

## Exploring the effect of agricultural extension services on farm households' food security in Abuja, Nigeria

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**ABSTRACT:** This study delves into the dynamics of agricultural extension services accessed by farm households' in Abuja, aiming to provide a comprehensive understanding of the prevailing practices and their impact on the local agricultural landscape. Through a systematic exploration of the services utilized by farm households', the research sheds light on the effectiveness of existing extension programs in enhancing agricultural productivity and sustainable practices. The methodology involves surveys and interviews conducted among a representative sample of farm households' in Abuja, capturing diverse perspectives and experiences. Key parameters under investigation include the types of extension services accessed, the frequency of engagement, and the perceived benefits and challenges encountered by farm households' in utilizing these services. By examining these aspects, the research seeks to identify patterns, gaps, and potential areas for improvement within the current agricultural extension framework. The findings of this study contribute valuable insights to policymakers, agricultural practitioners, and researchers, informing strategies to optimize extension services for enhanced farmer engagement and productivity. Additionally, the research addresses the unique socio-economic and environmental context of Abuja, offering localized recommendations for improving the accessibility and relevance of agricultural extension services in the region. Ultimately, this study serves as a crucial resource for fostering sustainable agricultural practices and bolstering the resilience of farm households' in Abuja.

**Keywords:** Agricultural, extension, services, accessed, farm, households', Abuja

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### INTRODUCTION

In Nigeria and other developing nations, the public sector has traditionally supplied agricultural extension services. Since the mid 1970s, Agricultural Development Programs (ADPs), which were funded by the World Bank loans, the governments of the 36 states, and the Federal Capital Territory, have been in charge of providing agricultural extension services in Nigeria (Agenyor, 2014). Agricultural extension offers farmers the guidance, knowledge, and other support services to help them increase the productivity of their crop and animal output which has an impact on both farm and non-farm earnings. They play a crucial role in putting policies and strategies for rural development into action. However, due to the poor quality of services offered by the ADPs as a result of the World Bank's removal of financial support

during the past 25 years, extension services have offered a variety of public, private, and non-profit organizations with a variety of goals. For instance, while commercial entities are motivated by profit considerations and strive to meet high quality standards in the raw materials that enter their processing plants as well as a level of production to accommodate plant and market capacity, public-sector organizations work toward the objectives of national policy. However, the non-governmental organizations (NGOs), which are frequently motivated by the wellbeing of the farm families, make up the majority of the voluntary sector. Nevertheless, despite the variances in their objectives and strategies, all of these organizations aim to accomplish their goals by exchanging information to affect the practices and

decisions of a sizable number of rural farm households' (Adebayo, 2004). According to Rivera *et al.* (2001), governments of developing nations face new extension difficulties as a result of the requirement to boost productivity in order to feed every citizen, increase the income of the rural population, and eradicate poverty. On the other hand, in a world that is changing quickly and where new technologies are being created all the time, it is necessary to manage the natural resources in a sustainable manner. Before updating and changing the current lack of food security, it is crucial that policymakers understand the crucial role that extension services play in the development of the national economy (Qamar, 2005). The Latin word 'ex', is a prefix which means 'out' and 'tension', or 'stretching', are the origin of the word 'extension'. The definition of extension is to spread out. The term "extension" was first used in the USA in 1914 to refer to a branch of a university for students who were unable to attend the main campus. In other words, an out-of-school system of education is what the word "extension" denotes. Extension includes education as a key component. Extension's fundamental purpose is instructional, according to Akinsorotan (2002). Extension education refers to the kind of instruction that is provided to rural residents outside the walls of the formal educational institutions to which such instruction is often restricted. The term "extension" can be interpreted in a number of different ways. Each extension agent probably has a different definition of extension. Extension is a dynamic notion, according to

Akinsorotan (2002), in that its meaning is constantly evolving. Therefore, the term "extension" cannot be clearly defined, but it refers to a dynamic process that occurs in rural areas.

Extension in Agriculture Education is a science that alters the behavior of the target population in a desired way via educational techniques so that they can raise their overall standard of life on their own (Kumar and Hansra, 2000). In order to reduce and eventually eradicate extreme poverty and hunger in developing nations like Nigeria, agricultural extension is one of the most efficient methods available. According to Rivera and Qamar (2003), extension is a political and organizational tool used to promote development. It can take the form of educational programs that encourage community participation in problem solving activities or it can be the transfer of monocrop technology. Research and agricultural education are just two of the many components that make up the larger knowledge system in which agricultural extension operates (Rivera. 2001).

The primary purpose of the Extension services is to provide farmers with agricultural information. These signals make up the knowledge that the farmer attempts to incorporate into their farming techniques. Although the impact of extension services on food security may not

always be able to measure precisely, an efficient extension information service has a major impact on agricultural output. One of the key avenues for alleviating rural poverty and food insecurity is agricultural extension initiatives. Therefore, the purpose of this study is to find out the type of agricultural extension services accessed by farm households' in Abuja, Nigeria. The specific objectives of this study are to:

- i. Describe the socioeconomic characteristics of the farm households' in Abuja.
- ii. Determine the type of agricultural extension services accessed by farm households' in Abuja.
- iii. Establish the effect of agricultural extension services on food accessibility by farm households' in Abuja.

## METHODOLOGY

The study was carried out in Abuja. Abuja is the capital city of Nigeria, in the middle of the country. Abuja is composed of Six Area Council, namely Abaji Area Council, Abuja Municipal Area Council, Bwari Area Council, Gwagwalada Area Council, Kuje Area Council and Kwali Area Council. The study area is located between Latitude: 9.072264 and longitude 7.491302. Municipal Area council is the largest area council while Bwari Area Council is the smallest.

Abuja is characterized by two distinct seasons, namely: rainy (from may through October) and dry (December/March). The two seasons are often separate by somewhat transition period in April and November. The months of February and March typify the pick of dry season with very high temperatures. The rain climax is usually in August. The months of November through January are marked by cold, and dry weather condition (i.e., the harmattan) under the influence of the Northeast Trade Wind. The vegetation of the study area is characteristically grass-dominated: forming a mixture of the Southern and Northern Guinea Savannah ecological biomes. The prevailing climate and ecological conditions in Abuja, combine to support thriving agricultural practices, that have earned the area, one of the status of the 'food basket of the nation'.

### Population of the study and research design

The population of the study consists of households' in three Area Councils, selected namely: Gwagwalada Area Council, Kuje Area Council and Abaji Area Council respectively. The choice of farmers in the three area councils was due to the fact that there is large population of Household farmers in the areas, having access to Agricultural Extension Services delivery that should

positively affect food security in their production level, livelihood and survival.

### Sample size and sampling techniques

Federal Capital Territory, Abuja is made up of six (6) Area Council but three Area Council namely: Abaji Area Council, Gwagwalada Area Council, and Kuje Area Council were purposely selected out of the six Area Councils for the purpose of this study due to their enormous agricultural engagements. Each of the area council is divided into extension blocks and cells. The population consist of farm households' from three blocks from each area council from which three cells shall be randomly selected. The population of the farm households from the selected cells is 324. The sample size will be derived using Yamane (1961) sample size formula;

$$n = \frac{N}{1 + N(e)^2}$$

Where n = Corrected sample size N = the population size, e = margin of error (0.05%)

Similarly,

$$n = \frac{1620}{1 + 1620(0.05)^2}$$

$$n = 320$$

In gathering data for this study, multi stage sampling techniques and purposeful sampling techniques will be used. Purposeful sampling techniques will be used in this research to select the prospective Area Councils of interest from the whole Area Council in the study area.

### Data collection

The data for the study is collected from primary source only. The data is collected using a well-structured questionnaire. Copies of questionnaire were administered to the respondents, within the study area, through direct contact. Enumerators from Agricultural Development Program (ADPs), who understand local language of the people, administered the instrument to the targeted respondents. The use of enumerators hastens the work, and also allows the respondents to express themselves in their local languages, thus ensuring a free flow of communication. A well-structured questionnaire was used to collect data from the respondents (farmers). The items contained in the questionnaire were sectionalized into four compartments, based on the objectives of the study. Section A, deals with the Socio-economic characteristics

of the farmers. Section B gives consideration to the farm households' access to Agricultural Extension Services. Section C, dealt with the farm households' food security level and lastly Section D, dealt with the constraints to farm households' food security level. This is the respondent's chronological age in years as at the time of surveyed. Age of a farmer has a characteristic of their performance in productivity as older farmers tend to be more experienced than the younger ones. Age is measured in years. Gender refers to the roles and responsibilities of men and women that are created in our families, our societies and our cultures. Gender roles and expectations are learned. They can change over time and they vary within and between cultures UNESCO (2003). Gender was measured in the context of: Male (0) and Female (1).

**Marital status:** This can be described as the respondent's situation with regards to whether they are single, married, separated, divorced, or widowed. Marital status are term used in forms, records, and other documents to ask or indicate whether a is married or single Wikipedia (2009). It was measured as a dummy variable with male farmer (1) otherwise (0)

**Level of Education:** This is defined as the highest level of education that the farmer has obtained. According to Gershon et al. (1988), education especially formal schooling constitute an asset as human capital which determines the efficiency of the owner. It was measured by indicating the respondents' highest level of education in years.

**Household Size:** This is the number of people living under the same roof. According to Bizoza et al. (2007), from a production perspective, the size of a households' is a function of labour endowment for business enterprise, thus, the larger the family members the more the labour force available. It was measured as the number of persons living under care of the respondent.

**Farm Size:** This is the size of the land cultivated by the farmer in acres and hectares. It is argued that farmers with larger lands are more likely to be more productive than farmers with lesser land. It was measured by respondents, stating the actual hectares cultivated annually.

**Farming Experience:** This is the years of enrolment in farming enterprises. According to Kawornu *et al.*, (2012), as a farmer gains experience in farming, he/she utilizes recourses efficiently and would be productive. Farming experience was measured in years.

**Income:** It is the money that an individual or business receives in exchange for providing goods and services.

**Table 1:** Socio-economic distribution of respondents farmers

Variables	Mean	Frequency	Percentage %
<b>Gender</b>			
Male		206	64.40
Female		114	35.60
<b>Marital status</b>			
Single		44.0	13.80
Married		234	73.10
Divorced		13.0	4.10
Widow		29.0	9.10
<b>Household size</b>			
	6.7		
≤ 5		141	44.00
6-10		145	43.30
11-15		22	6.88
≥ 15		12	3.75
<b>Age of the farmers (years)</b>			
	44.5		
≤ 30		52	16.25
31-40		88	27.50
41-50		102	31.88
>50	44.5	78	24.38
<b>Farming experience (years)</b>			
	19.4		
≤ 10		77	24.06
11-20		119	37.19
21-30		87	27.19
31-40		29	9.06
>40		8	2.50
<b>Educational status</b>			
	1.7		
No formal education		33	10.30
Primary School		94	29.40
Secondary School		109	34.10
Post- Secondary School		84	26.30
<b>Farm size (Ha)</b>			
	4.7		
≤ 5		241	75.31
6-10		55	17.19
11-15		10	3.13
>15		14	4.38
<b>Income</b>			
	661812.50		
<100000		48	15.00
1001000-200000		47	14.68
2001000-300000		36	11.25
3001000-400000		32	10.00
4001000-500000		31	9.69
> 500000		126	39.38

Source: Field Data Analysis, 2021

Income in this context refers to the amount the farmer receives as annual earnings from the farm. It was measured as the estimated income of the respondent per annum (in Naira Value).

**Constraints:** are the limitations or restrictions that hinder farm households from accessing food security. To identify the degree of constraints, a list of possible open-ended challenges in the use of Agricultural extension services is compiled with respondent options. Food security (which composed of food availability,

accessibility, utilization and stability) was measured using Likert scale where, respondents were ask their level of agree to a given question. For the purpose of this study, the independent variable shall be Agricultural extension services while the dependent variable is food security. The independent variable and the dependent variables shall be measured using regression models. The model is given as follows:

$Y = a + bx$ ..... regression equation -----  
-----Equation (one) Where Y = Result a = constant

$b$  = coefficient  $x$  = Independent Variable (agricultural extension services)  $e$  = residual or stochastic term (which reveals the strength of  $b_1x_1 + b_2x_2 + b_3x_3$ )

In specific form, if  $e$  low, this implies that the amount of unexplained factors is low, then the residual  $R$  and  $R^2$  will be high and vice.

### Data analysis

Data collected were analyzed using descriptive statistics. Descriptive statistics such as frequency counts, percentages and mean were used to analyze the data. Objectives 1, 2, and 3 were analyzed using descriptive statistics..

## RESULTS AND DISCUSSION

### Socio-economic characteristics of farm household

Table 1 shows the socioeconomic characteristics of the farmers. The educational status reveals that 34.1% of the farmers were educated up to secondary level 29.4% possessed primary school education, 26.3% had post-secondary education while, 10.3% of the small scale farmers had no formal education. These results imply that the level of awareness and adoption of agricultural innovations among the farmers would be very high. Literate farmers are expected to be more innovative because of their ability to obtain and comprehend information more quickly and their ability to take more risks. This finding goes in line with the findings of Bawa et al., (2010) who observed that educated farmers can obtain information from a wide range of sources, such as extension agents, electronic print media and internet, and also use their abilities to secure necessary inputs such as credit, insurance, payment methods, fertilizers and improved seeds for continuous agricultural productivity, profitability, and sustainability. The less educated the farmers, the less likely they are to understand inherent benefits in a given innovation this is because education may play an important role in adopting a new system of farming. Table 1 reveals that 37.19% had between 11 and 20-years of agricultural experience, 24.06% had less than 10 years of agricultural experience, 9.06% had 31-40 years of experience while only 2.5% had over 40 years agricultural experience. This result reveals that small scale farmers in the study area had considerable years of farming experience. This is in line with Apata (2010) who stated that farmers who have an experience of over ten years are no more novices in agricultural production. The significance of farming experience in agricultural production cannot be over emphasized, this is because it determines farmers' ability to make effective

farm management decisions, not only adhering to agronomic practices but also with respect to input combination or resource allocation. Experience is expected to influence farm production efficiencies because of accumulation of skills. Dossah and Mohammed (2016) noted that the longer a person stays on a particular job, the better his job performance tends to improve. Table 1 also revealed that 64.40% of the respondents were males while 35.60% were female farmers. It reveals that male farmers are actively involved in farming activities in the study area. This correlates with the study of Ayanwu et al., (2010) which stated that arable farming is predominantly male occupation and little women are involved in crop production. This also corroborate with Akintobi *et al* (2018) who observed that gender is a significant factor in agriculture because of its vital role in determining farming activities, and this could influence the adaptive capacity to employ various indigenous agricultural methods. Table 1 present the marital status of the respondents, 73.1% of the respondents were married, 13.8% were single, 4.1% were widowed while 9.1% of the farmers had divorced their partners. This study collaborated with the study of Aphunu and Nwabeze (2012) which stated that married people have responsibility for provision of household needs of their families' hence greater involvement in occupational diversification. Table 1 further shows the household size of the farmers and it reveals the number of family members who were living in the same building sharing food and basic needs. The data reveals 44.00% of the farmers had a household of less than 5 persons, 45.30% had household size between 6 to 10 persons, 6.88% had a household between 11 and 15 persons, while only 3.75% had household over 15. These results imply that household sizes among small scale farmers are large. Tambo and Abdoulaye (2013) expressed the significance of household size in agriculture hinges on the fact that the availability of labour for farm activities, the total area dedicated to different crop enterprises, the amount of farm produce retained for domestic consumption, and the marketable surplus are all determined by the size of the farm household. Mwajombe and Mlozi (2015) reported that family size was a significant variable which greatly influenced the technical efficiency of farmers. On the contrary, Bola et al., (2012) reported that a larger household size could as well worsen the poverty situation particularly if such composition is more of dependents. Table 1 shows that 75.31% of the respondents had a farm size less than 5 hectare, 17.19% had farmland between the 6 and 10 hectares. 3.13% had between 11 and 15 hectares and a meagre 4.38% had farm size above 15 hectares. This indicated that farmers' in the study area were predominantly small scale which small farmers. Lack of access to land remains a major constrain for farmers in

Africa especially for women farmers and land reform programmes have led almost exclusively to the transfer of land rights to the government (Baba et al., 2015).

### **The types of agricultural extension services accessed by farm households 'In Abuja**

From Table 1 other extension activities, which the farmers benefitted from, include: helping to form local farmers foam cooperatives societies or farmer group (83.2%). This agrees with the findings of Nnadozie *et al.* (2015) who asserted that cooperative societies have greatly contributed to agricultural development in Ivo local Government Area of Ebonyi State, by providing cash to small holder farmers, processing and marketing and group management.

Furthermore; Berko (2001) reported that cooperatives came in the form of farm settlement which did not only help farmer to increase food production but also to increase attack from their aggressors. Agenyour (2014) posited that cooperatives option is a veritable tool to effectively mobilize farmers to form groups and pool resources so as to become more effective in agricultural production. Agenyour (2014) continued that cooperative is capable of reducing spatial inequality and promote equitable sharing of the cost and benefits of development. Chambo (2009) insisted that cooperative society is the best institutional intervention for attaining food security in any country.

From the afore mentioned the cooperative formation as a role of agricultural extension activities, cannot be overemphasized, considering the reports from numerous studies, and of course, not surprising, the most impacting of all the agricultural extension activities opined by most farmers. Reason for this assertion could be due to the fact that, farmers group has a way of harmonizing individual farmers capacity leading to accessing other extension desirables. Other high demand extension activities include: fertilizers deep placement methods by agricultural extension agents (70.07%) farm input application (68.5%), Information on Marketing (68.2%). The least available agricultural extension services were: New crop varieties introduced to them by agricultural extension agents (39.9%).

### **Effect of agricultural extension services on their access to food accessibility**

Figure 1 shows the farmers' perceptions regarding the effect of agricultural extension services on their access to food. Among the farmers, 41.9% expressed a belief that agricultural extension services had a minimal effect on their food access levels. This phenomenon finds a comprehensive explanation in the work of Tare (2016),

who attributes this low effect to a tripartite of barriers: information gaps, skill limitations, and a scarcity of resources. These constraints collectively hinder the effective adoption of available technologies and management practices that could potentially enhance food accessibility for the farmers.

Building upon this, Bjornlund and Pittock (2017) draw attention to the intricate nature of conveying information. They underline that a crucial facet in realizing the effect of agricultural extension lies in the packaging of information and training materials. These materials must be tailored to resonate with the diverse needs and capacities of farmers and extension workers alike.

The dearth of sufficient information dissemination, combined with gaps in input supplies and financial services, dampens the transformative potential of agricultural extension services on food access.

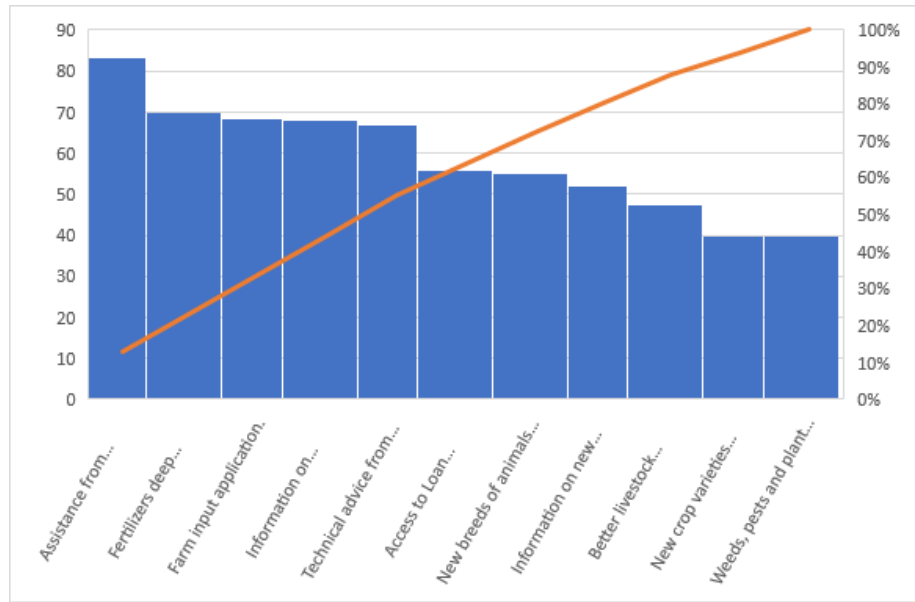
In contrast to this, a notable 28.1% of respondents perceived a significant positive influence on their access to food due to agricultural extension services. Furthermore, a small yet noteworthy segment of only 7.2% reported a very high influence on food accessibility through extension services. These findings converge with the outcomes of a study by Baiphethi and Jacobs (2019), which spotlight the role of extension services in elevating farmers' income through improved access to market information and linkages.

This linkage to markets facilitates increased income, offering the potential for farmers to procure additional food items that they might not produce or have in limited quantities. Raidimi and Kabit (2019) contribute to this narrative by highlighting the vital role of extension services in connecting farmers to affordable and reliable sources of inputs.

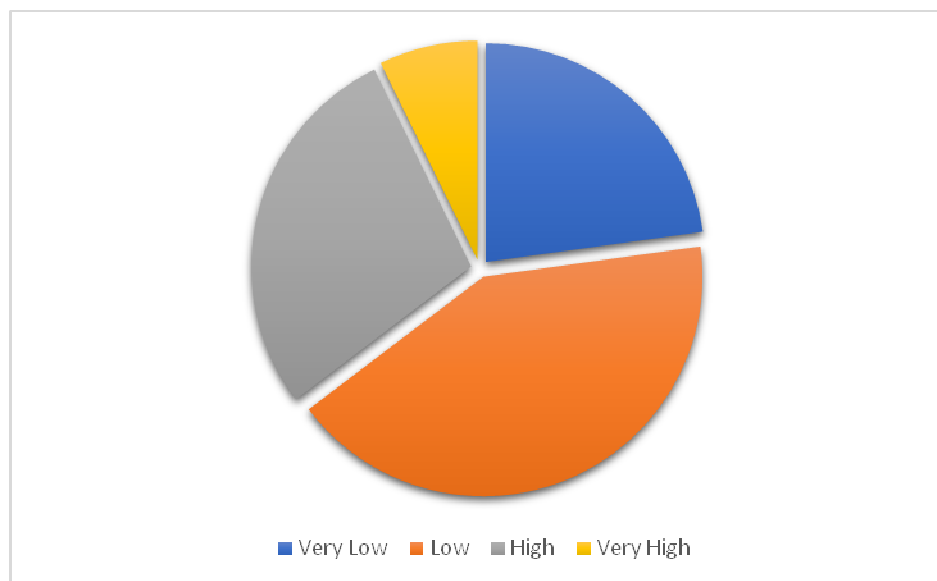
This link to inputs drives production efficiency, culminating in increased income. This augmented financial capacity empowers farm households, granting them the purchasing power necessary to obtain a wider range of food items.

Figure 2 unveils a tapestry of perceptions among farmers concerning the effect of agricultural extension services on food access. The juxtaposition of minimal and high effect highlights the multifaceted nature of this dynamic.

Tare (2016), Bjornlund and Pittock (2017), Baiphethi and Jacobs (2019), and Raidimi and Kabit (2019) collectively emphasize the importance of addressing information gaps, effective knowledge packaging, market linkages, and input access to amplify the positive effect of agricultural extension services on food accessibility. This holistic perspective reinforces the notion that agricultural extension goes beyond mere knowledge transfer, it extends to creating an ecosystem that empowers farmers economically and transforms their access to a diverse range of food resources.



**Figure 1:** The type of agricultural extension services accessed by farm households in Abuja Source: Field Data Analysis, 2021.



**Figure 2:** Effect of agricultural extension services on their access to food security Source: Field Data Analysis 2021

**Highlight of the study**

The study described the socioeconomic profiles of farmers in the study area. It revealed that among the small-scale farmers, 10.3% had no formal education, 29.4% had only primary school education, 34.1% had completed secondary education, and 26.3% had

postsecondary education. The study determined the types of agricultural extension services accessed by farm households' in Abuja. The most sought-after extension services were those that facilitated the formation of local farmer groups, such as cooperative societies. This service was accessed by a significant majority of 83.2% of respondents. Other highly demanded services included

methods for deep placement of fertilizers (70.07%), farm input application (68.5%), and marketing information (68.2%). However, the least available service was the introduction of new crop varieties by agricultural extension agents, accessed by only 39.9% of respondents.

## Conclusion

This study provides significant insights into the complex dynamics surrounding the relationship between agricultural extension activities and farm household food stability in Abuja. The findings reveal that while the impact of these extension services on food stability was generally perceived to be minimal, the multifaceted challenges posed by various factors cannot be ignored.

Governmental and economic factors, encompassing policy frameworks and economic constraints, alongside natural factors such as climatic variability, were identified as major impediments to achieving optimal farm household food security. The interplay of off-farm factors, bio-human influences, and institutional and social-political determinants further contributed to the intricate web of challenges faced by these households' in their pursuit of food stability. However, amidst these challenges, some avenues of positive influence on food stability were discerned. The introduction of new animal breeds through the efforts of agricultural extension personnel demonstrated a significant positive impact. Likewise, the application of farm inputs, the adoption of fertilizer deep placement methods advocated by agricultural extension agents, and the effective control of weeds, pests, and plant diseases by dedicated field officers emerged as factors positively correlated with enhanced access to food stability. Importantly, these factors were found to hold statistical significance at the 5% level. It is noteworthy that the majority of beneficiaries from these agricultural extension services were young, literate males. This underscores the potential for targeted interventions to leverage the positive impact of these services on food stability, especially among specific demographic segments.

In conclusion, while the study highlights the limited effects of agricultural extension activities on immediate farm households' food stability in Abuja, it emphasizes the broader context within which these effects are situated. The intricate interplay of various factors, both inhibitory and facilitative, shapes the ultimate outcome of food security for these households'. The positive correlations observed in specific instances underscore the potential efficacy of well-directed interventions and strategies. Moving forward, a comprehensive approach that addresses not only agricultural extension but also the encompassing socio-economic, natural, and institutional dimensions will be pivotal in advancing the cause of

sustainable food stability for farm households' in this region.

## Recommendations

**Tailored and Personalized Extension Approaches:** To maximize the impact of agricultural extension services, it is recommended that these organizations adopt more personalized and detailed approaches. Recognizing the diversity among farmers in terms of education, age, gender, and needs, tailored guidance and support should be provided. By addressing individual circumstances and requirements, extension services can better cater to the specific challenges faced by various farmer segments, leading to improved outcomes in terms of food security.

**Diversification and Innovation:** The extension activities should encourage farmers to diversify their agricultural practices and embrace innovative methods. This could involve the introduction of new crop varieties, improved animal breeds, and modern agricultural techniques that are resilient to the challenges posed by natural factors and changing climatic conditions. Such diversification and innovation can contribute to increased food availability and stability for farm households'.

**Capacity Building and Knowledge Dissemination:** Empowering farmers with knowledge and skills is essential. Agricultural extension services should emphasize capacity building through training workshops, seminars, and hands-on demonstrations. By equipping farmers with the necessary tools to enhance productivity and manage challenges, agencies can foster self-reliance and ultimately bolster food security.

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