialist respondents had 15 years and above, while 44.5% of producer respondents had 5-9 years and 54.5% had 15 years and above.

4.1.2 Extension approaches and channels of NAERLS for communicating with farmers in the adopted villages

In measuring this objective, two sets of data were gathered. The first set concerns appraisal of the extension approach as well as channels used for conveying messages to farmers of the adopted villages. The second set of data concerns the impact of communication efforts of NAERLS on agricultural productivity of farmers in the adopted villages. The second set of data also addresses the influence of particular communication channels on the uptake of specific disseminated agricultural technology. Consequently, the data presentation and analysis are done under two sub-themes.

a. NAERLS Extension Approaches and Channels

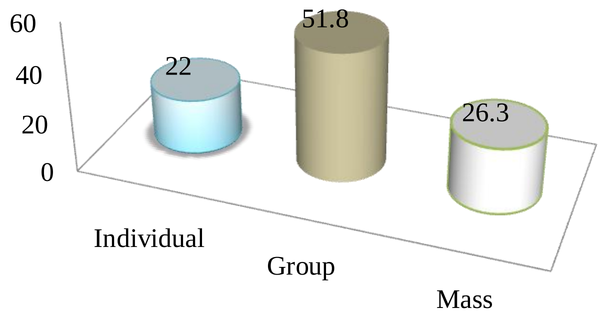

Figure 4.1: NAERLS communication approaches in its adopted villages

Source: Field data (February 2015) among NAERLS extension specialists and package producers

The data on extension communication approaches used by NAERLS (Figure 4.1) for farmers in the selected adopted villages showed that the Institute practised three extension approaches (individual, group and mass-mediated). However, the data showed that the group approach was the most prevalent, as it had the highest response of 51.8%. The mass-mediated approach came second with 26.3% of the responses, while the least used (22.0%) was individual approach.

Table 4.1.2a: Extent of farmers' access to communication packages in NAERLS adopted villages

SN	Communication package	Weighted Mean			
		Tudun Iya	**Okolo**	**Nwogi**	**Table mean**
1	Farm Visit	2.7	2.7	2.8	2.8
2	TV	1.9	1.7	1.7	1.8
3	Radio	3.0	3.0	3.0	3.0
4	Field Demonstration	2.6	2.4	2.5	2.5
5	Empowerment Training	2.8	2.8	2.6	2.7
6	Poster/Flipbook	1.5	1.8	1.8	1.7
7	Multimedia CD	1.4	1.5	1.6	1.5
8	Mobile Phone	2.1	2.0	1.9	2.0
9	**TOTAL WEIGHTED MEAN**	**2.5**	**2.2**	**2.2**	**2.3**

Source: Survey data (February 2015) among farmers in selected NAERLS adopted villages.

The data on extent of farmers' use of NAERLS communication channels (Table 4.1.2a) showed that, of the eight (8) channels measured, four (4) (namely, radio, farm visit, field demonstration and empowerment training) were most frequently accessed across the study villages (Tudun Iya, Okolo and Nwogi). However, radio, with weighted mean (WM) of 3.0, was the most frequently accessed. The least accessed channel was multimedia CD (1.5). Among the villages, Tudun Iya had the highest access to NAERLS communication channels, with a weighted mean of 2.5, while Okolo and Nwogi had 2.2 each. Overall, the data showed that farmers in the study sites had high access to the channels, with 3.2 weighted mean.

b. Impact of NAERLS Communication Activities on Farmers Productivity

Table 4.1.2b: Farmers' assessment of the impact of NAERLS communication on agricultural productivity in the adopted villages

SN	Item	Weighted Mean			Table mean
		Tudun Iya	**Okolo**	**Nwogi**	
1	Crop production/Farm yield	2.2	1.9	1.9	**2.0**
2	Income level	1.5	1.1	1.2	**1.3**
3	Access to inputs	1.8	1.7	1.6	**1.7**
4	General awareness about good practices	2.0	2.4	2.1	**2.2**
5	Weed and Pest Control (chemicals)	2.5	2.4	2.3	**2.4**
6	Marketing Decisions	2.1	1.9	2.0	**2.0**
7	Housekeeping/Management	1.5	1.2	1.1	**1.3**
8	Self-empowerment	1.5	1.0	1.2	**1.3**
	TOTAL WEIGHTED MEAN	**1.9**	**1.7**	**1.7**	**1.8**

Source: Survey data (February 2015) among NAERLS farmers in the three selected adopted villages

The data on impact of NAERLS communication activities on farmers' production indices in the adopted villages are presented in Table 4.1.2b. The data showed that impact on productivity was higher in Tudun Iya, with a weighted mean of 1.9, than in Okolo and Nwogi, which both had weighted means of 1.7. With regard to impact areas generally, only four (4) indices were highly impacted upon. These were weed/pest control (2.4 WM), awareness on agronomic practices (2.2), crop production/farm yield (2.0) and marketing decision (2.0). NAERLS communication activities did not consistently impact on income level, access to inputs, housekeeping/ home management, and self-empowerment at the villages. The total weighted mean of 1.8 signified that NAERLS communication activities had insufficient impact on the agricultural productivity of farmers in the study sites.

Table 4.1.2c: Assessment of NAERLS staff on the impact of communication approaches on farmers' productivity indicators in the selected villages

SN	Item	Weighted Mean			Table mean
		Individual	**Group**	**Mass**	
1	Crop production/Farm yield	2.1	2.5	1.7	**2.1**
2	Income level	1.9	2.0	1.6	**1.8**
3	Access to inputs	1.5	2.5	2.1	**2.0**
4	General awareness about good practices	1.5	1.7	1.8	**1.7**
5	Weed and Pest Control (chemicals)	1.6	2.0	1.2	**1.9**
6	Marketing Decisions	1.7	1.9	2.1	**1.9**
7	Housekeeping/Management	1.8	2.0	1.3	**1.7**
8	Self-empowerment	1.3	1.8	1.6	**1.6**
	TOTAL WEIGHTED MEAN	**1.6**	**2.1**	**1.7**	**1.8**

Source: Survey data (February 2015) among NAERLS extension specialists and package producers, Zaria

The data on the assessment of NAERLS staff (both extension specialists and extension package producers) regarding the impact of the Institute's communication approaches on farmers' productivity indicators (Table 4.1.2c) showed that the group approach was significantly impactful, with total weighted mean of 2.1. The least impactful was individual approach, which had 1.6 total weighted mean. Across the table, the group approach had significant impact on all but three (3) items: marketing decision (1.9), self-empowerment (1.8) and general awareness on good practices (1.7). On the other hand, the mass-mediated approach had significant impact only on two (2) items: access to inputs, and marketing decisions, which both had 2.1 weighted means. The individual approach had significant impact only on one item: crop production yield (2.1). Also across the table, all the approaches jointly had significant impact on crop production yield and access to inputs, with 2.1 and 2.0 table means respectively. The total table mean of 1.8, however, meant that NAERLS communication approaches were not significantly impactful on the productivity indicators of farmers at the selected sites.

Table 4.1.2d: Farmers' assessment of channels' influence on agricultural technology adoption in NAERLS adopted villages

SN	Agric technology	Weighted Mean by channels								Table Mean
		Farm visit	*TV*	*Radio*	*F. Demo*	*Training*	*Poster/ Flipbk*	*Multim. CD*	*M. Phones*	
1	Improved seeds/ seedlings	2.6	1.1	2.6	3.0	2.6	1.5	1.3	2.8	**2.2**
2	Improved livestock/ livestock feeds	2.2	1.2	2.0	2.3	2.0	1.2	1.1	1.8	**1.7**
3	Recommended agronomic practices	2.7	1.9	1.9	2.8	2.8	1.2	2.1	1.4	**2.1**
4	Use of farm chemicals	2.0	1.3	1.9	2.2	2.3	1.1	1.1	1.2	**1.8**
5	Diseases/ Pests control	1.7	1.5	1.8	2.7	2.5	1.4	1.4	1.1	**1.8**
6	Postharvest processes	1.4	1.6	2.0	2.0	2.0	1.2	1.4	2.0	**1.7**
7	Home utilization	1.8	1.7	1.8	2.1	2.3	1.1	1.2	1.5	**1.7**
	TOTAL W. MEAN	**2.1**	**1.5**	**2.0**	**2.4**	**2.4**	**1.2**	**1.4**	**1.7**	**1.8**

Source: Survey data (February 2015) among farmers in Tudun Iya, Okolo and Nwogi villages.

Table 4.1.2d presents a combined presentation of data on the perception of farmers of Tudun Iya, Okolo and Nwogi villages on the influence of NAERLS communication channels on agricultural technology adoption. The analysis was combined because, on a village basis, there was not much difference in their individual results. The data in Table 4.2b showed that only farm demonstration and empowerment training were consistent in influencing technology adoption across the table. On the other hand, the data showed that television and poster/flipbook were consistent in poorly influencing technology adoption. Taken together, the data showed that the uptake of two (2) agricultural technologies (improved seed/seedling, and recommended agronomic practices) were only significantly influenced by the channels, with table means of 2.2 and 2.1 respectively. With regard to individual channel influence on technology adoption, the data showed that farm demonstration (2.4 WM), empowerment training (2.4 WM), farm visit (2.1 WM) and radio (2.0 WM) had sufficient impact on adoption. However, the total weighted mean result (1.8) meant that NAERLS communication channels did not considerably influence technology uptake by farmers in the study villages.

Table 4.1.2e: Extension staff' assessment of channels' influence on agricultural technology adoption of farmers in NAERLS adopted villages

SN	Channel	Weighted Mean								Table Mean
		Farm visit	*TV*	*Radio*	*F. Demo*	*Training*	*Poster/ Flipbk*	*Multim. CD*	*M. Phones*	
1	Improved seeds/ seedlings	2.7	1.3	2.4	2.9	2.4	1.4	1.8	2.0	**2.1**
2	Improved livestock/ livestock feeds	2.0	1.6	2.3	2.1	2.3	1.7	1.6	2.6	**2.0**
3	Recommended agronomic practices	2.8	2.0	2.4	2.5	2.6	1.9	2.0	1.8	**2.3**
4	Use of farm chemicals	2.2	1.5	1.8	2.6	2.1	1.5	1.4	1.5	**1.8**
5	Diseases/ Pests/ Rodent control	2.1	1.9	2.0	2.2	3.0	1.4	1.3	1.6	**1.9**
6	Postharvest processes	1.3	1.6	2.3	1.7	1.8	1.2	1.2	2.2	**1.6**
7	Home utilization	1.5	1.4	1.5	1.9	2.7	1.4	1.7	1.2	**1.7**
	TOTAL W. MEAN	**2.0**	**1.7**	**2.0**	**2.2**	**2.3**	**1.5**	**1.6**	**1.8**	**1.9**

Source: Survey data (February 2015) among NAERLS extension specialists and package producers, Zaria

The data in Table 4.1.2e are also the combined presentation of the perception of extension specialists and extension package producers on the influence of NAERLS communication channels on the uptake of agricultural technologies in the study locations. Unlike what obtained for the farmers' data in Table 4.2c, the data in Table 4.2d showed that no channel had overwhelming influence on all the technology areas; but poster/flipbook again showed consistent poor performance on technology uptake by farmers. However, on individual channel basis, the total weighted mean showed that training (2.3 WM), farm demonstration (2.3), radio and farm visit were highly influential in technology adoption. The total weighted mean of 1.9 implied that NAERLS communication channels fell a bit short of influencing technology adoption in the study villages.

4.1.3 Involvement of farmers in NAERLS agricultural matters and initiatives

Table 4.1.3a: Perception of farmers on their involvement level in NAERLS agricultural initiatives at the study sites

SN	Event	Weighted means Tudun Iya	Okolo	Nwogi	Table mean
1	NAERLS visits the village for mutual interaction	2.5	2.6	2.2	2.4
2	Farmer groups are invited to NAERLS	1.5	1.3	1.3	1.4
3	Individual farmers visit NAERLS on matters pertaining to their farms	1.3	1.2	1.4	1.3
4	NAERLS seeks consent of farmers before agricultural events are organized in village	1.9	1.5	1.7	1.7
5	NAERLS jointly plan agricultural events with farmers before they take place	1.3	1.4	1.6	1.4
6	NAERLS and Farmers jointly execute/implement agricultural projects	2.6	2.2	2.4	2.4
7	NAERLS informs farmers of agricultural events before they take place in the village	2.4	2.2	2.0	2.2
8	There is a level of cost/resource sharing between NAERLS and farmers on agricultural projects at the village	1.5	1.2	1.4	1.4
9	NAERLS actively involves farmers in project evaluation study/survey, including discussion of results	1.2	1.5	1.2	1.3
10	NAERLS is well disposed to farmers' opinions on agricultural matters	2.0	1.9	2.1	2.0
11	NAERLS promptly attends to farmers' complaints	2.4	2.0	2.1	2.2
	TOTAL WEIGHTED MEAN	**1.9**	**1.7**	**1.8**	**1.8**

Source: Survey data (February 2015) among farmers in the three selected adopted villages.

The data on NAERLS interaction with farmers of the selected adopted villages with regard to agricultural matters and initiatives (Table 4.1.3a) showed that farmers in Tudun Iya had more interaction level with the study Institute than those of Okolo and Nwogi villages, with total weighted means of 1.9, 1.7 and 1.8 respectively. Of the eleven (11) items listed, only four had weighted means of significance across the villages—these were NAERLS' visits to the villages for mutual interaction, the joint execution of agricultural projects, NAERLS informing farmers before agricultural events take place, and the Institute's prompt attention to farmers' suggestions. The total weighted means on the perception of farmers (1.8) signified that the Institute was not involving farmers enough in agricultural matters and initiatives.

Table 4.1.3b: Perception of extension staff on the extent of NAERLS' interaction with farmers in agricultural initiatives at the selected adopted villages

SN	Event	Weighted means Producers	Specialists	Table mean
1	NAERLS visits the village for mutual interaction	2.2	2.5	2.4
2	Farmer groups are invited to NAERLS	1.8	2.1	2.0
3	Individual farmers visit NAERLS on matters pertaining to their farms	1.6	1.5	1.6
4	NAERLS seeks consent of farmers before agricultural events are organized in village	1.6	1.8	1.7
5	NAERLS jointly plan agricultural events with farmers before they take place	1.6	2.0	1.8
6	NAERLS and Farmers jointly execute/implement agricultural projects	2.1	2.4	2.2
7	NAERLS informs farmers of agricultural events before they take place in the village	2.2	2.8	2.0
8	There is a level of cost/resource sharing between NAERLS and farmers on agricultural projects at the village	1.2	1.4	1.3
9	NAERLS actively involves farmers in project evaluation study/survey, including discussion of results	1.2	1.5	1.4
10	NAERLS is well disposed to farmers' opinions on agricultural matters	2.2	2.3	2.5
11	NAERLS promptly attends to farmers' complaints	1.8	2.2	2.0
	TOTAL WEIGHTED MEAN	**1.6**	**2.0**	**1.8**

Source: Survey data (February 2015) among NAERLS extension specialists and package producers, Zaria

Table 4.1.3b presents data on the perception of extension specialists and producers about NAERLS interaction with farmers of the selected adopted villages in its agricultural matters and initiatives. The data showed that the highest area of farmers' involvement, as shown by the table means, was in NAERLS' disposition to farmers (2.5), which was followed by the Institute's visit to the villages for dialogue (2.4). The least area of participation was in NAERLS/farmers' cost-sharing initiative, which had a table mean of 1.3; this was followed by active participation of farmers in project evaluation (1.4). However, the data also showed that the total weighted mean of the perception of extension package producers (1.6) on farmers' level was poor, while that of extension specialists was marginally high (2.0). The total weighted mean of 1.8 for the table implied that farmers' participation level in NAERLS agricultural matters and initiatives, as perceived by the Institute's staff, was low.

Table 4.1.3c: Perception of NAERLS media package producers on their involvement of farmers in media packaging activities

SN	Activity	Weighted Mean
1	Field Assessment/ situational appraisal	1.7
2	Preliminary Message development/ design	1.4
3	Information gathering	2.3
4	Scripts/ manuscript writing	1.3
5	Programme presentation (voicing, hosting, etc)	2.0
6	Postproduction evaluation (on the field)	1.2
7	Postproduction editing (studio/office level)	1.5
	TOTAL WEIGHTED MEAN	**1.6**

Source: Survey data (February 2015) among NAERLS extension package producers, Zaria.

The data in Table 4.1.3c present information on farmers' participation in NAERLS' communication packaging activities. These activities cover preproduction work to postproduction and dissemination evaluation. The analysis showed that NAERLS always actively involved farmers in only two activities, which were information gathering and programme presentation, which had 2.3 and 2.0 weighted means respectively. The rarest area of participation was in postproduction field evaluation of communication materials, which had 1.2 weighted mean. The total weighted mean of 1.6 indicated that NAERLS rarely actively involved farmers in the study locations in its communication activities.

Table 4.1.3d: Farmers' perception of their use of NAERLS' feedback channels

SN	Channel used	Weighted mean			Total mean
		Tudun Iya	**Okolo**	**Nwogi**	
1	Visit to NAERLS office	2.1	2.4	2.6	2.4
2	Mobile phone (Calls)	2.3	2.2	2.8	2.4
3	SMS/Text message	1.2	1.6	1.6	1.5
4	Emails and social media	1.3	1.3	1.2	1.3
5	Letter writing	1.2	1.0	1.2	1.1
6	During evaluation visits/study	1.5	1.8	1.9	1.7
	TOTAL WEIGHTED MEAN	**1.6**	**1.7**	**1.9**	**1.7**

Source: Survey data (February 2015) among farmers in the three selected adopted villages.

With regard to farmers' perception of their use of NAERLS feedback channels, the data in Table 4.1.3d showed that only personal visit to NAERLS office and the use of mobile phone (call) were frequently accessible to across the three selected study villages, with total mean of 2.4 each. On individual village basis, the result showed that farmers in Nwogi had the highest access to the channels, with total weighted mean of 1.8, while those of Tudun Iya had the least access, with a total weighted mean of 1.6. The least accessed feedback channel across the table was letter writing (1.1); followed by email and social media (1.3). The total weighted mean of 1.7 showed that there was inadequate interaction between farmers of the study adopted villages and NAERLS through the feedback channels.

4.1.4 Communication barriers affecting farmers' adoption of agricultural technologies

In measuring the objective on barriers affecting technology adoption, the data analysis and presentation were done at two levels. The first set of data concerned barriers that were perceived to be present or inherent in the Institute's communication activities, while the second set related to barriers that were considered external or extraneous to the communication activities of the study Institute.

Table 4.1.4a: Farmers' perception of barriers inherent in NAERLS communication activities affecting technology adoption in the study locations

SN	Item	Weighted Mean			Table mean
		Tudun Iya	**Okolo**	**Nwogi**	
1	The communication channel is inappropriate	1.8	2.0	2.3	2.0
2	We cannot access communication channel	2.2	2.1	2.4	2.2
3	Format of message delivery is inappropriate	2.1	2.5	2.5	2.4
4	Method of message delivery is faulty	1.9	2.1	2.4	2.1
5	Language of message delivery is inappropriate	1.3	1.7	1.4	1.8
6	Time of message delivery is inappropriate	2.1	2.0	2.4	2.2
7	We are not carried along in the design of message	2.4	2.5	2.6	2.5
8	NAERLS messages don't respect our cultural values	2.1	2.0	2.1	2.1
9	We don't trust NAERLS and its messages	1.2	1.3	1.1	1.2
	TOTAL WEIGHTED MEAN	**1.9**	**2.0**	**2.1**	**2.0**

Source: Survey data (February 2015) among farmers in the three selected adopted villages

The data in Table 4.1.4a are on farmers' perception of the barriers inherent in NAERLS communication activities affecting technology adoption in the study villages. The data showed that only two (2) of the nine (9) tested barriers were not strong enough to impact on technology adoption. These were farmers' distrust for NAERLS as information source and inappropriate language use by the study Institute, which had total means of 1.2 and 1.8 respectively. The most significant barrier to technology adoption was 'farmers not being carried along in the message design,' which recorded table mean of 2.5; followed by inappropriate format of message delivery, with 2.4 table mean. On a village basis, Nwogi had the highest, while Tudun Iya had the least total weighted mean of 2.1 and 1.9 respectively with regard to communication barriers affecting technology adoption. The total weighted mean for the table (2.0) indicated that the tested barriers were high enough to affect agricultural technology adoption in the study villages.

Table 4.1.4b: Perception of extension specialists and extension package producers on communication barriers inherent in NAERLS activities that affect farmers' technology adoption in the study villages

SN	Item	Weighted Mean		Table
		Specialists	Producers	mean
1	Inappropriate communication channel	2.0	2.2	2.1
2	Inaccessible communication channel	2.1	2.3	2.2
3	Inappropriate message format	2.0	1.8	1.9
4	Faulty method of message delivery	1.9	1.7	1.8
5	Inappropriate language of message delivery	1.5	1.7	1.6
6	Inappropriate time of delivery	1.9	2.5	2.2
7	Farmers are not carried along in the design of message	2.1	2.4	2.3
8	Lack of trust for NAERLS as information source	1.2	1.3	1.3
9	Lack of consideration for farmers' cultural values	2.0	2.1	2.1
	TOTAL WEIGHTED MEAN	**1.9**	**2.0**	**2.0**

Source: Survey data (February 2015) from NAERLS extension specialists and package producers, Zaria.

The data on inherent communication barriers affecting technology adoption by farmers in NAERLS adopted villages, as perceived by staff of the study Institute, are presented in Table 4.1.4b. Of the nine (9) barriers tested, the result showed four (4) as being insignificant. These four barriers were: farmers' distrust for NAERLS as information source, which had table mean of 1.3, inappropriate language of message delivery (1.6), faulty method of message delivery (1.8) and inappropriate message format (1.9). Just as it was with farmers' data above (Table 4.1.4a), the strongest inherent communication barrier identified by the respondents was 'farmers not being carried along in the message design', with table mean of 2.3, while the least significant barriers were disregard for farmers' cultural values (2.1) and inappropriate communication channel (2.1). The total weighted mean for the table (2.0) signified that the tested barriers were high enough to impact agricultural technology adoption in the study sites.

Table 4.1.4c: Farmers' perception of the extraneous communication barriers affecting technology adoption in the study locations

SN	Item	Weighted Mean			Table mean
		Tudun Iya	**Okolo**	**Nwogi**	
1	Generally, I don't like change	1.6	1.5	1.7	1.6
2	Old methods of doing agricultural work are still better	1.5	1.6	1.6	1.6
3	Some innovations do not respect our cultural values	2.6	2.5	2.3	2.5
4	I cannot afford the cost of new innovations	2.6	2.5	2.2	2.4
5	Some innovations are not readily available/accessible	2.2	2.3	2.3	2.3
6	I have been disappointed before by certain innovations	2.3	2.1	2.5	2.3
7	There are too many conflicting information	1.8	2.0	2.3	2.0
8	I don't trust the information I received	1.6	1.7	1.8	1.7
9	I don't trust the intention of NAERLS	1.6	1.7	1.5	1.6
10	I don't trust the intention of government and its policies	2.3	2.4	2.6	2.5
11	Extension people are arrogant, giving too much regard for their 'book knowledge'	1.6	1.5	1.6	1.5
	TOTAL WEIGHTED MEAN	**2.0**	**2.0**	**2.1**	**2.0**

Source: Survey data (February 2015) among farmers of selected NAERLS adopted villages.

Table 4.1.4c presents data on the perception of farmers on the extraneous communication barriers to technology adoption in their villages. The result showed that, of the eleven (11) barriers listed, five (4) were not substantial enough to have affected technology adoption. These were: that extension people are arrogant, which had table mean of 1.5; farmers did not like change (1.6); old methods of agricultural work are better than new ones (1.6); farmers' distrust for NAERLS (1.6); and farmers did not trust the information from NAERLS (1.7). The strongest extraneous communication barriers identified were innovation's disregard for farmers' cultural values, and the lack of trust for government's intentions, which both had table means of 2.5. On village basis, Nwogi had the highest total weighted mean (2.1) than Tudun Iya (2.0) and Okolo (2.0). The total weighted mean for the table, which was 2.0, implied that all the extraneous barriers listed were jointly considered by farmers as having high impact on agricultural technology adoption in their villages.

Table 4.1.4d: Extraneous communication barriers affecting adoption as identified by NAERLS staff

SN	Item	Weighted Mean		Table
		Specialists	**Producers**	**mean**
1	Farmers do not like change of status quo	1.5	1.6	1.6
2	Farmers prefer old methods of farm practices to new ones	1.6	1.4	1.5
3	Innovations do not take farmers' cultural norms into consideration	2.2	2.4	2.3
4	Farmers cannot afford the cost of new innovations	2.4	2.5	2.5
5	Farmers feel they are not carried along in the development of new techniques	2.4	2.6	2.5
6	The innovations are not readily available to farmers	2.2	2.4	2.3
7	Farmers fear that government could abandon support for agricultural technology disseminated (due to policy inconsistency)	2.6	2.5	2.6
	TOTAL WEIGHTED MEAN	**2.1**	**2.2**	**2.2**

Source: Survey data (February 2015) among NAERLS extension specialists and package producers, Zaria.

Table 4.1.4d presents data on the perception of NAERLS staff of the barriers extraneous to the Institute's communication activities affecting adoption of agricultural innovations. Of the seven (7) barriers listed, the result showed that two (2) had no significant influence on technology adoption. Just as mentioned above on farmers' data (Table 4.1.4c), these barriers had to do with farmers' attitude to change: that farmers preferred old methods of farming to new ones, with table mean of 1.5 and that farmers did not like change (1.6). The strongest extraneous barrier to adoption was 'farmers' fear that government could abandon support for agricultural technology' which had 2.6 table mean; this was followed by unaffordability of technology and the non-inclusion of farmers in technology design, which both had 2.5 table means. Generally, the total weighted means for extension specialists (2.1) and extension package producers (2.2) were high and significant. And the total weighted mean for the table, which is 2.2, signified that the barriers were high enough to have influenced agricultural technology adoption in the study villages.

4.1.5 Measures for improving communication for enhanced agricultural productivity in NAERLS adopted villages

Table 4.1.5a: Farmers suggestions for improving NAERLS agricultural communication

SN	Item	Weighted means			Table
		Tudun Iya	**Okolo**	**Nwogi**	**Total**
1	Listen more to farmers complaints, observations and suggestions	2.2	2.4	2.2	**2.3**
2	Involve farmers more in its communication packages	2.0	2.6	2.3	**2.3**
3	Make broadcast schedules such that farmers can access with ease	2.3	2.4	2.6	**2.4**
4	Take farmers' cultural values into consideration	2.2	2.4	2.3	**2.5**
5	Work on language of communication for proper understanding	1.2	1.3	1.2	**1.2**
6	Design communication packages to fit into farming context	2.4	2.3	2.6	**2.4**
	TOTAL WEIGHTED MEAN	**2.1**	**2.3**	**2.2**	**2.2**

Source: Survey data (February 2015) among farmers of selected NAERLS adopted villages.

The data in Table 4.1.5a showed that only the language of communication, with table mean of 1.2, was found not to need improvement by all the farmers in the study sites. The fact that NAERLS has not been giving enough consideration to farmers' cultural values had the highest table mean of 2.5. On a village basis, the perception of farmers from Okolo had the highest total weighted mean of 2.3, while those of Tudun Iya had the least (2.1). With total weighted mean of the table being 2.3, the respondents indicated that NAERLS needs to work towards improving its communication activities for better agricultural outcomes.

Table 4.1.5b: Extension package producers' suggestions for improving NAERLS media packages

SN	Item	Weighted Mean
1	Idea conception/ programme conceptualization	2.9
2	Information gathering	2.9
3	Scriptwriting/ manuscript writing	2.3
4	Programme presentation	2.1
5	Postproduction editing (that is, electronic)	2.4
6	Individual programme production (single or in episodes)	2.2
7	Programme/ material packaging (finishing)	2.3
8	Project coordination	2.1
9	Coordinating farm broadcast activities	2.0
	TOTAL WEIGHTED MEAN	**2.4**

Source: Field survey in February 2015 among NAERLS extension package producers, Zaria

The data in Table 4.1.5b showed all the items listed with regard to extent of improving elements of NAERLS' communication package production were found to be substantial, with idea conception and information gathering having the highest weighted means of 2.9 each. Farm broadcast coordination was the area requiring least improvement, with 2.0 weighted mean.

Table 4.1.5c: Perception of package producers on how to improve NAERLS communication quality

SN	Item	Weighted mean
1	Periodic (institutional) programme/project review and planning	3.0
2	Periodic programme review and planning with other extension stakeholders	2.6
3	Institutional package/production preview panel	2.7
4	Audience feedback	2.3
5	Use of outsourced professionals for review	1.7
6	Use of communication strategy document as guide	3.0
	TOTAL WEIGHTED MEAN	**2.6**

Source: Field survey in February 2015 among NAERLS extension package producers, Zaria

The data on measures for improving NAERLS communication quality control (Table 4.1.5c) showed that the highest weighted mean of 3.0 was obtained for periodic institutional project review and the use of communication strategy document as guide; this was followed by institutional package production review panel (2.7) and periodic programme review and planning meeting with other stakeholders (2.8). The analysis further showed that the least area of improvement is the outsourcing of extension communication professionals as control mechanism, with 1.7 weighted mean. Overall, the table mean of 2.6 showed that NAERLS must work towards improving on its communication control mechanisms.

Table 4.1.5d: Perception of NAERLS staff on government's intervention areas for improving agricultural communication in the adopted villages

SN	Item	Weighted mean
1	More funds to the agriculture sector	3.0
2	Increased funding for research and extension	3.0
3	Increased staff training	2.9
4	Procurement of modern equipment for information gathering, processing and dissemination	2.8
5	Recruitment of more extension staff	2.2
6	Provision of communication-support infrastructure	2.7
7	Legislation of a national extension policy	3.0
	TOTAL TABLE MEAN	**2.8**

Source: Field survey in February 2015 among NAERLS extension specialists and package producers.

Table 4.1.5d presents data on the extent of need for government's interventions in achieving efficient agricultural communication in Nigeria. The highest weighted mean of 3.0 each was recorded for increase funding to the agriculture sector and for research and extension, as well as for the need to legislate for a national extension policy. This was followed by the need to increase staff training (2.9) and to procure modern information gathering, processing and dissemination equipment (2.8). The least weighted mean of 2.2 was obtained for recruitment of more extension staff. The total weighted mean of 2.8 obtained for the table suggested that the need for government's intervention in all the areas measured is significant.

4.2 **Discussion of Findings**

Based on the above presentation and analysis, this section will attempt to draw out the implications of each of the findings for the objectives, cross-referencing these, where necessary, with data from the Key Informant Interview and observation. In this section too, the discussion will be taken holistically and not segmented under different subtitles (or objectives), although the flow of thought would naturally follow the pattern of data presentation and analysis for the purpose of logic and coherence.

The finding that NAERLS practised predominantly group extension agrees with Gachie and Ruault (2010) who reported that a very important extension method in the developing worlds, and in consonant with global trend in information use and management, is the group approach, also called the T&D (training and demonstration) method. Also, Adekoya and Tologbonse (2011), Igbokwe (2011), and Arokoyo (2014) affirmed that this method involves the use of field schools and on-farm adaptive research (OFAR). This finding was also in consonance with observations from the field, where in each study location, farmers came and sat in groups, so much that questionnaire administration on individual farmers was perceived by them as a deviation from the norm.

However, the finding on the predominance of group communication approach seemed to be quite different from what the data from the Key Informant Interview suggested. The data from the Key Informant Interview (KII) were to the effect that the institute used group extension approach for all its activities. The KII (1) respondent had explained that NAERLS used group extension approach since the late 1990s when the Training and Visit (T&V),

which focuses on the individual farmer or farm family, was discontinued. The T&V approach was brought to Nigeria by the World Bank in the 1970s, and it led to the establishment of Agricultural Development Project (ADP) system (Morency, 2010:58).

In the late 1980s, NAERLS was mandated by the Agricultural Monitoring and Evaluation Unit (AGMUE) of the Project Coordinating Unit (PCU) to assess the T&V model and it was found to be ‘too expensive to run and was not tenable because it was not practical...’ The World Bank then conducted an independent research and came up with the same conclusion; hence, the T&V system was replaced with T&D (Training and Demonstration) system, which builds on group dynamics and participatory development approach (Arokoyo, 2009). The KII(1) respondent stated:

> Towards the end of the 1990s, NAERLS adopted the group or participatory extension approach for its farmers and this is what we use in our adopted villages. The approach deals more with farmers’ groups rather than the individual farmers or farm families. In extension parlance, a farmer group consists of ten (10) to fifteen (15) persons, usually of the same gender; and they are never more than 20 persons. This approach is more advantageous because: there is group dynamics; it is less expensive than the individual approach; and there are several opportunities and benefits that farmers can key into today through the avenues of government initiatives and the modern trend in participatory communication for agricultural development. *(Researcher’s interview with KII respondent, Dr. I.Y. Ismaila (NAERLS Director) 24 March 2015 at his office in ABU Zaria*)

The implication of the data above is that NAERLS practised the group extension approach after the failure of the individual approach. This means that while, in principles the Institute practised the participatory model, in practice the extension workers engaged the farmers using multiple approaches, perhaps due to the absence of a guiding communication strategy. However, the finding confirmed the relevance of mass-mediated approach, as have been earlier explained in the study. Moreover, the KII(1) respondent had pointed out that:

> Generally, extension approaches are divided into three: the individual approach, group approach, and mass approach.... The mass approach uses the mass media to reach farmers. Ordinarily, this method is not often used in isolation but as a strengthening method for any of the other two. Therefore, NAERLS has been

> employing the group approach, strengthened with the mass approach. *(Researcher's interview with KII respondent, Dr. I.Y. Ismaila (NAERLS Director) 24 March 2015 at his office in ABU Zaria*)

The implication of both quantitative and qualitative data above is that while, in principle the Institute practised the participatory model, in practice the extension workers engaged farmers using multiple approaches, perhaps due to the absence of a guiding strategy. The differing findings from the quantitative and qualitative data have implication for the relevance of a guiding communication framework. In support of this, Agbamu (2006; 2011) and Torimoro and Kolawole (2011) explained the importance of institutional communication strategy to organizational efficiency. The fact that the demographic data showed that 66.7% of the sampled extension agents had 15 or more years experience on the job showed that a majority of them witnessed the change from individual approach to group approach. Hence, the continued presence of the individual approach in the Institute' communication activities could be a sign of the disconnect between principle and practice.

The other consequence of this disconnect was the non-discriminatory use of communication channels for the diverse farming audiences in the adopted villages. Perhaps this explains the differing access level to communication channels found for the study sites, in which Tudun Iya had more access than Okolo and Nwogi villagres. Indeed, the KII data also revealed that NAERLS was under no obligation by government to practise a specific extension approach—which was in line with the stance of Arokoyo (1998), Nwajiuba (2012) and others that Nigeria has no policy regulating agricultural extension activities. But the KII data also showed that the absence of a regulating policy framework did not mean that NAERLS should practice agricultural communication in a disorganized manner. The KII (2) respondent, who is the national coordinator of Agricultural Extension Transformation Agenda (AETA), explained:

> There is no existing national communication framework that supposedly guides NAERLS dissemination activities... But this doesn't mean that NAERLS should do haphazard extension activities. There are several platforms and approaches that the Institute can choose from. What matters in the end, however, is knowing the factors that influence the selection of an approach. Who is NAERLS communicating with? In what situation and circumstance? What is the message it intends to communicate? What is the organization's mandate and philosophy on extension? Does the institute think farmers are passive receivers of information? In the new development paradigm, the audience is central, so much that the word 'beneficiary' of extension communication applies to all participants in the communication context. Until you have this concept, you cannot have a successful participatory communication approach. *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

The KII information above revealed two major issues. The first concerns the absence of a guiding national document on extension, which confirmed the findings of other scholars as stated above. The second concerns the fact that NAERLS communication activities were rather unorganized and, hence, the need for the Institute to organize or re-strategise for more effectiveness in its extension communication. In realisation of this, the KII (1) respondent emphasised the significance of the current study, when added that its findings and the resultant communication strategy would go a long way in helping the Institute improve its communication activities in the adopted villages.

With regard to the channels through which NAERLS executes its agricultural activities in the adopted villages, the findings showed the dominance of interpersonal channels (field visit, field demonstration, and empowerment training) and radio—although this was at various levels for the three study sites. On the other hand, television, multimedia CD, posters/flipbook and mobile phone were rarely used. These findings affirmed those of Odiaka (2010) who found, in his study of differential media use among rice farmers in selected villages of North-central Nigeria, that farmers have more access to interpersonal channels and radio than to multimedia CDs, mobile phones and television. Odiaka's study, however, focused more on electronic than interpersonal media. Haruna, Jamilu, Abdullahi and Murtala

(2013), while studying mobile phone ownership and use among farmers in selected sites of northern Nigeria, also found that despite the large-scale ownership, access to agricultural information on mobile phones was very low due partly to the socioeconomics of farmers and the low level of support-infrastructure provision. Moreover, these findings affirmed what had been obtained (above) for the average monthly income of farmers in the study sites—that is, 17,250 naira. Besides, this amount is 1,250 naira short of the minimum wage for the country.

The finding on the high access to interpersonal channels are also in harmony with those of Audu (2003), Abubakar, Ango and Buhari (2009) and Igbokwe (2011) who variously found that interpersonal media far exceed any other media of communication among farmers in Nigerian villages, mainly because of their interactive appeal and the notions of participation and immediate feedback. Ajayi (1999) and FAO (2002a) however, argued that the reason interpersonal media have become the best choice of rural farmers in developing countries is the relative cheap access rather than their interactive and immediacy appeals.

One consequence of the findings on channel access was that television, posters/flipbook and multimedia CD were consistently rarely accessed by all the farmers across the study locations. Haruna, Jamilu, Abdulahi and Murtala (2013) had ascribed reduction in the use of television in extension to high cost of production and airtime, while that of posters/flipbook and multimedia CD was linked by Nwachukwu (2009) to the problem of illiteracy among farmers. Moreover, the marginally high access to mobile phone use in agricultural extension by farmers, especially in Tudun Iya and Okolo villages may not be unconnected with the recent achievement by the e-Wallet Initiative of Agricultural Transformation Agenda, of which mobile phone is a major tool (Ayansina, 2015).

The observation data somewhat supported the poor access to electronic broadcast channels, especially television, as power supply to Okolo and Tudun Iya was said to have reduced drastically from approximately 28 hours and 35 hours per week to about 14 hours and 21 hours per week in Okolo and Tudun Iya respectively since 2014. In Nwogi, the situation was worse for broadcast channel reception, as power supply was only constant between 10am and 3pm when most farmers would have gone to the farm. Observation data also supported the high level access to radio, as mobile phones of most of the farmers were used to access radio programmes on Frequency Modulation (FM) channels.

It is important to note that, although the finding on farmers' access to channels did not suggest the superiority or inferiority of any channel over the others, Windapo and Olaoye (2001), Leeuwis (2008) and Agbamu (2006) have pointed out the components of group dynamics, such as participation, role expectation, interpretation, and appraisal, among others, as ingredients of interpersonal channels that make them unique and powerful media of communication, especially among rural farmers. On the other hand, with the finding on high access to interpersonal channels and radio by farmers in the adopted villages, the fact that these same channels were found to be highly influential to agricultural technology adoption was not surprising. Sasakawa Africa Association and Sasakawa Funds for Extension Education (2013) and NAERLS/FDAE (2014) have also found that poor access to channels directly affects adoption of farm technologies.

Furthermore, the KII data were somewhat remarkable with regard to the finding on the poor impact of NAERLS' communication efforts on farmers' productivity, as well as the role of communication channels in influencing technology adoption in the study locations. Although the group approach had some significant impact on farmers' productivity, the total weighted mean of 1.8 meant that all approaches were not jointly impactful on productivity. Morency

(2010) had pointed out that indiscriminate use of communication channels and approaches cannot produce results beyond the average. The KII data revealed, however, that the Institute had no basis for drawing any objective inference on the impact of its communication efforts on agricultural productivity in the adopted villages. The KII (2) explained:

> Assessing NAERLS communication efforts is a little difficult because the institute itself has not been able to conduct any assessment survey on its performance, nor employ the services of an external body to do same assessment. Besides, today's agriculture deals with evidence-based impact assessment. So what evidence is there on the institute's performance? Until the institute conducts such evidence-based research and employs an external body to do same, we cannot say exactly what impact it has made on agricultural productivity with precision. Perhaps your study would be the beginning of such objective assessment... On the other hand, NAERLS made some strong impact on farmer's productivity in the 1970s and 80s, when facilities were not major challenges for the institute.... But things snapped along the line, from the SAP period [1986] upwards, when government told all media houses to generate money and break even. So NAERLS paid the huge price for airtime for sometime while also reducing the number of production and frequency of broadcasts... *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

The data above are somewhat worrisome, as Rengasamy (2008) has posited that no project or organizational management can be termed effective without the systematic, regular collection and occasional analysis of information to identify and possibly measure changes in its sphere of work over a period of time. The fact that NAERLS had neither done a self-evaluation research or participatory monitoring and evaluation on its communication activities in the adopted villages leaves much to be desired. Rengasamy (2008) had added that performance evaluation research helps understand different stakeholders' perspectives in the communication and/or intervention initiatives, so that they can design better strategies to resolve competing or conflicting views.

On the other hand, the qualitative data also revealed that NAERLS has a conviction that its communication activities have highly impacted on farmers' productivity in their adopted villages. Although, the KII(1) respondent arrived at this conviction through other facts:

> First is the annual Agricultural Performance Survey (APS), which consistently showed general improvement in agricultural performance, distribution of inputs, as well as farmers' education on agronomic practices and government policies even in our villages. Second, we have received commendation letters and awards of exceptional performance from credit institutions and other stakeholders which partnered in the various intervention projects, stating improved income for our farmers, measured by their quick and timely repayment of loans... And third, the success of NAERLS' efforts in improving the livelihoods of farmers in our adopted villages has led the Agricultural Research Council of Nigeria to mandate the institute in 2013 to establish twenty (20) more for the West African Agricultural Productivity Project (WAAPP). *(Researcher's interview with KII respondent, Dr. I.Y. Ismaila (NAERLS Director) 24 March 2015 at his office in ABU Zaria)*

In summary, the finding on communication approaches and channels showed a seeming disparity between what NAERLS actually practised on the field and what should be practised. This apparent disconnect between tenets and practice thus led to haphazard use of communication channels for farmers in the adopted villages, without bias to their socio-cultural, ethno-religious and socioeconomic differences. These indiscriminate communication activities led to the rather poor or inadequate impact of the Institute's efforts on farmers' productivity in the study locations. These finding have various implications for the communication strategy to be developed at the end of the study. First, the strategy will make NAERLS extension approach visible to extension agents as well as other stakeholders. Second, this would enhance standardized and methodological approach to extension communication activities, and therefore discourage haphazard use of channels, messages and broadcast schedules to farmers in the adopted villages. Third, the project evaluation component of the strategy would enhance feedback and impact assessment activities of the Institute.

Moreover, the excitement on the faces of farmers while the research team toured their fields, as well as their cooperation during the study spoke much about their perception of the impact of NAERLS communication activities on the farming business. In a rather informal gesture, Mr Kashim Bala, head of the male rice farmers groups in Nwogi, remarked: "We have become centre of envy among our neighbours, because we get to reap the benefits of every new technology before it gets to any of them...” This statement was supported by his fellow farmers through nonverbal cues.

The findings on farmers’ level of involvement in NAERLS agricultural initiatives showed inadequate participation by farmers in the study sites. Further analysis of the result against Mafalopulos’ (2003) ladder of participation typologies in development initiatives showed that farmers only participated actively at the passive and consultation levels. This means that farmers were neither functional nor empowered participants. Rogers (1995) and Leeuwis (2008) have explained that passive communication participants are usually passive recipients of development initiatives. Scholars have also argued that participation in decision-making (that is, empowered participation) is the most critical to adoption, as it gives people control of their lives and environment.

At the same time, farmers acquire problem-solving skills and acquire full ownership of agricultural projects—two important elements of sustainable community development. FAO (2008), Laogun (2011) and Arokoyo (2014) suggested that participation in decision-making is fundamental and indispensable to sustainable development. In fact, the first three levels of participation in the Mafalopulos’ typology ladder, including the two levels present in NAERLS communication approach, have been criticised as being false participation by Laogun (2011). Laogun believed that participation in decision-making is fundamental and indispensable to sustainable development, and concluded that people are being manipulated through these three other forms of pseudo-participation to accept plans made by more powerful groups.

The finding on low participation level of farmers in the adopted villages was corroborated by observation and KII data. The qualitative data showed that although NAERLS communication approach was intended to be fully participatory (actively involving farmers in the adopted villages as development partners), certain factors had made this impracticable. According to the KII (1) respondent, adopted villages are model villages for testing agricultural technologies, so that the communication processes should necessary begin with the farmers and continue re-evolving around them. But the lack of funding and inadequate staff training had made this inclusion or partnership component difficult and unrealistic. At such a time, the experience and judgement of staff of the Institute are utilized:

> NAERLS is unique in that it is the first of its kind in Africa, serving as a link between the farmer, research institute and the federal government—hence the word *liaison*... But I must confess that due to certain recent constraints, such as lack of funding and inadequate staff training, the situation is not as it ought to be. These constraints have led to a compromise in that arrangement where information dissemination process begins with the farmer. At such a time, the experience and expert judgement of the extension package producer comes to play. *(Researcher's interview with KII respondent, Dr. I.Y. Ismaila (NAERLS Director) 24 March 2015 at his office in ABU Zaria)*

It is noteworthy that the finding on feedback channels available to farmers did not seek to determine the effectiveness or otherwise of the channels but to establish their presence and level of use by farmers. The finding, however, showed that the feedback channels were not appropriate for timely, on-field real-time interaction between NAERLS and farmers in the adopted villages. Interpersonal channels, which were the most used, are not instant and cost a lot of time and resources. Also, the use of phone call seemed expensive for the farmer, considering the results on demographics above, in which majority of farmers (35.4%) earned between 5000 and 15,000 (US$25 – 75) and 20.7% less than ₦5,000 (less than US$25) per month[1]. NAERLS (2014) showed that the price of a bag of NPK fertilizers in Nigerian open

[1] Dollar equivalents were calculated using $1 = N200 according to current exchange rates (Sanu, 2015).

market is ₦6,000. Oladele (2002) explained that feedback is an important indicator of communication success, while Agbamu (2006) stressed that the exchange of relevant agricultural information is incomplete without a strong functional feedback system. Agbamu (2001), however, explained that the development of agricultural technologies requires, among other inputs, a timely and systematic exchange of useful and relevant agricultural information both as initial message and as feedback. Hence, without effective feedback the communication cycle is incomplete.

Consequently, UNICEF (2006) and Okafor (2008) had argued that participation and feedback plays a determinative role in how farmers perceive technological innovation being disseminated to them. As stated earlier, the superiority of group or participatory extension approach (over others) has been hinged on group dynamics (Kolawole, 2011 and Leeuwis, 2008). But the absence of empowered participation and effective feedback circuit in the study Institute means therefore that these 'superior components' are missing, and that the goal of achieving sustainable agricultural development in the adopted villages might not be feasible until the components are mainstreamed into the dissemination processes.

The conclusion from the findings on objective 2, therefore, is that farmers were not effectively and adequately involved in NAERLS agricultural activities and initiatives. This conclusion agrees with that of Oladele (2007) that rural farmers in Nigeria are often largely ignored in decision-making activities regarding agriculture. Adekoya and Tologbonse (2011), while building on Oladele's finding, affirmed that this non-inclusion is largely responsible for the low rates of agricultural technology adoption in Nigeria. A well structured communication strategy which ensures that the dissemination of innovations to farmers takes them as the foremost stakeholders in the system and sees farmers more as partners than beneficiaries of development initiatives would go a long way in enhancing agricultural technology productivity in the study villages.

The finding on inherent communication barriers affecting technology adoption in the study sites showed that the items (barriers) listed were strong enough to have affected technology adoption by farmers. Indeed, with the presence of such barriers as inaccessible channel; inappropriate channel, delivery format and delivery time; and disregard for values of communication partners, this finding seems apt. Effective communication is described as a two-way process that requires efforts and skills by the sender to eliminate noise or barriers of all kinds. Collin and Jonathan (2008) added that agricultural extension service providers have the whole role (efforts and skills) for achieving effective communication— measured here by extent of technology adoption. To improve communication effectiveness, therefore, the sender must deal with all forms of barriers present in the process. A basic understanding of the communication process provides a good foundation for developing and maintaining effective communication skills and eliminating barriers or noise.

This finding has strong implication for the communication competency of NAERLS. On the one hand, the Institute has been able to build and sustain trust in the communication processes with its farmers in the adopted village, as well as break language barriers. Thus, the farmers had no doubt about the capacity and credibility of the Institute as partner in agricultural communication and initiatives. On the other hand, the farmers have issues with the communication contents and manner in which they were communicated. In what looked like a confirmation, the KII (1) respondent blamed the Institute's inability to surmount its communication challenges on their inability to properly interact with farmers as well as conduct monitoring and evaluation studies:

> How do we know the barriers when we cannot correctly identify them? The institute is grossly lacking in the areas of full interaction with farmers and conducting

> evaluation research, and this has to change. Without evaluation research, identification of actual communication barriers would be difficult. Up till now, too, the institute has not done any media /channel characterization study for our farmers. Somehow, our focus has shifted erroneously from research in extension methodologies to production and fieldwork, which are the roles of our clients, such as the ADPs and private extension bodies... *(Researcher's interview with KII respondent, Dr. I.Y. Ismaila (NAERLS Director) 24 March 2015 at his office in ABU Zaria)*

One other implication of the KII data above is that the absence of extension research in the Institute had become a barrier in itself, as it had impeded the communication competency of the Institute. How does one communicate effectively without an understanding of the information competencies of its communication partners? Fraser (1996) and Mantau (1998) pointed out that miscommunication often occurs where there is interaction outside a common field of shared meanings.

Moreover, the KII data above implies the presence of what could best be described as the use of guesswork on matters of principles and strategy. Thus, rather than the practice of demand-driven extension, NAERLS has been involved in opportunistic extension. According to Arokoyo (2009), opportunistic extension pertains to the identification of market opportunities and the creation of technologies to take advantage of them, in which case, the farmer is 'pushed' but he will latch on once he sees the advantage. The German Technical Cooperation (GTZ) (2008) has established the superiority of demand-driven extension to opportunistic extension. Besides, the current extension method being promoted by the Agricultural Extension Transformation Agenda of the Federal Government—and this is in line with modern trend and in accordance with communication for development.

Generally, the finding on extraneous communication barriers affecting agricultural technology adoption in the adopted demonstrated the weak liaison between research, technology development and farmers' felt needs. Upaise (2010) has argued that the strength of this liaison determines the level of agricultural technology adoption among a given farming population. And indeed, the finding had shown that unaffordability and unavailability of technology and distrust for government's intentions, rather than poor farmers' attitude to change, for example, were largely responsible for non-adoption of agricultural technologies.

Besides, the finding on unaffordability of disseminated innovations buttressed that on farmers' income above—which revealed that the average farmer in the study sites earned 17,200 naira monthly, which is less than the national minimum wage of 18,500 naira (Ayansina, 2015). Such meagre incomes are dwarfed by the costs of farm inputs, such as labour, improved seeds and tractorization. Also, these are besides the consistently rising total costs of production. For example, between 2013 and 2014 alone, the cost of producing a hectare of Sorghum increased by 19.3%; cassava by 30.4%; cowpea 34.6%; rice by 29.06%, and millet by 24.0% for Nigerian farmers, including those in NAERLS adopted villages (NAERLS/FDAE, 2014).

Furthermore, the finding that farmers were largely excluded from the technology design phase as well as the dissemination plan, so that both technologies and communication packages disregarded farmers' preferences and cultural values, affirmed those on low farmers' participation and technology adoption level above. Agbamu (2006) gave an example of an early maturing, high-yielding sorghum variety (SAMSORG 14) which was disseminated to some farmers groups in Niger State. After three years, a team went back for an adoption-evaluation study and found that the farmers had abandoned the variety for their old, late maturing and low-yielding ones. Other qualities of SAMSORG 14 were that it was resistant major leaf diseases; it was striga-tolerant, and matures between 140 and 160 days, as against the conventional 180-200 days. The evaluation study found that the farmers soon abandoned the technology because it did not take their culture and traditions to cognisance. The new variety had a very short stem, as against the long stem of the old ones—used for fencing farms and houses, as well as for roofing. Also, the new variety had high market value, but poor table value for the farmers. The *tuwo* or gruel (which is a favourite diet among the locals) got sour when kept overnight; meanwhile, the people preferred eating leftover *tuwo* in the morning.

However, the KII data also added that the critical elements of any agricultural technology development besides stakeholders' participation and communication framework, include the relative market advantage, cost, complexity, triability, observability, and predictability of the technologies being deployed. In other words, where these are not taken to cognisance at the development stage, they tend to be barriers to adoption. Upaise (2010), who studied two thousand and ten (2,010) farmers in Kenya to determine the rate of adoption of Tinz Tomato Juice Extractor, had found that the rejection rate was high because farmers generally perceived it as expensive and complex. In confirming the barriers of technology development and communication plans without the farmers, the KII(2) respondent stated explained:

> There is the general problem of top-down approach to technology creation. Most technologies are developed without the involvement of the end-users... When you sit in your air-conditioned office simply because you are a professor of agronomy to produce a variety of cassava without the farmer's input, you lose the farmer even before the technology gets to him. The scientist hurriedly and arrogantly develops a technology and expects extension people to perform a miracle by selling the idea quickly and smoothly to the farmer. This problem is complicated by the fact that extension people like us are constrained by inadequate funding to properly play the role of liaison between the farmer and research institutes. Yet we know that extension communication is about trust. *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

The KII data above also strengthens the finding above on farmers' distrust for disseminated information on agricultural technologies, especially because of experience of disappointment in the past. When a farmer, who is the ultimate risk-bearer in the farming business, tries out a technology and it fails, his business enterprise and, therefore, total investment for that farming season, may end disastrously. Rice farmers at the NAERLS adopted village of Nwogi were particularly alarmed in 2014 by the distribution of adulterated rice seeds (FARO 44 variety) as 'improved variety' by the Federal Government's Agricultural Transformation Agenda (ATA). The rice died before they tasselled; the few that survived gave very poor yield. Unfortunately, the problem was discovered late in the season so that they were not able to replant. This led to over 90% loss in capital investment (NAERLS/FAO, 2015). Indeed, no one, whether farmer or not, should be blamed for distrusting another that says one thing but does the opposite.

Consequently, Agbamu (2011) said that one consistent barrier to agricultural communication in Nigeria, over the years, is the distrust that farmers have for government with regard to policy consistency. He maintained that almost all government regimes struggle to outdo each others in the area of policies. In confirming this, the KII(2) respondent revealed:

> Under ATA, after a robust agricultural plan was unveiled and projects started, the Federal Government placed a ban on the import of rice. Billions of naira was pushed into the sector to grow it. Then some politicians went to pressure the president to allow them import rice and other food items because of the 2012 nationwide floods. They threatened that unless there is import, Nigerians will starve. The president was about acceding their request when the minister of agriculture intervened and dissuaded him. Such ambivalence discourages farmers and causes them not to trust government's intentions the next time they come up with great ideas.... *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

In affirming the KII data above, a few examples could suffice. In 2011, the federal government took a bill before the National Assembly that provided that smallholder farmers in villages would be given free mobile phones to aid the GES input distribution system. Even before the bill was presented for the first reading, the government made several announcements on the Nigerian Television Authority and Radio Nigeria, so that farmers' hopes were heightened. It was later shown that the number of phones to be supplied to the over 40 million rural farmers was just a little above 750,000 (Ayasina, 2015). Four years after, however, no phones had been supplied. Also in 2011, there was the announcement for the establishment of a Farmers Helpline Centre at NAERLS headquarter in Ahmadu Bello University, Zaria, which would provide calls of very low rates or toll-free for farmers. This was greeted with enthusiasm especially by farmers in NAERLS adopted villages. But as at February 2015, during the data gathering exercise for the current study, the Helpline Centre was inoperative. The implication is that whenever government gives such policy pronouncements, farmers become necessarily sceptical and unyielding.

Finally on communication barriers affecting agricultural technology adoption, the KII data also brought to light the problem of poor message production quality. The KII (2) respondent specifically identified this when he narrated that:

> Recently, we previewed in Abuja some radio jingles in English, Hausa, Yoruba, Igbo and Pidgin English on the Growth Enhancement Support Scheme (GESS) that NAERLS produced for the Federal Ministry of Agriculture. The criticism was enormous. There was an obvious lack of depth in the production quality, both in information depth and machine quality. But then we are aware that their studio equipment are obsolete and need total overhaul to meet today's high-definition quality. And there is the obvious problem of inadequate staff training and/or exposure. *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

Generally, the findings on communication barriers to agricultural technology adoption by farmers in NAERLS adopted villages highlighted the problem of top-down approach to agricultural technology development and to technology dissemination activities. This again stressed the finding above on low farmer participation level in NAERLS communication initiatives, as well as low impact of the Institute's efforts on farmers' agricultural productivity in the adopted villages. Therefore, just as maintained by Adekoya and Tologbonse (2011), the sidelining of farmers from agricultural technology design and dissemination activities ultimately led to ineffective extension campaigns and low rate of agricultural technology adoption in all the study locations (of Tudun Iya, Okolo and Nwogi).

Consequently, all the farmers in Tudun Iya, Okolo and Nwogi villages, as well NAERLS staff indicated the urgent need for the study Institute to improve its communication activities towards enhancing agricultural productivity in their villages. This finding on the general need to improve NAERLS agricultural communication efforts strengthens that above on low level of farmers' participation in the Institute's communication activities. The implication is for NAERLS to evolve a more participatory approach to extension communication activities. The need for a more inclusive approach to extension communication among Nigerian rural farmers has been highlighted earlier. Fajemisin (2014), for example, found several complaints by maize farmers in Nigerian villages, of poor inclusion in technology designs and dissemination plans. The farmers indicated that each time they felt slighted by attitudes of extension specialists and communicators, they made conscious attempts at resisting change. This is in line with Andragogy, the theoretical framework for the current study. Fidishun (2000) has argued that, since adults are internally motivated and self-directed, they resist change when they feel others are imposing information, ideas or actions on them. Besides, the participatory communication strategy that would develop and proffer is such that the role of the communication agent would mainly be that of a facilitator, guiding the farmers' movement toward self-directed and responsible decision, as well as fostering their internal motivation to change.

The other implication of the finding on the need for NAERLS to improve its communication activities is that when farmers are given appropriate space to bring their life experiences and knowledge into the communication learning content and context, extension messages and dissemination plans become responsive to their farming context. While studying the effects of different communication methods on seven hundred and eighty farmers, Bartholomai (2007) found that the respondents liked to be given opportunity to use their existing foundation of knowledge and experience gained from life experience, and apply this to their new learning experiences. Fidishun (2004:4) suggested that reflective learning opportunities assist farmers to examine ‘existing biases or habits based on life experiences and move them toward a new understanding’ of a farming innovation presented.

Remarkably, the findings on the high need for periodic institutional project review and planning, as well as a communication strategy document as guide in information packaging and dissemination activities are critical to the outcome of this study. Other elements in high demand were audience feedback research, institutional package production preview panel and periodic programme review with external extension stakeholders. FAO (2008) has stressed the importance of organizational structures to organizational effectiveness. Such structures include an inclusive communication strategy, which helps direct employees’ capacity towards achieving set organizational objectives. Morency (2010) and Arokoyo (2009a) further suggested that the absence of information quality and production control mechanisms in any system could itself become a communication barrier. A communication strategy, serving as a control mechanism, provides rules for production, dissemination, monitoring and evaluation processes of each communication campaign or project.

Moreover, the finding on the need to improve government support in agricultural communication especially in the areas of funding, training, and communication infrastructural provision was affirmed by the KII data. The KII (2) respondent had maintained that a major challenge facing the study Institute is insufficient funding, which also has serious implication for staff training and mobility, and equipment, among others. Indeed, the import of the finding on insufficient funding to agricultural extension system was emphasised by the KII (2) respondent, whose position was quite insightful:

> Nigeria often has splendid extension plans, such as we have for AETA action plan. But implementation is usually our problem. Indeed, agriculture has been the sector that the present government has performed exceptionally well. But there is no financial encouragement. Most of it is all media talk and electoral jamboree. There's poor financial and infrastructural support. The recent splendid performance in the sector can largely be ascribed to the doggedness of the minister and his team rather than to any other. *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

The Federal Government of Nigeria, between 2007 and 2011, allocated an average of 3.5% of the national budget to agriculture. This situation became worse when it budgeted 1.7% and 1.3% to agriculture in 2012 and 2013 respectively (Ayansina, 2015:13). Yet, Nigeria is signatory to the 2003 Maputo Declaration, termed the "Maputo Declaration on Agriculture and Food Security in Africa". The Declaration contained a 'commitment to the allocation of at least 10 percent of national budgetary resources to agriculture and rural development policy implementation within five years' (New Partnership for Africa's Development, NEPAD, 2010:8). However, Aderibigbe, Olomola, Mogues, Olofinbiyi, Nwoko, Udoh, Alabi, Onu and Woldeyohannes (2014), while analyzing agricultural public expenditure in Nigeria, put the figure at 4.7% as the average national expenditure allocated to agriculture from 2008 to 2012. This slight difference notwithstanding, there seems to be very low support for the agricultural sector. In stark contrast, Ghana, Rwanda and Burundi, in compliance with the Maputo Declaration, allocated 9.5%, 10.2% and 10.9% respectively of their budgets in 2013 to agriculture (Ayansina, 2015). With such financial support and posture, the Federal Government's campaign through ATA to evolve a market-oriented agribusiness along the value chains may be unachievable.

Besides, in a national agricultural performance survey for Nigeria, NAERLS and FDAE (2014) found that between 72% and 94% of the thirty-seven (37) Agricultural Development Projects (ADPs) consistently experienced very poor funding. In 2014, only Bauchi and Yobe ADP had up to 3% of their annual capital budgets. Most states recorded zero release of funds. This poor state of funding impacts on several extension performance indicators, such as the number of staff. For example, the recommended FAO extension agent/farm family ratio for developing countries is 1:1000. But in 2014, Rivers State had 1:12,286; Osun, 1:8,792; Plateau 1:8,000; and Benue 1:6,075 (NAERLS and FDAE, 2014: 182). As stated above, the ADP is the major client of NAERLS and embodies the extension arm in each state of the federation.

One other implication of the KII (2) data above is that the recent improved performance in the agricultural sector (NAERLS, 2013, 2014) was ascribed to the former minister of Federal Ministry of Agriculture and Rural Development (Dr Adesina Akinwumi) and his team rather than to government efforts. The measured performance was, however, mainly that recorded through Agricultural Transformation Agenda (ATA). Perhaps due to this outstanding performance, the new minister of Agriculture and Rural Development (Chief Audu Ogbeh) stated that the new federal administration will continue with ATA programme, although with some review and improvement (Akinjide, 2015). ATA's action plan focuses on twelve priority agricultural commodities within the six geopolitical zones: rice, cassava, sorghum, cocoa, cotton, maize, dairy, beef, leather, poultry, oil palm, and fisheries, as well as agricultural extension. The main target is to grow the agricultural sector through the various commodities and generate employment opportunities. The rice transformation plan, for example, would involve widespread local production of milled rice, so that high-quality, low cost local parboiled rice is produced; this should cause a decline in the demand for high-quality parboiled rice from 1.9 million tons to 1.3 million tons between 2011 and 2015

(FMARD, 2012). Through different innovative platforms, such as the e-wallet input distribution, promotion of Commodity Exchange Market scheme through the establishment of Strategic Grain Reserves (SGR) in every state, and provision of free improved seeds, NAERLS (2014) found that agricultural productivity had increased by an average of 35% between 2012 and 2014.

With regard to improving NAELRS' communication activities, the KII data revealed additional information, such as the need to invest more in on-time real-time information sharing. The relevant additional information enriched the findings of the study. Specifically, the KII(2) respondent outlined certain salient issues, stating that:

> On-time real-time information gathering and sharing is virtually dead in NAERLS, due in part to inadequate funding, staff training and staff commitment on the job. These were regular activities in the past. Ado Tuwengi and ABC Garuba were always on the move, at least eighteen days of the month, producing real-time information and broadcasting to farmers in the villages. Meeting of farmers' needs, rather than monetary gain, was their priority and motivation. Sometimes, they spent their money and waited for reimbursement. Today, NAERLS communication package producers are becoming mere in-studio producers, far away from real field problems. Such productions without farmers' participation or inputs do not bring about real change in behaviour.... *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

The KII data above, once more, emphasised the absence of farmers' participation in NAERLS communication activities, describing them as mere in-studio production. This lends support to the finding above on suggested areas of information packaging needing improvement, which outlined such crucial production elements of idea conceptualization, information gathering, postproduction editing, and programme presentation, among others. Moreover, the data above reckoned with the exceptional performance of the study Institute in extension communication but only in the past. The finding on lack of commitment on the job, as shown in the KII data, supported that of Fajemisin (2014) who found that Nigerian extension staff were becoming increasingly disillusioned about the monetary values of all their fieldwork, making claims for sundry allowances.

Second, the KII data provided additional areas needing improvement for effective extension communication in Nigeria:

> There is the general lack of political will to push through extension projects and initiatives. Our problem is not often that Nigeria does not know what to do or how to do it, but that the will power is lacking... There is also the need to actively involve the private sector and NGOs in extension provision. But this should be done cautiously. Public extension service may seem bad or insufficient today, but it is still what is largely available and accessible to Nigerian farmers. Farmers must first be brought to appreciate the place of information for improved agricultural productivity before they can be willing to pay for such information. Finally, there is the need for a viable policy that will conveniently handle the other extension challenges *(Researcher's interview with KII respondent, Dr. I.Y. Ismaila (NAERLS Director) 24 March 2015 at his office in ABU Zaria)*

The major implication of the KII data above is for agricultural communication policy. The observation on nonexistent policy framework buttressed the finding above that farmers were not adopting technologies because of fear of policy inconsistency. Nigeria has made three attempts at producing agricultural policies—1988, 2001 and 2008 (FMARD, 2012). But these documents, which largely provided for private sector extension, did not go beyond the formulation stages. The absence of a policy framework logically follows the lack of political will on the part of government in pushing through agricultural development initiatives. More so, the data stressed that privatization of extension should be promoted and achieved through a gradual development process. This position supports that of Duijsings (2002), who studied the different information and communication management techniques and policies, and concluded that farmers are ready to pay for information only after they are persuaded to appreciate the comparative market advantage of such information.

In Nigeria for example, there was a time when fertilizers were distributed free by government, but they were not picked up by farmers (Akinjide, 2015). Fertilizers were practically dumped so that they wasted away. Today, with more information, the farmers know that fertilizers are critical to improved productivity; hence, they are not only ready to pay part of the cost—as provided by the e-Wallet initiative of Agricultural Transformation Agenda (ATA), but they cannot even have enough (NAERLS/FDAE, 2014). Duijsings (2002:78) also found that technology adoption is widespread where farmers feel 'assured and insured' by an existing policy.

The final set of additional information concerned the expectations of government on NAERLS communication activities for improving agricultural productivity in the country. The KII (2) respondent provided a rather long but insightful analysis:

> Today, besides its core mandate issues, there are two major expectations of government: the first is that NAERLS is at the forefront of ATA implementation. The second is that the institute should be the centre of excellence in agricultural extension. This second expectation can be achieved through, one, excellent staff training. In the past, no one was employed as extension specialist without first orientation in-house, and then being sent to the various states, to the field for a period of one to three months. This helped the new entrant to get real field experience on farmer-extension agent relation and interaction. Two, NAERLS must be a centre of excellence in the area of extension communication research, which has been largely abandoned. It is the only institution in Nigeria with the responsibility of conducting research in extension communication methodologies. What are the institute's communication approaches? What is their strategy? And so on. Three, the system must go back to its vision of people satisfaction and not money gratification. Extension communication is people-centred; and its success is only measured by improvement in farm yields and increased socioeconomics of farmers... *(Researcher's interview with KII respondent, Professor T.J. Arokoyo, 20-21 March 2015 at the AETA National Coordination Office, Zaria)*

The KII data above stressed the need for NAERLS to be at the forefront of the implementation of Agricultural Transformation Agenda (ATA). In addition, the KII (2) respondent explained what he meant by being people-centred and measuring success by improvement in the life of a farmer. To buttress this, the respondent told a story of, how after the introduction of farmers field school (FFS) in Nigeria, some rural communities which had benefited honoured him with traditional chieftaincies and provided him with the regalia. The respondent was given the titles '*Damasini FFS'* in a community in Bauchi State, and *Baale Agbe of Igbo Ora* in Oyo State. For each 'coronation' ceremony, the villages prepared food and were in festive mood throughout that day. For him, this celebration by farmers for having improved their lives was the height of achievement.

In conclusion, the findings on objectives 1 to 4 provided the needed ingredients for designing a communication strategy for the study Institute towards improving agricultural productivity of farmers in its adopted villages. Such ingredients include the strengthening of farmers' participation in NAERLS communication activities (message conceptualization, design, production, dissemination and evaluation processes), which is in line with the group extension approach of the Institute.

Finally, it is noteworthy that the general implication of the findings on extension strategies of NAERLS revealed a subliminal existence of prescriptive extension (Figure 4.2), in which the communication process begins with diagnostic survey, wherein field problems are identified in the adopted villages, usually using rural participatory appraisal technique. At this starting point, the farmer fully participates. Thereafter, extension personnel design the message, select channels/media, produce the actual package and disseminate to farmers, without any input from the farmer. Evaluation is not often critical in prescriptive extension, but it usually has presence in it. Thus, the presence of evaluation (as feedback) gives the model a somewhat cyclical nature. However, the communication process is mainly vertical, as it largely positions the farmer as information recipient.

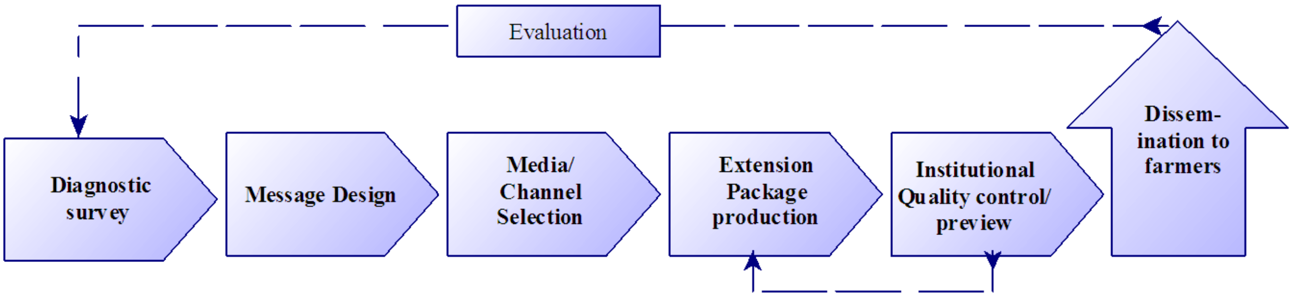

Figure 4.2: Researcher's representation of the communication model in NAERLS

Source: Deduced from field survey, May 2015

The general appraisal of the Institute's communication strategies showed that they had marginal impact on agricultural productivity of farmers in the adopted villages. In other words, the level of impact of NAERLS communication activities on farmers' productivity in the adopted villages cannot sufficiently be termed adequate because of two major factors: first, the communication activities were found to be unorganized and/or haphazard. Haphazard dissemination processes thus led to poor production quality; inappropriate channel use, delivery formats and schedules, message contents and contexts, among others. Second, there was low farmer participation. This low-level involvement in agricultural initiatives of the Institute led to production of communication packages that were not responsive to farmers' felt needs: there was disregard for farmers' values and priorities, relegation of farmers to the position of passive receivers of agricultural information instead of active partners and co-beneficiaries of the communication processes.

The findings and conclusion therefore highlight a gap: the need to organize NAERLS communication efforts in ways that encourage and facilitate high-level participation for all the communication stakeholders, especially farmers in the adopted village. This emphasized the importance of a communication strategy design as an output of the current study towards enhancing agricultural productivity in NAERLS adopted villages. Indeed, the cognitive dimension of an agricultural message design demands that a communication project should define up-front its SMART objectives (that is, specific, measureable, achievable, realistic and time-bound) and translate these into a step-by-step strategic planning as part of that project's life cycle. This is what the communication strategy designed in the latter chapter seeks to address.

Thus, the strategy developed includes guides on how to plan, execute, monitor and evaluate successful communication campaigns for improved agricultural productivity in the adopted villages. This strategy design, which is the research objective 5, forms the next chapter.

CHAPTER FIVE

STRATEGIC COMMUNICATION DESIGN FOR ENHANCING AGRICULTURAL PRODUCTIVITY

5.0 Introduction

This chapter deals with Objective 5 of the study and has to do with the development of a communication strategy. The development process involved participation from all the stakeholders (farmers, extension agents, media package producers, management of NAERLS as well as the coordinator of Agricultural Extension Transformation Agenda (AETA), the project of Federal Ministry of Agriculture and Rural Development). It should be noted that although the strategy and its initial application were directed at the Institute under study, its wider applicability extends to all adopted village projects and farm settlements in Nigeria.

NAERLS has the mandate of coordinating all extension activities in Nigeria, including research extension methodologies. Hence, it dictates the pace of extension in the country. With its adopted villages having been accorded the ideal or model for adopted village management in the national agricultural extension system, this communication strategy may thus become a model for the nation. As stated earlier, Nigeria has the largest national agricultural research and extension system (NARES) in sub-Saharan Africa, with seventeen (17) commodity-based research institutes, a specialized national agricultural extension institute, twenty-six (26) faculties of agriculture in regular federal universities; three (3) specialized universities of agriculture, thirty-seven (37) agricultural development projects (ADPs), eight (8) federal colleges of agriculture, and one international agricultural research centre (FMARD, 2012)— with a combined total of over three hundred (300) adopted villages.

There are different recommendations or models for constructing any communication strategy for rural development. A discussed earlier, there is that by Cook, Lally, McCarthy and Mischler (2012:7-14), which stratified the process into ten (10) stages. But George (2010), building on Cook et al.'s model, reduced the construction to three steps. However, the approach adopted by the current researcher to develop the strategy in this chapter was that prescribed by FAO (2004:82-87), which divides the construction stages into four and the reasons for this has been discussed above (see Figure 2.8). The four stages are: assessment, planning, production, action and reflection stages.

1. *Assessment Stage*: This comprises situation analysis and problem identification; audience and knowledge, attitude and practices (KAP) analyses; and communication objectives. This part is what chapters one to four of the current study have done.
2. *Planning stage*: This comprises the communication strategy development, which involves participation of strategic groups as well as media selection and mix. This stage has been done by the current researcher with select members of NAERLS management staff, extension specialists, extension package producers and farmers from the Institute's adopted villages
3. *Production Stage:* This comprises the strategic message design and media pre-testing and production. This stage too has carried out by the current study, the result of which is being presented in this chapter.
4. *Action and Reflection Stage*: This comprises media performances and field implementation of the strategy already designed, as well as monitoring and evaluation.

The goal of the communication strategy is to increase technology adoption and, therefore, enhance agricultural productivity among smallholder farmers in NAERLS adopted villages and similar experimental farm settlements across Nigeria. The strategy is intended as a tool to help organize NAERLS communication efforts in ways that encourage and facilitate high-level participation for all its communication stakeholders, especially farmers in the adopted villages. The components of the strategy will be illustrated and discussed below.

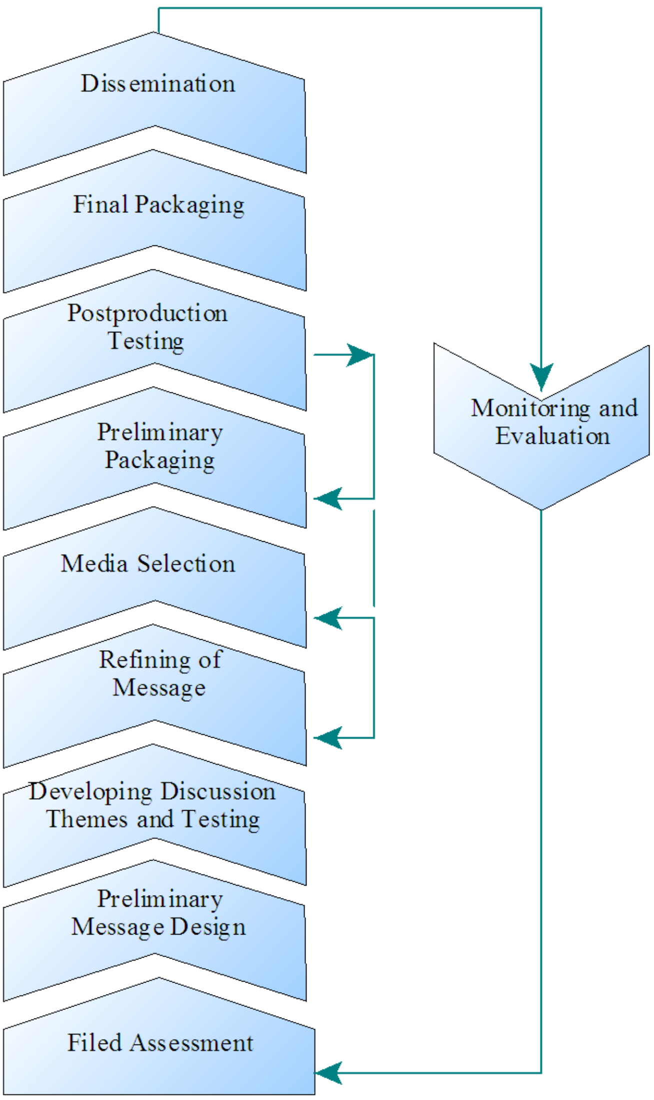

Figure 5.1: The Designed Participatory Communication Strategy
(Designed by Researcher adapting the recommendations of FAO, 2004)

5.1 Strategic Aim

The strategy is geared towards the development of a participatory model for planning, executing, monitoring and evaluating agricultural communication campaigns for increased and sustained agricultural productivity of smallholder farmers in adopted villages and, by extension, in Nigeria.

5.2 Strategic Objectives

The objectives of this communication strategy are to ensure that:

1. The dissemination plan of the institute is responsive to changing needs of farmers in the adopted villages
2. Communication messages de-emphasise persuasive and promotional approaches while emphasising farmers' participation and knowledge empowerment that facilitate farmers to make their own development decisions for and by themselves
3. Agricultural technologies or knowledge are communicated to or shared with farmers in a way that assist in achieving food security and reducing poverty

5.3 Components of the Communication Strategy

- **Field Assessment**

The cycle of the communication campaign or project should begin with field assessment or diagnostic survey, which would help identify farmers' **needs**, **opportunities**, **problems** and suggested **solutions** (**NOPS**). This should take the form of applied research, using participatory rural approach and with a sample spread beyond the immediate target adopted village or farm settlement to include other stakeholders, such as staff of ministry of agriculture and Agricultural Development Projects in the region.

- **Preliminary Message Design and Implementation Plan**

Based on the results from the field assessment, a preliminary message is drawn up around the **NOPS** and outlining the aim and objectives (or how the campaign hopes to achieve the aim). The campaign objectives should be developed using the **SMART** rule: that is, the objectives should be **specific**, **measurable**, **achievable**, **realistic** and **time-framed**. For example: A simple SMART objective could be:

> To raise awareness of 80% of livestock farmers between ages 16 and 65 years in Tudun Iya about the danger of Avian Flu, before the beginning of 2016 wet season activities (ie, end of April 2016).

From the objective, a prospective message title should be developed. Such title could be '***Irregular application of fertilizer is dangerous to crops***' (it must be one idea). It should NOT give messages that are hanging (not fully meaningful), such as '*The Dangers of irregular fertilizer application*' or simply '*Fertilizer application*'. Then in collaboration with an agronomist (in this case) and at least one farmer (but not more than two farmers) from Tudun Iya:

a. Describe or sketch the preliminary illustration or story line
b. Write down the theme statements and key words expressing the story line
c. Offer the problem, solution and practical benefits based on Research Findings
d. Emphasise features that satisfy the needs of a farmers' interaction group.

With the preliminary message having been designed, the **campaign implementation plan** (Table 5.1) should be drawn up. The SMART Objectives and campaign implementation plan are very important to the entire communication project, as they would be used as checkpoints in the Monitoring and Evaluation (M & E) stage. Note, however, that the SMART Objectives and Implementation plan are merely preliminary and are subject to change after meeting with farmers' groups in the adopted village as well as other stakeholders.

Table 5.1: Campaign implementation guide as instrument for M&E

Project title	SMART Objectives	Specific Activities	Comm. Purpose	Inputs	Output	Who is Responsible	Expected Outcome	Assumptions	Timeline

The contents of Table 5.1 are explained thus:

1. **Project title**: This refers to the specific communication campaign, such as '*Increasing awareness on the importance of fertilizer application in maize farming*.' Do not just write 'Fertilizer application.'
2. **SMART Objectives**: (**Specific, measurable, achievable, realistic** and **time-framed**) as explained above under 'Message Design'. The SMART objectives serve as checkpoints in M&E. One of such objectives, using our project title above could be '*To show farmers in Okolo Village, with the aid of audiovisual, the means of identifying the recommended types of fertilizers for maize farming.*'
3. **Specific activities**: Clearly list each activity to be carried out in line with the objectives, as well as the specialists to carry them out, including the time frame for each activity. For one objective, several activities can be drawn up. For example, following our Objective above, one specific activity could be:

   Activity: Video recording of an interview with Dr. A. Muyidee, maize breeding specialist at IAR/ABU Zaria, on the importance of applying the recommended fertilizer type in maize farming.

   Persons responsible: Mrs P.G. Maiyaki (TV producer), Mr I. Baduku (cameraman), S. Adekunle (driver)

   Timeline: Tuesday 12 February 2016

4. **Purpose**: This has also been explained above. It answers the question: What does the communication campaign intend to do? Would it be to inform, promote or educate? There can be more than one purpose to a message. NOTE that the purpose column is should be linked to the OBJECTIVE and not to the Title or Activity.
5. **Inputs**: These refers to all human and material resources needed for each specific activity; and they include clear estimates of funds needed for the activities, human resource, cameras, vehicles, etc. For better budgeting, this item is LINKED to each specific activity. In the case of the activity above, for example, these include '*day trip allowance for three senior staff, a car, video camera, audio recording gadget (as backup), etc*'
6. **Outputs**: These refers to the communication channels and message formats, such as workshop, text message, jingle, TV documentary, etc and, if broadcast, which station to disseminate the message—these basically mean all that one would see to confirm that a campaign has been executed. This section is LINKED to the PROJECT TITLE.
7. **Responsibility**: Who is in charge of the entire project or campaign? Or who should coordinate the achievement of each objective? This should usually be a team, in which case their names are listed and the coordinator indicated.
8. **Outcome**: What are the expected changes in human behaviour? What is the expected response from the audience? These should be LINKED to each SMART objective. For example, '*Maize farmers in Okolo village can correctly identify the marks/characteristics of the recommended types of fertilizers for maize farming*.'
9. **Assumption**: Projects are not executed in isolated societies. Stability in government, economy, climatic conditions, among others, often leave a window of uncertainties in a project environment. Thus, in planning, assumptions should be listed: an assumption, in this case, involves any event whose occurrence or non-occurrence

could affect the realization of the set objectives—such as a change in government or onset of rains. There could be several assumptions.

10. **Time Frame**: There has to be a definite time frame in which the campaign must have achieved its set objectives. This frame determines when to carry out the Monitoring and Evaluation exercise.

- **Developing Discussion Themes and Testing with Farmers**

The preliminary message is further developed into **discussion themes** to seek consultation with farmers in the target adopted village(s) **(field-testing).** This allows for evaluation whether the farmers 'see' what the extension communicator is 'showing'. The theme poses a problem (without the solution and benefits) and uses questions from a facilitator (extension agent) to provoke discussion among farmers' group. For discussion, the facilitator may present his material as, '***The Danger of Avian flu***' (minus the other part of the sentence which suggests the solution'), then he will ask the group while in the field:

a. What do you know about flu?
b. What happens when a flu is left unattended to?
c. Which of the livestock suffer flu?
d. What is happening here (*holding up or projecting a picture of an affected chicken*)?
e. Does it happen in your community?
f. What problem does this lead to?
g. What do you think is the root cause of the problem?
h. What can be done about it?

Table 5.2: Differences between basic message design and discussion theme

SN	Message	Discussion Theme
1	It aims to pass on information and elicit action	It aims to provoke discussion and dialogue
2	It is supposed to elicit a uniform meaning from the audience	It brings out different perception of an issue
3	It provides solutions or suggests actions	It presents a problem or a situation; so that questions from the facilitator can provoke discussions
4	It shows benefits of solution to audience	It helps the audience to identify needs, solutions and opportunities
5	It aims to persuade and motivate people to adopt a solution	It aims to generate views on possible causes, solution, and consequences of a posed problem

- **Refining the Message** (based on the outcomes of field testing)

Refining of message concerns three key communication areas: Content, Purpose and Treatment

Content: *All messages should address the following 4 areas*

1. Farmers' Needs
2. Farming Opportunities
3. Field Problems/Challenges
4. Solutions to identified field problems/challenges

These four areas are together called the NOPS approach to agricultural information dissemination.

Message Purpose: This is answered by the question: what does the communication campaign intend to pursue? There are mainly 6 purposes of agricultural communication. But an agricultural message should use ONLY ONE purpose at a time:

1. **Information**: this is the treatment given to a message that aims to provide **objective facts** on specific issues. It differs from other designs in that it transmits *raw data* without specific added value, such as making it more inviting or appealing or having

instructional connotations to treat it as transfer of knowledge. An example is 'to give information to the farmer on the specific symptoms of avian flu-infected birds'.

2. **Education**: This is a message for increasing knowledge and comprehension so as to change attitude/ behaviour through formal or semi-formal learning environment. And example will be to 'show the farmer the right amount of NPK fertilizer for maize'.
3. **Persuasion**: This is communicating to influence others. But it must be used with caution. First, persuasion has the connotation of **not being participatory** in nature. Hence, it should be used strictly in line with what came back from the field assessment and discussion theme testing. It should present a view that farmers must adopt **voluntarily**, even if passively. A good example of an agricultural message of persuasion would 'to let the farmer grow SAMMAZ 15 maize variety side-by-side with his traditional varieties and let him make objective assessment and decision on which is better for his business.' Second, it must not be a propaganda—which means, there must always be element of mutual fulfilment between the extension communicator and the audience.
4. **Promotion**: This is communication to inform and make farmers aware of an idea, concept or behaviour so that they want to identify with it. It creates a favourable impression of an idea or practice through motivation, image creation and/or positioning. An example of a message with promotion as purpose is 'to highlight the qualities of Oba Super 7 maize so that farmer groups in Okolo and Nwogi villages will increase demand for the seed.'
5. **Training**: This is communication to impart or increase skills and give opportunity for trial. The message design is different from education in that it focuses on practical skills rather than theoretical knowledge; hence, it always implies an interpersonal learning environment in venues such as workshops and demonstration sites. An

example is ‘to impart knowledge on step-by-step application of pre-emergence herbicide on cassava farm’.

6. **Advocacy**: This seeks to generate support of decision-makers, both within and outside the target community; it creates a conducive environment for a policy that is sensitive to farmers’ felt needs. Hence, it aims at influencing the development of policy, obtaining financial support and project legitimisation for the purpose of sustainability. An example of an agricultural message with advocacy as its purpose is that which ‘aims to highlight the market advantages accruable from partnership between cocoa farmers group in Okolo and cocoa buyers association in Oyo State so that collaboration activities would improve among the two groups’.

Message Treatments: Whatever agricultural message content and purpose to be addressed, the following treatments should be PRESENT in the copy:

a. **Appeal:** this is the benefit or value associated with the message, such as concern for farmer’s welfare, farm yields, the natural environment, or a government policy.
b. **Approach:** this means how a subject is presented, whether humorously or seriously; directly or indirectly; rationally or emotionally; or a combination or blend of these.
c. **Content:** This answers the question: what exactly is being presented or conveyed? What is the main idea or behaviour being promoted? There should be one idea at a time.
d. **Context** – This comprises the special characteristics of the media (or communication) environment in which the message is conveyed, such as beginning of the wet season, disease outbreak, dry season farming, postharvest period, etc. The message must take up the needed characteristics to fit well into the context.
e. **Correctness:** The message must be culturally appropriate, politically correct, and socially acceptable.

f. **Trust:** The message should create trust by presenting ONLY facts. Farmers will believe and be convinced only by a message that is based on facts.

g. **Call for action.** The overall aim of all extension messages is to call for a particular action. The action could be awareness or knowledge, or adopting an attitude or practice.

h. **Source** – This answers the question: Who is the source of the message? Is it government, donor agency or an NGO? The source often affects a message's credibility.

i. **Language**: What language(s) would best express the message to the target audience?

- **Media/Channel Selection**

There is no particular one-fits-all channel/medium. The channel/ medium to be used should depend on the *campaign objectives*, *purpose of message*, *availability* and *accessibility of channels to the target farmers*, *budget* and *time frame* available for the campaign. For example, if you want to increase people's participation in the E-Wallet fertilizer procurement and distribution initiative, you may use media tools of education, persuasion and promotion nature. You can integrate conventional and new media, as well as interpersonal communication modes in a variety of production and delivery formats using indigenous languages, English and/or Pidgin English to achieve the stated objectives. Table 5.3 presents a guide on channel characteristics—This is merely a helpful guide; the ultimate decision should depend on what has been listed above (that is, objective, purpose, availability, etc).

Table 5.3: Guide on channel characteristics

SN	Media	Criteria for choice	Purposes best suited	Weaknesses
1	Interpersonal/ face-to-face (group discussion, training, demonstration, trials, drama, field show, etc)	When addressing individual needs, need for high credibility, need for direct idea exchange, less budget, culturally sensitive issues, when there is poor or lack of technological infrastructure, need for participation	Training, Education, Advocacy, Persuasion	Limited reach, can be influenced or monopolised by influential persons, requires skilled message development and delivery, may lack prestige, time-consuming, difficult to organise
2	Radio	Wide coverage, availability when needed, cheap production (compared to TV), localised information,	Information, Promotion	Needs electricity and good reception, batteries for receiver, message too weak for education & training
3	Television	Need for appealing message, how-to-do-it message, high credibility, technical information,	Persuasion, training, education, promotion,	Depends on electricity, expensive to own, unavailability in rural areas, high production cost, time-consuming production, difficulty in localising agric information,
4	Retrievable Media (recorded video/ audio disks, multimedia CD, etc)	Need for persuasion, cheap and reliable information, repeated playback, production flexibility, cheap production, localised information, need for recorded feedback/ reaction	Training, education, persuasion	Requires specific talents and skills to produce, repeated playback can destroy content,
5	Print Media (posters, flipbook, leaflets)	Cheap, and simple production, extension support, need to take home for consultation and reminder, vivid description	Training, education, information persuasion,	Illiteracy, limited to explanation, skilled production
6	Interactive New Media (Mobile phone, social media, and Internet)	Discursive, interactive, timely dissemination and feedback, relatively cheap production and reception, need to reach youth farmers, need to integrate various media formats	Information education, persuasion promotion	Illiteracy, lack of support infrastructure, age-gap, could be expensive for farmers,
7	Theatre for Development or Agricultural Extension Theatre	When addressing individual needs, need for high credibility & for direct idea exchange, interactive, culturally sensitive issues, localised information, immediate feedback, direct audience participation in all stages of the communication, when there is poor or lack of technological infrastructure	Information, Training, Education, Advocacy, Persuasion Promotion	Limited reach, can be influenced or monopolised by influential persons, requires skilled message development and delivery, may be time-consuming
8	Folklore, storytelling, poetry, singing, mnemonics, and other traditional media	When addressing individual needs, need for high credibility, localise information, direct idea exchange, interactive, culturally sensitive issues, direct audience participation in all stages of the communication	Information, Training, Education, Advocacy, Persuasion	Limited reach, can be influenced or monopolised by influential persons, sometimes repeated can water down content
9	Participatory video and participatory photography	When addressing individual/ family needs, localise information, need for direct idea exchange, direct audience participation, when there is poor or lack of technological infrastructure	Information, Education, Promotion	Limited reach, can be influenced by a person, requires skill appreciate, develop and deliver, may lack prestige, difficult to organise

- **Preliminary package production**

This stage requires a lot of input from different communication specialists and farmers. It is the actual putting together of all the rushes, audio clips, or other information gathered into one package (copy), such as a jingle, poster, or radio episode; or a set of packages (copies, such as jingles, assorted posters, or episodes of a programme) in line with the production budget. If broadcast channels were selected, for example, this stage includes using a given format (eg, jingle, documentary, vox-pop, panel discussion, interview, etc), studio production (putting different rushes or audio clips together as a single story), editing, addition of special effects, recording in one single tape or burning into a CD or DVD, etc. If Interpersonal media (say, training) was selected, this stage includes drawing up training contents, training schedule in collaboration with resource persons (specialists), etc. The fact of it is that the media package should be ready for pretesting with stakeholders.

- **Postproduction testing**

The produced package (copy) should be previewed by extension specialists as well as extension communication package producers as a quality control measure. After this, the work is taken back to the field for testing with farmers. Beside all other observations and corrections, the package producer should watch out for the campaign objectives; he/she should ask questions in line with the message content, purpose and treatment; and should be careful not to deviate from his/her original objectives while not being too rigid. The purpose of the preview and field testing is to achieve a better and more effective campaign; hence, every observation should be taken seriously. Preview with colleagues (or institutional preview) serves the twin purpose of quality control and safeguarding the interest of the source. If the package is adjudged to be good enough, the package moves to the dissemination stage. But if it is found to be with one or more faults, it goes back to any of stage 4, 5 or 6 for correction.

- **Final Production**

This stage involves putting final corrections from the field testing into the production. If the postproduction testing came back certified as good, then the media package is given its final production touches (or finishing). If it is a message for broadcast station, for example, such as a radio jingle or an episode of a programme, the CD or DVD is properly labelled and burnt in the format specified by the station; it is a multimedia CD or poster production, the final copy is mass-produced or duplicated in the required number.

- **Dissemination**

This stage involves actual dissemination of communication package—the execution of the training programme, broadcasting of radio and television programme, distribution of printed materials, etc. It is concerns that 'output' that everyone would see to affirm that the information, knowledge or skill so packaged has been shared with or imparted to the target audience. If it is a radio or television production, then this stage entails its airing over the designated channel, at the agreed time and without change to the message.

- **Monitoring and Evaluation (M & E)**

This stage entails the assessment of the impact of the communication campaign, as well as getting back feedback to measure the success and challenges of the campaign against the set objectives and outcomes. In other words, it is a stage to both monitor what has been done, as well as evaluate the achievement (impact). It should be carried out following the **implementation plan** (Table 5.1) above. NOTE that this plan implementation guide SHOULD be developed at the beginning of the communication campaign.

The monitoring and evaluation exercise **measures the campaign OUTCOMES against its OBJECTIVES**. Let us look at an example of a campaign with the Objective: '*To raise awareness of 80% of livestock farmers between ages 16 and 65 years in Tudun Iya about the danger of Avian Flu, before the beginning of 2016 wet season activities (ie, end of April 2016).*

1. When should there be M&E? At the beginning of October 2016 (or later)
2. Study population? Livestock farmers in Tudun Iya aged 16-65 years.
3. What are to be monitored?

- Percentage of livestock farmers of the specified age that are aware of the danger of avian flu (is it up to 80%?)
- Level of awareness on the danger of avian flu (has it gone up? By what rate/ percentage?) **Note** that it is assumed that at the beginning of the communication campaign, there had been a field assessment (**see** first stage of this communication strategy) which provided data on awareness level as well as the percentage of livestock farmers (in their age brackets) that were aware of the danger of avian flu

In addition to the above, the M&E itself should specify its **purpose** vis-a-vis that of the communication campaign; **What** will be monitored; **How** it will be monitored (indicators); **When** the monitoring will be carried out (checkpoints); and **Who** will be responsible.

5.4 Evaluating the Communication Strategy

The evaluation of this communication strategy should be carried out regularly using rural appraisal tools (including questionnaire, focus group discussion, field observation, as well as secondary data) every **five (5) years,** to assess the impact of this communication strategy vis-a-vis the stated objectives. The purpose is to refine/ strengthen it for efficiency and effectiveness.

Moreover, the Dissemination-Awareness-Knowledge-Adoption-Productivity (DAKAP) sequence should be used to evaluate the effectiveness of the strategy, given the following premise, other things being equal:

1. Appropriate deployment of this strategy in the dissemination activities will lead to general farmers' awareness on improved farm practices and technologies
2. Increased awareness of improved technologies will increase
3. Knowledge of improved technologies, which in turn will lead to
4. Adoption of improved technologies, and then to
5. Increase in agricultural productivity

This chapter presented the communication strategy that was designed by the researcher in achieving Objective 5 of this study. The design was developed following a guide on how to construct an effective agricultural communication strategy by FAO (2008) and in accordance with the study's theoretical frameworks of participation and andragogy.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the summary of the study, major findings, conclusion and recommendations. The summary is first presented, followed by major findings; thereafter, the conclusion and recommendations are presented.

6.1 Summary of the Study

Chapter one presented relevant information and literature in support of the study background, statement of the research problem, justification of the study, aim and objectives of the study, theoretical framework, as well as information on adopted village concepts and NAERLS communication activities in its villages. The chapter explained that the aim of the research was to enhance agricultural productivity in NAERLS adopted villages by generating and deploying a participatory communication strategy. The specific research objectives were set to achieve the aim.

Chapter two presented a review of related literature. The review covered issues relating to agricultural activities in Nigeria, agricultural extension, extension approaches, development communication, channels for disseminating agricultural innovations to farmers, and diffusion of innovation theory, which is the theoretical framework on which the study is built. The justification for these selected concepts in this review is mainly the fact that they are the key variables or concepts around which the study was conducted. Chapter three was on the study methodology, dealing with issues of study design, population, sample and sampling techniques, instruments and methods of data collection, analysis and presentation. The research was said to lend itself to both quantitative and qualitative methods of scientific enquiry; the main reason being to use the best possible way of achieving the goal of the study. The use of these antipodal methods was justified on the basis of the sample spread. The study population was said to consist of all farmers in NAERLS adopted villages, all staff of NAERLS, and agricultural communication policymakers in Nigeria. The sample was 105; comprising 82 farmers, 12 extension specialists, 9 extension package producers and 2 policymakers.

Chapter four presented data analysis and discussion of findings. The presentation of quantitative data was done in figures and tables and analysed using simple statistical tools of frequency, percentage, mean and weighted means, while the qualitative data were presented as excerpts used. Chapter five presented the communication strategy that was developed by the researcher to strengthen NAERLS communication efforts in its adopted villages. The strategy aimed to increase farmers' participation and, therefore, engender sustained technology adoption and improved agricultural productivity the adopted villages, particularly, as well as similar experimental farm settlements across Nigeria in general.

6.2 Key Findings from the Study

This section presents the key findings of the study. The study found that farmers in the selected adopted villages have adequate trust for the competency of NAERLS as agricultural communication partner. There was also high trust by farmers for the intentions of the study Institute, with regard for agricultural information dissemination activities. This was further strengthened by the finding that all the farmers studied had positive disposition to adoption of new agricultural technology for improved production.

The study further found that farmers had marginal access level to NAERLS communication channels. And that there was marginal impact of NAERLS communication activities on farmers' agricultural productivity—although this impact was not uniform across the study locations. The results for Tudun Iya were always higher than those of Okolo and Nwogi. This was explained to mean that the there was higher level of communication interaction in Tudun Iya due to its proximity to the headquarter of NAERLS, as compared to the other villages.

However, the study found the absence of a working strategy document that served as communication guide for NAERLS extension staff. This created an apparent gap between the extension communication tenets of the Institute and the actual practice at the study sites. The gap further led to the production and dissemination of communication packages in a largely unorganized manner.

NAERLS' involvement of farmers in agricultural matters and initiatives was found to be not to be strong enough for farmer's empowerment. When the results were measured against Mafalopulous' (2003) ladder of participation in development initiatives, it was found that farmer's participation in the study Institute's agricultural initiatives did not go beyond the consultation rung.

Moreover, the study found that the major challenges or barriers to adoption of disseminated technologies by farmers at the study locations were largely hinged on farmers' exclusion from agricultural technology development and dissemination activities. There was also the barrier or challenge of inadequate funding for extension activities, which led to a somewhat disinclined compromise on the agricultural communication role of the study Institute.

The study further found a weak liaison between research and actual agricultural activities of farmers in the adopted villages. The finding was to the effect that the felt needs of farmers were not being met by certain agricultural technologies developed and disseminated.

Finally, the study found what can be described as the twin expectation of government on NAERLS communication activities for improving agricultural productivity in the country. The government expects that the institute organize its extension communication activities as to as to be at the forefront of the implementation of Agricultural Transformation Agenda. There was also the expectation for the Institute to evolve itself into a centre of excellence in agricultural extension communication— by establishing excellence in research and training.

6.3 Recommendations

In view of the findings given above, the researcher provides the following recommendations:

Deployment of a participatory communication strategy

The foremost implication of the conclusion of this research is the need for NAERLS to organise its communication activities within a participatory framework, model or strategy, which will serve as a guide for extension workers in meeting the felt needs of farmers in their adopted villages. The World Bank (2002) has found that rural people especially become non-responsive to development processes, no matter the benefits, when they feel that they are treated as inferior and/or ill-informed. To have an impactful agricultural knowledge and information system in the adopted villages, therefore, NAERLS should correctly and sufficiently involve the farmer in its communication activities and initiatives through a carefully developed communication strategy.

Although the presence of a participatory communication strategy does not, by itself, guarantee a perfect extension system, the general assumption of the World Bank (2002), Madukwe (2008) and others is that when the farmer is taken as an equal stakeholder in agricultural communication activities, appropriate technology packages are developed and disseminated through appropriate channels, and there are resultant better agricultural outcomes. The role of extension staff should be to facilitate the farmer's movement toward more self-directed and responsible decisions, as well as foster their internal motivation to change. The communication strategy developed by this research, if deployed appropriately, would go a long way in optimising the role NAERLS in facilitating farmers for better agricultural outcomes.

NAERLS should explore innovative options for inclusive communication among its stakeholders

The study found that despite farmers' satisfaction with the capacity and credibility of NAERLS as partner in agricultural initiatives, they were somewhat sceptical of messages emanating from the government. Such messages were seen as electioneering campaigns. Therefore, there is the need for NAERLS to strengthen the so-called high-fidelity channels (Leeuwis, 2008:35) that had been found effective in promoting technology adoption (such as interpersonal media) and explore new ones. Innovative options are systematic attempts to facilitate change through joint action. Such innovative options include the expansion of frontiers of interpersonal modes through annual stakeholders meetings and workshops which would bring national and sectional leaders of farmers unions, agrodealers, researchers, Agricultural Development Projects (ADPs), and policymakers for meaningful interactions. Interpersonal modes could also be strengthened through infusion of such media as theatre for development and participatory photography.

The strengthening of farmer-extension-research linkage system

The study established that the top-down approach to technology development has been largely responsible for the low level of agricultural technology adoption in the study villages. This finding implies a widening gulf between research and farmers' felt needs. To enhance agricultural technology uptake by farmers, the Institute should work towards linking research to farmers' felt needs.

The need for a national agricultural extension framework/policy

The study found a link between performance in agricultural extension and government policy on extension. There is the need, therefore, to develop a national agricultural extension framework or policy, which will legislate for the leadership, coordination, and funding of the national extension system, using the appropriate extension approaches under a pluralistic delivery system. Moreover, the current Agricultural Extension Transformation Agenda (AETA) advocates a market-oriented and knowledge and skills-based extension service delivery, as against the erstwhile advisory-based system. There is thus the need to evolve a policy framework that of necessity supports a people-centred and market-driven extension delivery.

6.4 Conclusion

The communication activities of NAERLS, even in their largely unorganised form, had marginal impacted on farmers' productivity. The expected level of impact was not achieved because farmers were not adequately involved in the dissemination activities, and because technology design and dissemination activities were not responsive to farmers' felt needs. The fact that the average farmer at the study locations was 45 years old and has 15 years of farming experience meant that they were responsible adults, who did not appreciate being forced to adopt technologies that showed no regard for their age, experience, investment, and culture, among others. Hence they became passive recipients and users of disseminated technologies. Therefore, if the Nigerian agricultural extension system must be effective, there is the need for NAERLS, which coordinates the system, to strategically organize its activities and strengthen its linkages with stakeholders to evolve a more people-centred, market-driven extension system. This could begin with the deployment of the participatory communication strategy developed in this study towards achieving sustainable home-grown agricultural development in the study adopted villages and, by extension, all adopted village projects and similar farm settlements in Nigeria.

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APPENDIX 1

LETTERS OF INTRODUCTION WRITTEN BY RESEARCHER FOR THE PURPOSE OF DATA GATHERING

1. Letter to Farmers Groups at the Adopted Village

Department of Theatre & Performing Arts, Ahmadu Bello University, Zaria
15 January 2015

TO:
Farmers' Group Leader

Dear Sir/Ma,

LETTER OF INTRODUCTION

I am a postgraduate student of Ahmadu Bello University, Zaria, studying to fulfill the requirements for PhD in Development Communication, at the Department of Theatre and Performing Arts of the University. My research topic is **Appraisal of the Communication Strategies of NAERLS, Zaria, Kaduna State.**

I request your kind permission and support in my data gathering exercise towards completing my research. The data to be gathered in your village are therefore purely for academic purpose and would be used as such. All information of the participants will be handled confidentially and will be kept anonymous.

The results of the study will be used to develop a communication strategy for improving NAERLS interaction with farmers in this village, so as to improve farmers' productivity.
Thank you for your help and kind gestures.

Yours sincerely,

ONAGWA Godfrey Ife

2. Letter to NAERLS Zonal Officers and Adopted Village Site Managers

Department of Theatre & Performing Arts, Ahmadu Bello University, Zaria
15 January 2015

TO:
NAERL Zonal Officers
NAERLS Adopted Village Site Managers

Dear Sir/Ma,

LETTER OF INTRODUCTION

I am a postgraduate student of Ahmadu Bello University, Zaria, studying to fulfill the requirements for PhD in Development Communication, at the Department of Theatre and Performing Arts of the University. My research topic is **Communication and Enhancement of Productivity in Adopted Villages of NAERLS, Zaria, Kaduna State.**

I request your kind permission and support in my data gathering exercise towards completing my research. NAERLS Adopted Village of …………………….. which is under your management has been selected for data gathering. Therefore, the data to be gathered from this village are purely for academic purpose. All information of farmers and other participants will be treated confidential and anonymous.

The results of the study will be used to develop a communication strategy for improving NAERLS interaction with farmers in the selected village, so as to improve their productivity.

Thank you for your assistance and kind gestures.

ONAGWA Godfrey Ife

3. Letter to NAERLS Director and the Coordinator of AETA

Department of Theatre & Performing Arts, Ahmadu Bello University, Zaria
15 January 2015

TO:
NAERL Director
National Coordinator, Agricultural Extension Transformation Agenda, Abuja

Dear Sir/Ma,

LETTER OF INTRODUCTION

I am a postgraduate student of Ahmadu Bello University, Zaria, studying to fulfill the requirements for PhD in Development Communication, at the Department of Theatre and Performing Arts of the University. My research topic is **Communication and Enhancement of Productivity in Adopted Villages of NAERLS, Zaria, Kaduna State.**

I request your kind permission and support in my data gathering exercise towards completing my research. I would kindly appreciate it if you would schedule an interview with me. I desire a one-on-one interaction with you with regard to the state of agricultural extension in Nigeria and the role of NAERLS in the general National Agricultural Research and Extension System in the country.

The results of the study will be used to develop a communication strategy for improving NAERLS interaction with farmers in the nation's adopted village initiative, so as to improve agricultural productivity of the Nigerian farming population.

Thanking you, sir, in anticipation of a favourable reply, I pray that this research will indeed contribute immensely to development of an effective extension system in Nigeria.

Yours sincerely,

ONAGWA Godfrey Ife

4. Letter attached to Questionnaire for NAERLS Staff

Department of Theatre & Performing Arts, Ahmadu Bello University, Zaria
15 January 2015

Dear Sir/Ma,

LETTER OF INTRODUCTION

I am a postgraduate student of Ahmadu Bello University, Zaria, studying to fulfill the requirements for PhD in Development Communication, at the Department of Theatre and Performing Arts of the University. My research topic is **Communication and Enhancement of Productivity in Adopted Villages of NAERLS, Zaria, Kaduna State.**

I request your kind permission and support in my data gathering exercise towards completing my research. The data required of you in the questionnaire are purely for academic purpose. All information provided will be treated confidential and anonymous.

The results of the study will be used to develop a communication strategy for improving NAERLS interaction with farmers in the selected adopted villages, so as to improve their agricultural productivity.

Thank you for your assistance and kind gestures.

ONAGWA Godfrey Ife

APPENDIX 2
INSTRUMENTS OF DATA GATHERING

1. QUESTIONS FOR SCHEDULED INTERVIEW WITH THE EXECUTIVE DIRECTOR OF NAERLS, ZARIA

SECTION A: Existing communication approaches used by NAERLS to reach farmers

1. What are the different extension communication approaches?
2. What informs your choice of a village as an adopted village?
3. Describe your institutional approach to communicating with farmers in the adopted villages
4. In what different ways do you generally reach farmers in adopted villages?
5. What existing institutional document, such as a communication strategy or framework, supports the use of such approach and channels?
6. If there is no document, what influence your choice of the communication approaches and channels?
7. What communication structures are provided by NAERLS to aid reception of disseminated innovations in the adopted villages?
8. How do you decide on what channels to use for what message?
9. How do you determine the content, context and/or format of each message design?
10. What communication peculiarities exist for adopted villages in the different ecologies?

SECTION B: Impact of NAERLS communication activities on farmers' productivity

11. How would you rate the overall impact of NAERLS communication activities on farmers' productivity indicators in the villages? (such as use of improved farming inputs, access to credit, etc)
12. To what extent have the communication activities of NAERLS improved farmers' livelihood in the adopted villages?
13. How did you come to such conclusion on the impact (*given above*)?
14. What approaches and channels of communication are especially effective for reaching farmers in the different villages across different agroecological zones of Nigeria?
15. Generally, how would you score NAERLS' communication efforts towards improving agricultural productivity in Nigeria over the years? And why give such a self-evaluation score?

SECTION C: Farmers' involvement in agricultural matters and dissemination design

16. Who are your major stakeholders in agricultural communication design and production activities?
17. At what levels are farmer actively involved in communication packaging and dissemination choices/ activities?

18. Discuss the interaction level of NAERLS and farmers of adopted villages with regard to farmers' active involvement in the Institute's agricultural matters and initiatives.
19. What feedback mechanisms are in place for monitoring and evaluating communication packages and campaigns?
20. How do you decide on the information needs of farmers at the adopted villages?
21. How does the farmer participate in the communication monitoring and evaluation process?

SECTION D: Communication barriers to uptake of technologies

22. What are the barriers identified so far as being inherent in NAERLS communication structure that are affecting the uptake of disseminated innovations by farmers in the adopted villages?
23. What are the identified barriers outside NAERLS control but that are strong enough to hinder the uptake of disseminated innovations in the adopted villages?
24. Generally, why do farmers in the adopted villages reject disseminated innovations, despite their capacity to impact positively on their agricultural activities?
25. How does NAERLS seek to overcome the various barriers inherent in its communication activities?

SECTION E: Improving the effectiveness of agricultural communication

26. What are the major constraints to quality agricultural information gathering and dissemination in the adopted villages?
27. What do you think NAERLS is not doing well enough in its communication with farmers in the adopted villages?
28. What would you suggest as way a forward for improving NAERLS capacity in agricultural communication?
29. What would you suggest to government for improving agricultural communication in Nigeria?

THANK YOU

2. **QUESTIONS FOR SCHEDULED INTERVIEW WITH THE NATIONAL COORDINATOR OF AGRICULTURAL EXTENSION TRANSFORMATION AGENDA, FEDERAL MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT, ABUJA**

SECTION A: Existing communication approaches of NAERLS

1. What communication approaches are recommended for reaching farmers within the Nigerian research and extension system?
2. Which government organization(s) support or prescribe such approaches?
3. Is there any document, such as a national extension framework, detailing such approaches?
4. What communication approaches of NAERLS are you aware of?
5. Do you have any official document detailing NAERLS communication approach/ strategy?

SECTION B: Impact of NAERLS communication activities on farmers' productivity

6. How would you say the communication activities of NAERLS have impacted on agricultural productivity of farmers in their adopted villages?
7. How would you rate the overall impact of NAERLS communication activities on agricultural productivity and farmers' income in Nigeria?
8. How did you come to such conclusion on the impact?

SECTION C: Farmers' involvement in the communication activities

9. What is the expectation on NAERLS' communication efforts with regard to liaising with farmers in the adopted villages as development partners?
10. What kind of relationship should exist between an extension research institute and its adopted villages?

SECTION D: Communication barriers to uptake of technologies

11. What are the major constraints to quality agricultural communication in Nigeria?
12. What barriers do you think are inherent in NAERLS communication approaches or structure that affect the uptake of disseminated innovations by farmers in the adopted villages?
13. What other barriers exist outside NAERLS communication activities that are impacting on farmers' uptake of technologies in the adopted village system?
14. Generally, why do farmers reject communicated innovations in Nigeria?
15. How should communication activities take care of the variously identified barriers to uptake of technologies?

SECTION E: Improvement agricultural communication activities

16. What do you think NAERLS is not doing right in its communication mandate?
17. What are your suggestions for improving agricultural communication in Nigeria?
18. What is AETA's relationship/collaboration work with the NAERLS?
19. To what extent are you involved in the agricultural communication activities of NAERLS?
20. What is the relevance of NAERLS' communication activities in the Agricultural Transformation Agenda (ATA) of government?
21. What are the future expectations of government for NAERLS in AETA?
22. What is government's expectation on NAERLS' communication efforts with regard to liaising with major institutional stakeholders in the Nigerian agricultural research system?

THANK YOU

3. EXTENSION SPECIALISTS QUESTIONNAIRE (ESQ)

SECTION A: Demographic section

i. Name of Department

………………………………………………………………….

ii. Gender ( ) Male ( ) Female

iii. Highest educational qualification

a. OND, HND / NCE ( )
b. BA/ MSc ( )
c. Masters ( )
d. PhD ( )

iv. Length of work experience in your organization

a. Less than 5 years ( )
b. 5 years – 9 years ( )
c. 10 years – 14 years ( )
d. 15 years and above ( )

v. Length of work experience in the agricultural sector

a. Less than 5 years ( )
b. 5 years – 9 years ( )
c. 10 years – 14 years ( )
d. 15 years and above ( )

SECTION B: Existing communication approaches

1. What communication approach does NAERLS use for deploying agricultural technologies in its adopted villages? (*You can tick more than one*)
   a. Individual approach (based on farm families) ( )
   b. Group approach (based on training and demonstration) ( )
   c. Mass-mediated approach (without interpersonal modes) ( )
   d. Other (specify) …………………………………………………………

2. What channels do you use for disseminated agricultural innovation to farmers in adopted villages? (*You can tick more than one*)
   a. Face to face/field visit ( )
   b. TV ( )
   c. Radio ( )
   d. Field demonstration ( )
   e. Empowerment training ( )
   f. Poster/flipbooks ( )
   g. Multimedia CDs ( )
   h. Mobile Phone ( )
   i. Others (specify) ....

3. To what extent do you use the following communication media with farmers in adopted village?

S/N		*Always*	*Occasionally*	*Rarely*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

SECTION C: Impact of existing communication approaches

4. To what extent would you say NAERLS use of **individual extension communication** approach has impacted on the following production indicators of farmers in the selected adopted villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

5. To what extent would you say NAERLS use of **Group extension communication** approach has impacted on the following production indicators of farmers in the selected adopted villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

6. To what extent would you say NAERLS use of **Mass-mediated extension communication** approach has impacted on the following production indicators of farmers in the selected adopted villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

7. To what extent would you say the following channels used by NAERLS have influenced the uptake of **improved seeds/seedlings** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

8. To what extent would you say the following channels used by NAERLS have influenced the uptake of **improved livestock/feeds** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

9. To what extent would you say the following channels used by NAERLS have influenced the uptake of **recommended agronomic practices** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

10. To what extent would you say the following channels used by NAERLS have influenced the uptake of **uses of farm chemicals as technology** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

11. To what extent would you say the following channels used by NAERLS have influenced the uptake of improved **disease and pest control technologies** by farmers in the study villages?

S/N		*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

12. To what extent would you say the following channels used by NAERLS have influenced the uptake of **postharvest and processing technologies** by farmers in the study villages?

S/N		*Highly*	*moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

13. To what extent would you say the following channels used by NAERLS have influenced the uptake of **home utilization technologies** by farmers in the study villages?

S/N		*Highly*	*moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

SECTION D: Level of involvement of farmers in agricultural matters

14. How would you rate the **frequency** of the following **activities** of NAERLS with regard to farmers in its adopted villages?

S/N	*Item*	*Frequently*	*Occasionally*	*Rarely*
A	NAERLS visits the village for mutual interaction			
B	Farmer groups are invited to NAERLS			
C	Individual farmers visit NAERLS on matters pertaining to their farms			
D	NAERLS seeks consent of farmers before agricultural events are organized in village			

E	NAERLS jointly plan agricultural events with farmers before they take place			
F	NAERLS and Farmers jointly execute/implement agricultural projects			
G	NAERLS informs farmers of agricultural events before they take place in the village			
H	There is a level of cost/resource sharing between NAERLS and farmers on agricultural projects at the village			
I	NAERLS actively involves farmers in project evaluation study/survey, including discussion of results			
J	NAERLS is well disposed to farmers' opinions on agricultural matters			
K	NAERLS promptly attends to farmers' complaints			
L	NAERLS visits the village for mutual interaction			

SECTION E: Communication Barriers to adoption of innovation

15. To what extent are the following barriers present in NAERLS communication activities, so much that they affect farmers' adoption of agricultural innovations in the villages?

SN	*Item*	*Highly*	*Moderately*	*Poorly*
A	The **channel** of communication is **inappropriate**			
B	The **channel** of communication is **inaccessible**			
C	The **format** of message is inappropriate			
D	**Method** of message delivery is **faulty**			
F	**Language** of delivery is inappropriate			
G	**Time** of delivery of message is inappropriate			
H	Farmers **are not carried along** in the design of communicated message			
I	Farmers **do not trust** NAERLS as information source			
J	The message lacks consideration for farmers' cultural values			

16. The following extraneous barriers affect farmers' adoption of agricultural innovations:

SN	*Item*	*True*	*Somewhat True*	*False*
A	Farmers do not like change of status quo			
B	Farmers prefer old methods of farm practices to new ones			
C	Innovations do not take cultural norms into			

	consideration			
D	Farmers feel they are not carried along in the development of new techniques			
E	Farmers cannot afford the cost of new innovations			
F	The innovations are not readily available to farmers			
G	Farmers fear that government would abandon support due to policy inconsistency			

SECTION E: Measures for Improving Agricultural Communication

17. To what extent would you rate the following as being needed for improving agricultural communication in Nigeria?

SN	*Item*	*High*	*Moderate*	*Low*
A	More funds to the agriculture sector			
B	Increased funding for research and extension			
C	Increased staff training			
D	Procurement of modern equipment for information gathering, processing and dissemination			
E	Recruitment of more extension staff			
F	Provision of communication-support infrastructure			
G	Legislation of a national extension policy			

THANK YOU

4. EXTENSION PACKAGE PRODUCERS' QUESTIONNAIRE

SECTION A: Demographic section

a. Name of Department …………………………………………………………………….

ii. Highest educational qualification

  a. SSC ( )
  b. OND/ HND/ NCE ( )
  c. BA/ MSc/ BAgric/ BEd ( )
  d. Masters ( )
  e. PhD ( )

iii. Length of work experience in communication and/or broadcasting activities

  a. Less than 5 years ( )
  b. 5 years – 9 years ( )
  c. 10 years – 14 years ( )
  d. 15 years and above ( )

iv. Length of work experience in NAERLS

  a. Less than 5 years ( )
  b. 5 years – 9 years ( )
  c. 10 years – 14 years ( )
  d. 15 years and above ( )

SECTION B: Existing communication approaches

1. What communication approach does NAERLS use for deploying agricultural technologies in its adopted villages? (*You can tick more than one*)

  a. Individual approach (based on farm families) ( )
  b. Group approach (based on training and demonstration) ( )
  c. Mass-mediated approach (without interpersonal modes) ( )
  d. Other (specify) ……………………………………………………………

2. What channels do you use for disseminated agricultural innovation to farmers in adopted villages? (*You can tick more than one*)

  a. Face to face/field visit ( )
  b. TV ( )

c. Radio ( )

d. Field demonstration ( )

e. Empowerment training ( )

f. Poster/flipbooks ( )

g. Multimedia CDs ( )

h. Mobile Phone ( )

i. Others (specify) ....

3. To what extent do you use the following communication media with farmers in adopted village?

S/N		*Always*	*Occasionally*	*Rarely*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

4. To what extent would you say NAERLS use of **individual extension communication** approach has impacted on the following production indicators of farmers in the selected adopted villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

5. To what extent would you say NAERLS use of **Group extension communication** approach has impacted on the following production indicators of farmers in the selected adopted villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

6. To what extent would you say NAERLS use of **Mass-mediated communication** approach has impacted on the following production indicators of farmers in the selected adopted villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

7. To what extent would you say the following channels used by NAERLS have influenced the uptake of **improved seeds/seedlings** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

8. To what extent would you say the following channels used by NAERLS have influenced the uptake of **improved livestock/feeds** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

9. To what extent would you say the following channels used by NAERLS have influenced the uptake of **recommended agronomic practices** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

10. To what extent would you say the following channels used by NAERLS have influenced the uptake of **uses of farm chemicals as technology** by farmers in the study villages?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

11. To what extent would you say the following channels used by NAERLS have influenced the uptake of improved **disease and pest control technologies** by farmers in the study villages?

S/N		*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

12. To what extent would you say the following channels used by NAERLS have influenced the uptake of **postharvest and processing technologies** by farmers in the study villages?

S/N		*Highly*	*moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

13. To what extent would you say the following channels used by NAERLS have influenced the uptake of **home utilization technologies** by farmers in the study villages?

S/N		*Highly*	*moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

SECTION D: Level of involvement of farmers in agricultural matters

14. How would you rate the **frequency** of the following **activities** of NAERLS with regard to farmers in its adopted villages?

S/N	NAERLS visits the village for mutual interaction	*Frequently*	*Occasionally*	*Rarely*
A	Farmer groups are invited to NAERLS			
B	Individual farmers visit NAERLS on matters pertaining to their farms			
C	NAERLS seeks consent of farmers before agricultural events are organized in village			
D	NAERLS jointly plan agricultural events with farmers before they take place			
E	NAERLS and Farmers jointly execute/implement agricultural projects			
F	NAERLS informs farmers of agricultural events before they take place in the village			
G	There is a level of cost/resource sharing between NAERLS and farmers on agricultural projects at the village			
H	NAERLS actively involves farmers in project evaluation study/survey, including discussion of results			
I	NAERLS is well disposed to farmers' opinions on agricultural matters			
J	NAERLS promptly attends to farmers' complaints			
K	NAERLS visits the village for mutual interaction			

15. How often do you involve farmer in the adopted villages in the following media packaging activities?

S/N	*Item*	*Always*	*Occasionally*	*Rarely*
A	Field Assessment/ situational appraisal			
B	Preliminary Message development/ design			
C	Information gathering			
D	Scripts/ manuscript writing			
E	Programme presentation (voicing, hosting, etc)			
F	Postproduction evaluation (on the field)			
G	Postproduction editing (studio/office level)			
H	Others (specify			

SECTION E: Communication Barriers to adoption of innovation

16. To what extent are the following barriers present in NAERLS communication activities, so much that they affect farmers' adoption of agricultural innovations in the villages?

SN	*Item*	*Highly*	*Moderately*	*Poorly*
A	The channel of communication is inappropriate			
B	The channel of communication is inaccessible			
C	The format of message is inappropriate			
D	Method of message delivery is faulty			
F	Language of delivery is inappropriate			
G	Time of delivery of message is inappropriate			
H	Farmers are not carried along in the design of communicated message			
I	Farmers do not trust NAERLS as information source			
J	The message lacks consideration for farmers' cultural values			

17. The following extraneous barriers affect farmers' adoption of agricultural innovations:

SN	*Item*	*True*	*Somewhat True*	*False*
A	Farmers do not like change of status quo			
B	Farmers prefer old methods of farm practices to new ones			
C	Innovations do not take cultural norms into consideration			
D	Farmers feel they are not carried along in the development of new techniques			
E	Farmers cannot afford the cost of new innovations			
F	The innovations are not readily available to farmers			
G	Farmers fear that government would abandon support due to policy inconsistency			

SECTION E: Improving the effectiveness of agricultural communication

18. To what extent should NAERLS extension package producers improve on the following stages of production to enhance agricultural productivity in Nigeria? (*tick appropriately*)

S/N	*Item*	*Highly*	*Moderately*	*Rarely*
A	Idea conception/ programme conceptualization			
B	Information gathering			
C	Scriptwriting/ manuscript writing			
D	Script/ manuscript editing (pre-production)			
E	Programme presentation			
F	Postproduction editing (that is, electronic)			
G	Individual programme production (single or in episodes)			
H	Programme/ material packaging (finishing) (including print and CDs)			
I	Project coordination (such as coordinating WAAPP or FAO radio project)			
J	Coordinating Farm broadcast activities			
K	Others, specify			

19. To what extent should the following areas/activities of media package production be improved on for the purpose of effectiveness and efficiency? (*NOTE*: *prioritize based on what currently exist*)

SN	*Item*	*High*	*Moderate*	*Low*
A	Idea conception/ programme conceptualization			
B	Information gathering			
C	Scriptwriting/ manuscript writing			
D	Programme presentation			
E	Postproduction editing (that is, electronic)			
F	Individual programme production (single or in episodes)			
G	Programme/ material packaging (finishing)			
H	Project coordination			
I	Coordinating farm broadcast activities			
J	Others, specify			

20. To what extent should the following Institutional mechanisms be improved on (or introduced where it had been absent) to ensure better communication quality control?

SN	*Item*	*High*	*Moderate*	*Low*
A	Periodic (institutional) programme/project review and planning			
	Periodic programme review and planning with extension stakeholders (such as Monthly Technology Review Meeting, National Extension Review and Planning, etc)			

B	Institutional package/production preview panel			
C	Audience feedback			
D	Use of outsourced professionals for review			
E	Use of communication strategy document			
F	Others, specify			

21. To what extent would you rate the following as being needed generally for improving agricultural communication in Nigeria?

SN	*Item*	*High*	*Moderate*	*Low*
A	More funds to the agriculture sector			
B	Increased funding for research and extension			
C	Increased staff training			
D	Procurement of modern equipment for information gathering, processing and dissemination			
E	Recruitment of more extension staff			
F	Provision of communication-support infrastructure			
G	Legislation of a national extension policy			

THANK YOU

5. FAMERS' QUESTIONNAIRE

SECTION A: Biographic section

i. Village……………………………………

ii. Gender
   a. Male ( )
   b. Female ( )

iii. Category of respondent
   a. Crop farmer ( )
   b. Livestock ( )
   c. Produce marketer ( )
   d. Youth ( )

iv. Age bracket
   a. Less than 20 years ( )
   b. 20 -35 years ( )
   c. 36-50 years ( )
   d. 51-65 years ( )
   e. Above 65 years ( )

v. Length of experience in the agricultural business or activities
   a. Less than 5 years ( )
   b. 5 years – 9 years ( )
   c. 10 years – 14 years ( )
   d. 15 years and above ( )

vi. Average income per month
   a. Less than ₦5,000 ( )
   b. ₦5,000- ₦15,000 ( )
   c. ₦16,000 - ₦30,000 ( )
   d. ₦31,000 – ₦50,000 ( )
   e. ₦51,000 and above ( )

vii. What is your level of education?
   a. Primary ( )
   b. Quranic ( )
   c. Secondary ( )
   d. Tertiary ( )
   e. None ( )
   f. Other specify...

SECTION B: Existing Communication Approaches

1. To what extent do you access agricultural messages through the following NAERLS channels/media?

S/N		*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile phones			
I	Others (specify			

SECTION C: Impact of existing communication approaches

2. To what extent would you say NAERLS use of communication activities have impacted on your following production indicators? *(MULTIPLE TICKING)*

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Crop production/Farm yield			
B	Income level			
C	Access to Input			
D	General awareness on good farm practices			
E	Weed and Pest control (chemical use)			
F	Marketing Decisions			
G	Housekeeping/ Management			
H	Self-empowerment			
I	Others, specify			

3. To what extent would you say the following channels used by NAERLS have influenced your uptake of **improved seeds/seedlings**?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

4. To what extent would you say the following channels used by NAERLS have influenced your uptake of **improved livestock/feeds**?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

5. To what extent would you say the following channels used by NAERLS have influenced your uptake of **recommended agronomic practices**?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

6. To what extent would you say the following channels used by NAERLS have influenced your **uses of recommended farm chemicals**?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

7. To what extent would you say the following channels used by NAERLS have influenced your uptake of improved **disease and pest control technologies**?

S/N	*Item*	*Highly*	*Moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

8. To what extent would you say the following channels used by NAERLS have influenced your uptake of **postharvest and processing technologies**?

S/N	*Item*	*Highly*	*moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

9. To what extent would you say the following channels used by NAERLS have influenced your uptake of **home utilization technologies**?

S/N	*Item*	*Highly*	*moderately*	*Poorly*
A	Farm visit (face to face)			
B	TV			
C	Radio			
D	Field demonstration			
E	Empowerment training			
F	Poster/flipbook			
G	Multimedia CD			
H	Mobile Phone			
I	Others, specify			

SECTION D: Level of involvement of farmers in agricultural matters

10. How frequently does NAERLS carry out the following a**ctivities** in your village?

S/N	*Activity*	*Always*	*Occasionally*	*Rarely*
A	NAERLS visits the village for mutual interaction			
B	Farmer groups are invited to NAERLS			
C	Individual farmers visit NAERLS on matters pertaining to their farms			
D	NAERLS seeks consent of farmers before agricultural events are organized in village			
E	NAERLS jointly plan agricultural events with farmers before they take place			
F	NAERLS and Farmers jointly execute/implement agricultural projects			
G	NAERLS informs farmers of agricultural events before they take place in the village			
H	There is a level of cost/resource sharing between NAERLS and farmers on agricultural projects at the village			
I	NAERLS actively involves farmers in project evaluation study/survey, including discussion of results			
J	NAERLS is well disposed to farmers' opinions on agricultural matters			
K	NAERLS promptly attends to farmers' complaints			
L	OTHERS, Specify			

11. For any complaint or suggestion, we get back to NAERLS through the following media?

S/N		*Always*	*Occasionally*	*Rarely*
A	Physical visit to the office			
B	Mobile phone (calls)			
C	SMS/ Text messages			
D	Letters			
E	Emails			
I	Others, specify			

SECTION E: Communication barriers

12. What is your perception on NAERLS communication activities/ channels/messages with regard to your agricultural work?

SN	*Item*	*Very True*	*Somehow True*	*False*
A	NAERLS communication channel is inappropriate			
B	We cannot access its communication channels			
C	Its format of message delivery is inappropriate			
D	Its method of message delivery is faulty			
E	The language of its messages is inappropriate			
G	Time of message delivery is inappropriate			
H	We are not carried along in the design of NAERLS messages			
I	NAERLS messages don't respect our cultural values			
J	We don't trust NAERLS and its messages			
K	Others, specify			

13. The following barriers often affect my attitude to agricultural technology adoption

SN	*Item*	*Very True*	*Somehow True*	*False*
A	I hate change generally			
B	Old methods of doing agricultural work are still better			
C	Some innovations do not respect our cultural values			
D	I cannot afford the cost of new innovations			
E	Some innovations are not readily available/accessible			
F	I have been disappointed before by certain innovations			
G	There are too many conflicting information			
H	I don't trust the information so received			
I	I don't trust the intention of NAERLS			
J	I don't trust the intention of government and its policies			
K	Extension people look down on farmers and give too much regard for their 'book knowledge'			
L	Others, specify			

Section F: Improving Agricultural Communication

14. What should NAERLS do to improve agricultural communication with you?

SN	*Item*	*Very true*	*Somehow true*	*False*
1	Listen more to farmers complaints, observations and suggestions			
2	Involve farmers more in its communication packages			
3	Make broadcast schedules such that farmers can access with ease			
4	Take farmers' cultural values into consideration			

5	Work on language of communication for proper understanding			
6	Design communication packages to fit into farming context			
7	OTHERS, Specify			

THANK YOU

APPENDIX 3
TRANSCRIPTS OF KEY INFORMANT INTERVIEWS

1. **Interview with the Executive Director of NAERLS, Dr Ismaila Y. Ilu, on 24 March 2015 at his office at NAERLS headquarter, Zaria**

What is an adopted village and what informs the choice of a village?
Adopted villages are extension villages, or model villages for testing agricultural technologies. They are used as testing grounds. When the first five villages were established, participatory extension model was used by NAERLS for dissemination of technology. Because of the success of AV from ARCN, the Institute was given mandate to establish more AV for WAAPP. Besides, NAERLS has several AV, because as an extension institute, it needs to practice several innovation dissemination models using several adopted villages. There are criteria for selection. But as a first rule, the Institute looks for what are called 'difficult' places (villages that are inaccessible, remote and somewhat secluded).

What communication approaches are being used by NAERLS?
The approach used before now, or until recently, is the training and visit (T&V), which focuses on or deals with individual farmers or farm family. This was brought by the World Bank since the 1970s and led to the establishment of ADP. Then NAERLS was mandated by AGMEU of PCU to assess the T&V model; where it was found that it was too expensive to run and thus, recommended that it was not tenable because it was not practical. The published report was highly criticized by the ADPs and other beneficiaries, who thought the research was biased in its assessment. Then the World Bank itself conducted an independent research and came up with the same conclusion. It therefore struck the T&V system, starting with India, where it all started, and extending this to Nigeria.

This was later replaced by T&D (training and demonstration). It is noteworthy that India, the starting point of T&V, did not have a research institute as NAERLS. Its institutes, operating separately, linked farmers to research, or farmers to government policies, or government to research. NAERLS (was and) is unique in that it is the first of its kind in Africa and other developing countries the world over. It serves as a link between the farmers, research institutes and the federal government—hence the word 'liaison'. It relays field problems to the research institutes and government and then carries back the communication/ information/ proffered solution/ innovation to the farmers. But I must confess that due to certain recent constraints, such as lack of funding and inadequate staff training, the situation is not as it ought to be. These constraints have led to a compromise in that arrangement where information dissemination process begins with the farmer. At such a time, we make do with what we have—we make do with experience and expert judgement.

In T&V approach, QTRM, MTRM, FNT and other meetings are held, where state extension service providers are linked with research institutes and real field problems are discussed and related issues raised. At the meetings, they present papers and come up with impact points. But T&V failed in Nigeria mainly because, one, the meetings took a long time to be organized and concluded; and two, the research institutes were not trained to disseminate but to create technologies. But NAERLS is trained and equipped with the necessary tools to, first, simplify technologies that have been created through research, and then disseminate them to farmers in usable forms.

The ADPs could not perform because the staff were brought in from the state ministry of agriculture, often without specialized training in extension communication. In their early stage, the state paid their salaries while the federal government and WB provided funds for their projects in a 25%/75% ratio respectively. At this stage, the ADPs were highly successful in project execution because the three bodies paid their part of the fund in what is known as counterpart funding arrangement. But when the WB withdrew its support after its study, the 25% from the FG became insufficient for running the ADPs. Even then, this 25% soon ceased from coming as the counterpart arrangement was broken. The state governments refused to give anything other than the salaries which they were used to; and moreover, they became obliged morally to keep paying salaries, as the composition of the ADP is such that its staff are indigenes of the state. But there are still a few states which provide fund for running a few projects in their ADPs.

Thus, the Nigerian extension system is stuck with the Training and Demonstration (T&D) approach to extension, even though its structure is not followed or implemented. NAERLS thus dropped the T&V and adopted the group approach or T&D in the middle of 1990s or towards the end.

Institutional extension approaches are generally divided into three: the individual approach, group approach, and mass approach. The mass approach/method, the media (broadcasts and prints) are used to reach farmers. Ordinarily, this method is not often used in isolation but as a strengthening method for any of the other two. NAERLS has been employing the group or participatory extension approach with its farmers in the AVs and this is strengthened with the mass approach. The group approach deals with farmers as groups rather than as individual farmers which T&V had. In extension parlance, a farmer group consists of 10 - 15, and never more than 20, people. This approach is more advantageous because: 1) of group dynamics, 2) it is less expensive than personal approach, 3) several opportunities today especially with regard to development communication in agricultural development that the approach has.

How do you determine what to communicate?

The communication activities or what to communication starts with a diagnostic survey. There is the Annual Wet Season Evaluation survey or Annual Agricultural performance survey (APS), which technically determines what to communicate. The APS is a learning opportunity for interacting with farmers, ADP, agricultural ministries officials and other stakeholders. The survey provides different feedbacks— those directly affecting farmers, those affecting NAERLS, those affecting research institutes, and one affecting government or policy makers. The survey comes up with a memo for the bodies affected. For NAERLS, the results or memo is used to produce its annual work plan (document). Some of the feedback could lead to further research to get more clarification on the field problems, while others could directly lead to media content development, design of dissemination approach, decision on channel use, and so on. This also determines whether training (skills acquisition) is necessary. In general, the segmentation and design of all NAERLS activities depend on research from the field. In this case, the determination of what to communicate starts with the farmer.

There is also the content of communication. The availability of technologies determines what to communicate. There is largely the problem of unavailability of technologies. For example, for crops, there is abundance of technologies (varieties and agronomic practices) for maize and cassava, on how to enlarge production and income, such as disease and drought-resistant, hybrids (for maize only), pro-vitamin A, early maturing, etc. This is not so for many other crops, such as yam, potato, tomato, soybean, sorghum and millet. No matter the ingenuity of your communication strategy/approach if there is no technology on ground, there is actually nothing to 'sell'. A technology must be available and must perform to 'sell' itself.

There is the angle of communication infrastructure, both at the sender's and receiver's end. No matter how good your communication package is, if the support infrastructures are not available, you might end up using inappropriate channels.

What determines the format of message and media of communication?

What determines the format of message is the stage of the audience (farmer) positionally to the technology being communicated, such as awareness level (jingles, pamphlets, demonstration, etc) where he needs to be exposed first and foremost to the new technology. This will ginger his interest—the foremost interest from the economic angle is profit. After this stage (that is, after interest has been secured), you need to give specific technical information. 'How do I try it? What is the fertilizer requirement? What are its agronomic practices?' This technical information could require a more elaborate audiovisual programme or a T&D (training and demonstration) rather than a radio programme, for example.

Under the participatory approach, instead of the extension service provider establishing a demonstration plot, it is the farmer group that establishes a demonstration plot under the supervision of the service provider. The participatory model is also superior in that while the extension agent manages the group's demonstration plot, he is also understudying the technology itself.

It depends on the specific nature of information to be disseminated. Print and Radio (audio) is usually used during awareness stage; telling audience of the potential of a technology. This is because the information does not need to be too tangible or technical. Specific and technical information (such as planting density, seed quality, disease manifestation, etc) requires visual effect, hence the use of audiovisuals (TV, CDs, demonstration)

What different approaches and channels do you use for the various farming audiences in the different villages and across various agroecological zones?

The media channels used are generic for Nigeria, based on the national mandate. NAERLS was established in accordance with the US collegiate extension model. For this reason, there is the food technology and home economics department, which tests the end-result (table result) of each agricultural technology to be disseminated, to determine its acceptability, palatability and/or deviation from prevailing varieties/technologies. This way, all crop varieties and livestock breeds are followed up to the 'recipe stage' and taken to the farmers in extension villages and other places. Usually, this is prepared alongside older varieties.

In the past, extension packages for all technologies had the home as the ultimate target. But today, with the focus of ATA and global economic trends, the target is the industry. So at the adopted village level, the target has shifted to cottage industry along the value chain.

How would you say NAERLS communication activities have impacted on farmers in its adopted villages?

No impact study on communication activities has been conducted over the years—in fact, since 1987. There is an ongoing evaluation study for adopted villages at the headquarters, undertaken by the Monitoring and Evaluation Unit of the Institute. However, this is not on the communication activities but on the interventions in the area of technologies, such as improved poultry and duck production, as well as modern sheep and goat production. These were done in collaboration with NAPRI and a few other stakeholders. These interventions were demand-driven (that is, based on request from farmers and donor agencies). These starts with empowerment training for the participants, credit-sourcing for setting up small-scale farms for the participants and monitoring the progress of such production activities. So actually, we cannot objectively say this or that is the extent of impact of our communication activities on farmers productivity in the villages, because there has been no research in that regard.

However, we have other indicators to mention our performance. Farmers have been tremendously affected positively, and this is evidenced in many ways:

1. **Annual Performance Survey:** The field outlook each year shows general improvement in agricultural performance, distribution of inputs (seeds, stock, chemicals, credit, tractorization), as well as farmers' education on agronomic practices and government policies. Even after the unprecedented 2012 nationwide flooding that took everyone by surprise did not affect production as much as predicted.
2. **Commendation**: Letters of commendation from credit institutions (such as banks) which partnered in the various intervention projects, stating of improved income for participating farmers, measured by their quick, timely and smooth repayment of loans.
3. **100% loan repayment by farmer groups**: The criteria used in exposing farmers to loans were such that the financial institutions carried out objective feasibility and profitability surveys of each project among farmers. The farmers themselves are empowered with the knowledge and skills of loan repayment using proceeds from the

farm; and after training, recommendations on each participating farmers group are made to the financial institution based on the trials. There has been 100% repayment of loans by farmers groups.

How would you describe the extent of participation that farmers in the adopted villages are allowed by NAERLS in your agricultural initiatives?

There are two main advantages of participatory model over the T&V: first, the farmers have ownership of the demonstration plot; and second, documentation is more homegrown. During field demonstration, the extension provider documents the stages of activities, practices and results especially in audiovisual forms, so that this is broadcast at the rural technology resource centre to the entire community so that participants can appraise their activities and those who did not have the opportunity to participate could see the results and make better decisions.

The Institute got an excellent score long ago in the 1980s, which made the federal government to give it a national mandate. The establishment of zonal offices in the six agro-ecological zones has made the reach of the institute far and wide, and impacted on its efficiency and effectiveness.

But there is a major challenge: that of being squashed between institutions, that is, the problem of institutionalism. The institute is meant to work alongside the state ADPs, which have been rendered largely ineffective by lack of funding. NAERLS was not established to make direct contact with the average Nigerian farmer. Rather, its work is to decide on the best means of reaching farmers; the best media (text, audio, video, or a combination of many), approach, etc. ADPs are basically NAERLS clients in each state, that is, the contact people that take disseminated technological information to farmers. NAERLS' direct contact with farmers is only at the adopted village level. Therefore, since the activities of ADPs are almost grounded to a halt, NAERLS has to find alternative ways of deploying disseminated information on technologies that have been demonstrated and tested in the adopted villages to the larger Nigerian farmers.

This new gap created by the ADP challenge, coupled with the fact that, as an institution under the federal ministry of Agriculture, and thus run in a manner befitting ministry work, has become so daunting that NAERLS has almost abandoned its research role in extension methodologies. Thus, in the area of research in extension methodologies, as a matter of its mandate, NAERLS has not performed well. You cannot therefore independently evaluate the success of NAERLS without evaluating the ADP system and the federal ministry of agriculture.

Moreover, public extension systems have to work with private extension providers to be effective in modern times. When extension research is conducted, NAERLS must distribute results among public and private extension providers, which then disseminate. The private providers sell their information for a profit. At the beginning, the government pays for such information so that the farmer gets it almost free and get acquainted with the profit of that information. Thereafter, the government gradually withdraws its subsidy. With the level of performance of the ADPs, therefore, there is the need for NAERLS to sell to the government the idea of operating private extension systems to compliment the public system. SASAKAWA Global, for example, has provided a good model for private extension provision in Nigeria and has found that once farmers become used to the benefits of extension services, they would make arrangements for paying for the services provided. So NAERLS, being the national government's institution for linking farmers-research-extension, still has a lot to do in this regard.

Generally, therefore, extension service provision in Nigeria still has a long way to go. We are not there yet; but we are far ahead of where we began.

There used to be 3 extension institutions in the past, AERLS in the north, one in Umudike in the east, and another IAR&T Ibadan in the west. But while those of the east and west fizzled out on their own with years of inactivity, the northern institution handled the work of extension as if it were a national institution and provided services to the west and east. But in 1987, while AERLS was experiencing hard times, there was suggestion for it to be merged with IAR, which had been its mother institute. But the leadership of AERLS protested up to the then head of state, General Ibrahim Babangida, stressing the need to keep it as an extension-providing institution. A panel of enquiry was set up, which then found that the institute's publications were all over the country, and that these have helped filled the gaps left by the moribund extension institutes in the west and east. This led to the national mandate and the addition of 'National' to AERLS in 1987.

NAERLS is not to have direct contact with Nigerian farmers, to interact with them on the field and teach them what to do. That is the work of other extension providers, such as ADPs, MIS operators, SASSAKAWA Global, Novus Agro, etc. Rather, NAERLS is established to facilitate the extension activities of private and public extension bodies through research and training activities on the best approaches, methods, strategies, channels, media, etc for communicating agricultural information; the best context, format, timing, content, etc for communicating such information. The institute is to initiate, influence and dictate how extension service provision should be carried out in Nigeria.

How can NAERLS's agricultural communication efforts to farmers in adopted villages be improved for effectiveness?

Adopted villages are experimental fields for the Institute, where different extension communication models and approaches are tried out. Today, NAERLS is experimenting with the same models and approaches in all its adopted villages in different agro-ecological zones, where there are also divergent socio-ethnic groups. So by design, the models in the northwest should not necessarily be the same with those in the southwest and southeast because of the different socio-linguistic, ethnic and other traits, as well as climatic/ agro-ecologic conditions. But this is what is practised. There should be cases for comparison: is the individual model better in this area than the group model?

In running the adopted villages, private extension providers and non-government organizations (NGOs) must be employed to experiment on the different models, while NAERLS supervises and coordinates their activities and schedules. This would also cut cost and enhance efficiency of delivery.

We are also not researching enough. For example, up till now, NAERLS has no media/channel characterization for the Nigerian farming audience. Somehow, the focus of the institute has shifted from research in extension methodologies to production and fieldwork, which are the roles of our clients, such as the ADPs and private extension bodies. For example, NAERLS is not supposed to be producing radio and TV programmes solely to be broadcast in different state and private stations. Instead, it is to produce rushes for these other extension bodies. Again, take presentation of extension results for instance. NAERLS website is supposed to be full of materials for different presentation formats and materials, such that extension personnel could log on and browse for desired slides, audio, video or texts (on such topics as maize production, processing or marketing). In fact, the institute's survival and competiveness in this age of globalization depend on its going back to this focus.

So I will conclude by saying that there is the general lack of political will to push through extension projects and initiatives. Our problem is not often that Nigeria does not know what to do or how to do it, but that the will power is lacking. There is also the need to actively involve the private sector and NGOs in extension provision. But, as the saying goes, it must be done gradually. Public extension service may seem bad or insufficient today, but it is still what is largely available and accessible to Nigerian farmers. And there is the need for a viable policy that will conveniently handle certain extension challenges.

What would you say are the communication barriers to technology adoption in the villages?
There have been several research in this regard but they were never concluded. Like I stated earlier, the institute is highly lacking in research, and this has to change. Without research, identification of actual communication barriers would be difficult. We hope that your research will lead in this way. How do we know the barriers when we cannot correctly identify them? The institute is grossly lacking in the areas of full interaction with farmers and conducting evaluation research, and this has to change. Without evaluation research, identification of actual communication barriers would be difficult. Up till now, the institute has not done any media /channel characterization study for our farmers both at the adopted village level and elsewhere. Like I usually say, our focus has shifted from research in extension methodologies to production and fieldwork, which are the roles of our clients, such as the ADPs and private extension bodies.

But generally, there is the problem of top-down approach in the creation of technologies—that is, they lack participation. Most of the technologies were developed without involvement of the end-users. Technologies created are not demand-driven (originating from farmer). All technologies should solve field problems. When this does not start from the farmer, could be discountenanced by the farmer because he is the ultimate risk taker in the farming business.

Describe the national extension framework for Nigeria that NAERLS works with

There is none in Nigeria, but NAERLS works with the collegiate system of the US, which comprised of specialists and technical staff. This way, the staff system and operations are divided into specialists and technical (or audiovisuals). In the past, the blocks housing staff were arranged in this order (Block A was for specialist, while Block B was for audiovisuals). Block A had 6 departments, while Block B had one, mainly because the mandate is purely extension communication. At that time, NAERLS produced materials and send to all the state ADPs for airing.

What is the relationship between NAERLS and AETA?

AETA's work is not parallel to that of NAERLS. The vision of the minister of agriculture is to grow Nigeria's agricultural sector while working with different actors in the value chain. These actors include private extension providers. The minister came from the private extension background, as former head of AGRA in Kenya. To achieve the agricultural extension aspect of ATA, therefore, he appointed one of the most brilliant brains in the Nigerian extension system, Professor T. Arokoyo, who is also a former director of NAERLS, as the coordinator of AETA. The plan and arrangement is that AETA is domiciled in NAERLS, so that the latter drives the AETA component of ATA. Under this arrangement too, each project of AETA is first and foremost deliberated upon and planned for at NAERLS. For example, the Federal Department of Agricultural Extension was created in 2013, including the staff requirements of the department, through the influence of NAERLS using the platform of AETA. Also, agricultural extension in the country is redesigned within the market-oriented approach (demand-driven), as against the prevailing push model (supply-driven) in the country. But personnel operating the extension system in Nigeria were trained in the supply-driven approach, and they continue to operate the new system with old knowledge, using farmers field school, plot demonstration, etc.

On the other hand, the lack of understanding of the core concept of demand-driven extension and the fact that old hands are made to run the new system have created an impression—and sometimes rightly so—that AETA is a parallel system to NAERLS. Indeed, cases have arisen where the Institute was used as if it were a private or public contractor on extension matters, even where it could have been at the core of idea conceptualization. At other times, hiding under the concept of public-private partnership arrangement, private individuals/agencies are given certain extension mandate for the country and NAERLS is used almost as an appendage to or a subcontractor for individuals/agencies. This is a wrong approach and is not in tandem with the spirit and letter of the establishing AETA Document.

Constraints to extension

There is the problem of unavailability of technologies. For example, for crops, there is an abundance of technologies available to the farmer for enlarging production and income, such as disease and drought-resistant, hybrids, pro-vitamin A, etc.

Agricultural extension in the country is being redesigned by AETA in line with the market-oriented approach (demand-driven), as against the prevailing push model (supply-driven) in the country. But personnel operating the extension system in Nigeria were trained in the supply-driven approach, and they continue to operate the new system with old knowledge. In other words, there is the need to change orientation, through training of all extension personnel, to appraise and operate a demand-driven extension system.

There is the absence of consistent, relevant long-term training. Extension personnel are created within a long period of time through consistent exposure to experience and skills. The ability to solve different field problems over a period of time qualifies one as extension personnel.

There is the problem of insufficient funding to extension agencies. For many years now, especially with the current democratic regime, there has been consistent but gradual dwindling of funds for extension activities in the country. This lack of funds has limited the mobility of field personnel so much that they only become salary-earning, office-sitting staff.

There is the dominance of public extension system in the country. There is the need to decentralize the system and give private participation enlarged roles in extension. Uganda has done this and it is working.

2. **Transcript of KII Interview national coordinator of Agricultural Extension Transformation Agenda (AETA), Professor T.J. Arokoyo, on 20 and 21 March 2015 at the AETA National Coordination Office, Zaria.**

What extension framework is there for Nigeria?

There is no existing national communication framework that supposedly guides dissemination activities, whether for NAERLS or other bodies. However, there are several approaches that can be used in extension. But this doesn't mean that NAERLS should do haphazard extension activities. There are several platforms and approaches that the Institute can choose from. What matters in the end, however, is knowing the factors that influence the selection of an approach. So I would rather you ask of factors influencing the selection of channels/media. Who are we talking to? In what situation? What circumstance? And these all starts with the communicator. What are your knowledge and skills in communication?

Two, the message you want to communicate. Then your organization, your philosophy about extension; do you think farmers are passive receivers of information? But the paradigm shift in development extension, the clientele is central, so much so that the word 'beneficiary' of extension communication applies to all participants in the communication context. Until you have this concept, you cannot be said to have successful participatory or development communication.

So who is NAERLS communicating with? What is the organization's mandate and philosophy on extension? Today, the farmer is central. So personally, I teach that there is no best communication channel or approach. The 'best' is dependent on a variable number of factors: first, you the communicator, two your organization, three your message, four the clientele (stakeholders), five the environment in which you communicate (context). Analyzing these factors would help you come up with the best communication channel/ approach/ strategy. No matter how great the Internet is making waves, if the required knowledge, skills and infrastructure are not available within the communication context or environment, the channel becomes useless and ineffective. How can you communicate when there is no access?

Assessing NAERLS Extension efforts and impact on agricultural productivity

Despite the lack of funding and lack of professionalization of extension in Nigeria, NAERLS has made tremendous impact on farmer's productivity. However, I must say that to assess its communication efforts is a little difficult because the institute itself has not been able to conduct any assessment survey on its performance, nor employ the services of an external body to do same assessment. Besides, today's agriculture deals with evidence-based impact assessment. So what evidence is there on the institute's performance? Until the institute conducts such evidence-based research and employs an external body to do same, we cannot say exactly what impact it has made on agricultural productivity with precision. Perhaps your study would be the beginning of such objective assessment.

The Institute's success was high in the 1970s and 80s, when facilities were not major challenges for the institute. Then, NAERLS printed millions of assorted extension materials and distributed them free to farmers in all the states in the north and a few others in the south. These publications were in English, Hausa, Ajamin (that is, the writing of Hausa language in Arabic text), Yoruba, Igbo and pidgin English. The English ones focused mainly on extension personnel. There were also robust farm broadcast activities (radio and TV) which were distributed across the country, impacting on adoption rates of different technologies. The programmes were aired almost free by the different stations.

But these activities snapped along the line, especially from the SAP period upwards, when government told all media houses to generate money and break even. The backlash was on NAERLS, which was told to pay huge price for airtime. The institute paid the bill for sometime while also reducing the number of production and frequency of broadcast.

AETA took up this challenge to push for a legislation that all radio and television stations must give 2% of their airtime for public service in agriculture, health and education. To this regard, we worked with the federal ministries of agriculture, education and health, as well as with the National Communications Commission (NCC). But honestly, I do not know what happened along the line; but the plan died somehow, which shows that Nigeria is not building institutions.

So assessing NAERLS communication efforts is a little difficult because the institute itself has not been able to conduct any assessment survey on its performance, nor employ the services of an external body to do same assessment. Besides, today's world, especially the agricultural sector, deals with evidence-based impact assessment. So what evidence is there on the institute's performance? Unfortunately, this is a major area that NAERLS has been lacking. And it carries to the larger Project Monitoring and Evaluation (PME) Unit of government ministries, departments and agencies. Until the institute conducts such evidence-based research and employs an external body to do same, we cannot say exactly what impact it has made on agricultural productivity with precision.

Yet NAERLS has been involved in assessing others. So it is more than capable for such an assessment project, but has been failing on its part. Even when staff are told to give their periodic work report, they fail to do the right thing. Rather than supplying quantitative data, they provide their reports in narratives, which is difficult to evaluate for an organization. How many farmers have be trained in a particular zone for a particular period? How has the training translated into increased productivity?

How would you assess performance of extension in Nigeria vis-a-vis farmers' productivity?

The Nigerian extension system is growing towards where it should be, but we cannot say it has performed very well. In terms of knowledge base, it is well positioned. Nigeria often has splendid extension plans, such as we have for AETA action plan. But implementation is usually our problem. For example, the AETA action plan is a beautiful piece which international bodies have praised Nigeria for. But the implementation has not been as impressive. Indeed, agriculture has been the sector that the present government has performed exceptionally well. But there is no encouragement, as the government has not given the sector the needed attention. For many years now, the ministry has not received up to 3% of the national budget. This is more than a disgrace to the country. So the splendid performance in agriculture can be well ascribed to the doggedness of the minister and his team rather than to the national government. Nigeria is signatory to the Maputo declaration.

Indeed, the sector sometimes receives project grants from foreign agencies, but these are few and far apart. NAERLS is the major actor in the AETA programme; hence it is to host and operate the National Farmers Helpline, meant to tremendously transform the agricultural sector. But for years now, this project has been without support.

In the wider area of extension policy, the nation is not faring well. Nigeria does not have a functional agricultural extension policy. NAERLS was able to push through the establishment of a Federal Department of Agricultural Extension, even though the operations are not done according to recommendations. But until the hurdle of having a viable policy is crossed, we may not be able to objectively and fairly measure performance on a national scale. I had travelled to Kenya and brought back that country's first agricultural extension policy to the minister of agriculture. Nothing has been done on it. Like Kenya, Ghana, Zimbabwe and many other developing countries in Africa have such policies. So generally, Nigeria has not fared well in the area of agricultural extension, even among developing countries.

Effectiveness of Agric Extension in Nigeria

You cannot be effective in any area if you have no adequate human capacity and funding to support your activities. Extension is done in the field and not in the offices. For example, communication staff must go out to the field in good vehicles and functional, modern information gathering/ disseminating equipment. Why has the Research-Extension-Farmer-Input-Linkage System (REFILS) not work effectively in Nigeria? Because all stakeholders have to come together as a forum, on one platform of interaction, to manage and coordinate research and extension in an environment of a viable policy framework. Where is the policy? How can these stakeholders attend the meeting regularly without fund? And how can the people deliver without adequate capacity?

Therefore, whether REFILS or, as is being currently argued, FERILS, the government must sit up. It does not matter which approach is used, as the concept is a management tool for bringing all stakeholders to the table. Recall that the very first thing a researcher does with regard to REFILS is a diagnostic survey, which describes the conditions of the farmer and the farming situation. The survey is when the researcher goes to the farmer to find out what he is doing, how and why he is doing it. Then, what are the challenges—can we do it better, or can we do it differently to achieve better results? This is the starting point. For example, 60% of agricultural productivity depends on the quality of seed used. So what kind of seed is the farmer using and why? The absence of such survey, due to lack of fund, thus means a lot for extension communication.

So our problem is not that Nigeria does not know what to do or how to do it, but that the will power is lacking. I have always argued in every forum I attend that Nigeria has no business with poverty. Why not invest our petrodollars in agriculture and then move the system from subsistence to agribusiness? Mark my words: today's youths are not ready to waste their time on subsistence agriculture. The USA and other developed countries that are doing well in agriculture are not actually doing anything really different from what Nigeria is doing. Remember that NAERLS itself was established based on the US' collegiate model. What these countries do to excel is that they do the right thing at the right time with the right motive and support. Capacity building and strengthening major linkages along the value chain are their major concern.

Public/private extension

How much can the private extension bodies or NGOs do for now? Thus, privatization of extension in Nigeria can only be achieved through a gradual developmental process. The farmer must first and foremost be brought to appreciate the place of information for improved agricultural productivity, before they can be willing to pay for such information (as is practiced in private extension). Information is power; as they begin to value it, they will know that it comes at a cost. This was achieved under FADAMA 3, when farmer beneficiaries (usually farmers associations) were made to pay 10% of the extension services, thus becoming contributory partners.

For example, too, there was a time when fertilizers were distributed free by government, but they were not picked up by farmers. Fertilizers trailers were practically dumped so that they waste away. Today, with more information, the farmers now know that fertilizers are critical to improved productivity. So they are now not only ready to pay part of the cost—as provided by the e-Wallet initiative of ATA, they cannot even have enough. The e-Wallet provides 2 subsidized fertilizer bags per registered farmer. Hence, farmers who were buying fertilizers measured in cups and small bowls before now buy at half price two bags and without stress.

Staff capacity training and Extension communication

There is no extension communication without research, which is also a means of capacity building for the extension communication professional. NAERLS should be strictly involved in On-Farm Adaptive Research (OFAR), which takes an agricultural technology from the research institute to the farmer, so as to give it a human face. OFAR means taking two options only to the farmer, plus his own practice, for him to make his final decision/selection. Sometimes, it could mean taking what is supposedly the best to demonstrate to the farmer to help him make decision. The farmer takes it along his traditional practice, so that there is no 'magic story' told to him by another. This form of research links the research institute to the socioeconomics of the farmer. This area of research has been largely moribund in the institute because of lack of funding. Alongside NAERLS, the ADPs are supposed to be doing OFAR. But the lack of fund to them makes this impossible.

How can extension communication in Nigeria be improved upon for effectiveness

There is the challenge of non-legislation of extension matters. For example, what happens to ATA, AETA, GES and all other initiatives and project when the present government or the present minister of agriculture leaves? Thus there is the need to have a legislation to ensure continuity, stability, and sustainability. You do not introduce a farmer to profitable means of production and then suddenly take it away from them. There may be revolt.

Therefore, NAERLS must strive to do be the centre of excellence it was established to be in extension. In the past, no one was employed as extension specialist without first orientation in-house, and then being sent to the various states, to the field for a period of one to three months. This will help you get real field experience on how to conduct diagnostic surveys, relating with farmers and how to produce packages for effective extension. Without this exposure, you were not fit to be called a subject-matter specialist, especially in the area of communication with them. Extension communication to Nigerian farmers is akin to the traditional proverb among the Yoruba that 'we put our heads together to exchange lice.' This means that farmers and extension agents become so close for their heads to be near enough to exchange lice. We know that with the low support today for extension activities, this training opportunity may not be possible as before, but there must be consistent staff orientation and training, where papers are presented and enough discussions take place, especially in the area of communication skills. The field of extension communication is open to different subject-matter specialists, such as agricultural engineers, livestock and fisheries specialists, agronomists, agricultural economists, etc. So their entrant into extension communication must give them an avenue for 'value addition' in communication skills. This would allow them to know what is required of them, how to apply their specialist knowledge in communication, how to skilfully use such knowledge to improve farmers' livelihood.

Two, NAERLS must remain a centre of excellence in the area of extension communication research, which has been largely abandoned. Instead, what we have today is that specialists conduct research in their separate fields without the crucial area of extension methodologies. NAERLS is the only institution in Nigeria with the responsibility of conducting research in extension communication methodologies. And that is what your research is all about: what are the institute's communication approaches? What are the best global communication approaches? And so on. For example, I call an NAERLS staff and he is not able to tell me about extension in Kenya or Ethiopia or India or Germany. When staff go for professional conferences and training in or outside Nigeria, they are going for the purpose of presenting/ publishing paper or improving their CV for promotion and not for the knowledge and training to becoming a better extension communicator. Their so-called trainings are not making impact on the farmers or on the larger society.

Three, the system must go back to its vision of people satisfaction and not money gratification. Extension communication is people-centred; and its success is only measured by improvement in farm yields and increased socioeconomic indices of the farmer. But today, the humanity side of extension communication has been overshadowed by the economic side; we have allowed ourselves to be dragged into the general social menace of financial gratification as the ultimate goal of work done. When I got promoted to the rank of professor, I was not as happy as when a farmer or group of farmers walked up to me and say “Thank you sir for the knowledge you gave us. Our farms are doing exceptionally well today and our lives have been better ever since.” There is nothing more satisfying than that. Such statements from real people are soul-satisfying for a well trained extension communicator. And this starts from the orientation training. When we were introducing the farmers field schools in Nigeria, some rural communities which have benefited from our various extension project gave me traditional chieftaincy titles and even went ahead to provide the befitting regalia for the office. I was given *Damasini FFS* in a community in Bauchi State, and *Baale Agbe of Igbo Ora* in Oyo State. That of Oyo State was given to me alongside David Mansedeke (from Zimbabwe) and we were given the chieftaincy attires. The town prepared pounded yam and was in festive mood throughout that day. They invited their sons and daughters from far and wide to the event, and they treated with royalty. It was a wonderful celebration. There is nothing more satisfying than when a society celebrates a man for his contribution to humanity. This is what brings sustained commitment to the job. But when we allow the economic gains to take over, we become satisfied by being called doctor or professor so and so, sitting in air-conditioned offices and giving farmers whatever information we think fit and at whatever spare time we have.

Besides, there is the need for government to increase funding to the sector. In those days when NAERLS used analogue equipment, there was more communication work done (in broadcast and print) in one year than is done today in five years. Staff slept in their offices to work overnight so as to meet broadcast targets. Nobody cared much for overtime pay as they cared for meeting people’s needs. This was possible, however, because there was enough fund to support information gathering, production and transmission activities. Each programme area of department had well prepared annual budgets and vote books which were followed. This is not the case today.

But there is a word of caution here. My FAO colleagues have told me several times that money is not everything. NAERLS has, in several ways, shown the nation that it is leading in the operation of adopted villages with regard to technology demonstration and bringing technologies to Nigeria’s rural villages. The potential in the Institute is still great due to its national mandate.

What are the communication barriers to agricultural adoption among rural farmers?

Let me use diffusion and adoption theory to explain the scenario. There are five to six attributes to explain an innovation and see whether it can be accepted and adopted. Then look at development communication: why do development interventions fail? There is the general problem of top-down approach to technology creation. Most technologies are developed without the involvement of the end-users. When you sit in your air-conditioned office or classroom simply because you are a professor of agronomy to produce a variety of cassava without the farmer’s input, you lose the farmer even before the technology gets to him.

After such hurried creation of innovation, they think that some salesmen (ie, extension communicators) would do the magic of persuading people to accept and adopt it. The scientist often erroneously believes that his work is done when he finally comes up with his so-called super-technology and that the reason for non-adoption is tied to extension. In fact, we often boast that Nigeria has technologies on the shelf to keep the agricultural sector going for the next ten years even in the absence of any other research or technology. But how did they develop these technologies? Usually when they are completed, they are tested in 20 meter by 20 meter fields, but without the involvement of farmers.

All technology development must start with the farmer, that is, the diagnostic survey—this brings the concept of participation. When a gap is identified and a technology is developed to fill that gap, we take it to the farmer to see where it fits into his scheme of things. If anything, it must help take advantage of market opportunity. A technology that works well must have some level of participation among farmers. This is why there must be a balance between demand-driven research and opportunistic extension—the last pertains to identification of a market opportunity and the creation of technology to quickly take advantage of such opportunity, in which case, the farmer is ‘pushed’ but he will latch on once he sees the advantage.

The critical elements in any development interventions are: your stakeholders, participation, communication framework, resources, government policy, ownership/ sustainability. These must be analysed carefully to know why farmers reject technology. Let us take policy for example.

Under ATA, after a robust agricultural plan was unveiled and projects started, the Federal Government placed a ban on the import of rice. Billions of naira was pushed into the sector to grow it. Then some politicians went to pressure the president to allow them import rice and other food items because of the 2012 nationwide floods. They threatened that unless there is import, Nigerians will starve. The president was about acceding their request when the minister of agriculture heard about it. The minister then had to intervene and dissuade the government on such stance. This was after billions of naira had been invested into rice farming and farmers have been encouraged and supported to grow rice. Such ambivalence discourages the farmer and causes him not to trust your intentions the next time you come up with great ideas. What the minister did was to promote and support dry-season farming in Nigeria, which then added 8.6 million metric tons to the nation’s rice production.

The innovation itself should be examined in the areas of: relative advantage, complexity, triability, observability, predictability. For example, if it is so complex over a farmer’s normal practice and it is not compatible for me, why would he use it? What is the relative advantage? Every farmer wants to ride good cars too. They are not stupid; but they take risks cautiously.

There are also issues regarding the communication channels and sources generally. First, there is lack of trust. These are not the best of times for agricultural broadcasts. Most

Nigerians (including farmers) no longer trust broadcast messages because they have become too intertwined with electioneering campaigns and other messages setting agendas of government. Hence people become unnecessarily sceptical of broadcast messages. The first victims are programmes on Nigerian Television Authority and Federal Radio Corporation of Nigeria, as well as various state television and radio stations. In fact, independent or private stations have recently begun to toe this dangerous line for pecuniary gains.

There is inappropriate use of communication channels. Besides the TV section/work of NAERLS is dead, as it has been inactive for many years now. What have been produced are kept on the shelf as trophies. Yet, there are certain information that can only best communicated by ‘showing’ and demonstration to the farmers. When visual information is hurriedly and ill-packaged as audio materials, then the use of inappropriate communication channel or medium results.

There is poor production quality in the area of information richness (depth) and actual packaging quality (machine quality). There were some radio jingles (in English, Hausa, Yoruba, Igbo and Pidgin English) on the Growth Enhancement Support Scheme (GESS) that NAERLS produced for the Federal Ministry which were previewed in my presence in Abuja. The criticism was such that I felt somewhat ashamed that we have been brought to such level. There was an obvious lack of depth in the production. The studio equipment are obsolete and need total overhaul to meet today’s high-definition quality. As for the depth of information, this brings us back to inadequate training and/or exposure of staff.

How can NAERLS’ communication efforts be improved for effectiveness in its adopted villages?

On-time real-time information gathering and sharing is virtually dead in NAERLS, due in part to inadequate funding, staff training and staff commitment on the job. These were regular activities in the past. Ado Tuwengi and ABC Garuba were always on the move, at least eighteen days of the month, producing real-time information and broadcasting to farmers in the villages. Meeting of farmers’ needs, rather than monetary gain, was their priority and motivation. Sometimes, they spent their money and waited for reimbursement. Today, however, NAERLS communication package producers have specialised their work on in-studio production, far away from real field problems. Such productions without farmers’ participation or inputs do not bring about real change in behaviour. Beside, when there is no on-time real-time information gathering/sharing, there will be no on-time real-time solution provision.

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What is the relationship between AETA and NAERLS?
Anyone who says AETA is taking over the duties of extension communication from NAERLS especially with regard to the national Agricultural Transformation Agenda does not know what he is talking about. AETA was designed to drive ATA by facilitating the extension communication stakeholders both in the public (such as NAERLS) and private sectors to do what is required of them within the ATA initiative. AETA is not an institution but an action plan, and it is treated as a value chain (extension value chain) in the Federal Ministry of Agriculture and Rural Development. But it is a cross-cutting value chain, which is supposed to service all other value chains—rice, maize, sorghum, beef, poultry, fisheries, women and gender issues, etc. I was chosen to lead the plan and I am situated in NAERLS to ensure that the Institute, being the centre of excellence in extension communication, fully participates and play its expected role in ATA.

The relationship is thus, the facilitation of NAERLS by AETA so that the former becomes the prime mover of the latter. In fact, at the regular meetings of AETA committee, I was always criticised for involving NAERLS in all and any project under AETA.

What are the expectations of government on NAERLS in the long and short-term?
I have explained this earlier. But the summary is that government wants NAERLS to be in the forefront of ATA implementation. When you play back the tape you will find that part where I said the Institute needs to be a centre of excellence in extension research and training, as well as extension communication, not only for Nigeria but also for Africa. Hence, besides its core mandate issues, NAERLS should be at the forefront of ATA implementation; and it be the centre of excellence in agricultural extension.