PAT June, 2018; 14 (1): 73-80 ISSN: 0794-5213

Online copy available at www.patnsukjournal.net/currentissue

Publication of Nasarawa State University, Keffi

Effect of Extension Services on Maize Production in Edo State, Nigeria

Osabuohien, J.I.[1] and Okoedo-Okojie D.U.[2]

Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, P.M.B 1154, Benin-City, Edo State, Nigeria
E-mail: [1]julius.osabuohien@uniben.edu [1]J6family@yahoo.com [2]david.okoedo-okojie@uniben.edu

Abstract
Extension services are of immense benefits to farmers and agricultural productivity. The study specific objectives were to ascertain maize farmers' access to extension services, their perceived effectiveness of extension service on maize production, and their perceived effect of extension services on maize farm size, income, and yield. Data were collected with the aid of questionnaire using simple random sampling technique. Descriptive statistical tools were used for data analysis. Findings reveal that 52.7% of the maize farm were on less than 1 acre cultivated majorly with hired labour (44.7%) by respondents of household size of modal range of 6-10 persons earning an estimated annual income of not more than N100,000.00. Respondents' access to ($\bar{X}$=2.53) and frequency of access ($\bar{X}$=3.00) to extension services were high especially as regards technical capacity building. Inferential results indicated that extension services have effect on farm size (t=26.91p<0.05), maize farmer's income (t=13.17p<0.05), and maize farm yield (t=33.40p<0.05). It is recommended the maize farmers' access to and frequency of access to extension services should be sustained in the study area.
***Keywords**: Extension services, agricultural productivity, farm size, income, and yield*

Introduction

Maize is an important cereal crop mostly produced by small scale farmers in Nigeria. And Nigeria is one of the highest producer of maize in sub-Saharan Africa (IITA, 2012; Cadini and Angelucci, 2013; Hernández, 2016). In addition to human consumption, it serves as raw material in the production of livestock feeds. Corn starch, oil, syrup, and sugar are main industrial products that small scale corn farmers are yet to take advantage of to enhance their farm income and livelihoods. It has been asserted that the level of maize production in Nigeria today is below what is expected considering the growing human population and industries that require maize and its products (Adeolu and Adeyemo, 2011). The short fall in maize output in Nigeria has been attributed to the fact that bulk of maize produced is from smallholder farmers with rudimentary and inefficient farming systems adopted by these farmers (Ajibefun, 2002; Oluwatayo *et al.,* 2008). According to Opaluwa *et al.* (2014), considering the economic importance of maize, its local production needs to be increased to meet its growing demand.

For small scale maize farmers to reap the benefits accruable from modern maize production, the services of extension services cannot be undermined as it will ultimately help them to alleviate poverty and promote their social and economic status. According to Igbinidu and Osabuohien (2016), one of the ways of alleviating rural farmers' poverty is by boosting their agricultural outputs. Adequate attention to Agricultural Development Programmes whose primary task is to provide extension services to farmers in Nigeria would certainly alleviate poverty and promote smallholder maize farmers social and economic status. Then there would be remarkable progress in agriculture despite the obstacles to farmers' production in Nigeria (Initiative for Public Policy Analysis, IPPA, 2010).

Government had been advised to expend more resources on agriculture particularly on proven technology disseminated to farmers by extension workers and also on infrastructures as these are able to bring about significant improvement in maize production (Damisa and Igonor, 2007). According to Okoedo-Okojie and Edobor (2013), agricultural extension is essential institutional components in the process of agricultural development which aims at providing farmers with necessary education, skills, and technical information to enable them make

effective farm management decision to enhance their daily practices. Adegboye *et al.* (2013) reported that the dissemination of agricultural information by extension agent is very crucial to agricultural productivity of farmers because it is only through this means that they can learn. They further proposed that the transfer of extension information to women maize farmers should be strongly strengthened as extension information is significant in enhancing the output of the women maize farmers.

The possible solution to meeting the growing demand for maize and its products is likely to be extension services whose mandate it is to put at the door-step of the farmers necessary farm related information and proven agricultural technologies. If this is rightly in place, the present gap in maize production would be addressed. To this end, the objectives of the study are to: examine maize farmers' access to extension services; ascertain respondents' perceived effectiveness of extension service on maize production; and determine effects of extension services on maize farm size, income and yield by respondents.

Hypothesis

There is no significant relationship between farmers' access to extension services and farm size, yield and income

METHODOLOGY

Edo State is situated in South-South zone of Nigeria, bounded in the north and east by Kogi State, south by Delta State and west by Ondo State. The State covers an area of 17,802km^2 and geographically lies approximately between Longitude 6.30^o N and 6.00^o E and a population of 3,233,366 with 1,633,946 males and 1,599,420 females. A reasonable size of the population of the State particularly in rural areas are farmers cultivating wide range of crops such as rubber, oil palm, maize, rice, plantain and so on. The climate is typically tropical with two major seasons, wet (rainy) and the dry (harmathan) seasons. The wet season comes between April and November and the dry season between December and March.

The study was conducted in three local government areas Ikpoba Okha local government in Edo south, Esan west local government in Edo central and Etsako west local government area in Edo north. The large concentration of maize farmers in these LGAs informed the choice of this study.

The selection of three local government areas in Edo State namely Ikpoba-Okha, Etsako-west and Esan-west local government areas were purposively selected due to the preponderance of maize production in these areas. Two (2) villages were then randomly selected from each of the three local government areas. Twenty-five (25) respondents were randomly selected from the sample frame generated for each of the following villages: Uleigun and Ukhiri in Ikpoba Okha local government, Ekpoma and Irrua in Esan-west local government, Igbe and Iyekhe in Etsako- west local government. The total sample size of the study therefore is 150 respondents. A structured questionnaire was used for data collection. Access to information sources was measured on a 4-point rating scale of high access (any time) coded 4, access (at times) coded 3, low access (sometimes) coded 2 and no access coded 1. A mean score of 2.5 (4+3+2+1 = 10÷4 = 2.5) was taken to mean that respondents have access to a particular information source. Farmers' perceived effectiveness of the information source used in communicating technologies was measured in 4 point rating scale as follows; highly effective coded 4, effective coded 3, less effective coded 2, not effective coded 1. A mean score of 2.5 (4 + 3 + 2 + 1 = 10: 4 =2.5) was taken to mean that a particular information source was effective.

Farmers were asked to indicate the number of technologies they adopted before and after their access to extension services and information sources, the number of technology adopted was taken as percentage rate of adoption for that particular respondent, farmers were asked to indicate their yield and income before and after their access to extension services and use of

information sources. The difference was taken as the effect of extension services on farm size, yield and income respectively. Descriptive statistics such as percentage, frequency distribution, mean and the "before" and "after" approach was used to ascertain the effect of extension services on respondents adoption using inferential statistic such as spearman rank correlation and Student t-test.

$$r_s = 1 - \frac{6\Sigma d^2}{n^3 - n}$$

Where;
r_s = spearman rank correlation coefficient
d = differences between ranks
n = No of ranks

Results and Discussion

Farm characteristics of respondents

Results in Table 1 indicate that 0.7% of the maize farmers had farm sizes of 10 -15 ha and above 15 ha while 38.0% and 8.0% had farm sizes ranging from 1-5 ha and 5–10 ha respectively. However, about 52.7% of the maize farmers had farm lands below 1 ha. The result implies that the respondents were more into subsistence maize production. This is slightly different from the findings of Abiola *et al.* (2014) who reported that about half of the population (49.4%) of their respondents owned farms less than one hectare of maize farmland. But agrees with earlier findings of Okoedo-Okojie (2015) who reported that about 66.0% of Maize farmers in Edo State have farm size of < 1 hectare, which is slightly different from the finding of Mohammed *et al.* (2013) whose study showed that about 95.55% of their respondent maize farmers had farm sizes ranging from 1 – 2 ha. It therefore means that most maize farmland in Edo State is less than 5 hectares.

Higher (34.7%) percentage of the respondents had farming experience of 20 years and above. This means that the farmers were well experienced in maize production. This result is similar to the findings of Okoedo-Okojie and Onemolease (2009) who reported that about 30.7% of their respondents had between 11 – 20 years of farming experience while Abiola *et al.* (2014) who reported that about 32.4% their respondents had more than 15 years farming experience. A large percentage of the respondents (47.3%) had a family size between 6 – 10 persons. This could be advantageous in carrying out maize farming practices.

Table 1 shows that maize farmers who are non–members of any social group represented about 14.7% of the respondents. A majority (85.3%) proportion of the respondents belong to different associations/cooperatives particularly maize related ones. Hence, it can be inferred that the respondents were equally exposed to some of the benefits obtainable from being a member of a social and/or farmers' group. Furthermore, about 41.4% of the respondents had no leadership experience while about 32.9% have led group before. Those who have held other positions before represented about 25.7% of the maize farmers. This implies that some of the maize farmers may have acquired some level of organization abilities and/or competencies over the years.

Furthermore, 39.3% of the farmers had annual income of N100,000 while about 26.7% and 26.0% had annual income of N100,000-N200,000 and N200,001–300,000 respectively. Farmers with an annual income of N300,000 and above represented about 8.0% of the respondents. Hence, it could be inferred that maize farming in the study area may be very lucrative. About 42.7% of the farmers used family labour, 44.7% used hired labour while 12.7% used self-labour. Mohammed *et al.* (2013) found that majority (68.75%) of their respondents maize farmers used hired labour while about 20.83% used family labour.

Table 1: Distribution of respondents according to farms' characteristics

Variables		Frequency (n=150)	Percentage
Farm sizes	< 1	79	52.7
	1-5	57	38.0
	6-10	12	8.0
	11-15	1	0.7
	15 and above	1	0.7
Farming experience	1-5	28	18.7
	6-10	32	21.3
	11-15	29	19.3
	16-20	9	6.0
	20 and above	52	34.7
Household size	<5	35	23.3
	6-10	71	47.3
	11-15	25	16.7
	16-20	14	9.3
	20 and above	5	3.3
Social group belonged to	None member	22	14.7
	Maize farmers assoc	11	7.3
	Co-op society	52	34.7
	Others	65	43.3
Group leadership status	No experience	58	41.4
	Have led a group	46	32.9
	Held other positions	36	25.7
Income range (annual)	<100,000	59	39.3
	100,000-200,000	40	26.7
	200,001-300,000	39	26.0
	300,001 and above	12	8.0
Labour source	Family	64	42.7
	Hired	67	44.7
	Self	19	12.7

Source: Field survey data (2018)

Farmers' access to and frequency of accessing extension services

Table 2 shows respondents' access and extent of access to extension services. The respondents have access to technical capacity building ($\bar{X}$= 2.53), input provision linkages ($\bar{X}$=3.17), support for farmers organizations ($\bar{X}$=2.99) and farmers learning group ($\bar{X}$=2.93): Others include developed micro enterprise ($\bar{X}$=2.67), knowledge sharing ($\bar{X}$=2.72), and platform and information ($\bar{X}$=2.52). The results indicated that respondents frequently had access to all the identified services except collecting information from maize farmers and taking it to reaching institution ($\bar{X}$=2.43), education ($\bar{X}$=2.37), and Knowledge platform and information ($\bar{X}$=2.42). Based on these results, it can be inferred that adequate access to the aforementioned extension services culminated in the adoption of the various farming technologies. According to Rogers and Shoemakers (1997) cited in Onoh and Peter-Onoh (2012), adoption of new ideas, methods, practices or techniques provide the means of achieving sustained increase in farm productivity and income.

Table 2: Farmers access to and frequency of accessing extension services

Extension services	Access to		Frequency of accessing	
	Mean($\bar{X}$)	SD	Mean($\bar{X}$)	SD
Technical capacity building	2.53*	0.24	3.00*	1.00
Input provision linkages	3.17*	1.01	2.71*	0.71
Support for farmer's organization	2.99*	0.95	2.65*	0.70
Farmers learning group	2.93*	0.96	2.60*	0.66
Market linkages	2.43	0.77	2.59*	0.74
Developed micro enterprises	2.67*	0.86	2.58*	0.71
Knowledge sharing	2.72*	0.96	2.54*	0.74
Knowledge platform and information	2.52*	0.83	2.42	0.82
Education	2.34	0.70	2.41	0.80
Acting as link between farmer and research institute	2.43	0.80	2.37	0.77

Source: Field survey data (2018) *Have access ($\bar{X} \geq 2.50$); Frequent ($\bar{X} \geq 2.50$)*

Perceived effectiveness of extension services on maize production

Table 3 reveals that six of the extension services were perceived by respondents to be effective on their maize production. So, farmers adopted the following technologies, use of clean planting materials ($\ddot{X} = 2.33$), post-harvest storage method ($\bar{X}$=2.18), timely weeding ($\bar{X}$=2.13), time of planting ($\bar{X}$=2.13), time of harvesting ($\bar{X}$=2.08), and use of pesticides ($\bar{X}$=2.07). This result supports Abiola *et al.*(2014) findings that most farmers had positive perception towards adoption of farming practices which according to them had increased adopter farmers income, yield at harvest, improved their feeding habits/household food security and have boosted the their ability to make use of improved varieties.

Table 3: Perceived effectiveness of extension service on maize production

Services	Mean($\bar{X}$)	SD
Use of clean planting materials	2.33*	0.77
Post-harvest storage method	2.18*	0.75
Timely weeding	2.13*	0.79
Time of planting	2.13*	0.79
Time of harvesting	2.08*	0.81
Use of pesticides	2.07*	0.82
Spacing	1.79	0.78
Inter cropping crop rotation	1.77	0.76
Improved varieties	1.73	0.77
Row planting	1.65	0.76
Time of fertilizer application	1.49	0.73
Others	1.19	0.55

Source: Field survey data (2018) **Effective* ($\bar{X} \geq 2.00$)

Effect of extension services on farm sizes, income and yield of maize by respondents

From Table 4 shows the mean farm size of the respondents before extension services was 0.74ha. This later increased to about 2.52ha after extension services indicating a positive increase of 1.78ha in farm sizes of the maize farmers after they were exposed to extension services. Based on these results it can be inferred that extension services are beneficial in

helping maize farmers to cultivate larger expanse of lands. Also the mean annual farm income of the respondents increased from N76,666.67 to N198,666.67 after extension services. It could be inferred that the extension services were very effective in increasing maize farmers' income in the study area. Similarly mean crop yield of maize before the respondents' access to extension services was about 2.41 kg. The farmers' access to extension services gave rise to a crop yield of about 7.46 kg. This corresponds to an increase in maize yield of about 5.05 kg which was realized after the respondents' access to extension services. This signifies that extension services were very effective in the study area especially in helping the maize farmers to maximize their crop yield and also increasing their economic benefits. This finding agrees with Ogunwale *et al.* (2006) who reported that contact with extension agents and the use of various recommendations had positive impact on the standard of living of farmers as a result of increased income.

Table 4: Analysis of respondents perceived effect of extension services on maize production

	Before		After	
	Freq	**%**	**Freq**	**%**
Farm size				
<1	125	83.3	-	-
1 to 2	16	10.7	51	34.0
2-3.0	7	4.7	68	45.3
3.1-4.0	2	1.3	18	12.0
4.1-5.0	-	-	6	4.0
5.1-6.0	-	-	6	4.0
>8.0	-	-	1	0.7
Total	150	100	150	100
	$\bar{X}$ **=0.74 ha**		$\bar{X}$ **= 2.52 ha**	
Income				
<100,000	118	78.7		
100,000-200,000	24	16.0	61	40.7
200,001-300,000	8	5.3	44	29.3
300,001-400,000	-	-	37	24.7
400,001-500,000	-	-	7	4.7
500,001-600,000	-	-	1	0.6
Total	150	100	150	100
	$\bar{X}$ **= N 76,666.67**		$\bar{X}$ **= N 198,666.67**	
Yield				
<1	36	24.0	-	-
1 to 2	35	23.3	-	-
2-3.0	25	16.7	-	-
3.1-4.0	30	20.0	6	4.0
4.1-5.0	14	9.3	13	8.7
5.1-6.0	7	4.7	7	4.7
6.1-7.0	1	0.7	10	6.6
7.1-8.0	2	1.3	33	22.0
>8.0			81	54.0
Total	150	100	150	100
	$\bar{X}$ **=2.41**		$\bar{X}$ **=7.46**	

Source: Field survey data (2018)

Hypothesis

The mean farm size, income, and yield of the respondents before the extension services were 0.74 ha, which increased to 2.52ha after the extension services. Mean annual farm income of

the respondents increased from N 76,666.67 before the extension services to N 198,666.67 after extension services; and an increase in maize yield of about 5.05 kg was realized after the respondents' access to extension services (Table 5). The critical t values of 26.91, 13.17 and 33.40 respectively indicate that there is a significant relationship between the farm sizes, income and yield and respondents access to extension services at 5% level of significance. Therefore, the null hypothesis was rejected at 5%. However, these results do not agree with the findings of Ayansina, Oyeyinka, and Ayinde (2015) that there was a significant relationship between the benefits derived by the respondents which include increased quantity of crops produced, farm income, skill acquisition and improved education in public and private extension organizations in South-Western Nigeria.

Table 5: Effect of farmers' access to extension service on farm size, yield and income

Variables	Mean		difference	t value	prob. Level
	Before	After			
Farm size (ha)	0.74	2.52	1.78	26.91*	P<0.050
Income (N)	76,666.67	198,666.67	122,000.00	13.17*	P<0.050
Yield (kg)	2.41	7.46	5.05	33.40*	P<0.050

Source: Field survey data (2018) *Significant at 5% (critical t value = 1.96)

Conclusion and recommendations

The study concludes that extension services had significant effect on farm size, income and farm yield. It is recommended that maize farmers' access to extension services should be sustained in the study areas

References

Abiola, M.O., Omoregbee, F.E. and Caroline, S. (2014). Effect of T&V Innovation on Income and Farmers Performance in Edo State, Nigeria. *American Journal of Agriculture and Forestry*. 2(4): 159-167.

Adegboye, G.A., Oyinbo, O. and Owolabi, J.O. (2013). Analysis of the Sources and Effect of Extension Information on Output of Women Maize Farmers in Soba Local Government Area of Kaduna State, Nigeria. *European Scientific Journal* 9(9): 1857 – 7881

Ajibefun, I.A. (2002). Analysis of Policy Issues in Technical Efficiency of Small Scale Farmers Using the Stochastic Frontier Production Function: with Application to Nigerian Farmers. A paper presented at the International Farm Management Association Congress, Wageningen, Netherland, July. 1-13

Ayansina, S.O., Oyeyinka, R.A. and Ayinde, A.F.O. (2015). Farmers' Participation in the services of Public and Private Extension Organizations in Southwestern Nigeria. *British Journal of Applied Science & Technology* 8(3): 238-245

Cadini, P and Angelucci F (2013). Analysis of Incentive and Disincentive for Maize in Nigeria. Monitoring African Food and Agricultural Policies (MAFAP). Technical Report Series MAFAP/ FAO Rome. Pp 41

Damisa, M.A., Igonor, E. (2007). The Adoption of Integrated Soil Fertility Management Practice Among Women Farmers: A Logistic Model Analysis'. *J. Agric. Educ. Ext.* 13(2):107-106.

Hernández,J. M. (2016). Rescuing our maize: building a network *Farming Matters* P. 25

Igbinidu O. and OsabuohienJ.I. (2016). Effect of yam-based production on poverty status of

farmers in Kabba/Bunu Local Government Area of Kogi State, Nigeria *International Journal of Environmental and Agriculture Research* 2(6): 13-20

IITA (2012). International Institute for Tropical Agriculture. Growing in Nigeria. Commercial Crop Production Guide Series. Information and Communication Support for Agricultural Growth in Nigeria. USAID Pp 1-8

Initiative for Public Policy Analysis (IPPA, 2010). Palm oil and economic development in Nigeria and Ghana, recommendation for the World Bank's 2010 palm oil strategies. Accessed on 23rd August, 20211 from *www.ippanigeria.org*

Mohammed, A. B., Ayanlere, A. F., Ibrahim, U. and Muhammad, L. A., (2013). Economic Analysis of Maize Production in Ogori / Magongo Local Government Area of Kogi State, Nigeria. *Journal of Agricultural Economics and Development* 1(3): 47-61.

Ogunwale, A.B., Ayoade, A.R. and Ayansina, S.O. (2006). Impact of Extension Service On farmers' production activities in Ogbomoso Agricultural Zone of Oyo State, Nigeria. *Journal of Agricultural Extension*, 9:150-158.

Okoedo-Okojie, D.U. and Edobor, E,W. (2013). Identification of Communication Needs of Extension Agents in Ondo State, Nigeria. *International Organization of Scientific Research, Journal of Agriculture and Veterinary Science* 4(1): 1-6S

Okoedo-Okojie, D.U. (2015). Determinants of constraints to information sources utilization among Maize farmers in Edo State, Nigeria. *British Journal of Applied Science and Technology* 9(2): 182-190

Okoedo-Okojie, D.U. and Onemolease, E.A. (2009). Factors Affecting the Adoption of Yam Storage Technologies in the Northern Ecological Zone of Edo State, Nigeria. *J. Hum. Ecol,* 27(2):155-160

Oluwatayo, I.B., Sekumade, A.B. and Adesoji, S.A. (2008). Resource Use Efficiency of Maize Famers in Rural Nigeria: Evidence from Ekiti State. *World Journal of Agric. Sci.* 4(1): 91-99

Opaluwa, H.I., Otitoliaye, J.O. and Ibitoye, S.J. (2014). Technical Efficiency Measurement among Maize Farmers in Kogi State, Nigeria. *Journal of Biology, Agriculture and Healthcare* 4(25): 240-247

Onoh, P.A. and Peter-Onoh, C.A. (2012). Adoption of Improved Oil Palm Production Technology among Farmers in Aboh Mbaise Local Government Area of Imo State. *International Journal of Agricultural and Rural Development* 15(2): 966 – 971