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## **Effects of Farmers' Level of Education and Cooperative Membership on Access to Agricultural Extension Services in Abuja, Nigeria**

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### **ABSTRACT**

The study examined the effects of farmers' level of education and cooperative membership on access to extension services in Abuja. A purposeful technique was adopted for sample selection while semi-structured questionnaires were used for data collection. A sample of 240 farmers made up of 30 cooperative and 30 non-cooperative farmers who had no formal education, 30 cooperative and 30 non-cooperative farmers who had primary school education, 30 cooperative and 30 non-cooperative farmers who had secondary school education and 30 cooperative and 30 non-cooperative farmers who had post secondary school education were used for the study. Two-way analysis of variance was used for data analysis. Results indicated that there was no significant difference ( $p>0.05$ ) in cooperative and non-cooperative farmers' access to extension services but the mean responses indicated that cooperative farmers had, slightly, more access to extension services more than non-cooperative farmers. Similarly, farmers' level of education did not significantly affect ( $p>0.05$ ) access to extension services although, the mean response value for farmers who had no formal school education but were members of cooperative societies was higher compared with others. Furthermore, there was no significant ( $p>0.05$ ) interaction effect of cooperative membership and farmers' level of education on access to extension services. Based on the findings, the paper concluded that farmers' level of education and cooperative membership did not affect access to extension services.

**Key words:** Cooperative farmers, non-cooperative farmers, level of formal education, agricultural extension

### **INTRODUCTION**

Some decades ago, scientific agriculture was introduced in Nigeria. Since then, eighteen national agricultural institutes, three universities of agriculture, nineteen federal colleges of agriculture, eight faculties of veterinary medicine and about forty university faculties of agriculture were established all over the country to generate improved technologies for onward dissemination to farmers (ARCN, 2009). The evolution of the research institutes dates back to three periods of Nigerian history: the colonial period (1861-1959), the period of internal self government (1951-60) and the post-independent era (1960 to date) (Unamma, 2004). With the existence of these institutions, documented evidence (IITA, 2002; Nze, 2002) showed that some agricultural technologies that are compactable with farmers' agro-climatic and socio-cultural environment have been developed and are lying in the shelves of the research institutes. Apart from the availability of new agricultural inputs, IITA (2002) further stated that other research and development institutes in charge of agro-processing machines have developed a range of simple and efficient small-scale processing equipment. But due to the weakness in technology transfer, the processing

machines have remained largely with research institutes. Nnadozie and Nwaru (2002) also corroborated the report by adding that a number of appropriate technologies which can revolutionize rural problems in Nigeria are there in the shelves of many researchers and research institutions. In the same view Nze (2002) stated that research institutes have done well in the sourcing of agricultural technologies as well as improved agricultural inputs in all the components of agriculture. The implication of the above reports is that new agricultural technologies have been developed by research institutes and researchers but have not been effectively transferred to the farmers.

Since the inception of the research institutes, colleges and university faculties of agriculture and veterinary medicine, Nigeria has been in search for effective strategies for transferring the available farm technologies from their sources to the ultimate users- the farmers. The search resulted in the establishment of Agricultural Development Programme (ADP) by the Federal Government of Nigeria in 1975 (Oladele, 2004). The first generation ADPs started as enclave projects in Funtua, Gusau and Gombe in the then Kaduna, Sokoto and Bauchi States, respectively. The achievements by the enclave ADPs motivated the Federal Government of Nigeria to establish additional enclave ADPs at Ayangba, Lafia, Bida, Illorin, Ekiti-Akoko and Oyo North between 1979 and 1982 (Oladele, 2004; Akpobo, 2007). Presently, all the states in Nigeria have established ADPs for agricultural extension purposes. To effectively transfer agricultural technology to over 70% of her population who are farmers, Training and Visit Extension System which was based on diffusion model, was adopted (Benor and Baxter, 1984). The main aim of ADP is to ensure that information on new agricultural technologies reach the farmers-male or female. This role is very vital because farmers cannot successfully adopt a new technology unless they are aware of it and learn how to incorporate it into their farming business.

When one thinks or looks at the existence of ADPs in all the states of the federation, the research institutions and the colleges and faculties of agriculture in Nigeria, one is left with no option than to conclude that government has tried. But ironically, reports have indicated that agricultural technologies have not made much impact in agricultural development (Yahaya, 2003). In a study conducted by Agwu and Agada (2010) in Benue State, Nigeria, the authors reported that majority (73.3%) of the participants had no contact with the extension agents within one year. Only 16.7% had between one and three contacts with extension agents while 10.0% had between four and six visits within one year. This implies that most farmers in that state did not receive the necessary attention and support from the extension organization/agents. This confirmed the observation made by Ladele and Ayoola (2011) that the effects of various extension approaches adopted in Nigeria has not significantly transformed the agricultural and rural landscape. The authors further added that there are poor linkages and interaction in the entire research-extension-farmers systems which often resulted in the delivery of inappropriate technologies and subsequent low adoption by farmers. Similarly, Unamma (2004) stated that the spread of adoption of most of the technologies have been rather slow. This is discouraging and contrary to the studies conducted by Anderson and Feder (2004) and Nor and Madukwe (2002) which indicated that investment in extension has the potentials to improve agricultural productivity and increase farmers' incomes, especially in developing economies like Nigeria.

The problem of poor extension services to farmers is not only in Nigeria because reports from some other countries also confirm similar conditions. For instance, a study of the impact of Training and Visit Extension System in Kenya (Guatam, 2000) and Pakistan (Hussain *et al.* 1994) found no significant impact after a longer period of implementation. Many donors have also expressed

frustration in trying to reach the farmers. One of such frustrations was revealed in a statement made by Wharton (1983) which stated thus:

- If there is an area where we have been most unsuccessful, it has been the development of cost-effective and programme efficient models for the delivery of new scientific and technical knowledge to the millions upon millions of farm producers of the Third World. We know how to harness the creative and inventive forces of science and technology in the war on hunger but I submit that we still have not been fully successful in technology diffusion

The above statement by Wharton (1983) showed that agricultural technology generation is not the problem but dissemination. The inability of ADP to transfer agricultural technologies to farmers calls for concern because no matter how ideal an agricultural technology may be, it will not attain the desired result except it is transferred to the farmers who apply them in the farm for increased production. The challenge to improve agricultural extension services in Nigeria has attracted the attention of many scholars, government and non-governmental organizations, especially the World Bank resulting in the conduct of many researches to improve the situation.

Since agricultural extension services have been widely accepted as a vital input in agricultural and rural development particularly, in an agrarian economy like Nigeria, there is every need to identify the variables that effect farmers from reaping the benefits of scientific innovations. Hence, the main objective of this study is to determine the effects of formal education and cooperative membership on farmers' access to agricultural extension services in Nigeria. The two variables were chosen because there is an apparent consensus that they can influence the behaviour of an individual farmer towards change. For instance, in a study conducted by Igwe *et al.* (2009) on the determinants of the women's access to credit in Abia State Nigeria, it was reported that farmers who were members of cooperative societies had more access to credit than non-cooperative farmers. In a similar study in Abia State, Ibezim *et al.* (2010) stated that there was significant difference in the income and output of cooperative and non-cooperative farmers. The mean income and output of the cooperative farmers was found to be higher than that of the non-cooperative farmers. Findings by Agbo (2009) in Enugu State in Nigeria revealed that about 60.5% of the respondents who belonged to cooperative societies got various sums of money as credit through their cooperatives. Specifically, the author stated that 14.52% of the respondents reported that they bought farm inputs at subsidized prices while 25% were assisted by the cooperatives to sell their farm produces. Other authors like Adeyemo (1994) and Holloway *et al.* (2000) also reported that cooperative farmers performed better than non-cooperative farmers in their business.

On education, Nwaru (2007) stated that it helps to enhance farmers' abilities to understand and evaluate new production techniques. Exposure to education according to Otunaiya and Akinleye (2008) will increase farmer's ability to obtain process and use information relevant to the adoption of improved agricultural technologies. Also, Ballara (1991) added that education helps people to acquire knowledge, make better use of natural resources and protect the environment. The author further added that it facilitates a change in attitude that encourages increased production. According to Imonikhe (2010), education enhances farmers' ability to make accurate and meaningful management decisions. This is possible because Abdulsalam *et al.* (2010) stated that the level of education of a farmer is an important factor that determines his/her ability to understand policies or programmes that affect farming, Empirical evidence attests to the fact that education has impact on agriculture. For example, Ironkwe *et al.* (2009) stated that educational

status was positively and significantly related to cassava production at 5% alpha level. In another study, Ukoha *et al.* (2010) reported that a 1% increase in education would lead to a 0.7% increase in total factor productivity of cassava farmers in the positive direction. Again, in a study conducted Ballara (1991), the author reported that four years of primary education, increased productivity by 7.4% with additional benefits in the form of increased modernization of agricultural production incentives, marketing facilities, distribution of seeds and fertilizers and adequate access to extension programmes. In the analysis of Brood-and-Sell Broiler Enterprise in Enugu State, Nigeria, Ezeibe (2011) also observed that the level of formal education had positive and significant effect on the output. Similar findings by Okoronkwo *et al.* (2009) also indicated that positive relationship exists between education and yam output although the effect according to the author was not significant ( $p>0.05$ ). From the forgoing, there is no doubt that cooperative membership and formal education can affect farmers' access to agricultural extension services hence the study.

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

- Determine the effect of cooperative membership that is, the effect of being a cooperative or non-cooperative farmer on access to agricultural extension services
- Determine the effect of farmers' level of education (no formal school education, primary school, secondary school and post secondary school education) on access to agricultural extension services
- Determine if cooperative membership and farmers' level of education interact to affect farmers' access to agricultural extension services

## **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: (1) farmers who had no formal school education but were members of cooperative societies, (2) farmers who had primary school education and were members of cooperative societies, (3) farmers who had secondary school education and were members of cooperative societies, (4) farmers who had post secondary school education and were members of cooperative societies, (5) farmers who had no formal school education and were not members of cooperative societies, (6) farmers who had primary school education but were not members of cooperative societies, (7) farmers who had secondary school education but were not members of cooperative societies and (8) farmers who had post secondary school education but were not members of cooperative societies. A total of 30 farmers from each of these 8 categories were purposefully targeted for the study giving a total of 240 respondents. To access these categories of farmers, a purposeful technique was adopted for sample selection while semi-structured questionnaires were used for data collection. Abuja has 4 agricultural zones- namely, central, eastern, northern and western with 12 agricultural blocks and 93 cells. Equal numbers (30 farmers) from each of the eight categories were used to minimize biasness that may arise as a result of having more respondents from each of the farmer-categories. By implication, 30 observations were made in each of the 8 farmer-categories. The two independent factors studied are cooperative membership and educational status while the dependent variable is access to agricultural extension services. The cooperative membership has two levels (cooperative farmers and non-cooperative farmers) while education status has 4 levels (no formal education, primary school, secondary school and post secondary school). The combination gave 2x4 mixed factorial

design with 8 treatment levels (the farmer-categories). This is an independent measure ANOVA (Andy, 2005) and it is mathematically expressed as:

$$Y_{ij} = \mu + C_i + E_j + CE_{ij} + e_{ij}$$

Where:

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

$\mu$  = General mean

$C_i$  = Refers to the effects of cooperative membership (cooperative or non-cooperative farmers)

$E_j$  = Refers to the effects of education (no formal education, primary school, secondary school and post secondary school education)

$CE_{ij}$  = Interaction effect of cooperative membership and education

$e_{ij}$  = Error term

By interpretation, the model states that a farmer's access to agricultural extension services ( $Y_{ij}$ ) depends on whether the farmer is a cooperative or non-cooperative member, that is, cooperative membership ( $C_i$ ); the educational status of the farmer ( $E_j$ ); and the interaction effects of cooperative membership and educational status ( $CE_{ij}$ ). The  $\mu$  is a constant 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 above scores were used for data analysis in line with the method adopted by David (2004), Fredrick and Wallnau (2004), Shah and Madden (2004), Andy (2005) and Gray and Kinnear (2012). SPSS 15.00 was used to run the analysis and it was tested at 5% probability level. The socioeconomic characteristics of the respondents captured during data collection include: age (years), years of farming experience (years), gender (male or female), household size 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) and literacy level which also include: no formal school education, primary school education, secondary school education and post secondary school education which includes Ordinary National Diploma (OND), Higher School Certificate (HSC), Nigerian Certificate of Education (NCE), Higher National Diploma (HND) or Bachelor degrees:

The hypotheses of the study are set as:

- $H_0$ : There is no significant effect of cooperative membership on farmers' access to agricultural extension services
- $H_0$ : There is no significant effect of farmers' level of education on access to agricultural extension services
- $H_0$ : There is no significant interaction effect of cooperative membership and farmers' level of education on access to agricultural extension services

## RESULTS AND DISCUSSION

Table 1 shows the analysis of variance (ANOVA) results of the farmers' access to extension services in Abuja, Nigeria. The "cooperative membership" row of the ANOVA table shows the effects

Table 1: ANOVA results on the farmers' access to agricultural extension services

Sources of variation	df	SS	MS	F-cal	p-value	Sig
Cooperative membership	1	0.07	0.07	0.08	0.78	ns
Educational status	3	4.43	1.48	1.74	0.16	ns
Coop membership*Education	3	0.90	0.30	0.35	0.79	ns
Error (between factor)	232	196.33	0.85			
Total	239	202.33				

of cooperative membership on farmers' access to agricultural extension services (the main effects of cooperative membership). The result,  $F(1, 232) = 0.08$ ,  $p = 0.78$ , indicated that there was no significant difference ( $p > 0.05$ ) in the mean responses of the cooperative and non-cooperative farmers regarding access to agricultural extension services in the study area. This implies that access to agricultural extension services was perceived the same by both cooperative and non-cooperative farmers. The result is contrary to apriori expectation because it was expected that irrespective of education, cooperative farmers should have more access to agricultural extension services than non-cooperative farmers. The reason is that cooperative societies are capital organizations (Gabre-Madhin, 2001; Anderson and Jack, 2002; Valentinov, 2003) and as such they can take advantage of collective actions. In fact, Gilson (2003) argued that organizations with relatively high social capital will be more effective and efficient than those with low social capital. 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,  $F(3, 232) = 1.74$ ,  $p = 0.16$ , indicated that there was no significant difference ( $p > 0.05$ ) in the effects of farmers' level of education on access to agricultural extension services. In other words, there was no significant difference ( $p > 0.05$ ) in the mean responses of the farmers who had post secondary school education, secondary school education, primary school education and no formal school education regarding access to agricultural extension services. It can also be inferred from the results that the educational status of the farmers did not significantly affect their access to agricultural extension services. This result is also contrary to apriori expectation because it was expected that irrespective of cooperative membership, farmers who have post secondary school education and were members of cooperative societies should have more access to agricultural extension services than those who had no formal education. This is expected because the impact of education on agriculture has been reported by Nwaru (2007), Otunaiya and Akinleye (2008) and Abdulsalam *et al.* (2010). All their reports suggest that educated farmers are in a better position to access farm production resources including agricultural extension services. Furthermore, the "coop membership\*education" row of the ANOVA table shows the result of the interaction effects of cooperative membership and farmers' level of education. The result,  $F(3, 232) = 0.35$ ,  $p = 0.79$ , revealed that there was no significant ( $p > 0.05$ ) interaction effects between cooperative membership and farmers' level of education on access to agricultural extension.

Table 2 shows the mean responses of the farmers regarding their access to agricultural extension services. Although there was no significant difference in the mean responses of the cooperative (2.93) and non-cooperative (2.90) farmers, the mean values indicated that cooperative farmers' access to agricultural extension services was very slightly higher than that of non-cooperative farmers. This is an indication that the cooperative farmers perceived that they had more access to agricultural extension services than non-cooperative farmers. Although the result

Table 2: Mean responses on the farmers' access to agricultural extension services

Educational status	Cooperative membership		Row mean total
	Cooperative farmer	Non-cooperative farmer	
No formal education	3.13	3.00	3.07
Primary school	3.10	2.97	3.03
Secondary school	2.83	2.80	2.82
Post secondary school	2.67	2.83	2.75
Column mean total	2.93	2.90	2.92

showed that there was no significant difference in cooperative and non-cooperative farmers' access to agricultural extension services, research conducted by Ibezim *et al.* (2010) showed that there were significant differences in the output, income and farm size of cooperative and non-cooperative farmers in Abia State, Nigeria. Similarly, the mean responses also revealed that there is a gradual decrease in access to agricultural extension services from farmers who had no formal education and were not members of cooperative farmers to farmers who had post secondary school education and were members of cooperative. Those who had primary school education had more access to agricultural extension services (3.03) than farmers who had secondary school education (2.82) while those who had secondary school education had more access to agricultural extension services than those who had post secondary school education (2.75).

Based on the result, it can be inferred that those who have post secondary education are not interested in agricultural extension services. This, probably is because most of them do not have agriculture as their main occupation-many of them are civil servants who take agriculture as a partime business. Espig (1992) argued that farmers abandon farming as their level of education rises. This is a fact and must have been one of the courses of their poor access to agricultural extension services. On the contrary, farmers who have at most primary school education rely mainly on agriculture for their livelihood hence, the need for agricultural extension services. In other words, it can equally be deduced from the result that the more the level of farmers' education, the less interest he/she will pay to access agricultural extension services while the less the farmers' level of education, the more attention that he/she will pay to access agricultural extension services for production purposes.

Table 3 shows the mean response values of the different farmer-categories interviewed in order of their access to agricultural extension services. The mean response values indicated that farmers who had no formal school education but were members of cooperative societies (3.13) had more access to agricultural extension services than farmers in other categories. This is followed by farmers who had primary school education but were members of cooperative societies (3.10). The farmers who had post secondary school education and were members of cooperative societies had the least access to agricultural extension services (2.67). This is contrary to the apriori expectation because Doss and Morris (2000) observed that education was a significant determinant of adoption of maize varieties in Ghana. By implication, this means that education can equally improve farmers' access to other farm inputs which are, in most cases, being disseminated by extension agents in Nigeria. It was expected that farmers who had post secondary school education and are members of cooperative societies should have access to agricultural extension services more than farmers who had no formal school education and are not members of cooperative societies.



Table 3: Mean responses of the farmers-categories in order of access to agricultural extension services

Farmer-categories	Mean response values
Farmers who had no formal school education but were members of cooperative societies	3.13
Farmers who had primary school education and were members of cooperative societies	3.10
Farmers who had no formal school education and were not members of cooperative societies	3.00
Farmers who had primary school education but were not members of cooperative societies	2.97
Farmers who had secondary school education and were members of cooperative societies	2.83
Farmers who had post secondary school education but were not members of cooperative societies	2.83
Farmers who had secondary school education but were not members of cooperative societies	2.80
Farmers who had post secondary school education and were members of cooperative societies	2.67

Table 4: The socio-economic characteristics of the farmers

Socio-economic characteristics	Frequency	Percentage
<b>Gender</b>		
Male	203	84.58
Female	37	15.42
Total	240	100.00
<b>Years of farming experiences</b>		
1-10	43	17.92
11-20	86	35.83
21-30	82	34.17
>30	29	12.08
Total	240	100.00
<b>Farm size (ha)</b>		
0-1	68	28.33
2-3	145	60.42
4-5	21	8.75
>5	6	2.50
Total	240	100.00
<b>Household size</b>		
1-2	11	4.58
3-4	11	4.58
5-6	62	25.84
>6	156	65.00
Total	240	100.00
<b>Age of the farmers (year)</b>		
≤20	0	0.00
21-30	26	10.83
31-40	93	38.76
41-50	92	38.33
>50	29	12.08
Total	240	100.00

Table 4 shows the socioeconomic characteristics of the farmer-categories interviewed. The gender distribution of the farmers indicated that majority (84.58%) of them were males while only 15.42% were females. This does not mean that men were more in agricultural production in the study area rather it implies that it is difficult to access women farmers for data collection. The women were difficult to access because of purdah - a religious (NARP, 1994). Based on the religious belief, the enumerators had more interaction with the male farmers than with the female farmers hence the skewness of the data in favour of the men-folk. Household distribution revealed that

majority (65.00%) of the farmers had over six persons per household which shows that majority of the farmers had large households. On age distribution, greater percentage of the farmers fell within 31-50 years. This shows that the farmers were still in their active and productive age and can perform farming activities. Furthermore, majority (60.42%) of the farmers cultivated pieces of land ranging from 2-3 hectares of land - an indication that they were small scale farmers.

## CONCLUSION

In agriculture, most of the variables that affect production directly or indirectly do not act in isolation but rather they interact to produce effects. It is based on the interaction effects of some of these variables that a study was conducted to determine the effects of farmers' level of education and cooperative membership on access to agricultural extension services. The research was conducted because it is believed that cooperative membership and farmers' levels of education are important social variables that could affect farmers' behaviours. The findings indicated that, irrespective of farmers' level of education, there was no significant difference in cooperative and non-cooperative farmers' access to agricultural extension services. Similarly, irrespective of cooperative membership, farmers' levels of formal education did not significantly affect access to agricultural extension services. Furthermore, there was no significant interaction effect between cooperative membership and farmers' level of education on access to agricultural extension services. Based on the above findings, the paper concluded that cooperative membership and farmers' level of education were not the major determinants of farmers' access to agricultural extension services in the study area. The paper therefore recommended that similar researches should be replicated in other areas to see if the same results apply.

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