



Role of Agricultural Extension Programmes in Promoting Food Security in Akuku-Toru Local Government Area of Rivers State.

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ABSTRACT

The study examined the Role of Agricultural Extension Programs in Promoting Food Security in Akuku-Toru Local Government Area of River State. The study adopted descriptive survey design. The population of study comprised farmers and extension agents taken from locally registered farmers of Community Based Associations (CBAs) in the seven communities in Akuku-Toru Local Government Area of Rivers State. The random sampling technique was applied to realize a sample of four hundred and ninety four (494) made up of 454 farmers and 40 extension agents. The instrument for data collection is a closed-ended structured questionnaire titled "Role of Agricultural Extension Programmes in Promoting Food Security Questionnaire" (RAEPPFSQ). The reliability coefficient is 0.81. The data collected were analysed using descriptive statistics which includes mean (\bar{x}) and standard deviation statistics. The findings showed that agricultural extension programmes play a positive role in sensitizing farmers on how to access grants and loans, to increase their productivity towards food security; sensitizing farmers on market accessibility for farm produce, to enhance food security. It also revealed that agricultural extension programmes help to sensitize farmers on utilization of available farming space to increase food production and ultimately food security. Based on the findings, the researcher recommended amongst others that the government at all levels and relevant organizations should partner with agricultural co-operatives and financial institutions to ease access of farmers to grants and loans for increased food production and that the government (Ministry of Agriculture) and other relevant agencies should mobilise, sensitize and educate farmers on appropriate use of space for farming activities.

Keywords: Agricultural Extension, Agricultural Extension Programmes, Food security.

INTRODUCTION

Development of the economy of many countries could be tied to a functional and vibrant agricultural sector, considering the place of food security as a basic need in the lives of any populace. Over the years, due to urbanization and land/sea pollution, agricultural practices have diminished, especially subsistence farming which in the past took care of household food needs and supplies. It is worthy of note that before other forms of economic growth would be established, survival of the family unit is essential and cannot be accomplished without solidifying the basic need of food security in the family. General economic development is greatly desired in any and every society, thus the importance of food security, which is the basic foundation for the growth of the least/smallest unit (the family) of any society, cannot be overemphasized.

Historically, agriculture provided the resources for financing economic development in Nigeria, long before crude oil became the major source of revenue and foreign exchange-earnings. Prior to the oil boom in the 70's, there was a healthy economic competition among the then four regions of the country (Nigeria), as each exploited its comparative advantage by focusing on the cultivation and production of specific set of cash crops. Nigeria was reasonably self-sufficient in food production and carved a respectable niche for herself as a major exporter of a bouquet of cash crops ranging from groundnut, palm oil, cocoa, rubber to cotton, including hide and skin (Smith, 2018; Okotie, 2018). Nigeria was famous for her agrarian economy through which cash crops were exported and basic food requirements for the country was provided. Raw materials for local industries were also provided through her agricultural practices.

Not only was agriculture able to cater for up to 95 percent of the food needs of Nigerians, it contributed about 64.1 percent of the Gross Domestic Product (GDP) and employed over 70 percent of the Nigerian population (Paul, 2015). Additionally at that time, export of agricultural produce accounted for 80 percent of the country's foreign exchange earnings and 50 percent of Governments revenue (Okotie, 2018).

The agricultural strides achieved prior to the "oil boom" era were as a result of the agricultural extension programs adopted by the Federal Government. They were used to educate and influence the farmers towards the great successes recorded in food security/sufficiency.

Concept of Agricultural Extension

Agricultural extension is a service or system which assists farm people, through educational procedures, in improving farming methods and techniques, increasing production efficiency and income, bettering their levels of living, and lifting the social and educational standards of rural life.

The economy of most developing countries is dependent on rural based small-scale agriculture whose productivity is not increasing, but contributing towards eradicating household food insecurity, malnutrition and poverty. The over-increasing decline in agricultural production has been attributed to a number of factors, one of which has been inappropriate and/or ineffective dissemination of technologies (Sindu et. al, 2008).

Agriculture has already reached the limits of land and water, and so future increase in food production must exploit biological yields on existing land which could be made available to the people through extension services. (Puskur et. al, 2008).

According to Kobani and Alozie, (2019), Agricultural extension provides a veritable base for community development. Extension is a continuous education process to develop individuals, village leaders and the community as a whole. In agricultural extension, the people are motivated through a proper and organized approach to help themselves by applying science and technology in farming, home making and community living.

The emphasis of agricultural extension has been changing with more focus on food and nutrition security, poverty alleviation, and the sector has witnessed entry of new actors such as the private sector and NGOs in the delivery of extension services.

Concept of Food Security

Food security was defined in the 1974 World Food Summit as:

“Availability at all times of adequate world food supplies of basic foodstuff to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”.

In 1983, FAO expanded its concept to include securing access by vulnerable people to available supplies, implying that attention should be balanced between the demand and supply side of the food security equation:

“Ensuring that all people at all times have both physical and economic access to the basic food that they need”

Essentially, food security can be described as a phenomenon relating to individuals. It is the nutritional status of the individual household member that is the ultimate focus, and the risk of that adequate status not being achieved or becoming undermined.

Today, the concept of food security is generally understood to incorporate four main components: availability, access, utilization, and stability; although, some see stability as a separate cross cutting factor. For a state of food security to exist, all these components must be sufficiently present (Gibson, 2012).

The widely accepted World Food Summit (1996) definition reinforces the multidimensional nature of food security and includes food access, availability, food use and stability. “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996).

Government Efforts in Promoting Agricultural Education towards Achieving Food Security in Nigeria.

There have been individual and collaborative efforts at local, regional and international levels by governments and non-government bodies to reduce food challenges. These effort by government could be seen as extension efforts aimed at introducing change in the farming behaviour of farmers, even though ideally, they lack some necessary characteristics of a time extension system.

Some home grown government food security programmes and initiatives in Nigeria from 1960 to date include: National Development Plans (1 and 2), Operation Feed the Nation, African Development Bank (ADB), Green Revolution, River Basin Development Authorities (RBDA), Directorate of Foods, Roads and Rural Infrastructure (DFRRI), Structural Adjustment Programme (SAP), National Poverty Eradication Programme Scheme (NAPEP), Poverty Alleviation Programme (PAP), the FADAMA I, II, and III project among others (1999-2007). President Umaru Musa Yar’adua came with the 7 Point Agenda in 2007 and the Nigerian National Rice Development Strategy Plan NRDSP (2009), the Agricultural Transformation Agenda (ATA) by Goodluck Jonathan (2011-2015), Agriculture Anchor Borrowers Programmes (AABP) 2015 to date by Mohammedu Buhari (Chinedum, 2011, Kerly, 2014, Oyetunji, 2017 and Adebayo, 2017). In summary, to Chinedum (2011:45-53), Nigerias’ agricultural policies right from independence to fourth republic, aimed at achieving food security; increase production and productivity, income and employment generation, and exports expansion and food imports reduction to free resources for critical social goods development and effective social service delivery.

In 1973, the government embarked on the National Food Programme (NAFPP), which was a voluntary scheme launched in Nigeria to make the country self-sufficient and food secured. Operation Feed the Nation (OFN) was launched in 1976, hoping to increase local food production and thereby reduce food imports, citizens were encouraged to cultivate empty plots of lands to boost agricultural production. The Agricultural Development Project (ADP) were initiated in the mid-1970s as Nigeria oil production revenues were on the rise, the project was designed to increase crop production through rural development, with focus on improved technology, increased supplies of farming inputs, and improvement of infrastructure. The River Basin Development Authorities (RBDA) were established to undertake the development of ground water resources and maintain dams, dykes, wells, or boreholes, irrigation and drainage systems to boost agricultural production.

In 1986, the Directorate of Food, and Road and Rural Infrastructure (DFRRI) was established to influence the performance of agricultural related projects in rural areas to boost food production. The Structural Adjustment Programme (SAP) was established in 1986, and was aimed at restructuring and diversifying the production base of the economy so as to reduce the over dependency on the oil sector and imports. In 2005, the government assisted by the World Bank established the FADAMA project, designed to enhance agricultural production and value addition to small holders and rural entrepreneurs in the states under the FADAMA programme. The FADAMA programme is to provide support for water management systems in low lying flood plains, so that farming can continue in the dry seasons. The project brought about the adoption of simple, low cost irrigation technologies that helped farmers achieve substantial rise in production for horticultural crops.

As part of efforts to make Nigeria food secured, the government established various agricultural research institutes; Nigeria Cereal Research Institute was established in 1975 for the genetic improvement and production of Soybean, rice, sugarcane, and sesame. The Lake Chad Research Institute was established in 1960 for the genetic improvement and development of production technologies for wheat, millet, and barley. National Root Crop Research Institute was established in 1976 for the genetic improvement of yam, cassava, cocoyam, Irish and sweet potato and ginger. The Nigerian Stored Products Research Institute (NSPRI) was established in 1954 to conduct research in all aspect of post-harvest handling and storage of all agricultural crops, though it was initially mandated to focus its attention on export crops, at independence it was given the mandate to research also into local food crops via improvement and maintenance of quality of perishable crops. It has developed the use of the ventilated yam barn for the storage of yam tubers, techniques for preserving fresh cassava stems, development of waxes for the treatment of citrus, and techniques for the production of pineapple, mango, okra, tomato, and pepper into more stable forms. Systems for storing grains at domestic and commercial levels have also been developed. It has the mandate to improve capacity building in post-harvest technology for artisans in the fabrication of packaging and storage structures, and trained interested small farm holders on food preservation techniques (Adegbola and Bamishaiye, 2011).

Roles of Agricultural Extension Programmes in Sensitizing Farmers on how to Access Grants and Loans to Increase Productivity towards Food Security

Globally there are over 500 million smallholder farms, cultivating food and generating economic activities, creating the conditions for communities to thrive. Farming is an arduous profession made even more challenging by the worsening effect of climate change. Every year, farmers, especially those in developing countries, struggle to maximize their harvests and turn profits. Multiple bad years in a row can impoverish a farmer and reverberate outwards by depriving communities of a key source of food.

The harsh possibilities of agriculture have deterred millions of young people from entering the field, at a time when countries need to generate more food because of the growing population. Farmers are essential to the well-being of all communities. The work they do turning soil and irrigating land contributes to entire communities: helping pregnant women stay healthy, children thrive in school, and adults pursue meaningful careers. By increasing and improving financial assistance and extension services for small holder agriculture, governments and international aid groups can ultimately create a new generation of farmers capable of taking on the extraordinary challenges that lie ahead.

Local farmers requires government to work closely with agricultural extension service providers that are unlocking the potential of rural communities. There are interlocking reasons for why governments neglect smallholder farmers in developing countries- farmers often lack political power, despite all the odds, they still manage to produce food so politicians see no need to help them, and by the time politicians allocate budget money to more seemingly urgent priorities, there's no money left for farmers. There is also a serious lack of data regarding the specific needs of farmers and evolving environmental conditions. Without data to bolster the case for budget expenditures, money often does not get disbursed. The agricultural extension service providers are working to highlight the problems and opportunities facing farmers in order to unlock resources (McCarthy, 2021).

Many governments are loath to simply hand out money to their citizens and have not set up sufficient bureaucracies to deliver, manage and follow through on micro-financing, conditional cash transfers, and other approved means of support to farmers. The agricultural extension providers work in ensuring that funds actually reach the farmers.

Roles of Agricultural Extension Programmes in Sensitizing farmers on Market Accessibility for Farm Produce to enhance Food Security.

Access to improved market can influence household food and nutrition security through multiple pathways. Market access can increase smallholder farmers' income through decreased transaction costs, improve food consumption, and reduce poverty and household food insecurity. Improved market access also increases the variety of available foods, thereby increasing opportunities for consumption diversification. Using the World Bank Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA), we find that households located closer to market centres spend more on household consumption, consume more diverse diets, and are less food insecure than those households located farther away from markets (Muhammed and Mekbib, 2019).

Numerous barriers have limited market access for smallholder farmers in Africa, leaving them unable to leverage and benefit from recent gains in farm productivity. Agriculture, in most communities, is subsistence-based and characterized by low productivity; and the plight of farmers worsened by limited access to markets.

As efforts are directed towards increasing food supply and reducing hunger in Africa by raising smallholder productivity, an equal push to improve access to markets is also imperative. The under-developed and inefficient agriculture markets mean that farmers face challenges in preparing to sell their crops and connect with buyers.

Many African countries lack key elements necessary for efficient and effective markets infrastructure, including transport systems, market linkages, storage facilities, legal and policy frame and financial systems. For farmers, the lack of market resources is linked to low farm-gate prices, weak farmers' organization, narrow markets, a lack of market information, and a lack of affordable finance. In addition to directly increasing incomes of smallholder farmers, a systematic approach to removing market-access bottlenecks and strengthening market infrastructure would drive gains in productivity and improve food security. One of these bottlenecks could be described alongside the extension strategy to tackle its effects as follows:

1. Lack of market information where adequate and reliable information on market needs is disseminated to every stakeholder in the marketing value chain (to include the farmers, the sellers, the buyers, the food processors, the financiers, etc), thus giving room for biased judgements and decisions on transactions, ultimately leading to market failures. Extension programmes through the use of Information and Communication Technology (ICT) could influence and impact positively on the marketing value chain. ICT facilitates access to better market and agronomic information on factors like crop prices, weather conditions, available financial resources and others, thus improving the efficiency of their transactions.

The Alliance for a Green Revolution in Africa (AGRA), was established in 2006, and sought to trigger a uniquely African Green Revolution that transforms agriculture into a highly productive, competitive and sustainable system that assures food security and lifts millions out of poverty. AGRA launched its Market Access Programme (MAP) in 2008 with the objective of directing investment and resources into realizing meaningful improvements to the market infrastructure of the core food staples in Africa.

The Market Access Programme is an important component of AGRA's mission as sustainable transformation of the agriculture sector depends on well-functioning markets that provide reliable outlets for farm produce, while also serving as dependable sources of affordable food.

AGRA through its Market Access Programme has been a key actor in developing well-functioning markets in Africa through a variety of interventions, including the development of rural market places, storage and warehousing systems, equipment operating market information systems and promoting of enabling legal and policy frameworks (AGRA.org., 2015).

Roles of Agricultural Extension Programmes in Sensitizing Farmers on Utilization of Available Farming Space to increase Food Production and Ultimately Food Security

Land is a fundamental factor of production in the agricultural sector. Most of our food is grown on land, so there has always been a close link between the delivery of food security and land use, it plays an essential role in increasing as well as sustaining agricultural production. Agricultural land provides the largest share of food supplies and ensures an essential number of ecosystem services (e.g. providing food, fuel, fibre) (Pereira et.al, 2018; Scown et.al, 2019; Stephens et.al, 2018).

Sustainable land management is key to reducing the conflicts resulting from the lack of food (United Nations, 2015a).

Despite a relatively small contribution to the GDP, agriculture is a key activity for Nigeria as it provides livelihood for a large share of the population. Land use and urbanization are responsible in declining the food supply in selected regions. Strong land and resource governance and secure property rights helps farmers, households, and businesses achieve increased food security through improved access to land, natural resources, and markets, increasing food production and consumption.

The relationship between land tenure, resource governance, and food security may be direct or indirect. Direct linkages include enabling food, labour, and capital investment in food production by securing land and property rights, reducing land-related conflicts, or improving equitable land access. Indirect linkages might include securing businesses' land and property rights to mitigate threats to business continuity, safeguarding owners', employees' and suppliers' ability to buy food.

Globally, the food insecure live predominantly in rural areas and 84% of the worlds' farms are smaller than 2 hectares (Fan, 2016). For many of smallholders, access to land is the basis for their livelihoods and a critical factor in family's food security (Nwanze, 2005). As populations increase and land becomes increasingly scarce (Godfray et.al, 2010), addressing the threats to smallholders' access to land is essential to food security (Holden & Ghebru, 2016). Land lies at the heart of both household-level food security and rural development. Land reforms have focused on redistribution of land to increase access for land-poor and landless farmers, and more commonly in recent years, on improving security of tenure through certification and other schemes (Holden & Ghebru, 2016). Land rights can take many forms, with different regimes suitable for different types of farming and different communities (Holden & Ghebru, 2016). Whatever their form, secure rights are; clearly defined, enforceable, appropriately transferable, and socially and legally legitimate, for many smallholders, one or more of these components are missing (Landesa, 2012). Security of land and resource rights is widely recognised as a valuable, and perhaps necessary, prerequisite for improving productivity (Landesa, 2012). When farmers are confident that they will enjoy the benefits of improvements they make to their land and the crops they produce, they are likely to invest more, boosting productivity and incomes (Lawry, Samii, Hall, Leopold, Hornby, & Mtero, 2017). Moreover, financial institutions may be more willing to provide credit for these improvements, or insurance against losses (DeSoto, 2000).

Sustainable land use and protection of soils play a key role in food, climate and human security (Lar, 2005; Braun, 2013; Amundson, 2015). In spite of this, land degradation has become a global problem occurring in most terrestrial biomes and agroecologies, in both low-income and highly industrialized countries (Le, Nkonga, Mirzabaev, 2016). It affects an estimated 1.5 billion people and a quarter of land area in all agroecological zones around the world

(Lal, Safriel, Boer, 2012). Annually, an area of about 5-8 million hectare of formerly productive land goes out of cultivation due to degradation globally (TerraAfrica, 2006 *unpublished report*). To rescue the situation, the introduction of appropriate land use policy is mandatory.

Agriculture forms the basis of the worlds' food supply, soil conditions, water availability, weather extremes and climate change can represent costly challenges both to farmers and the overall food security of populations. Space-based technology is of value to farmers, agronomists, food manufacturers and agricultural policy makers who wish to simultaneously enhance production and profitability. Remote sensing satellites provide key data for monitoring soil, drought and crop development, rainfall assessments from satellites, for example, help farmers plan the timing and amount of irrigation they will need for their crops.

Throughout the world, the agricultural sector plays a vital role in sustaining local, regional and global economies as well as livelihoods. It is estimated that there are some 570 million smallholder farmers who depend on their land as their main source of income and food. Today, societies rely on conventional farming methods, but are those methods capable of satisfying the income and subsistence needs on an individual level? As the number of people living in hunger and poverty continues to rise, it is clear that more efficient and productive agriculture systems are necessary to support our ever-growing needs. With conventional agriculture, farmers are taught to intensely plant only one type of crop throughout their field, believing that they are making the best use of the space available, but this is, in fact, far from the reality. Farmers miss out on many valuable returns when they only think laterally and do not account for the vertical and perimetric spaces capable of providing much needed income and subsistence boosts.

Roles of Agricultural Extension Programmes in Sensitizing Farmers on Mechanized Methods of Farming to Enhance Food Security

Mechanization is defined as the art of using machineries to hasten production, accomplish tasks and reduce fatigue and human labour in order to produce better quality goods and services. Agricultural mechanization is the process whereby equipment machineries and implements are utilized to boost agricultural and food production.

Mechanization can be improved effectively at the grassroot level with the assistance of extension personnel who help in creating awareness, and educating the farmers on embracing farm mechanization and sustaining their interest as regards introduction of one technology per time, need specification, technical know-how, action and satisfaction.

Mechanization plays a vital role in enhancing sustainable food production, thereby boosting food security as exemplified in various mechanized operations ranging from planting, germination, growth and weed control of the crops.

The food production stages which include; land clearing, planting and weeding, harvesting, transportation, processing, storage and consumption, could all be enhanced through mechanization.

The immense benefit of mechanization in agriculture cannot be overemphasized as it contributes significantly to increased food production and the entire value chain.

Mechanization of agriculture entails substituting machines for human power expended on farm activities for fast, less stressful and increased output in the farming process.

Use of farm machinery at small scale level in Nigeria is at a low level (Olaoye and Rotimi, 2010). The original intention of the government and leadership of the agricultural sector has been to popularize the use of machineries to facilitate agricultural practice through indigenous mechanization and this led to the formation of the National Centre for Agricultural Mechanization (NCAM). The essence of this centre is to oversee manufacturing of farm tools, and standardization and certification of agricultural tools, machines and equipment in Nigeria, as well as testing and evaluating the suitability of all types of imported and locally developed agricultural tools, machines and equipment already in use and those proposed to be used in Nigeria (Anazodo, 1980). Poverty level in Nigeria has continued to be on the increase despite the fact that 80% of Nigeria's population engages in agriculture. (Dauda, Musa and Ahmed, 2012). This realization establishes the fact that the practice of agriculture in Nigeria is not given the right approach which is mechanization. It is envisaged that if mechanization is given priority in Nigeria, the level of involvement of youths in agriculture may assume an upward trend. The need for farmers to engage the use of machines becomes paramount as this has a very high potential to enhance agricultural productivity (FAO, 2008). It is expedient that extension providers motivate rural farmers towards adoption of new technologies to boost their farm yields.

Some of the ways to motivate them include:

1. Giving them attention by way of creating awareness, educating farmers and rendering adequate support to them. Efforts should be directed at ensuring that farmers are given maximum support, understanding and encouragement to change their perspectives in relation to the new and improved ways of farming. Education on the benefits of mechanization should be given to farmers.
2. Extension personnel should ensure they counsel persons involved in deploying new technologies not to bombard farmers at the grassroots with "too much innovations" as this may confuse them. One machine should be introduced per time and farmers should be allowed to get used to such machine by technically showing them how to operate it before another is introduced. This will help farmers in sustaining interest and encourage duplication of efforts as they mobilize other farmers into adopting or using these machines.
3. The extension service provider needs to know the need of a particular community and the kind of technology that will satisfy such needs. When a specific machine meets the desire of farmers, the extension personnel is able to recommend these machines or assist in getting it for them if it requires for rent. As a result, it becomes easier for them to quickly adopt such machines for their farming purposes.

4. The confidence level of farmers needs to be built over a period of time. Skill acquisition programmes should be organized to give them the boldness to try their hands on the machines. When they are convinced that they are able to operate the machines, the rate of adoption increases and ultimately impacts on their level of productivity.
5. Appreciating the performance of farmers as they use the machines encourages them to intensify their efforts in the same direction and they will also encourage others to use the machine. Conscious and intentional actions must be taken by extension practitioners at ensuring that farmers continuously use the machines available for agricultural processes.
6. The level of satisfaction of farmers with the technology should be measured by extension service providers. This can be determined by weighing the benefit achieved with the use of these farm machines over the manual use or out-dated machines used in time past. It is this process that will confirm if the machine has met the desire of the farmers.

Agricultural extension providers are major agents that should relate with all other disciplines as they are the link between the farmers and other organizations that may want to deploy new technologies or new ways of doing things. Extension personnel are able to promote mechanized farming at the grassroots level in a way that will ensure a continuous and optimum utilization (Owalabi, Kolawole, Ajala et al.).

Statement of the Problem

The problem of this study is centered on the fact that there is increasing rate of food shortage and hunger. Prices of agricultural produce have been on the increase and this has affected the rural poor and the urban poor as well. Following the discovery of oil in Nigeria and the subsequent oil boom in the 1970's, agricultural sector which used to be the main foreign exchange income earner for the country was totally neglected. This resulted to decline in agricultural production hence Nigeria became a major importer of food items and agro-allied raw materials. The cumulative effect of this situation is that agricultural sector failed to perform its traditional functions effectively.

With the enormous agricultural potential that Rivers State has with vast arable land, one would expect that there would be abundance of agricultural produce. Unfortunately, this is not the case as the price of food (agricultural produce) has been on a steady increase due to scarcity of these products. This has led to increasing rate of hunger both in rural and urban areas. This food shortage has been attributed to a number of factors which include the fact that most youths and younger people who are supposed to be engaged in agricultural activities are rather focused on acquiring "white collar" jobs and any other endeavor outside the field of agriculture.

It is worthy of note however, that successive administrations at federal and state levels have initiated several policies and embarked on variety of agricultural programmes aimed at improving the viability of the agricultural sector. Some of such initiatives are the establishment of the Operation Feed the Nation (OFN), Green Revolution, the Directorate of Food, Road and Rural Infrastructure (DFRRI) and others, opened up in the rural areas for effective agricultural activities and to boost food production.

In spite of these government's agricultural initiatives, it is worthy of note that majority of the farmers in Akuku-Toru Local Government Area as in other parts of Nigeria still utilize the basic local tools for farming which include machetes, hoes, fishing nets and hooks, as opposed to technologically advanced tools available for use in the agricultural sector. However, reality today shows that little have been achieved from the above set goals. Hunger and malnutrition, low production and productivity, increasing unemployment and poverty, high rate of importation as against export are the order of the day. In addition, agriculture has remained subsistent and unattractive, a venture for the poor. The question then is will the adoption of a different approach in the form of agricultural extension programmes promote food security in Akuku-Toru Local Government Area of Rivers State? Providing answer to this question, therefore, is the problem of the study.

Research Questions

The following research questions will guide the study:

- What is role of agricultural extension programmes in sensitizing farmers on how to access grants and loans to increase their productivity towards food security in Akuku-Toru Local Government Area of Rivers State?
- What is role of agricultural extension programmes in sensitizing farmers on market accessibility for farm produce to enhance food security in Akuku-Toru Local Government Area of Rivers State?
- What is role of agricultural extension programmes in sensitizing farmers on utilization of available farming space to increase food production and ultimately food security in Akuku-Toru Local Government Area of Rivers State?
- What is role of agricultural extension programmes in sensitizing farmers on mechanized methods of farming towards ensuring food security in Akuku-Toru Local Government Area of Rivers State?

METHODOLOGY

The study adopted descriptive survey design. The population of study comprised farmers and extension agents taken from locally registered farmers of Community based Associations in the seven communities in Akuku-Toru Local Government Area of Rivers State. The random sampling technique was

applied to realize a sample of four hundred and ninety four (494) made up of 454 farmers and 40 extension agents. The instrument for data collection is a closed-ended structured questionnaire titled "Role of Agricultural Extension Programmes in Promoting Food Security Questionnaire" (RAEPPFSQ). The reliability coefficient is 0.81. The data collected were analysed using descriptive statistics which includes mean (x) and standard deviation statistics.

RESULTS

Research Question 1: What is the role of Agricultural Extension Activities in sensitizing farmers on how to access grants and loans, to increase their productivity towards food security in Akuku-Toru Local Government Area of Rivers State?

Table 4.1: Descriptive Statistics of farmers and Extension Workers on the role of agricultural extension activities in sensitizing farmers on how to access grants and loans to increase their productivity towards food security in Akuku-Toru Local Government Area of Rivers State.

S/N	Statement	Farmers n = 454			Extension n = 40		Workers
		X	SD	Remark	X	SD	
1.)	Participation in agricultural extension activities has enabled farmers know how to access grants and loans	3.09	1.11	Agree	2.90	0.70	Agree
2.)	Farmers are optimistic, having information after being educated through the extension programmes on how to easily access grants and loans for farming	2.78	1.13	Agree	2.83	0.95	Agree
3.)	Farmers know how to and have started the process necessary to access grants and loans for farming	2.91	0.92	Agree	2.83	0.90	Agree
4.)	Through extension programmes, farmers have been able to access loans and grants for farming	1.89	0.71	Disagree	2.10	0.95	Disagree
5.)	Farmers' orientation and perception towards issues on grants and loans have been affected positively.	3.13	0.87	Agree	2.93	0.76	Agree
	Grand Mean	2.76			2.72		
	Grand Standard Deviation	0.94			0.85		

Source: Researcher's Field Result, 2023.

Research Question 2: What is the role of agricultural extension programmes in sensitizing farmers on market accessibility for farm produce, to enhance food security in Akuku-Toru Local Government Area of Rivers State?

Table 4.2: Descriptive Statistics of farmers and Extension Workers on the role of agricultural extension programmes in sensitizing farmers on market accessibility towards food security in Akuku-Toru Local Government Area of Rivers State.

S/N	Statement	Farmers n = 454			Extension n = 40		Workers
		X	SD	Remark	X	SD	
6.)	Extension programmes has exposed farmers to vast demands for agricultural products in the market	3.17	0.91	Agree	3.15	0.58	Agree
7.)	Extension programmes have taught farmers how to access customers for their products	3.06	0.86	Agree	2.95	0.75	Agree
8.)	Extension programmes have educated farmers on how to promote business relationships with buyers/clients	3.22	0.79	Agree	3.08	0.77	Agree
9.)	Farmers have better understanding on market demands and how to meet those demands with produce	2.48	0.90	Disagree	2.20	0.82	Disagree
10.)	Through extension programmes, farmers have learnt how to process farm produce to meet market demands.	2.39	0.95	Disagree	2.25	0.81	Disagree

Grand Mean	2.86	2.72
Grand Standard Deviation	0.88	0.74

Source: Researcher's Field Result, 2023.

Research Question 3: What is the role of agricultural extension programmes in sensitizing farmers on utilization of available farming space to increase food production and ultimately food security in Akuku-Toru Local Government Area of Rivers State?

Table 4.3: Descriptive Statistics of farmers and Extension Workers on the role of agricultural extension in sensitizing farmers on utilization of available farming space to increase their productivity towards food security in Akuku-Toru Local Government Area of Rivers State.

S/N	Statement	Farmers n = 454			Extension n = 40		Workers
		X	SD	Remark	X	SD	Remark
11.)	Extension programmes have educated farmers to understand that no land space is too small to start farming	3.22	0.78	Agree	2.95	0.61	Agree
12.)	Farmers are effectively utilizing the available land space at their disposal for farming	1.73	0.65	Disagree	2.03	0.70	Disagree
13.)	Extension programmes have taught farmers how to effectively cultivate on farming land space	3.12	0.73	Agree	2.80	0.69	Agree
14.)	Farmers have improved yields as they have learnt how to effectively treat farming land space with fertilizers	3.33	0.58	Agree	3.03	0.77	Agree
15.)	Farmers have, and utilize a sizeable farming land space for subsistent farming	2.03	0.48	Disagree	1.83	0.68	Disagree
	Grand Mean	2.68			2.52		
	Grand Standard Deviation		0.64			0.69	

Source: Researcher's Field Result, 2023.

Research Question 4: What is the role of agricultural extension programmes in sensitizing farmers on mechanized methods of farming towards ensuring food security in Akuku-Toru Local Government Area of Rivers State?

Table 4.4: Descriptive Statistics of farmers and Extension Workers on the role of agricultural extension programmes in sensitizing farmers of mechanized methods of farming to increase their productivity towards food security in Akuku-Toru Local Government Area of Rivers State.

S/N	Statement	Farmers n = 454			Extension n = 40		Workers
		X	SD	Remark	X	SD	Remark
16.)	Participation in Agricultural extension programmes has exposed farmers to mechanized methods of farming	3.24	0.65	Agree	3.25	0.54	Agree
17.)	Through training, farmers have acquired some skill in utilizing basic mechanized tools for farming	3.11	0.73	Agree	3.90	1.05	Strongly Agree
18.)	Mechanized farming method has helped improve farmers' crop production.	2.69	0.91	Agree	2.55	0.81	Agree
19.)	Mechanized farming methods as taught by extension programmes are easy to learn and practice.	2.76	0.82	Agree	3.07	0.69	Agree

Grand Mean	2.95	3.19
Grand Standard Deviation	0.77	0.77

Source: Researcher's Field Result, 2023.

DISCUSSIONS AND CONCLUSIONS

The findings of the study for research question 1 revealed that the majority of respondents agreed that agricultural extension programmes have positively influenced the sensitization of farmers on access to grants and loans for increased productivity, evidenced in the high mean rates of items 1,2,3 and 5, which indicated that participation in agricultural extension programmes taught farmers how to access grants and loans, increased the optimism of farmers on access to grants and loans, driven farmers to begin the process necessary to obtain grants and loans. The findings corroborate with that of Cornor (2022) that development institutions focused on agriculture have prioritized providing support for smallholder farmers to improve their economic and social conditions, one of which is through access to grants and loans. Item 4 however, showed a disagreement to a positive influence of the actual accessing of grants and loans by farmers due to issues like lack of trust by the lending institutions poor leadership vision in the agricultural sector, high interest rates, diversion of loans by farmers, among others, as expressed by Odinwa, Johnny, Ekeogu and Chukuigwe (2022).

Findings in research question 2, items 6,7, and 8 with a high mean rate, shows that respondents agree that through extension programmes, farmers have been exposed to the vast demand for agricultural produce in the market as well as how to access customers for their various farm produce. Farmers have also learnt and developed skills on customer relations as they both join forces knowing that they need each other to sustain a supply of fresh produce, according to Buila (2014). Items in 9 and 10 of research question 2 shows that the respondents disagree to the learning of processing of farm produce to meet market demands. These disagreements come on the basis of inability to access raw materials for processing purposes, high cost of production, limited support from government agencies amongst others, as illustrated by Laudat (2015), with a grand mean rate above 2.5 but lower than 3.5, respondents affirm to agree that agricultural extension programmes have helped in sensitizing farmers on market accessibility towards food security.

Research question 3 with varying agree and disagree mean ratings of items 11 through 15 reveals that with regards to items 11,13, and 14 (understanding land space, utilizing land space and treating land space with fertilizers) that agricultural extension programmes had a positive impact on sensitizing farmers on utilization of available farming space to increase food security. According to Hannah and Max (2019), agriculture is a major use of land and half of the world's habitable land is used for agriculture. Over the last few centuries wild habitats have been squeezed out by turning it into agricultural land. In considering items 12 and 15 of research question 3, that disagree to the question of agricultural extension programmes influencing farmers to greater utilization of available land space for farming and farmers accessing sizeable land space for farming, Abiodun and Obayelu (2013) enumerate some challenges militating against these to include, poor land, water and waste products management, rising land cost and accessibility to urban land. In rural areas, declining soil fertility and the impact of soil erosion threatens the ability of land to produce sufficient food.

Research question 4 presents items 16 through to 19 to have a strong agree mean ratings covering the positive impact of agricultural extension programmes on exposing farmers to mechanized methods of farming, developing skills in utilizing basic mechanized tools and improvements in crop production. Mechanized method of harvesting and threshing helps prevent crop losses in the harvesting process. Axmann (2021) alludes to this assertion of mechanization of agriculture positively influencing food production and increasing farmer's income. Participation in agricultural extension programmes has exposed farmers to the ease in learning and practicing basic mechanization activities in farming processes for better crop yields and better farm operations and management.

CONCLUSIONS

The following conclusions were drawn from the research findings; that agricultural extension programmes play a positive role in:

- Sensitizing farmers on how to access grants and loans, to increase their productivity towards food security.
- Sensitizing farmers on market accessibility for farm produce, to enhance food security.
- Sensitizing farmers on utilization of available farming space to increase food production and ultimately food security.
- Sensitizing farmers on mechanized methods of farming towards ensuring food security.

RECOMMENDATIONS

In view of the findings and conclusions of the study, the following recommendations were made:

1. The government at all levels and relevant organizations should partner with agricultural co-operatives and financial institutions to ease access of farmers to grants and loans for increased food production.
2. The government and all relevant agencies should partner with farmers to ensure accessibility of farm produce to the markets.

3. The government (Ministry of Agriculture) and other relevant agencies should mobilise, sensitize and educate farmers on appropriate use of space for farming activities.
4. The government should partner with agricultural cooperatives and agricultural extension agents to fund training programmes for farmers, on the use of mechanized tools and equipment for farming.

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