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Full Length Research Paper

Impacts of gender and farmers' level of education on access to agricultural extension services in Abuja, Nigeria

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The study examined the impacts of gender and farmers' level of education on access to agricultural extension services in Abuja. A purposive technique was adopted for sample selection while semi-structured questionnaires were used for data collection. A sample of 80 rural male and female farmers who had post secondary, secondary, primary and no formal school education were used for the study. In each of the four educational categories, 10 male and 10 female farmers were selected. Two-way analysis of variance was used for data analysis and results indicated that irrespective of education, there was no significant difference ($p > 0.05$) in gender access to agricultural extension services. But, the mean response (3.03) indicated that female farmers had slightly more access to agricultural extension services than their male counterparts (2.98). Similarly, irrespective of gender, there was no significant ($p > 0.05$) effect of farmers' level of education on access to agricultural extension services. Remarkably, farmers who had no formal school education had more access (3.40) to agricultural extension services than farmers who had at least primary school education. Furthermore, there was no significant ($p > 0.05$) interaction effect of gender and education on farmers' access to agricultural extension services. Based on the findings, the paper concluded that gender and level of education were not major determinants of farmers' access to agricultural extension services in the study area.

Key words: Agricultural extension services, no formal school, primary school, secondary school, post secondary school.

INTRODUCTION

In Nigeria and, indeed, other parts of the world, agriculture is one of the economic sectors that plays multiple roles. First, apart from crude oil, it is one of the major contributors to the Gross Domestic Product (GDP) (NBS, 2012). Second, it is the major employer of labour because it employed about 70 to 80 percent of her population (Okolo, 2004; Ugwu and Kanu, 2012). Third, it is the major source of food for her teaming population (Dayo et al., 2009) and feed for her livestock animals. Fourth, it is the major source of raw materials for her growing industries (Okolo, 2004). Based on the above roles, there is no doubt that agriculture is very strategic in the survival of Nigeria as a nation and should not be toiled with. One of the most important agricultural sub-sectors is agricultural extension services. It is very important because it is charged with the responsibility of transferring agricultural technologies from the developers to the farmers – male or female, literate or illiterate, young or old. According to Anderson (2007), agricultural extension can be defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods.

The above definition reflects the importance of agricultural extension services in our society but there are strong feelings that the gender of a farmer and his/her level of education affect access to agricultural extension services. Some scholars (Okojie, 1991; Sokenu, 1993 and Dunmede, 1990) believe that women are marginalized in terms of access to agricultural extension services compared to their male counterparts. A study by Imoh and Nwachukwu (2009) showed that only 23 percent of the female farmers were visited once in a month against 54 percent of males in Ebonyi State, Nigeria. A survey conducted by FAO (1998) indicated

that female farmers received only 5 percent of all the agricultural extension services world-wide and only 15 percent of the world's extension agents were women. In addition, many agricultural projects according to Bambarger (1994) are designed on the assumption that the male household head is the main agricultural worker and decision-maker and consequently, most technical assistance and productive inputs according to the author are directed towards the male members of the households. Some of these observations have formed the bases for gender debate in agriculture and have provoked a lot of research and arguments in Nigeria and other developing countries of the world.

Apart from the gender of the farmer, education is always pinpointed as one of the major contributory factors (Stedham and Yamamuru, 2002) affecting access to agricultural extension services in the society. This is so because it is believed that male farmers are more educated than the female farmers. Based on this perceived inequality in education between male and female farmers, there is an apparent consensus that female farmers are marginalized in terms of access to agricultural extension services and other productive resources. The feeling of marginalization becomes more pronounced when you consider the impact of education on human development. For instance, a study conducted by Nambiro, Omiti and Mugunieri (2006) in Kenya indicated that the literacy status of a household's head had a significant impact on the likelihood of receiving demand-induced extension services. In addition, the result further showed that the educational level of a household's head was positively and significantly related to the probability of an extension visit. Similarly, the findings by Ukoha, Okoye and Emetu (2010) showed that a 1 percent increase in extension contact led to a 0.3 percent and 0.7 percent in total factor productivity of cassava farmers in the positive direction. Similar report by Mejeha and Nnana (2010) indicated that education will give people opportunities to have access to institutional related services like loans, extension services and information which are relevant to farmers. This is possible because education enhances farmers' capacity to appreciate and comprehend the use of modern farm technologies that enhance output and income (Okwuokenye and Onemolease, 2010). Better education according to Okoye et al, (2008) would lead to improved access to knowledge and tools that enhance productivity. The above findings suggest that educated farmers are likely to have access to agricultural extension services than non-educated farmers.

Since access to agricultural extension services is a crucial factor in agrarian transformation, there is every need to determine the impact of gender and farmers' level of education on access to agricultural extension services. This is very vital because the challenge to improve agricultural extension in Nigeria has attracted the attention of many scholars, government and non-governmental organizations including the World Bank. Their efforts should be complemented by identifying the factors that affect farmers from reaping the full benefits of scientific innovations and causing inequality in gender relations. The findings shall as well provide non-governmental organizations, planners, policy-makers and agricultural extension staff with updated information on gender access to agricultural extension services in Abuja, Nigeria. In addition, it will serve as a reference point to gender scholars who are seeking for empirical evidence on the impact of gender and education on farmers' access to agricultural extension services.

OBJECTIVES OF THE STUDY

The broad objective of the study is to determine the impacts of gender and farmers' level of education on access to agricultural extension services in Abuja, Nigeria. Specific objectives are to:

1) Determine the impact of gender on access to agricultural extension services.
2) Determine the impact of farmers' level of education (no formal school education, primary school education, secondary school education and post secondary school education) on access to agricultural extension services.
3) Determine the interaction effect of gender and farmers' level of education on access to agricultural extension services in the study area.

HYPOTHESES

1) Ho: There is no significant effect of gender on access to agricultural extension services.
2) Ho: There is no significant effect of farmers' level of education on access to agricultural extension services.
3) Ho: There is no significant interaction effect of gender and education on farmers' access to agricultural extension services.

RESEARCH METHODOLOGY

This study was conducted in Abuja, Nigeria which is located between latitudes 8°25` and 9°25` N and longitudes 6°45`and 7°45` E. The population for the study comprised 80 rural farmers made up of 10 males and 10 females who had no formal school education, 10 males and 10 females who had primary school education, 10 males and 10 females who had secondary school education, and 10 males and 10 females who had post secondary school education. The above combinations gave 8 different farmer-categories (the 8 treatment combinations). To access these categories of farmers, a purposive technique was adopted for sample selection while semi-structured questionnaires were used for data

collection. The sampling was done in the four (4) agricultural zones in Abuja - namely, central, eastern, northern and western with 12 agricultural blocks and 93 cells. The two independent factors studied are gender and educational status of the farmers while the dependent variable is access to agricultural extension services. Gender has two levels (male and female) while educational status has four (4) levels (no formal school education, primary school education, secondary school education and post secondary school education). The combination gave a 2x4 mixed factorial analysis of variance with 8 treatment levels (the 8 farmer-categories). This is an independent measure ANOVA (Andy, 2005; Gray and Kinnear, 2011) and it is mathematically expressed as:

$$Y_{jj} = \mu + G_i + E_i + GE_{ij} + e_{ij}$$

Where:

Y_{ij} = Individual farmer's access to agricultural extension services

μ = General mean

G_i = Refers to the effects of gender on access to agricultural extension services

E_j = Refers to the effects of farmers' level of education (no formal education, primary school, secondary school and post secondary school education) on access to agricultural extension services.

GE_{ij} = Refers to the interaction effects of gender and education on access to extension services

e_{ij} = error term

By interpretation, the model states that a farmer's access to agricultural extension services (Y_{ij}) depends on the gender of the farmer, that is, whether the person is a male or female farmer (G_j); the educational status of the farmer (E_i); and the interaction effect of gender and farmers' level of educational (GE_{ij}). The μ is the population mean (constant) and it is the grand mean of the scores empirically obtained and thus does not contribute to any variation in the observed differences (Aggarwal, 2002) while e_{ij} is the error term. In the questionnaires, the different farmer-categories were asked to state their level of access to agricultural extension services with the following options: very highly accessible = 4; highly accessible = 3; fairly accessible = 2; very low access =1 and not accessible at all = 0. The responses were used for data analysis in line with the method adopted by David (2004), Fredrick and Wallnau (2004), Shah and Madden (2004), Andy (2005), Gray and Kinnear (2011) and Ajah (2012). SPSS 15.00 was used to run the analysis and it was tested at 5% probability level. The socio-economic characteristics of the respondents captured during data collection include: age (years), years of farming experience (years), literacy status and household size which is defined by NPC (2006) as a person or group of persons living together usually under the same roof or in the same building/compound, who share the same source of food and recognize themselves as a social unit with a head of household.

RESULTS AND DISCUSSION

Table 1 shows the analysis of variance (ANOVA) results of the farmers' access to agricultural extension services in Abuja, Nigeria. The "gender" row of the ANOVA table shows the effects of gender on access to agricultural extension services (the main effects of gender). The result, $F(1, 72) = 0.07$, $p = 0.70$, indicated that there was no significant difference ($p > 0.05$) in the mean responses of the male and female farmers regarding access to agricultural extension services in the study area. This implies that irrespective of the farmers' level of education, access to agricultural extension services was perceived the same by both the male and female farmers. The result is contrary to apriori expectation because it was expected that irrespective of education, the male farmers should have more access to agricultural extension services than the female farmers. The fact that there is no significant difference in gender access to agricultural extension services could be attributed to the gradual dismantling of the biased assumptions and underlying misconceptions about gender and agriculture in our society (Iheke and Nnana, 2008), Again, the "educational status" row of the ANOVA table revealed the effects of farmers' level of education on access to agricultural extension services (the main effects of education). The result, $F (3, 72) = 1.10$, $p = 0.36$ showed that irrespective of gender, there was no significant difference ($p > 0.05$) in the effects of farmers' level of education on access to agricultural extension services. This result is also contrary to apriori expectation because it was expected that irrespective of gender, farmers who had post secondary school education should have more access to agricultural extension services than those who had, at most, secondary school education. Farmers who had post secondary school education were expected to have more access to agricultural extension services because reports by many authors (Nwaru, 2007; Otunaiya and Akinleye 2008 and Abdulsalam, Yaro and Alobo (2010). suggest that educated farmers are in a better position to access farm production resources including agricultural extension services more than non-educated farmers. Furthermore, the "gender*education" row of the ANOVA table shows the result of the interaction effects of gender and farmers' level of education on access to agricultural extension services. The result, $F (3, 72) = 0.60$, $p = 0.62$, indicated that there was no significant ($p > 0.05$) interaction effects of gender and farmers' level of education on access to agricultural extension services. The result of the interaction of gender and farmers' level of education shows that belonging to any of the eight farmer-categories was not a major determinant of farmers' access to agricultural extension services in the study area. This is contrary to the

Table 1. ANOVA results of the farmers' access to agricultural extension services.

Sources of Variation	Df	SS	MS	F-cal	*P*-value	Sig
Gender	1	0.05	0.05	0.07	0.70	NS
Educational status	3	2.30	o.77	1.10	0.36	NS
Coop membership*Education	3	1.25	0.42	0.60	0.62	NS
Error (between factor)	72	50.40	0.70			
Total	**79**	**54.00**				

Source: Survey data, 2012

Table 2. Farmers' mean responses on access to agricultural extension services.

	Gender		Row mean
Educational status	**Male farmer**	**Female farmer**	**total**
No formal education	3.40	3.10	3.25
Primary school	2.60	3.00	2.80
Secondary school	3.00	3.10	3.05
Post secondary school	2.90	2.90	2.90
Column mean total	**2.98**	**3.03**	**3.00**

Source: Survey data, 2012

findings of Imoh and Nwachukwu (2009) which showed that male farmers had more access to extension services than the female farmers in Ebonyi State although, the authors did not apply inferential statistics to see if significant differences exist. The result of the interaction effects can be justified because access to information communication technologies (ICT) especially, GSM and the existence of multiple social groups in our society have contributed in reducing gender gaps in different areas. Moreover, the study was conducted in the rural communities in Abuja where a lot of government intervention programmes in agriculture are taking place.

Table 2 shows the farmer-categories' mean responses on access to agricultural extension services. Irrespective of education, the mean responses for both the male and female farmers were 2.98 and 3.03 respectively. Although the mean values are not significantly different, it is clear that the female farmers had relatively more access to agricultural extension services than their male counterparts. This result is contrary to the findings of Durno and Stuart (2005) which showed that male farmers had more access to agricultural extension services than female farmers. On the other hand, the mean responses indicated that irrespective of gender, farmers who had no formal school education, had relatively more access to agricultural extension services than farmers who had at least primary school education. This may be attributed to the fact that most of the farmers with, at least, primary school education do not have agriculture as their main occupation and hence may not be interested in agricultural extension services. Farmers who had no formal school education rely mainly on agriculture for their livelihood hence they may have expressed more interest in agricultural extension services than their educated counterparts. This is a fact because Espig (1992) argued that farmers abandon farming as their level of education rises and this, of course, may have contributed to the educated farmers having less access to agricultural extension services. Looking at Table 2, it is remarkable to note that male farmers who had no formal school education had more access (3.40) to agricultural extension services followed by the female farmers who had no formal school education (3.10), female farmers who had secondary school education (3.10), female farmers who had primary school education (3.00), male farmers who had secondary school education (3.00), male and female farmers who had post secondary school education (2.90) and male farmers who had primary school education (2.60). Based on the mean response values, it is clear that male farmers who had no formal school education had more access (3.40) to agricultural extension services while male farmers who had primary school education (2.60) had the least access. The mean responses of the male and female farmers who had post secondary school education were approximately the same compared to the mean responses of the male and female farmers in other educational categories.

Table 3 shows the socio-economic characteristics of the farmers. The age distribution of the farmers indicated that both the male and female farmers were within the age group of 31 – 40 years. Psychologically, farmers in this age group can easily learn from agricultural extension agents because the cognitive, affective and psychomotor domains of the farmers are still active. Greater proportion of the male (97.50%) and female (70.00%) farmers were married but the distribution of the

Table 3. The socio-economic characteristics of the farmers.

Socio-economic characteristics	Male farmers		Female farmers		Pooled data	
	Freq	%	Freq	%	Freq	%
Age (years)						
≤ 20	0	0.00	0	0.00	0	0.00
21 – 30	3	7.50	9	22.50	12	15.00
31 – 40	16	40.00	18	45.00	34	42.50
41 – 50	13	32.50	8	20.00	21	26.25
> 50	8	20.00	5	12.50	13	16.25
Total	**40**	**100**	**40**	**100**	**80**	**100**
Household size (number of persons/household)						
1 – 2	1	2.50	1	2.50	2	2.50
3 – 4	1	2.50	3	7.50	4	5.00
5 – 6	11	27.50	16	40.00	27	33.75
7 – 8	10	25.00	11	27.00	21	26.25
> 8	17	42.50	9	22.50	26	32.50
Total	**40**	**100**	**40**	**100**	**80**	**100**
Years of farming experience (years)						
1 – 10	4	10.00	19	47.50	23	28.75
11 – 20	12	30.00	16	40.00	28	35.00
21 – 30	15	37.50	4	10.00	19	23.75
> 30	9	22.50	1	2.50	10	12.50
Total	**40**	**100**	**40**	**100**	**80**	**100**
Marital status						
Married	39	97.50	28	70.00	67	83.75
Separated	0	0.00	1	2.50	1	1.25
Divorced	0	0.00	2	5.00	2	2.50
Single	1	2.50	1	2.50	2	2.50
Widow	0	0.00	8	20.00	8	10.00
Cooperative membership						
Yes	28	70.00	11	27.50	39	48.75
No	12	30.00	29	72.50	41	51.25
Total	**40**	**100**	**40**	**100**	**80**	**100**

Source: Survey data, 2012

marital status indicated that it is relatively easier to find female farmers who are separated, divorced, widowed or single than male farmers in the study area. This is probably because most of the male farmers marry more than a wife (polygamy) or re-marry if there is any problem resulting in divorce or death of their wives. Looking at the years of farming experiences, the result showed that most (37.50%) of the male farmers had between 21 - 30 years of farming experience while greater proportion of the female farmers (47.50%) had between 1 - 10 years of farming experiences. This shows that both the male and female farmers had enough farming experiences that could aid positive transfer of learning. Furthermore, the distribution of the farmers based of cooperative membership showed that majority (70.00%) of the male farmers were members of cooperative societies while only 27.50% of the female farmers were members of cooperative societies.

CONCLUSION

The study was conducted in Abuja, Nigeria and the main objective was to determine the impacts of gender and farmers' level of education on access to agricultural extension services. The two factors (gender and education) were chosen because it was believed that they can act in isolation or interact to influence farmers' access to agricultural extension services hence the use of two-way independent factorial analysis of variance. The findings showed that irrespective of the farmers' level of education, there was no significant difference in the male and female farmers' access to agricultural extension services (the main effect of gender). Again, the result also indicated that irrespective of gender, the farmers' level of education did not significantly influence their access to agricultural extension services (the main effect of education). In addition, the result also revealed that there

was no significant interaction effect of gender and farmers' level of education on access to agricultural extension services. Furthermore, based on pooled data, the socio-economic characteristics of the farmers showed that majority of the respondents were married with more than 4 persons per household; fell between the age limit of 31 - 40 years and had between 11 - 20 years of farming experience. Majority of the male farmers were members of cooperative societies while most of the female farmers were not members of cooperative societies. Based on the findings, the paper concluded that gender and farmers' level of education were not the major determinants of access to agricultural extension services in the study area. It was therefore recommended that the study should be replicated in other places to see if similar results exist.

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