FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

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INAUGURAL LECTURE SERIES 43

2ND JUNE, 2016

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Preamble

Mr. Vice Chancellor sir, Deputy Vice Chancellor Academic, Deputy Vice Chancellor Administration, Registrar, Bursar, University Librarian, the Deans of Schools, Directors, Professors, HODs and Unit heads, erudite academics, members of the university community, invited guests, great FUT Minna students, gentlemen of the press, distinguished ladies and gentlemen.

I thank the good Lord for the opportunity given to me to go this far in life and for enabling me to stand before this distinguished gathering of men and women to deliver the 43 Inaugural lecture of this great citadel of learning, that I am presenting this Inaugural lecture is a testimony of the Lord's faithfulness. Today I am what I am by the grace of God (I Cor 5:10). To him, be all the glory.

Mr. Chairman Sir, distinguished audience I am here today to present the 43 Inaugural lecture of this University. This is the 8th Inaugural from the School of Agriculture and Agricultural Technology, the second from the Department of Agricultural Economics and Extension Technology, the **first** from the Agricultural Extension option of the programme.

Mr. Chairman the title of my lecture **is Agricultural extension for food security: implication for sustainable development goals**. The choice of this topic was guided by the need to raise more awareness about agricultural advisory services to end users - farmers and how we can make agricultural production sustainable, based on the resources available to our farmers to attain food security, and the role of extension policy and the import of ICT in achieving sustainable development goals which is the current agenda for all countries of the world including Nigeria. Empirical evidences show that our agriculture is dominated by small scale farmers; hence our research and extension services should focus on technologies that would raise their income and make farming sustainable.

The rest of this address will now first define the major tasks of agricultural extension and then briefly review the extension service and its constraints to date. Then it will examine the issues that are shaping or likely to shape agricultural extension. It will conclude with a suggestion of what an "effective extension delivery system for food security/sustainable agriculture" should be, its features, processes and how to promote it to ensure food security, improved rural livelihoods and sustainability.

Introduction

Overview of Nigerian Agriculture

Prior to Nigeria's independence in 1960, the dominant role of agriculture served the purpose of exporting primary cash crop produce (cotton, cocoa, palm oil, rubber, etc) to United Kingdom to support the development of the British industrial sector. At this period there was little effort on the processing of agricultural commodities to add value to the primary product from agriculture though there were sufficient commodities for domestic needs. Also Nigeria agriculture was able to grow at a sufficient rate to provide adequate economic support to the nation, contributing to about 44 percent of the country GDP and 90 percent of non oil export / (FMARD 2012).

Agriculture is the mainstay of Nigeria economy, it is known to employ more than 70 percent of the country labour force and provide economic sustenance to about 80 percent of the population (NBS, 2014), unfortunately the agricultural sector is finding it difficult to play the crucial role of not only ensuring self sufficiency in food needs of Nigeria but also serves as a major source of foreign exchange earnings. Among the roles conventionally ascribed to the agricultural sector in a growing economy are those of

* providing adequate food for an increasing population
* supplying adequate raw material to a growing industrial sector

* constituting the major source of employment
* constituting a major source of foreign exchange earnings and
* providing a market for the products of the industrial sector.

According to FMARD (2012) the agricultural sector is faced with mirage of problems which militate against optimizing its potential. Some of the constraints include low productivity, poor marketing and distribution infrastructures, and inadequate access to credit, weak extension services and inadequate database among others. An attempt to ameliorate the constraints by the Federal Government was the adoption of the Agricultural Policy for Nigeria in 1988 (FMARD, 2000).

Indications of problems in the Nigeria agriculture, however started to emerge as from the first decade of the country's independence (1960-1969) these indications were clearly evident from increasing food supply short falls, rising food prices and declining foreign exchange earnings from agricultural exports. However not much rational concern was shown because the problem was thought to be temporary effects of a series of crises which eventually culminated in the civil war (1967-1970)

The second decade of Nigeria's independence (1970-1979) witnessed a rapid deterioration in the country's agricultural situation. Not only were there widening food supply-demand gaps and rising food import bills, there were also rapid decline in government revenue from agriculture, in foreign exchange earnings from agricultural exports and in the labour force required in agriculture. The situation was further compounded by the effect of civil war severe draught in some part of the country, government fiscal and monetary policies and above all, an oil boom which created serious distortions in the economy and accelerated the rate of migration of labour from agriculture.

In an effort to tackle these serious problems, government initiated a number of agricultural policies, programme and projects largely within the framework of three successive rational development plans from 1970 to 1974, from 1975 to 1980 and from 1980-1985. Experience from these policies, programmes and projects have however convinced the government and all those concerned with agricultural development efforts in Nigeria that there is no alternative to well designed and articulate agricultural policies as instruments for promoting agricultural growth and development.

Origin of Agricultural Extension and Advisory Systems

The dissemination and use of improved agricultural technology and management practices can be traced back thousands of years in different parts of the world, including China, Mesopotamia, Egypt, and even in the Americas. However, The origins of public- or government-funded extension and advisory systems can be traced back to Ireland and the United Kingdom during the middle of the nineteenth century. During the potato famine in Ireland (1845–1851), agricultural advisors helped Irish potato farmers diversify into different food crops. Various European and North American governments observed this development, and "traveling instructors" started using the term by the second half of the nineteenth century by many countries.

The term *extension* itself was first used to describe adult education programmes organized by Oxford and Cambridge universities in England in 1867; these educational programmes helped extend the work of universities beyond the campus and into the neighboring communities. This term was later formally adopted in the United States in conjunction with the land grant universities that were originally established as teaching institutions during the 1860s. Research activities were added in 1887, and extension activities were started in the 1890s and then formally added in 1914 as part of each university's official mandate.

During the early twentieth century, the United Kingdom transferred responsibility for agricultural extension activities to the Ministry of Agriculture; these activities were then officially called *advisory services*. This same term (in English) was used by most European countries as they developed and/or expanded similar advisory services within their respective ministries of agriculture. The United States and Canada still use the term *extension services* to describe their non formal education programmes, while many European countries still use the term *advisory services* to describe their respective extension programmes and activities.

The terms *extension* and *advisory services* can be used somewhat interchangeably, but the following framework gives a useful perspective on the different approaches being pursued by different countries and donors in organizing and implementing effective extension systems. This framework juxtaposes these different terms or approaches by reviewing *how* the delivery of educational programs and formation/communication services takes place and *why* it takes place. In this framework, the options are whether extension workers want to convince farmers what to do (i.e., persuasive methods) or whether they seek to inform and educate farmers about different market opportunities, technical options, and/or management strategies, and then let them decide which option would work best for them.

In most developing countries, the terminology used to establish public agricultural extension or advisory institutions were commonly recommended by the donor agency that helped create these public agricultural extension or advisory systems. For example, the United States Agency for International Development

(USAID) played an active role in establishing agricultural universities as well as research and extension systems in many developing countries during the 1960s and 1970s; therefore,

many of these public agricultural extension systems still carry the "**extension**" title. On the other hand, most Ministries of Agriculture, worldwide, administers their public extension systems; therefore, an increasing number of countries, especially in Sub-Saharan Africa, now use the term *advisory service*.

Mr. Vice Chancellor Sir, permit me to start this lecture by explaining the concept agricultural extension Agricultural extension can be defined as knowledge-transfer which promotes the development of agriculture by maintaining and increasing its profitability in the face of changing socio-economic conditions. The main mission of agricultural extension services is to promote a more effective application of human, economic, and environmental resources in agriculture. Agricultural extension acts as a link and facilitator in the relations between agricultural producers, processors, research and educational organisations, agricultural market institutions, and the government.

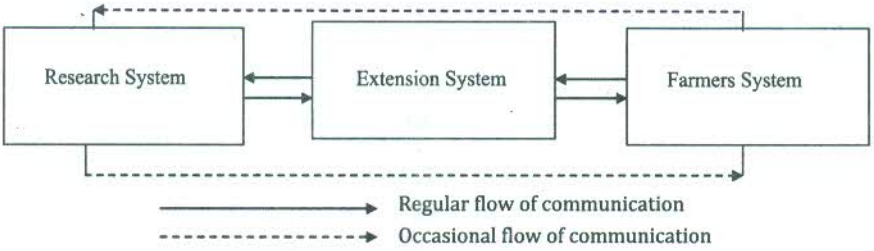

Fig. 1: System involved in farm technology generation

Agricultural Extension and Advisory Services (AEAS) can also be defined as system and mechanism designed to build and strengthen the capacity of rural farmers and other stakeholders. This is accomplished by providing access to information and technologies but also by enhancing agricultural skills and practices, capacity to innovate, and address varied rural development challenges, through training programmes, improved management and organizational techniques (Birner *et al.* 2009).

The spectrum and nature of the services provided by agricultural extension offices have been constantly changing from the moment these services were introduced. Initially agricultural extension dealt primarily with a number of practical but rather constrained issues in the areas of crop and live-stock production – mostly biological and veterinarian aspects. Assistance in improving farm organisation, home economics, and accountancy were also among the services provided by the first agricultural advisory agencies (Agbamu, 2000).

Agricultural extension plays a crucial role in promoting agricultural productivity, increasing food security, improving rural livelihoods, and promoting agriculture as an engine of pro-poor economic growth. Extension as a rural support service is needed to meet the new challenges agriculture is confronted with: changes in the global food and agricultural system, including the rise of supermarkets and the growing importance of standards and labels; growth in non-farm rural employment and agribusiness; constraints imposed by HIV/AIDS, and other health challenges that affect rural livelihoods; and the deterioration of the natural resource base and climate change.

The overriding philosophy of extension is helping people/farmer to help themselves. The primary purpose of extension is to extend knowledge in order to solve problems at the local level, Agricultural extension employs teaching and learning principles that affect changes in the farmers.' It is therefore concerned with three basic educational tasks.

* Dissemination of useful and practical information related to agriculture and home economics
  Practical application of such knowledge to help farmers and housewives analyse their problems and bring improvement in a systematic way through carefully planned and organized programmes, these program must start in the villages and must tackle problems the

villagers see and want can be done

* To assist in using the technical knowledge gained to better solve their own problems.

Extension involves developing knowledge, skill and favorable attitudes in the farmers and his family thus enabling them to benefit from research and technology with the ultimate aim of raising their **efficiency** and achieving **higher level of living**, it is not solely concerned with teaching and securing the adoption of a particular improved farm practice but with the changing the outlook of the farmers and encouraging his initiative in improving his farm and home. Its effectiveness is measured by its ability to change a static situation into a dynamic one (Adegeye, *et al* 2005)

What contribution can agricultural extension make to agricultural production? One of the ap-proaches in assessing agricultural extension's impact is to measure the relationship between extension activity and changes in farmer awareness, knowledge, and farm productivity, efficiency, and profitability (Weber, 1987). In a number of studies, the economic impact of agricultural extension is measured in this manner. How has the agricultural extension service faired with government's efforts to achieve food security and improved rural livelihoods? This is the focus of this inaugural.

Extension Model

There are four major extension models, these are technology transfer model, farmers first model, participatory approach model and sustainable development model (Norton and Brough, 1995).These models provide guidance on the development and use of specific extension technique to solve identified farm issues based on specific locations.

CENTRAL ISSUES IN FOUR EXTENSION MODELS

Attribute	Technology Transfer	Farmers First	Participatory Approach	Sustainable development extension
Strategy	Top-down	Bottom-up	Interactive	interdependent
Aim	Technology Adoption	Empower Farmers	Cooperative action	Sustainable development
Pre-Cursors	Research development	Experienced farmers	Participatory of key stakeholders	Collaboration of stakeholders
Key-Players	Scientist Extension Agents	Farmers	Stakeholders/ Facilitators	Farmers, Extension Agents/Scientist/ Professionals

Fig. 2: Extension models

Sources: Geoff Norton and Elaine Brough (1995)

Agriculture policy in Nigeria

The Nigeria Agricultural Policy provided the framework for implementation of programmes and guidelines for agricultural development. The broad objective was to attain self sustaining growth in all the sub-sectors of agriculture and realization of the structural transformation relevant for overall socio-economic development of rural areas (FMARD, 1988). This was expanded in the revised policy to include promoting farmer friendly Agricultural Policy that achieves food security, eradicates poverty, develops the rural economy and protects the environment (FMARD, 2000).

The objectives and strategies to achieve them as spelt out in the policy documents emphasize the importance of agricultural extension to the goal attainment of the agricultural sector. To achieve increased production and improved processing in all the sub-sectors of agriculture (crop, livestock, and fisheries), improvement of quality of life and promotion of environment friendly practices and other objectives require extension effort.

The new policy thrust expanded the broad objective according to FMARD (2000) to include:

* Promoting farmer-friendly agricultural policy that achieves food security, eradicates poverty, develops the rural economy and protects the environment through;
* Creating the conducive macro-environment to stimulate greater private sector investment in agriculture;
* Rationalizing the roles of the three tiers of government in their promotional and supportive activities to stimulate growth;
* Reorganizing the institutional framework for government intervention in the sector, Articulating and implementing integrated rural development as a priority national programme to raise the quality of life of the rural people;
* Increasing agricultural production through increased budgetary allocation and promotion of the necessary developmental, supportive and service-oriented activities, opportunities;
* Increasing fiscal incentives to agriculture,
* Promoting increased use of agricultural machinery and inputs through favourable tariff policy.

This policy direction placed additional responsibilities on extension by including sustainable development components. Two strategies will be discussed to highlight how to achieve food security sustainable agriculture viz REFILS and Value Chain.

Development of Agricultural Extension System: The Research and Extension System in Nigeria

In addition to its vast natural and human resources, Nigeria has perhaps, the largest National Agricultural Research and Extension System (NARES) in Sub-Saharan Africa today, made up of: 17 Commodity-based Research Institutes, a specialized National Agricultural Extension Institute, 50 Faculties of Agriculture in regular Federal Universities, 3 specialized Universities of Agriculture, 11 Federal colleges of Agriculture, a

specialized National Agricultural Extension Institute and one International Agricultural Research Centre (IARC = IITA),Arokoyo,2009 and yet Nigeria is still categorized among the food-deficit or food insecure nations in Africa. A most pertinent question today therefore is: why has Nigeria's awesome National Agricultural Research and Extension System (NARES) not been able to engineer a sustainable agricultural development that would have ensured: national and household food security, improved rural livelihoods and indeed, make Nigeria's agriculture competitive in the world agricultural market today. Among the major **reasons** that have been adduced for this rather serious situation include:

i. Unfriendly policy environment, compounded by policy somersaults and poor to no incentives provided for the private sector thus, triggering reduced investors' confidence. This has consequently resulted in reduced capital availability for local investments in agricultural development (Arokoyo, 2009).
ii. .ii) A dominant, ineffective, and inefficient public agricultural extension service that is characterized by a top-down, supply-driven extension system compounded by serious structural, organizational and management challenges.
iii. Grossly inadequate, irregular and untimely release of funds to the agricultural and rural development sector and worse for agricultural extension and advisory services.
iv. The National Agricultural and Research Extension System (NARES), has been plagued by a weak, dysfunctional and uncoordinated Research-Extension-Farmer-Inputs Linkage System (REFILS).

The REFILS as designed is expected to bring all the key stakeholders in the agricultural sector together in participatory technology development, adaptation, dissemination and

utilization for sustainable agricultural development. The critical need to develop very strong linkages between the Research, Extension, Farmers and the private sector for sustainable agricultural development, led to the conceptualization and establishment of **(REFILS)**.

At the full development of the Farming Systems Research and Extension approach in Nigeria, the Research Institutes were reorganized and the country restructured into five agro-ecological/farming systems zones. Five zonal commodity Research Institutes were identified and mandated to take charge of the farming systems research and extension needs of each of the zones as follows: IAR/ABU Zaria, for the North West zone, LCRI Maiduguri, for the North East zone, NCRI Badeggi, for the Middle Belt zone, IAR&T/OAU Ibadan, for the South West, and NRCRI Umudike, for the South East. Under the last administration however, ARCN was directed to restructure the country along the geo-political zones, thus we now have the South-South farming systems research and extension zone with the Nigerian Institute for Oil Palm Research (NIFOR) as the Zonal Coordinating Research Institute.

Despite the new arrangements, linkages between and within the major stakeholders in agricultural development remained weak. The Research-Extension-Farmer-Input Linkage System (REFILS) is basically a mechanism/strategy established to bring together **all** the key stakeholders in agricultural development (research, extension, farmers, policy makers and the private sector for the effective management of research and extension delivery for sustainable agricultural development. The "I" for inputs in the acronym assumes a holistic meaning to cover all the relevant actors in the private sector that are responsible for the supply of production, harvesting and processing **inputs,** marketing and other essential services. The strategy has not only strengthened the traditionally weak linkages between research and extension, it also has identified and brought in other key actors in agricultural research (the universities) and in extension delivery (the NGOs) and Policy makers.

On the whole, REFILS operated quite effectively and smoothly while

the World Bank assistance lasted and all activities held as planned especially the Annual Zonal REFILS Workshops, the Technical Meetings, the monthly technology review meetings (MTRM), including the Pre-MTRM visits, and the Forth-nightly training (FNT). There is no doubt that the system has made significant contributions to agricultural development. However farmer participation remained low and private sector involvement even lower. The termination of the World Bank support under the NARP, compounded by the drastic reduction in funding and rationalization of the ADP staff marked the beginning of the demise of REFILS nationwide.

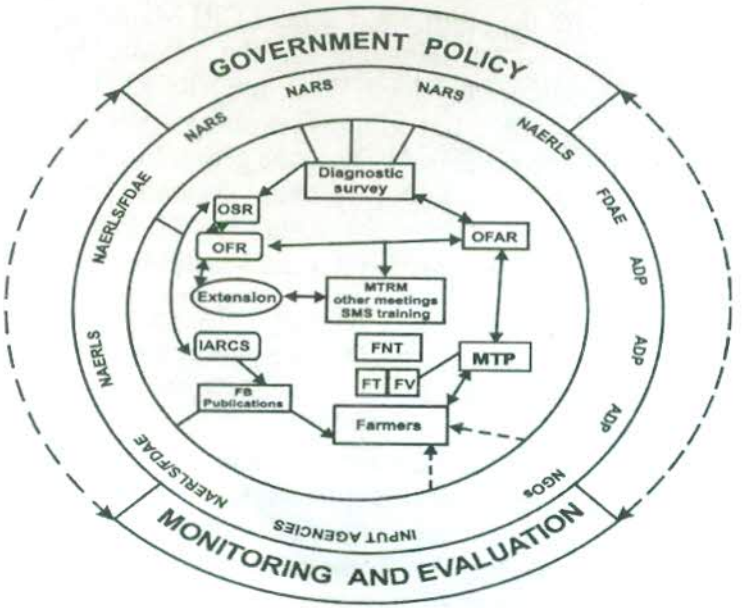

Fig. 3: The REFILS Model

Concepts of Food security and Food insecurity

Food Security: "Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." (FAO, 2002).

Food security, by definition, is therefore not simply about availability of food. It also entails (i) accessibility, that is, the ability of individuals or a nation to acquire food on a sustainable basis; and (ii) the reliability and distribution of food. The former relates to utilization and consumption of safe and nutritious food, while the latter relates to the equitable provision of food to points of demand at the right time and place (Mkanawire, 2002).

Food insecurity exists when people do not have adequate physical, social and economic access to food, thereby not meeting the requirement of access, availability, affordability and utilization. This could result in undernourishment when caloric intake is below the minimum dietary energy requirement (MDER), defined as the amount of energy needed for light activity and a minimum acceptable weight for attained height. This concept varies by country and from year to year depending on the gender and age structure of the population.

The genesis of the rise in food security threat worldwide started in 1995 and all attempts at curbing it seems unfruitful at least in different region. More than one billion of the out of over six billion of the world population are undernourished (FAO, 2009) In 2009, the Food and Agriculture Organization (FAO) of the United Nations estimated that about 1.02 billion people worldwide were undernourished. The FAO noted that this represented more undernourished people than at any time since 1970 and constituted a worsening of the already unsatisfactory trends that were present before the current global financial crisis (2008-09). The increase in food insecurity could be attributed to high domestic food prices, low personal incomes and increasing unemployment associated with the global financial crisis.

The slow growth of agricultural and food production has resulted in growing food imports and food insecurity. Households spend up to 70% of their income on food and yet nearly 50% of the children under five are malnourished. Also According to World

Bank (2007) the government of low income countries devotes 19% of their budget on military expenditure and less than 5 % on agriculture.

As a result of the decline in agricultural output, domestic food supply had to be augmented with large imports. Nigeria became major importer of rice, wheat and coarse grains as her economies and population grew faster than domestic output. The food import bill rose from N57.7 million in1970 to a peak of N1,819.6 million in 1981 before declining to N940.6 million in 1985, representing an average of N846.0 million per annum during the period and an average annual growth rate of 26.1 per cent. Food imports accounted for 15.3 per cent of total imports and 1.6 per cent of GDP.

Some of the major factors militating against the attempt at curbing food security are climate change, increased demand for the use of food crop as source of bio fuel and soaring food prices (Terado *et al.,* 2010 and Rosegrant 2008) and government ineffectiveness.

In Nigeria, for instance, successive governments came up with different programmes and policies such as (1) Operation Feed the Nation, mass mobilization and mass awareness programme on food production; (2) the River Basin Development Authority aimed at harnessing the potential of existing water bodies through irrigation services, fishery development and control of flood, water pollution and erosion; (3) Agricultural Development Project aimed at enhancing the technical and economic efficiencies of small-scale farmers (4) Green Revolution aimed at accelerating the achievement of the general agricultural sub-sector objectives; (5) the National Special Food Security Programme was aimed at offering a practical vehicle for piloting and eventually extending the application of innovative low cost approaches both technical and institutional to improving the productivity and sustainability of agricultural system with the

ultimate objective of contributing to better livelihoods for poor farmers on a sustainable basis and (6) the National Fadama Development Project (Fadama I, II, and III) aimed at addressing some of the factors that militate against the full realization of the potential benefit of agricultural production activities. According to Blench and Ingawa (2003), the Fadama projects were aimed at increasing the incomes of Fadama users who depend directly or indirectly on Fadama resources through empowering communities to take charge of their own development schedule.

The major problems militating against agriculture and food security in Nigeria were identified by (Ukeje, 2004; FMARD, 2005) as inadequate farm inputs, lack of working capital, inadequate capital expenditure on agriculture by the government, low level of education, low rate of technology adoption, post harvest losses and communal/religious crises.

The prospects for increased agricultural production and food security in Nigeria are good because of the following factors: the abundant land resources for the production of crops, livestock and forestry products and large domestic and international markets for agricultural commodities. However, the achievement of increased agricultural production and food security will require a comprehensive strategy to reduce some important constraints, in particular, the inadequate supply of agricultural inputs and machinery.

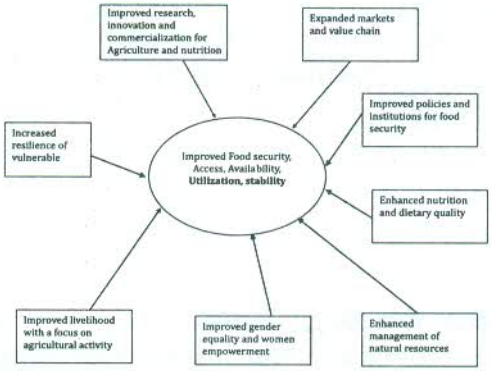

Fig. 4: Food Security Learning Frame Work

The ultimate solution to combating hunger and food insecurity at the national, as well as the global level, is to provide undernourished people with opportunities to earn adequate income and to assure an abundant supply of food from either domestic production or imports, or both (FAO 2002.

Extension is extremely important in helping to confront problems of availability, access, and utilization. It helps to enhance the productivity and consecutively the production of food. It can assist in providing opportunities for income generation. And, it generally provides improvement of nutritional advice through home economics programmes and enhances the quality of rural life by way of community development.

Problem of Food Security

Although appreciable real output growth rates have been achieved in the agricultural sector in the last five years, a significant break-through in productivity to effectively guarantee domestic self-sufficiency is still constrained by a number of problems. These problems are the inadequacies in the supply and delivery of farm inputs; shortages of working capital; low rate of technology adoption; diseases and pests infestations; poor post-harvest, processing, and storage technology; environmental hazards; constraints; and land constraint.

Inadequate Supply of Farm Inputs

The unavailability of major farm inputs critical for agricultural production (fertilisers, seeds, agro-chemicals, machineries, etc) at the appropriate time and at the right prices has remained a source of worry and frustration. Government efforts to develop efficient and effective input procurement and distribution systems that will ensure timely delivery of adequate quantity and quality of farm inputs to farmers have not been successful.

Despite the large sums of money that had been spent on procurement and subsidization of farm inputs, the problems of availability, accessibility, stability and sustainability still remain.

The adoption of many promising improved packages of technology has been compromised by the unavailability of the complimentary farm inputs.

Inadequate Working Capital

Small scale farmers do not have adequate capital to expand their scale of operations and/or take advantage of profitable packages of technology to boost productivity. The bulk of capital injection by this category of farmers comes from owner's equity and informal credit sources. There is also the need for effective support for the formation and growth of farmers' cooperatives to assist in accessing credit, using the group for the mobilization and guarantee.

Inadequate Capital Expenditure

The volume of capital allocation to agriculture and the quality spending over the years have been low and poor. The share of agriculture in total capital expenditure which averaged about 2.5 per cent need to be increased. The adequacy of capital and effective implementation of projects will ensure the effective provision of infrastructure and encourage research into crop production.

Low Rate of Technology Adoption

The reduction and outright elimination of subsidies on all agricultural machinery like tractors, harvesters, harrowers and planters following deregulation has reduced the use of machines in agricultural activities. The post-harvest technology available in Nigeria is poor and grossly inadequate to cope with vibrant, market-oriented food production efforts of Nigeria's small holders. Apart from the damage which the crops are exposed to in the field as a result of pests and disease attacks, a considerable proportion of the harvest is lost due to poor processing and storage technique. Crop losses have been estimated to be as high as 20 per cent of harvest in some cases.

Poor Extension Services

The twin problem of inadequate extension services and the low morale of the available extension staff need to be addressed. More emphasis should be placed on having well trained extensionists and consideration should be given to female extension workers to address the problem of gender access to new innovations. Effort should be made as a matter of priority to ensure that the salaries and allowances of this important group of workers are paid regularly.

Environmental Hazards

The problems of drought/desertification, as well as, soil erosion have remained very serious for Nigerian agriculture. These problems often manifest in the forms of soil degradation and deforestation. While some of these changes are caused by natural forces, they could also be caused by the direct result of over-grazing, over-cultivation, bush burning and deforestation associated with increased population and poor conservation practices. Attempts to solve the problems have been through nation-wide tree planting campaigns in the past and encouraging people to switch to the use of fuel efficient facilities, like stove and gas cookers. Unfortunately, the prices of stoves and gas cookers have risen sharply, thereby making them out of the reach of most rural dwellers. The increase in petroleum products prices has also resulted in farmers resorting to the bush for their fuel.

Post Harvest Losses

The problem of inadequate storage facilities has compounded the problem of food security. It is estimated that about 15 – 20 per cent of the crops produced are lost before they can be consumed. This situation is made worse by the dearth of agro-processing industries in the country. It also has a discouraging effect on the farmers as the struggle to sell most of their crops immediately after harvest results in cut throat competition and lower prices.

Low Level of Education

The low level of education of small scale farmers, especially women who form the bulk of the agricultural labour force has remained a major constraint to the adoption of modern farming techniques and the ability to access other inputs necessary for increased productivity in the sector.

Communal / Religious Crisis

The frequent communal / religious crisis in some region of the country is a major constraint to food security in Nigeria. The crises occur either during planting, weeding or harvesting period and with the flight of farmers from the areas irrespective of the stage of farming, food security Is threatened as most, if not all the crops are lost.

Apart from other fundamental but nevertheless serious problems including funding, the LGAs do not even have the human resources to provide even the most basic extension delivery services. A study by Manfu International (1997) revealed that "the average number of agricultural personnel per LGA in the country was 29 in the junior cadre, 8 in the intermediate and 4 in the senior cadre for a total of 41 per LGA.

Challenges to Agricultural Development

The main challenges faced by agriculture in Nigeria according to (FMAWR 2009) could be grouped under five categories:

- **Infrastructure inadequacies**, which include poor road network particularly feeder roads, markets and storage/processing facilities as well as inadequate irrigation facilities which limit agricultural production to only the wet season in many parts of the country. Some 80 percent of the respondents across the country in a 1995 survey identified infrastructure as the most critical constraint to the development of agriculture in Nigeria.
- **Limited access to improved technologies** in the form of the non availability of improved seeds, cuttings, breed,

vaccines and agrochemicals, etc and the use of mainly hoes and cutlasses as the principal implement for crop agriculture at the small-holder level. Related to technological constraints are poor research and extension services as well as weak linkages with farmers for the uptake of innovations in areas such as seeds, pest and diseases controls.

- **Financial market weaknesses**, which may be attributed to inadequate and poorly targeted credit and the absence of competition in the supply markets as well as a well-defined effective demand structures as a result of low income and poverty.
- **Resource market failure**, which relate to land and labor market inefficiencies, the lack of enforceable ownership and control over land, and rent-seeking behavior of associated public agencies.
- **Organizational and governance constraint**, which relates to smallholdings, dispersed nature of farm settlement, and unorganized nature of farmer communities. Associated with the organizational deficiencies are policy ambiguities at all three levels of government. For effective coordination of agricultural extension service delivery in Nigeria, the organizational structure below is being proposed.

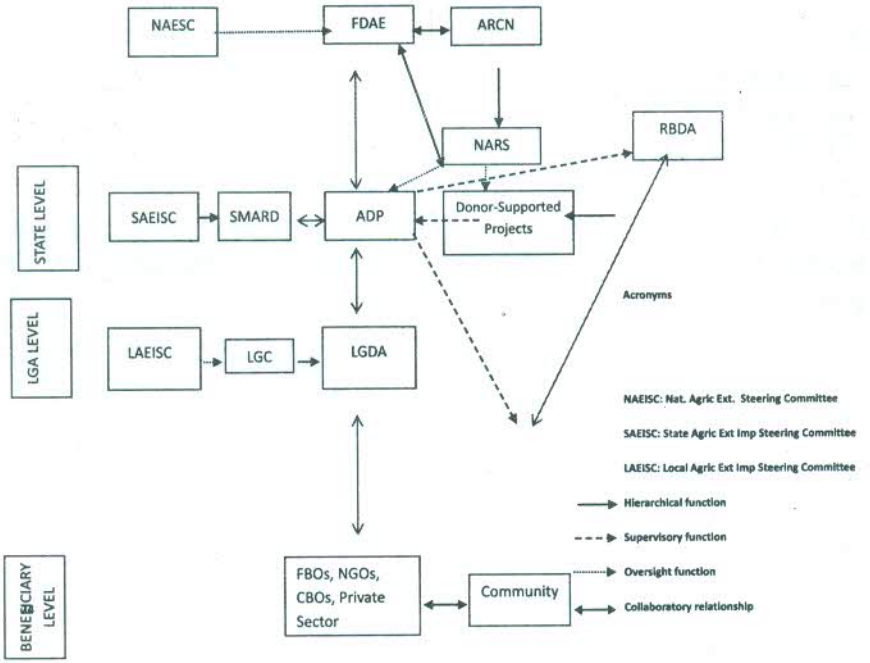

Fig. 5: Proposed Agricultural Extension Organizational structure

These challenges are compounded by the characteristics of Nigeria agriculture. First, more than 70 percent of the farming population in Nigeria consists of smallholder farmers, each of whom owns or cultivates less than 5 ha of farmland (NARP 1994), but together accounts for 90 percent of the total farm output. Many such farms are fragmented and scattered in different locations because of inadequate access to farm land under the current land tenure system. This has serious negative implication not only with respect to higher transaction costs but also makes mechanization difficult. Second, most Nigerian farmers operate at the subsistence level, with marketable surplus ranging between 0-25 percent depending on the household size. Farmers with large household sizes tend to have marketable surpluses that are usually lower than farmers with

small household sizes. Third, the growth of the sector over the last ten years may be attributed mainly to acreage expansion and favorable weather, implying that the factors that impede productivity growth such as the low level of mechanization (use of technology), use of traditional varieties of seed, weather-dependent farming, low or zero application of fertilizer, difficult access to formal credit, etc. are still binding. To redress this there is the need for a strategy.

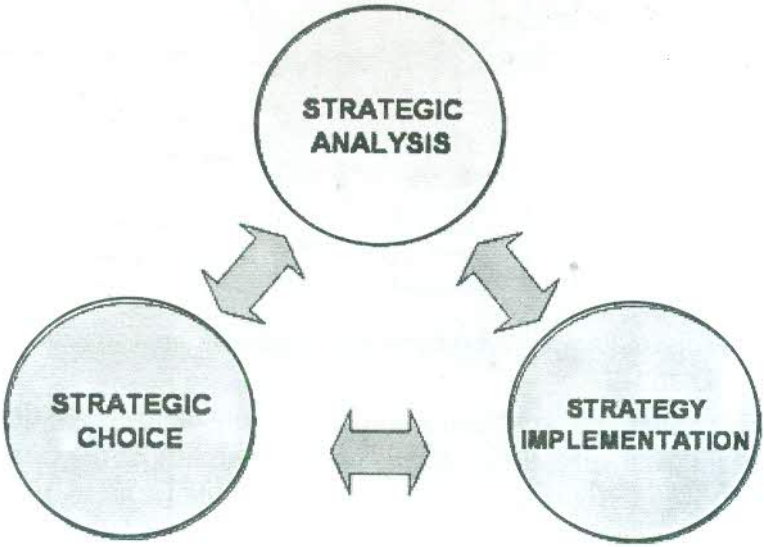

Fig. 6: The Strategy Formulation Process

This helps to determine where to go and how to get there, strategic choices, which deal with an understanding of the nature of stakeholder expectations, would need to be made. Such an exercise to identify strategic options, evaluate and select such options finally, the resulting choices would need to be translated into actions for strategy implementation. One of the strategies to achieve food security and sustainable food production is to consider the value chain.

Agriculture Value Chain

The value chain is defined as the full sequence of activities or functions required to bring a product or service from conception, through the intermediary steps of production, transformation, marketing, and delivery to the final consumers.

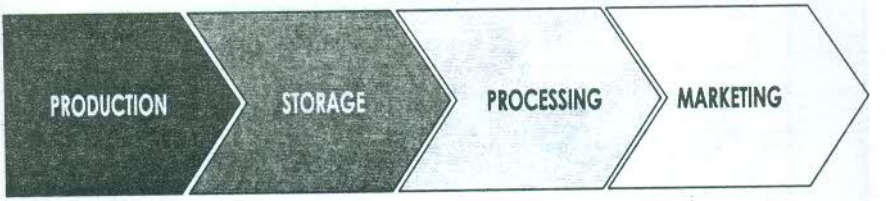

Fig. 7: Value chain

The value chain approach involves not only addressing major constraints and opportunities faced by farmers or producers, but also those of processors, traders and other businesses at multiple levels and points along a given value chain. The process also include facilitating a wide range of activities such as: access to inputs, strengthening the delivery of business and financial services, enabling the flow of information, facilitating improved linkages between actors and to higher-value markets. All these activities are potential sources of income generation and employment creation for both skilled and unskilled labor. That is what makes the value chain approach different from other approaches and enhances its attraction to development practitioners.

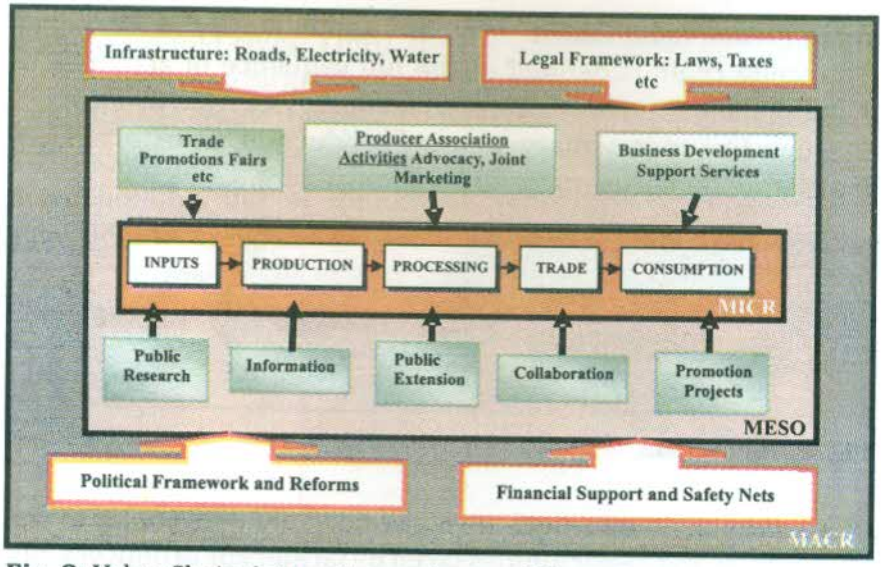

Fig. 8: Value Chain Actors, Supporters and Promoters
Source: GTZ Eschborn (2007): Value Links Manual

Value Chain Innovation Platform

This is a commodity based approach/strategy designed to support various economic actors (researchers, fabricators, agro-dealers, producers, processors, marketers, financial institutions and policy makers, etc.) in the Value Chain. It is a framework for engagement and partnership by various stakeholders along the commodity value chain for purpose of learning and sharing information and knowledge that may be applied in specific or broad terms to resolve challenges, increase productivity, income and enhanced livelihood. The platform allows for quick diagnosis of challenges using value chain analysis and to identify potential solutions as well as reveal opportunities for enterprising actors to explore and develop products and services that promote visible means of livelihoods thereby creating social and economic impacts. These approaches tackle farm problems and give support to all operators along the value chain from farm to the market, i.e." from farm to fork".

Results obtained from the implementation of Innovation Platforms in Nigeria revealed that the platform is effective in enhancing the generation and diffusion of agricultural innovations through bridging the gap between agricultural research and extension. (Arokoyo 2014).

As there is no "best" extension tool/method nor a "One size fits all", a mix of communication methods (print: assorted Extension Publications & electronic: Radio, TV & traditional ICTs) and modern tools/methods (Mobile phone & Internet) should be employed to meet the various needs of the different actors in the value chains of interest being promoted by government.

Private Sector-led Extension Services Provision and Supervision

The capacity of the agricultural extension service will be strengthened by equipping the state governments to establish farm support centres as "one-stop" facilities in each local government, in partnership with the private sector to train and disseminate new farming techniques. The centres will also be used to distribute inputs. The proposed framework to be used is illustrated below.

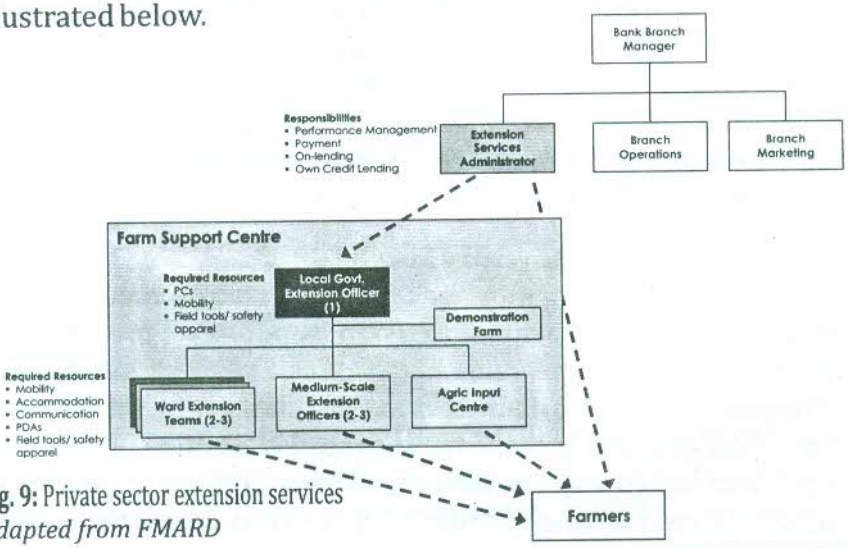

Fig. 9: Private sector extension services
Adapted from FMARD

The following are some of the major challenges:

Poor Linkage between Research, Extension and farmers

Research is a major input and continuous improvement ingredient to cutting edge agricultural development innovation and is crucial in ensuring a diverse, resilient, productive and sustainable agricultural sector. However, often than not, the flow of information between researchers and producers is not as efficient and effective as it should be. Ensuring efficient flow of technological innovations between the researchers, extension and producers can only be achieved through the development of an efficient researcher, extension and farmers linkages.

High Extension / Farmers Ratio

One of the major challenges for extension relates to the lack of extension capacity. Nigerian agriculture is distinctively characterized by smallholder farmers. The demand for extension and advisory services varies according to the nature of the farming practices (i.e. crop farming, livestock farming or mixed farming systems involving both crops and livestock) and farm size. This ratio is further blurred by the increase of smallholder farmers due to land redistribution and agricultural development policies and the fact that the target group among farming communities is often poorly defined, thus leading to the assumption that everyone that lives in rural areas is a farmers, which creates more pressure for extension and the perception that public extension services are ineffective and inefficient.

Lack of Synergy by Advisory Services

In Nigeria there are a number of state, private and civil society institutions that provide extension support to producers at different stages of the value chains. Each of these institutional groupings is further disintegrated at the level of the different classifications. While these institutions invest and contribute in small and varied ways to the overall development of producers' across the country, their efforts have not been able to make much

impact on the overall picture of smallholder farmers.

Lack of a National Policy and Regulatory Framework

Although there are a number of regulatory initiatives and strategies aimed at ensuring improved extension and advisory services, the lack of a national policy framework means that the implementation of these strategies has been limited to individual stakeholder decisions. Extension and advisory services in Nigeria remains unregulated Niger does not have a regulatory framework within which the delivery of extension and advisory service takes place.

Extension Service Providers (ESPs) have no formal guidelines, governing code of ethics and working standards. The practice, therefore, is for every Extension Service Provider to apply what they regard as appropriate. Consequently, some providers venture into extension services without adequately trained personnel and/or the pre-requisite extension working tools, thereby adversely affecting the quality of services offered.

Clients need assurance that the extension service they receive is of high quality. In a pluralistic extension delivery environment, all stakeholders need to know that the extension resource is used efficiently and with synergy rather than duplication, overlap or omission. Clients should be protected from receiving contradictory information and advice, particularly those that adversely affect them or their enterprises.

Narrow Service Focus by Advisory Services

Extension and advisory services face major challenges in the areas of relevance, efficiency, accountability and sustainability. The changing economic scenario in Nigeria and the need for appropriate agricultural technologies as well as the need for innovative and climate resilient production practices to respond to rising food prices, food and nutritional security, poverty alleviation, diversifying market demands, export opportunities

and environmental concerns, is posing a new set of challenges to technology dissemination systems. Extension and advisory services must respond to a wide set of local, national and global pressures to the agriculture, forestry and fishery sectors across the value chains. Extension is part of a wide range of services needed to help producers acquire relevant knowledge and skills to increase and sustain the productivity and competitiveness of their enterprises.

Extension and advisory services lack a developmental and systems approach, where practitioners have a holistic view and understand the total value chain and linkages. This presents a new challenge for the education and training curriculum for extension practitioner. These call for a multidisciplinary approach to training that capacitates current and future extension practitioners and advisors with the relevant and diverse knowledge and tools without compromising the quality and depth of subject-specific (agriculture, forestry or fisheries) skills. Moreover, a major part of the extension and advisory services provided is focused on agriculture, thus the need to broaden the current scope towards a wider focus on forestry and fisheries with stronger emphasis on societal wide sustainable economic development issue.

Mr. Chairman, in this section I will employ the concept of sustainable development as a paradigm to analyse the agricultural extension environment in Nigeria. The paradigm assumes that there are key actors central in agricultural extension practice. The paradigm assumes also that identifying and examining the actors in agricultural extension will provide the needed data for an appropriate policy and practice.

Definition of Sustainable Development

The term 'sustainable development' has become more widely used than it used to be few decades ago. So, what is meant by the phrase 'sustainable development'? Although the idea can be

traced back at least to 1972 and the United Nations Stockholm Conference on the Human Environment, it still has various definitions. The most common definition is the one from the 1987 Brundtland Report; it is '**development that meets the needs of the present without compromising the ability of future generations to meet their own needs.**' (Report of the 1987 World Commission on Environment and Development *Our Common Future*).

The first main global sustainable development conference was the United Nations Conference on Environment and Development (UNCED) in 1992 at Rio de Janeiro in Brazil; more than 100 head of states met at this conference to discuss the urgent problems of environmental protection and socio-economic problems. One way of achieving this is through sustainable agriculture

Sustainable Agriculture

Agriculture has changed dramatically, especially since the end of World War II. Food and fiber productivity soared due to new technologies, mechanization, increased chemical use, specialization and government policies that favored maximizing production. These changes allowed fewer farmers with reduced labor demands to produce the majority of the food and fiber across the globe.

Although these changes have had many positive effects and reduced many risks in farming, there have also been significant costs. Prominent among these are topsoil depletion, groundwater contamination, the decline of family farms, continued neglect of the living and working conditions for farm laborers, increasing costs of production, and the disintegration of economic and social conditions in rural communities.

A growing movement has emerged during the past two decades to question the role of the agricultural establishment in

promoting practices that contribute to these social problems. Today this movement for sustainable agriculture is garnering increasing support and acceptance within mainstream agriculture. Not only does sustainable agriculture address many environmental and social concerns, but it offers innovative and economically viable opportunities for growers, laborers, consumers, policymakers and many others in the entire food system. **The common factor among all the extension perspectives is the desire to bring about a productive agriculture today and tomorrow, which in essence, is my simple definition of sustainable agriculture.**

The term **sustainable agriculture** means an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs;
- enhance environmental quality and the natural resource base upon which the agricultural economy depends;
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
- sustain the economic viability of farm operations; and
- enhance the quality of life for farmers and society as a whole."

Sustainable agriculture does not refer to a prescribed set of practices. Instead, it challenges producers to think about the long-term implications of practices and the broad interactions and dynamics of agricultural systems. It also invites consumers to get more involved in agriculture by learning more about and becoming active participants in their food systems. A key goal is to understand agriculture from an ecological perspective - in terms of nutrient and energy dynamics, and interactions among plants, animals, insects and other organisms in agroecosystems - then balance it with profit, community and consumer needs. Sustainable agriculture integrates three main goals-

environmental health, economic profitability, and social and economic equity.

Why Sustainable Agriculture?

1. More people we need more food in the future, it is estimated that that the world population will increase by 2 billion by 2050.
2. Agriculture uses resources that are becoming scarce: Land, soil, water, nutrients.
3. Farming remains key sources of income. About 75% of the world poor in developing countries live in rural area.

The **characteristics** of sustainable agriculture among others are that:

* Sustainable agriculture ensures sufficient production for present and future generations
* optimizes productivity while reducing the impacts on environment and health
* builds on local populations and their knowledge, and empowers women in agriculture
* uses locally adapted and– if possible – renewable inputs
* ensures secure livelihoods
* reduces the vulnerability of producers
* supports the multi-functionality of agriculture.
  supports the multi-functionality of agriculture.

Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, stewardship of both natural and human resources is of prime importance. Stewardship of human resources includes consideration of social responsibilities such as working and living conditions of laborers, the needs of rural communities, and consumer health and safety both in the present and the future. Stewardship of land and natural resources involves maintaining or enhancing this vital resource base for the long term.

What are Sustainable Development Goals?

The Sustainable Development Goals (SDGs) are a proposed set of targets relating to future international development. They are a universal set of goals, targets and indicators that UN member states are expected to use in framing their agendas and policies over the next fifteen years (2015-2030).

The Sustainable Development Goals (SDGs) builds upon, follows and expands the Millennium Development Goals (MDGs) which were focused on developing countries and which ended by end of 2015. In other words, SDGs are the next generation of development targets for the world to meet. This is why the SDGs form an important core of global development policy. Implementing this ambitious agenda will bring challenges at the national, regional and international level of a broader scale than those of the original MDGs. The SDGs were adopted by the UN summit in September 2015 and has become globally applicable beginning since January 2016.

The SDG contains 17 goals and 169 targets covering a wide range of development issues, ranging from ending poverty and hunger, improving health and education, making cities more sustainable, combating climate change, and protecting the environment. The goals are designed to complete the unfinished business of the MDGs and address the economic, social and environmental aspects of sustainable development. The Sustainable development goals are:

* End poverty in all its forms everywhere
* End hunger, achieve food security and adequate nutrition for all, and promote sustainable agriculture
* Attain healthy life for all at all ages
* Provide equitable and inclusive quality education and life-long learning opportunities for all
* Attain gender equality, empower women and girls everywhere

* Secure water and sanitation for all for a sustainable world
* Ensure access to affordable, sustainable, and reliable modern energy services for all
* Promote strong, inclusive and sustainable economic growth and decent work for all
* Promote sustainable industrialization
* Reduce inequality within and among countries
* Build inclusive, safe and sustainable cities and human settlements
* Promote sustainable consumption and production patterns
* Promote actions at all levels to address climate change
* Attain conservation and sustainable use of marine resources, oceans and seas
* Protect and restore terrestrial ecosystems and halt all biodiversity loss
* Achieve peaceful and inclusive societies, rule of law, effective and capable institutions
* Strengthen and enhance the means of implementation and global partnership for sustainable development.

The agricultural sector is well-placed to contribute to this new "post-2015"development agenda given its potential to contribute to increased food security, poverty alleviation and reduced child mortality through better nutrition, among others.

The SDGs emphasize the importance of agriculture and the need to reinvigorate farming worldwide by supporting farmers, increasing investments in research, technology and market infrastructure and extending knowledge sharing. This will catalyse innovation and empower farmers. Most times the results of agricultural extension and research are quite often not commensurate with the effort expended, when measured against various criteria of agricultural success including sustainability.

Throughout the SDG process, Farming First will be used to bring

the collective voice of farmers, scientists and businesses working in agriculture to the forefront of the dialogue—while reinforcing the Farming First key principles to achieving sustainable agriculture.

Farming First's 5 Key Messages for the Post - 2015 Development Agenda are:

1. Agriculture, food security and nutrition are central to realising the Post-2015 Agenda and the Sustainable Development Goals. Investments in agriculture have no parallels in other sectors in terms of the potential to promote human development and sustainable economic growth.
2. Farmers in the developing world can become as productive as those in the developed world — while supporting continuous gains in sustainability for all.
3. It is imperative to re-commit to empower farmers via support to knowledge sharing and deliver accessible, quality extension in farm management and marketing.
4. Agriculture requires supportive frameworks for investment in infrastructure and inclusive markets.
5. A greater focus is necessary on working with farmers and other stakeholders across the value chain to address food waste and food loss.

The Farming First Coalition has two specific recommendations for the SDGs:

1. **SDG: Eradicate hunger and malnutrition,** because it is possible to "end hunger, extreme poverty and the worst impacts of malnutrition and food security within a generation" (Madrid Consultation FAO-WFP, 4 April 2013).

2. **SDG: Adopt sustainable agricultural practices**, which recognise and support a wide diversity of agricultural systems, farming practices, technologies and farmers, as well as balanced diets and which recognise that sustainable

agricultural practices differ by landscapes so countries and farmers need flexibility and a variety of solutions.

PRIORITIZING NIGERIA'S IMPLEMENTATION STRATEGY

As a country facing severe developmental challenges "blown up" by a burgeoning population amidst declining oil revenues which was a mainstay of her economy Nigeria will need to prioritize the goals in order to ensure it meets the targets.

National planning requires an understanding of the progress already made in other to adequately plan for the future. It is to this end that the progress recorded with the MDGs are highlighted, while the new targets in the issues are highlighted within the context of identifying the priorities for national development.

The SDGs has over 500 indicators which require annual reporting of high-quality data from all countries. This will require much greater investments in building independent, impartial national statistical capacities and strengthening quality and standards. Analysts say poor execution of projects, racketeering, inflation of contracts, and other contractual breaches as some of the factors responsible for Nigeria's inability to achieve its MDG goals. With the poor data tracking capacities, implementation tracking will be a major challenge.

There is also the issue of funding the SDGs. It is quite clear that Nigeria is already facing fiscal challenges precipitated by declining oil revenues and lack of viable economic alternatives. For the MDGs, government spent about N3tn annually as against the total sum of N4.3tn required to achieve the MDGs targets before the 2015 deadline. It is definitely assumed that funding the SDGs will be more difficult. Among the 17 Sustainable Development Goals (SDGs), Goal 1 is to end poverty in all its form everywhere, and Goal 2 is to end hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Obviously, the first two goals are crucial to Nigeria, a nation where almost 100 million people live on less than a $1 (£0.63) a day. 60.9 per cent of Nigerians in 2010 were living in abject poverty; the figure had risen from 54.7 per cent in 2004, according to a report by the Nigerian Bureau of Statistics (NBC 2013).

The all-inclusive nature of SDG goals implies that it may be difficult implementing the goals at the national level as it contains a mix of different agendas and policies. Not all nations have achieved the MDGs, yet all nations have been called upon to implement the SDGs, all within the same time frame of 15 years. The fact that governments are allowed to develop their implementation strategy may create implementation difficulties in which government may defer strong commitments. Furthermore, the SDGs do not address the pressing issues of wealth concentration and inequality, a major issue that needs to be addressed if sustainability is to be ensured.

Achieving the 169 UN targets by 2030 by any country of the world is a tall order and their vigorous pursuit would amount to a wild goose chase if individual countries do not mobilize efforts at sifting the most relevant, beneficial and practicable targets that would produce the greatest good within the limits of available indigenous resources and foreign aids. The backbone of any extension service is people. The providers of extension services must be willing and able to engage in an almost continuous process of retraining so that they are able to provide farmers with the most up-to-date information, in order to meet the target. The major challenges hindering effective extension and advisory service delivery in the Country include:

- Leadership and Coordination characterized by loss of focus, confusion, unnecessary rivalries and conflicts in programs and projects implementation.
- Non-involvement of the key stakeholders, and

development partners in policy articulation.
- Inadequate budgetary and other financial provisions.

IMPLICATION OF SDG FOR AGRICULTURAL EXTENSION AND ADVISORY SERVICES

The development of a comprehensive and integrated extension and advisory services policy in Nigeria is one of the prerequisites to facilitate the establishment of an efficient extension and advisory system that can contribute to increased productivity and farm income while ensuring equitable and sustainable improvements and growth. The starting point to address the challenges posed by an inefficient and ineffective agricultural extension and advisory services is putting in place, a dynamic and functional policy that will guide the administration of AEAS operators in the agricultural sector. Such a policy should also be friendly enough to attract the private sector which has major roles to play in the pursuit of the public-private-partnership (PPP) concept in line with best-global practices.

Other issues to consider include, ownership that is mainstream SDG into national development plan, monitoring and reporting. There is the need for people participation in review process, accountability, establishes mechanism for private sector engagement, civil society participation, trade-offs, data and measurement to use.

My Contributions

Mr. Vice Chancellor Sir my research focus has been quite diverse and varied. My specialization is such that demands being jack of all trades in Agriculture and related discipline and **Master of All**. Agricultural extension belongs to social science, hence it uses applied research methodology, it deals with social problems that may hinder effectiveness of a social system and proffer solution to facilitate better understanding and improved standard of living. I have focused on issues directly to farmers with regards to

innovation, media access, production resources and management.

I have served as a Consultant to National Fadama, World Bank (LEEMP) IFAD, PTDF to mention a few. I have contributed modestly to knowledge in the subject area through studies carried out with colleagues, collaborators and my students over the past years. Summaries of some of the **studies carried out on extension related activities, adoption of innovations, role of ICTs, food security to mention a few are described below:**

Studies on adoption of farm practices

In a study on adoption of improved practices of cotton production, we found out that The sources of information through which the respondents first heard about the cotton package included other farmers, extension agents, use of radio, television, pamphlets, posters and hand bills.(Adeniji, Voh, Ogungbile (2005). The study shows the various sources of information to farmers on the improved cotton production practices. It shows that extension agents were the major channel through which 74 percent, of the respondents received information on improved practices while about 53 percent identified radio as the main source of information. Other sources identified were village heads / friends / and neighbours indicated by 9 percent of the respondent, while 4 percent of the respondents identified research institute as the major source. This indicates that the level of adoption increases correspondingly with increase in intensity of extension contact.

Similar studies by Adenij, Voh, Atala and Ogungbile (2007) revealed that Innovation adoption is based on the theory of social change. Rogers (2003) defined social change as the process by which alteration occurs in the structure and function of a social system. It involves discovery, invention, innovation and diffusion, Innovation adoption is expected to lead to increase in agricultural production, improvement in the income and welfare

of farmers and their household In our study of adoption of improved practices for cotton production in Katsina State we found that several socio economic factors have significant relationship with adoption of improved farm practices, especially with Samcot 8,0,10. It was revealed that by several of these studies that extension agents had significant influence on small scale farmer's adoption behavior at different stages of adoption process.

Other studies by Ajayi, Adeniji, Olaleye and Oyero (2014) on effect of socio economic factors on the adoption of improved production technologies revealed that using binomial logit regression, there was a positive and significant relationship between education and extension visit at 0.05 level of significance ant to enhance food security in the area constant visit by extension agents was advocated.

Adeniji (2007) assessed the constraint to cotton production in Katsina State. The study gave insight into the constraints inhibiting technology adoption by farmers in Katsina State, as lack of fertilizer, frequency of spray and market opportunities.

Studies on impact of mass media channels

Access to various information media affects not just the farmers but the whole process of innovation. The process of increasing efficiency of agricultural production through modernization depends mainly on the extent to which farmers can incorporate improved practices into their farming operations. In order to adopt these practices, the farmers must become aware of their existence, develop interest, evaluate, try them, and become convinced of their relevance and usefulness before finally adopting the practices. In a study of impact of mass media on adoption of innovation in Kaduna State, Adeniji and Ega (1996) found that 97% of the respondents were of the view that radio was the major source for awareness of innovations followed by extension bulletin in Hausa 68%, posters 62%, television 46%,

while 25% of the respondents identified newspapers as their source 16% through magazines and 15% through film shows.

Innovation adoption is based on the theory of social change Rogers (2003) defined social change as the process by which alteration occurs in the structure and function of a social system. It involves discovery, invention, innovation and diffusion, Innovation adoption is expected to lead to increase in agricultural production, improvement in the income and welfare of farmers and their household. In our study of adoption of improved practices for cotton production in Katsina State Adeniji (2002), Adeniji *et al* 2007 found that several socio-economic factors have significant relationship with adoption of improved farm practices. It was revealed that by several of these studies that extension agents had significant influence on small scale farmer's adoption behavior at different stages of adoption process.

Adeniji, Tsado, Ojo and Fadamitan (2012) investigated adoption of quality protein maize among farmers in Bosso Local Government Area of Niger State, the findings show that 75 percent of the respondents adopted quality protein maize. Result of Probit analysis revealed that there is a positive and significant relationship between farm size, lack of credit facilities, and high cost of inputs, genders and years of farming experience but there is no significant relation between the level of adoption of extension contact the implication is that irrespective of the level of extension contact they will still adopt QPM.

Table 1: Probit estimates of level of adoption of Quality Protein Maize by farmers in Bosso Local Government Area of Niger State

Variables	Estimates	Z – values
Farm size (X1)	.396	19.755***
Extension contact (X2)	-.007	-.146$^{N.S}$
Educational level (X3)	-.019	-6.019***
Age (X4)	-.024	-11.911***
Household size (X5)	.014	4.198***
Gender (X6)	.162	2.689***
Years of farming experience (X7)	.016	8.260***
Intercept	-.476	-4.835***

Studies on food insecurity

In the study of women involvement in rural household food security status in Bosso Local government Area, Adeniji and Age (2012) Education, farm size and Age of the respondents were significant at 10%, that is the more educated they are, the better informed they are to adopt innovations that would enhance their food security status. And that households are food secure if the decision on income from off farm are jointly taken by husband and wife.

Tsado, Adeniji, Ojo and Tsado (2009) in a study on analysis of women contribution to household food security in Doko, Lavun LGA the study revealed that over 60% of women investigated spent most of their income on food consumption for their households and 89% of the respondents indicated that they are in dare need of more food. A deliberate effort is advocated to enhance their productive activities to enhance their contribution to household food security.

Women farmers and the need for a gender sensitive extension was investigated by Maiangwa and Adeniji (2009), the study posited that if women are to carry out their multifaceted role in agriculture and respond to market incentives more efficiently they need effective extension service. Maiangwa, Omolehin,

Adeniji and Mohammed (2010) assessed food insecurity and challenges of agricultural extension in developing countries. The strength and weaknesses of extension systems were identified in this study.

Adeniji and Jirgi (2010) examined cost and returns analysis of cotton production in Katsina state and found that cotton production was profitable as indicated by the average net income (N20,526.30). The total cost of production was (N45,796) while the total revenue was (N66,216.66) the average net returns shows that cotton production is profitable.

The significant role of ICT in agricultural extension activities cannot be over emphasized, Agricultural extension has the responsibility of communicating research findings and improved agricultural practices to farmers, the efficiency with which the information and practices are conveyed to farmers to a large extent would determine the level of productivity, thus Arokoyo (2005), Gurstein (2003) posit that a strong linkage complimented by flawless information flow, enhanced by the effective use of ICT by extension service will boost production and improved the rural livelihood. Adeniji (2010) found that ICTs have potential to impact positively on extension delivery. ICTs are used to circulate market prices, weather information, and to offer specific kinds of extension advice, ICTs targeting small holders will need investment from private and public sector

Rahman and Adeniji (1997) in their study of technical efficiency in vegetable production in Nasarawa State found that the estimates of the stochastic frontier which shows the best practice performance or efficient use of the available technology, is presented in Table 3. The coefficients of planting material and irrigation for vegetable production are statistically significant at 5 per cent level in virtually all the agricultural zones in the state. The signs of the coefficients of the stochastic frontier in every

zone are positive. The positive coefficients imply that there was direct relationship between output and the inputs in vegetable production. In every zone, fertilizer was not significantly related to output in vegetable farming.

Table 2. Maximum likelihood estimation results from the stochastic frontier model for vegetable production in Nasarawa State

Zone	Regression coefficients				
	Constant	Planting material	Fertilizer	Labour	Irrigation
Nasarawa south	0.724*	0.056*	0.152	0.471*	0.162*
	(3.841)	(2.684)	(1.148)	(3.104)	(4.011)
Nasarawa north	0.658*	0.038*	0.462	0.260	0.230*
	(2.794)	(3.111)	(1.271)	(1.042)	(2.763)
Nasarawa west	0.917*	0.171*	0.523	0.420	0.143.
	(3.056)	(2.840)	(0.972)	(1.150)	(1.094)
All zones	0.813*	0.094*	0.307	0.519*	0.271*
	(2.972)	(2.777)	(1.021)	(2.784)	(3.116)

*Significant at the 5 per cent level.
Figures in parentheses are t-ratios.

Chemical control in vegetable production was investigated in Kaduna State, Adeniji (2008), the study revealed that farmers were oblivious of harmful effect of these chemicals (herbicides and pesticide) on human, environment and crops if not properly applied. It was recommended that extension services should embark on more training of farmers on handling of chemicals during application and Integrated Pest management practices advocated to enhance safety of the environment.

While, Umar, Olaleye, Adeniji Nmadu (2014) in a study of farmers willingness to pay for demand driven extension in Niger State found that 82% of the respondents were willing to pay for extension services, and that farm size, degree of commercialization of farm enterprise, farm income significant effect in farmers willingness to pay for extension services in cash, at least N15,000 per year.

CONCLUSION

National extension services in the country is plagued with a number of structural and counter productive challenges that limit the efficiency and effectiveness of efforts and investments in the development of smallholder producers in particular. Efficient and effective extension and advisory services can broker and facilitate information sharing and skills development in support of agricultural, forestry and fisheries' development especially for smallholder entrepreneurs. In its current form, public extension service cannot facilitate the accelerated capacity development of a range of producers that is desired to address, challenges of rural and economic growth, food insecurity, inequality and unemployment.

Moreover, extension can provide researchers with an essential reality check for understanding how farmers and other market actors are using new technologies. Extension and research should inform policy-makers about how food security initiatives are impacting on different target groups and how man and women farmers are struggling with their own household food security while, looking for ways to enter new markets.

Historically, extension services excluded a large number of support services rendered by other NGOs like Leventist Foundation, etc. all of which provide important and critical services to producers and processors. Recognition of the entire spectrum of services rendered to producers and processors therefore provides a basis for broadening extension services, hence the appellation 'extension and advisory services.'

RECOMMENDATIONS

As early as the 1990s, the Food and Agriculture Organisation (FAO) of the United Nations Global Consultation on Agricultural Extension recommended that governments' develop and periodically review their agricultural **extension policies.** Extension and advisory services are an integral component of

ensuring the efficient facilitation of government development programmes in rural areas; hence the development of the National Extension policy for crop, Forestry and Fisheries has become a matter of priority. With an AEAS policy in place, there will be consistency and continuity it is easier for governments to comply with SDG demand of food for all by 2030.

A number of challenges with regard to **the coordination of extension and advisory services must be addressed** urgently to enhance and maintain the required pace of rural development.

The lack of a national framework for extension and advisory services creates unnecessary confusion with regard to the roles and responsibilities of different stakeholders on service delivery. Therefore, it is imperative to establish a national policy for effective and efficient delivery of extension and advisory services in Nigeria.

The **participation of the private sector in agricultural research and extension** has remained low and the most sited excuse has been "the inconsistencies and somersaults" in government policies. Globally, proponents of AEAS policy strongly stressed the need for governments and institutions to move from "opinion-based policy" to "evidence-based policy", due to the fact that the policy-making process is inherently political and, that the processes through which evidence translates into policy options often fail to meet required quality standards.

Thus the proposed body will harmonize **the critical elements that are required to power sustainable and market-oriented agricultural development** using the commodity value chain approach. This will enable Nigeria to be food secured and become a major player in the global food market. The most successful agricultural development stories in both the developed and

The strength of an effective extension and advisory service lies in

the ability of **all role-players, stakeholders and service providers in the sector to work together** and share knowledge and information. This will ensure that the combined capacity and knowledge base within the public, private and non-profit actors can be synergized and channelled towards the advancement of the agriculture, Government should **facilitate extension and advisory services that are pluralistic,** recognizing that there are roles for the state, the private sector, non-profit organizations and for producers themselves in delivering services.

It is advocated that **a demand driven approach be put to use** in the Country for Agricultural Extension and Advisory Services. This demand responsive agricultural extension service has a variety of tools and approaches consistent with a pluralistic extension system to be deployed in providing targeted, effective and efficient response to the needs of the clientele. Such approaches and tools include:

- Farmer Field and Business School
- Innovation Platforms with emphasis on targeted value chains
- e- Extension/ICT
- Adopted Village and School Concept
- Technology Transfer Centres
- Empowering Women and Youth in Agriculture
- Extension support materials, interactive/study tours
- Need based skill improvement training.

(1) E-Extension should be adopted nationwide as part of the national extension service delivery system. In this regard:

a. The Federal Government should equip the existing structures of National Farmers Helpline Headquarters in NAERLS, Zaria and the Northwest Zonal hub located in IAR, Zaria to make it operational;

b. National Helpline hubs should be established in the remaining five geopolitical zones;

c. Capacity building programme should be undertaken to upgrade the skills of all operators of e-extension at Federal, State and local government levels.

(2) The following agricultural **extension approaches have been tested and found effective and should be promoted:**

a. Farmer Field and Business School (FFBS);
b. Value Chain Innovation Platforms (VCIPs);
c. Adopted Village;
d. Adopted School.

Decentralization of the public extension system to the district, local or community levels ensuring the bottom-top approach and multi-stakeholders innovation perspective in the agricultural development;

The decentralized extension approach at the district or community level organized farmers into producer groups, where by farmers have a say through the district level over resource allocation and procurement of suitable services whether public or private;

The growing recognition that markets, not technology, is the primary driver for agricultural development in many countries; have led to the transformation of subsistence farming to production of targeted high-value crops/products within each district or community so that farmers can diversify their risk and move into new enterprises once a particular market is saturated;

In order to revitalize the extension service delivery in Nigeria there is need **for cost sharing between Federal, State, LGC and Communities**. Hence, clearly defined roles for the different tiers of government in extension services delivery and funding. There should be clearly defined roles for the private sector in extension services delivery and funding support for agricultural research and extension. Well-developed Farmer - and Community - based Organizations.

I. The cost sharing ratio proposed is:

a. Federal – 36%
b. State – 25%
c. LGC – 35%
d. Community – 4%.

APPRECIATION

Mr. Vice Chancellor sir, a Professor is like a cooked food ready to serve the hungry. The process of having cooked food involved many activities and actors. The starting point may well be soil preparation, planting, harvesting, processing value addition, in all these processes human beings and cost are involved thus: I want to thank the Lord for this honour and for making it possible for me to stand before you people this afternoon, indeed God fulfilled his word in Psalms 18:29 *For by thee I have run through a troop, and by my God have I leaped over a wall.*

I appreciate the contribution of my late parents Chief R. A. Adeniji and Alhaja S. Adenike Adeniji (nee Adeyemo) for my education, and ensured I had a disciplined, and God fearing upbringing. They gave me the very best of every resources they had. May their soul rest in peace.

I am grateful to my elder brothers Eng, F. G. Adeniji (late) and my sister Moriyike Adeniji -Atanda (late) and my immediate senior brother Eng, Adegboyega Adeniji. To my sisters Mrs. Mofesola Akomolafe and her husband Chief Isaac Akomolafe, you are a rare gem Mrs. C. I. Ogunsuyi, Mrs. Grace Dillimono (my sister in-law) and Mrs. Idowu Olorunsola. I also acknowledge Miss Oluwaseun Akinnusoye for her contributions too.

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Fadipe (nee Sobowale) Mrs. Kike Adegoke, Deji Ajayi, Lanke Olamisegbe, AVM Kole Omirin (rtd) Brig. Gen. T. O. Olowomeye, Pharm. Mathew Fatuyi, Mr. Ayo Adesida , Dr. M. A. Ojo , Profs. Rotimi Olaleye, Musa Galadima, etc. I say a big thank you for the friendship and for being there for me always.

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Finally, I thank Prof. Bisi Ayanwale and his team, the Seminar and Colloquium Committee for the encouragement given to deliver this lecture.

And to everyone who has contributed one way or the other to making me what I am today, I am grateful. And for you the esteemed audience I appreciate you for honouring me by being here today.

Mr. Vice-Chancellor sir, this is the journey so far. I believe there are new grounds to break, more mountains to conquer and many more dreams to realize particularly the dream of disseminating information to farmers to ensure sustainable food production and ensuring food security even before 2030. Together we, academics and experts in the field of agriculture in Nigeria, can realize that dream if we understand that after all, we are academics, researchers or experts in the field of Agriculture because there is farming as an occupation and there is the Nigerian farmer to work with.

Sir, I would like to end this lecture by quoting my favourite Bible verse:
"Unto him that is able to do..... Eph. 3:20

Thank you for your kind attention. I am done. God bless you all.

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PROFILE OF THE INAUGURAL LECTURER

Professor Oladimeji Bolaji Adeniji hails from Ado Ekiti, Ekiti State, Nigeria. He was born 4 December 1960 to the family of late Chief R. A. Adeniji and Alhaja S. Adenike Adeniji. He attended AUD Primary School, Ado Ekiti, 1967-1972, Ladigbolu Grammar School, Oyo and Oyemekun Grammar School, Akure 1973-1981 for his secondary education. Professor Adeniji was at University of Ife, Ile-ife 1981-1984, He later proceeded to Ahmadu Bello University, Zaria where he bagged his M.Sc. and PhD in Agricultural Extension 1996 and PhD 2002, respectively.

He joined the services of Federal University of Technology, Minna on transfer from Ahmadu Bello University, Zaria as Senior lecturer in 2007 and rose to the rank of Professor of Agricultural Extension in October, 2012, the first Professor of Agricultural Extension in the Department.

Professor Adeniji served the university as a member of several committees such as anti cultism committee, Senate Representative on the Board of CDRM&DS, Campus Community Communication Forum.

He has also held several important position of responsibility among others - Chairman, Academic Staff Union of Universities (ASUU) Federal University of Technology, Minna 2010-2012. Chairman, Committee on Cooperative Extension, Member, Servicom Brigade, Outside the University, Prof. Adeniji is a member of some non-governmental and community based organizations such as Secretary Nigerian Participatory Research Network (NIPRANET), Secretary General Nigerian Forum for Agricultural Advisory Services (NIFAAS).

As an academic Prof Adeniji has attended and actively participated in several conferences both at national and international levels. He has to his credits over seventy (70) publications in journals, edited proceedings, conference papers

etc. He has many professional/proficiency certificates in various disciplines. His research interests are Agricultural extension, rural development, socio-economics and Gender issues in agriculture; Professor Adeniji has over the year been enhancing the capacity of high level manpower in agriculture through teaching and project supervision. To date he has supervised/co supervised 56 Undergraduates, 30 Masters and 6 Doctoral students. He has served as external examiner and assessor to various universities and has reviewed/ still reviewing for local and international journals, He is a member of AESON, FAMAN, NAAE, NSAP to mention a few.

Prof Adeniji has attended several professional and management courses within and outside Nigeria, He is a keen sports man. His hobbies include playing table tennis, football and chess. He is married with children