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Research Article

The effect of gender and educational status on small-scale farmers access to agricultural extension services in the north central Nigeria

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The study assessed the effect of gender and educational status on farmers' access to extension services in North Central Nigeria (Plateau, Kogi, Benue and Nasarawa States). A sample of 640 farmers (320 males and 320 females) was collected through a simple random technique while questionnaires were used for data collection. A three-way ANOVA was used for analysis. First, pooled data result showed that, irrespective of educational status and location, there was no significant difference in gender access to extension services. However, the mean responses indicated that the male farmers relatively accessed extension services more than their female counterparts. Second, irrespective of gender and location, the result showed that farmers' educational status did not significantly affect their access to extension services but farmers who had secondary education relatively accessed extension services more than those in other categories. Third, regardless of gender and educational status, the result indicated that there were significant locational differences in the farmers' access to extension services. The farmers in Kogi State significantly accessed extension services more than their counterparts in other states. Fourth, in some states, the result showed that access to extension services significantly depended on both gender and the educational status of the farmers. Generally, the grand mean response (1.72) showed that farmers' access to extension services was moderate. Finally, the paper concludes that farmers' educational status (regardless of gender) is not a major determinant of access to extension services in the study area.

Key words: Gender, educational status, extension services, small-scale farmers, agriculture

INTRODUCTION

Globally, agricultural extension is one of the sectors that has attracted both public and private interest because of its role in technology transfer to the end users (farmers). It is organised in different patterns across the world and as such scholars conceptualize it in different ways. For instance, Anderson (2007) defined agricultural extension as the entire set of organisations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods. In their own opinion, Van den Ban and Hawkins (1996) see it as a process involving the conscious use of communication of information to help people form sound opinions and make good decisions. Similarly, IFAD (2001) stated that it is a set of activities that involve communication, information, demonstration and technical training geared towards transforming and disseminating new technologies to farmers. All these concepts of agricultural extension indicate that it is a set of activities intended to bring about a sequence of outcomes among targeted clients. As an important aspect of agriculture, argued that an extension should be a primary tool for making agriculture and its related activities more effective and efficient in meeting the needs of farmers. stated that quality and effectiveness of extension services is one of the factors that will guarantee the sustainability of agricultural development.

With the above definitions, there is no doubt that the role of agricultural extension in the development of any nation cannot be over-emphasised. However, in Nigeria, there are strong feelings that the agricultural extension programme is not performing to capacity due to some constraints. affirmed that ineffective agricultural extension service in Nigeria was a major constraint to the performance of the agricultural sector. Some of the constraints include insufficient extension personnel, poor agricultural extension services delivery and limited interaction between researchers and extension agents (Daneje, Vosanka, and Undiandeye, 2010) and the inability of Nigerian Government to give agricultural extension programme the desired attention (Aremu, Kolo, Gana and Adelere, 2015). According to Aremu, et al. (2015), there was no policy in Nigeria to pave way and support large financial intervention for agricultural extension and farmer-education. Some of these problems have been lingering for a long time because stated that since the late 1990's, inadequate funding led to the virtual collapse of research and extension institutions that provided services to end-users. All

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these according to, strongly suggest that agricultural extension programme in Nigeria has been treated as a mere part of agriculture. Hence, it has failed to possess the expected operational autonomy needed for agricultural transformation.

The problems confronting agricultural extension service are not only visible in Nigeria because many scholars have tried to identify factors influencing extension service delivery in other countries. For instance, in the Democratic Republic of Congo, Ragasa, Ulimwengu, Randriamamonjy and Badibanga reported that the country failed to deliver knowledge and technologies to rural areas despite having one of the highest extension agent-to-farmer ratio and a pluralistic extension system. Petros, Nachimuthu, Atinikut, and Mohammed studied the challenges of extension service for rural poor and youth in Amhara Region of North Western Ethiopia. The report indicated that agricultural system in that area was still characterized by low level service delivery that was unable to transform the existing traditional system of agriculture to a modern one. This is line with the report from Government of Kenya (2010) which attributed low agricultural productivity in Kenya to inadequate research–extension–farmer linkages. All these corroborate the observation of FAO (2001) which revealed that, in many developing countries, wide adoption of research results by majority of farmers remains quite limited due to week extension services.

From the foregoing, there is no doubt that scholars have tried to explore the factors affecting agricultural extension service in different parts of the world. However, with these abundant evidence, hardly will you see any one simultaneously addressing the effect of gender and educational status on small-scale farmers' access to agricultural extension services in the north central Nigeria. Although, a similar study was conducted by Ajah (2013) in Abuja. this study was designed to cover six states (locations). The study, therefore, addressed the following questions: 1) Are there locational differences in farmers' access to agricultural extension services? 2) Irrespective of location and farmers' educational status, do male farmers have access to agricultural extension services more than their female counterparts? 3) Irrespective of gender and location of the farmer in the north central Nigeria, does educational status influence his/her access to agricultural extension services? 4) Regardless of location (state), do male and female farmers in each of the educational statuses differ in their access to extension services? 5) In each of the locations (states), does the educational status of a male or a female farmer affect his/her access to agricultural extension services? Providing answers to the above question is vital because several reports have highlighted the importance of gender and farmers' level of education in agricultural development. With respect to gender, Lambrecht, Vanlauwe and Maertens (2016) argued that issues about gender are rarely considered in the literature on agricultural extension and technology adoption. This call for attention because gender is essential in understanding the context in which agricultural development is being implemented in Nigeria as developing country. This is a fact because it deals with the social relationships between men and women and how these relationships are negotiated in the production of goods and services in the society. In their work in the Democratic Republic of Congo, Lambrecht, Vanlauwe, and Maertens showed that targeting both genders within a household can make agricultural extension programmes more cost effective. This underscores the importance of gender and corroborates Njuki, Parkins and Kaler who stated that it is crucial to attend to gender in agricultural extension because gendered inequalities contribute to global hunger and food insecurity. Farnworth and Colverson contended that there is little use in increasing extension services if men and women are not equally empowered to access agricultural information and make decisions about them. All these suggest the need to close gender gap in agricultural extension because if disparities between gender persist, World Bank stated that sustainable and equitable development would be undermined. On education, Nwaru stated that education and training help to unlock the natural talents and inherent enterprising qualities of farmers, enhance their abilities to understand and assess new production techniques. Exposure to education enhances farmers' ability to make accurate and meaningful production decisions. This is possible because in India, found that a minimum threshold level of education significantly influenced the adoption of modern varieties of paddy and the farm productivity of adopters and reported that a 1% increase in education led to a 0.7% increase in total factor productivity of cassava farmers in the positive direction. In Malawi, Ferreira stated that there was a significant and positive correlation between educational attainment and agricultural productivity. On average, according to the report, an extra year of education was associated with approximately 1.0% increase in yields when inputs are controlled and 3.0% when they are not controlled. From the forgoing, there is no doubt that education plays significant roles in agricultural development hence the need to determine if male and female farmers in different educational categories access extension services differently in different locations in the North Central Nigeria [1].

OBJECTIVES OF THE STUDY

The main objective of the study is to assess the effect of gender and educational status on small-scale farmers' access to agricultural extension services in the North Central Nigeria. The specific objectives are to determine:

1.If the gender of a farmer affects his/her access to agricultural extension services irrespective of his/her educational status in the North Central Nigeria.

2.The effect of farmers' educational status on access to agricultural extension services irrespective of gender in the North Central Nigeria.

3.If farmers' access to agricultural extension services depends on the location (State) where they operate irrespective of gender and educational status.

4.If there is significant interaction effect of gender and educational status on farmers' access to extension services.

5.If there is significant interaction effect of gender, location and educational status on farmers' access to extension services.

METHODOLOGY

The study was conducted in the North Central Nigeria. The zone is made up of Abuja (the Federal Capital Territory), Nassarawa, Kogi, Benue, Kwara, Niger and Plateau States. Out of the seven States, Plateau, Kogi, Benue and Nasarawa States were purposively selected for the study. Simple random sampling technique was used to select a total 400 farmers from each of the four states giving a total of 1600 farmers (respondents). Data collection were done through the help of agricultural extension agents who served as enumerators in their respective states. In the questionnaires, the farmers were asked to rate their level access to agricultural extension services using very highly accessible (4), highly accessible (3), moderately accessible (2), fairly accessible (1), not accessible (0). After data collection, the questionnaires were sorted into the following eight (8) categories: 1) male farmers who had no formal school education (20), 2) female farmers who had no formal school education (20), 3) male farmers who had primary school education (20), 4) female farmers who had primary school education (20), 5) male farmers who had secondary school education (20), 6) female farmers who had secondary school education male farmers who had post-secondary school education (20). This gave a total of 160 per state and 640 respondents (320 males and 320 female) for the four states (20 x 8 x 4 = 640). Note that 20 respondents were the

maximum that could be realized to get equal sample for each of the 8 categories in each state. This helped to reduce the biasness that could have arisen from unequal sample size. The rating scores were used for analysis in line with methods applied by Ajah and Atewamba (2018), Ajah and Okorie (2016), Colin and Paul (2011), and Shah and Madden (2004). SPSS 16.0 was used for data analysis and mean separation was done using Bonferroni model (Field, 2005) at 5% probability level. A three-way analysis of variance (ANOVA) (Field, 2005) was used for the analysis and it is expressed mathematically [2].

RESULTS AND DISCUSSION

ANOVA Results of the small-scale farmers' access to Agricultural extension services

Table 1 shows the results of the three-way analysis of variance (ANOVA) carried out to determine the effect of gender and educational status on small-scale farmers' access to agricultural extension services in the North Central Nigeria. The first, second and third rows of the ANOVA table contain the effect of location (State), gender and educational status on the farmers' access to agricultural extension services respectively. Rows 6 contains the interaction effect of gender and educational status while row 7 has the interaction effect of location, gender and educational status on the farmers' access to extension services. Only these results are interpreted here because they cover the objectives of the study. This is one of the advantages of using a three-way ANOVA in analysis because it breaks down results into sources of variation. For a comprehensive understanding of the results, mean separation was carried out and results presented in Figures 1-.8.

Table 1. ANOVA results of small-scale farmers' access to agricultural extension services.

Sources of variation	Df	SS	MS	F-cal	P-value
Location (State)	3	239.79	79.93	68.9	0
Gender	1	0.56	0.56	0.49	0.49
Educational status	3	3.84	1.28	1.11	0.35
Location (State)*gender	3	5.83	1.94	1.68	0.17
Location (State)*educational status	9	20.19	2.24	1.94	0.04
Gender*educational status	3	1.86	0.62	0.53	. 66
Location*gender*educational status	9	20.03	2.23	1.92	0.04

Effect of location (state) on small-scale farmers' access to agricultural extension

In the study, it was premised that the location of a farmer, irrespective of his/her gender and educational status, will affect his/her access to agricultural extension services. This led to a pooled data analysis comparing one state to another regardless of gender and educational status. Hence, the question is: Are there locational differences in the farmers' access to agricultural extension services? On this, we test the hypothesis which states that there is no significant locational differences in the farmers' access to extension services in the North Central Nigeria. The result, $F(3, 608) = 68.90$, $P = .00$, indicated that there was significant ($p < .01$) locational differences hence the rejection of the null hypothesis (Table 1). This is in line with the apriori expectation because the socio-cultural and political environment in the states where the farmers operate are not the same. For example, the mean separation in Figure 1 showed that farmers in Kogi State significantly accessed agricultural extension services more than their counterparts in other states. This, to an extent, shows that some states in Nigeria pay more interest in agricultural extension programme than others. The locational differences in access to agricultural extension services may also be attributed to the educational status of the farmers in Kogi State because Ibitoye and Onimisi (2013) stated that their level of education was high. The low access to agricultural extension services in Benue State may be attributed to farmer-herder conflicts which Aderinto and Achem (2019) argued was a major threat to the survival of citizens in that State including crop farmers.In such situation, no extension agent will like to risk his/her life going to interact with farmers in a very volatile area.

presented in Table 1. This is a pooled data analysis comparing access to extension services by farmers in different educational categories using responses from the four states but without reference to gender. Here, the question is: Irrespective of gender and location (state), does educational status influence farmers' access to agricultural extension services? In this regard, we test the hypothesis which states that the educational status of a farmer does not influence his/her access to agricultural extension services. The result, $F(3, 608) = 1.11$, $p = .35$, showed that the farmers' educational status does significantly ($p > .05$) affect their access to agricultural extension services hence the acceptance of the null hypothesis. In other words, farmers' level of education is not a major determinants of their access to agricultural extension services in the study area. This agrees and consolidates the report by Ajah (2013) which indicated that farmers' level of education was not a major determinant of access to agricultural extension services in Abuja, Nigeria. Remarkably, the mean response (1.81) in Figure 3 showed that farmers with secondary school education had more access to agricultural extension services than those in other categories while farmers who had no formal school education had the least (Mean=1.63). This is contrary to apriori expectation because it was expected that farmers with post secondary school education will have access to agricultural extension services more than others. This was expected because

Nwachukwu (2005) argued that high literacy level is a fertile ground for extension work as education helps the farmers to access information among other things. Similarly, Garba (2011) observed that farmers' educational level and membership of organization highly correlated with the adoption of improved technologies [3].

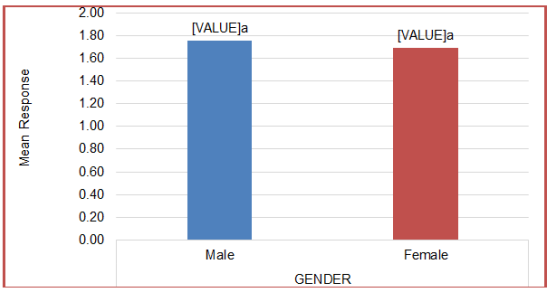

Figure 1: Farmers' rating of access to extension service by gender (pooled data)

Effect of gender on small-scale farmers' access to

Agricultural extension

The result of the effect of gender on small-scale farmers' access to agricultural extension is shown in Table 1. This is a pooled data analysis comparing male and female farmers' access to extension services using responses from the four states and without reference to educational status. The question, therefore, is: Irrespective of location and farmers' educational status, do male farmers have access to agricultural extension services more than their female counterparts? Answering this question led to the test of hypothesis which states that there is no significant difference in gender access to extension services in the study area. The results, $F(1, 608) = 0.49$, $p=49$, showed that there was no significant difference ($p>0.05$) in the male and female farmers' access to agricultural extension services hence the null hypothesis was accepted. Although, there was no significant difference in gender access to agricultural extension services, the mean response indicated that the male farmers slightly accessed extension services more than their female counterparts. This tallies with a similar finding by which showed that there was no significant difference in gender access to agricultural extension services in Abuja Nigeria. This is contrary to apriori expectation because available evidence, indicated that women are margined in access to agricultural extension services. Educational status affect gender access to extension services across the state. The mean response (Figure.4) showed that there were marginal differences is in gender access to extension services in each educational status. This consolidates the tests the hypothesis which states that there is no significant interaction effect of gender

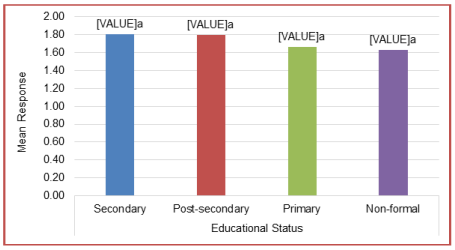

Figure 2. Farmers' rating of access to extension service by educational status (pooled data).

Comparing gender access to extension services in each of the educational statuses

The result of the interaction effect of gender and educational status on farmers' access to extension services is presented in Table 1. It shows how the male and female farmers in each of the educational statuses rated their access to extension services across the states (pooled data analysis). The question is: Regardless of location (state), do male and female farmers in each of the educational statuses differ in their access to extension services? It tests the hypothesis which states that there is no significant interaction effect of gender and educational status. The result, $F(3, 608)=0.53$, $p=66$, shows there is no significant interaction effect of gender and educational status on farmers' access to extension services hence the acceptance of the null hypothesis. In other words, there is no statistical evidence to show that farmers' finding in Figure 3 which accessed the effect of educational status on access to extension service. The result is encouraging because Lambrecht, Vanlauwe, stated that targeting male and female farmers within a household has the potential to make agricultural extension programmes more cost effective. Similarly, the finding also supports the view of Farnworth and who argued that extension services is of little use if male and female farmers are not given equal opportunities to access information and make use of them in their production decisions.

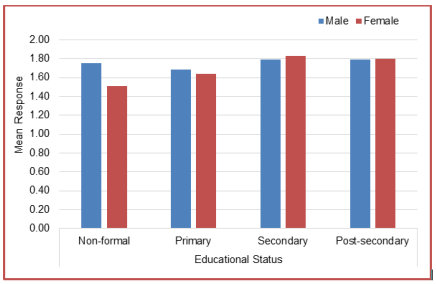

Figure 3: Gender access to agricultural extension service in each educational category.

Comparing farmers' access to agricultural extension services in each state

The result of the interaction of gender, location and farmers' educational status is shown in Table 1. Here, the analysis is not based on pooled data bot rather responses from each location (state) were analyzed to reflect gender and educational status. In this regard, the question is: In each of the locations (states), does the educational status of a male or a female farmer affect his/her access to agricultural extension services? It tests the hypothesis which states that there is no significant interaction effect of location, gender and educational status on farmers' access to extension services. The result, $F(9, 608) = 1.92$, $p = .04$, indicates that there is significant interaction effect of location, gender and educational status on farmers' access to extension services. This finding agrees with Ajah (2013) which showed that there was no significant interaction effect of gender, location and educational status on farmers' access to extension services. Based on the result, mean separation was done and are presented in Figures 5 - 8. First, for farmers with no formal school educations, the results of the mean separation showed that there was no significant difference in gender access to agricultural extension services in

Plateau (Figure.5), Kogi (Figure.6) and Nasarawa States. But, on the contrary, male farmers in Benue State (Figure.6) significantly accessed extension services more than their female counterparts. Second, looking at the farmers that had primary school education, the results showed that there was no significant ($p > .05$) difference in gender access to extension services in all the states. However, there were marginal differences in gender access to extension services. Third, we discuss farmers who had secondary school education and the results indicated that there was no significant difference in gender access to agricultural extension services in Plateau (Figure.5), Benue (Figure.6) and Nasarawa (Figure. 8) States. But, in Kogi State (Figure.6), the female farmers significantly accessed extension services more than their male colleagues. Fourth, we look at access to extension services by farmers who had post-secondary school education. The results of the mean separation showed that there was no significant difference in gender access to agricultural extension services in in all the states [4].

However, there were marginal differences in gender access to extension services with the male and female farmers having comparative advantages in some states. The observed marginal differences in access to agricultural extension services by male and female farmers in the same educational status is a clear indication that education is not a major determinant of farmers' access to extension services. The relative differences in access to extension services for farmers in the same educational category within the same state may be attributed to the interest the farmer pays to extension education. Again, it may be due to

cultural norms in the study area because Thamaga–Chitja and stated that the patriarchal nature of rural societies regarding women as minors under the authority of men denies women direct access to agriculturally productive resources. The magnitude of the mean responses in some states showed that farmers' access to extension service is low [5].

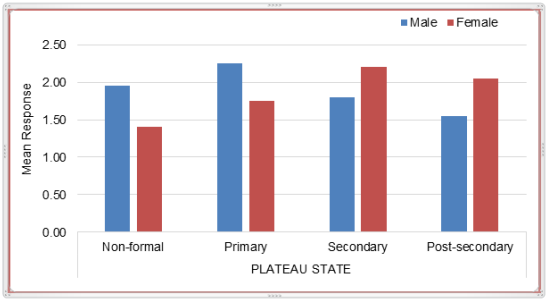

Figure 4: Gender access to agricultural extension service in each educational category.

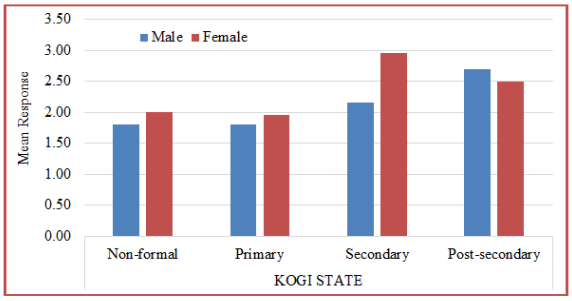

Figure 5: Gender access to agricultural extension service in each educational category.

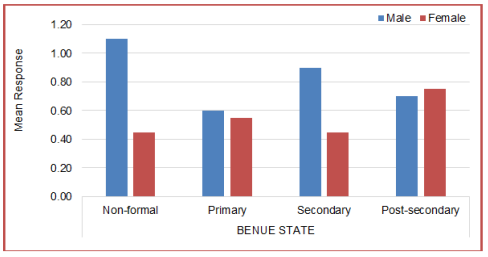

Figure 6: Gender access to agricultural extension service in each educational category.

CONCLUSION

Naturally, it a fact that variables that affect farmers' access to agricultural extension services act either in isolation or jointly to influence farmers' behaviour. Against this backdrop, the study assessed the effect of gender and educational status on small-scale farmers' access to extension services in the north central Nigeria. First, the finding showed that irrespective gender and educational status, some states in the north central Nigeria provided agricultural extension services to their farmers more than others. In this regard, the government in the less performing states should see it as a challenge and step-up extension services to the farmers. This will not only encourage the farmers to work hard but also help them to increase food production and improve food security in Nigeria. Second, the study cleared some air on the issue of male dominance in access to agricultural extension services as the findings strongly suggested that agricultural extension agents in the north central Nigeria performed their duties with fairness to gender. In fact, the finding showed that female marginalization as widely speculated by feminist and gender scholars in access to extension services is diminishing in the study area. Third, farmers' educational status does not guarantee gender dominance in access to extension services because in some states, male and female farmers with no formal school education accessed extension services more than their counterparts that had post-secondary.

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