

Research Paper

Effect of farmers' access to extension and agro-input services on maize production in Nigeria

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The study was carried out to determine effects of farmers' access to extension and agro-input services on maize production in Nigeria. A multi-stage sampling was used to select 198 maize farmers from three agricultural zones (Northwest, North central and Southwest) purposively based on their high maize production. Data were collected through questionnaires and analyzed using descriptive (frequency counts, percentages and mean) and inferential (Pearson Product Moment Correlation) statistics at $p=0.05$. Result shows that farmers age was 44.8 ± 7.23 years, majority (78.5%) were male, married (93.9%), with average annual income of $\text{N}332,795.46\pm 25,190.51$. All the farmers have access to extension and agro-input services in the study area and dissemination of information on current farm operations

(1.72 ± 0.08) was ranked first on access to extension while technical advice on the use of agrochemicals (1.65 ± 0.94) was ranked first on access to agro-input service. The average maize yield recorded by farmers was 2080 ± 1374.3 kg/ha. There were significant relationships between access to extension service ($r=0.291$), access to agro-input service ($r=0.200$) and maize yield. There should be enhanced access by maize farmers to agricultural extension and agro-input services in Nigeria in order to improve maize production in the country.

Keyword: Agro-inputs, extension service, maize production, yield, dissemination

INTRODUCTION

The Agricultural sector in Nigeria has continued to play a prominent role in the socio-economic development of the country. The sector provides employment to about 70% of the active labour force, contributes over 40% to the Gross Domestic Product (GDP) and accounts for about 6% of the nation's foreign exchange earnings, second only to crude oil (NAQAS, 2009).

The role of extension in bringing about a broad-based development in the agricultural sector particularly in developing countries like Nigeria cannot be over-emphasized. Agricultural extension which is a "vital component" of Research-Extension-Farmers-Input Linkage System (REFILS) has been one of the approaches used to improve agricultural productivity in Nigeria. The extension agencies function as a conduit for bringing agricultural innovations to farmers as well as taking farmers problem to the researchers. Extension

education that is sometimes referred to as education for action is the rallying point for all activities that have taken place in the other components (research, farming, provision of agro-inputs and marketing). The efforts of the agro-input providers cannot be underestimated in the development of agriculture as corroborated by Etyang et al. (2004) who reported that apart from selling inputs; the dealers were providing other three important services namely: information on agronomic practices for seeds, pesticides and fertilizers. Availability and access to farm inputs are critical to improving productivity and food security (NAERLS and NPFS, 2012). Agricultural extension service has been providing the vital link between research and farmers (Sanyaolu, 2008). Therefore to bridge the gap between findings of researchers and growing information and knowledge needs of the farmers; extension is important. Agro-input

services when rendered to farmers will avail them the opportunity to use improved farm inputs in maize production which will enhance growth, health and quality products, increased output, better market access/prices, improved income and livelihood for farmers in Nigeria.

Maize production is of strategic importance for food security and socio-economic stability in Nigeria but confronted with several constraints capable of reducing production by 70% (Agrictech, 2007). In Nigeria, for instance, maize is one of the two major crops that occupy about 40% of the land area under agricultural production and maize production in Nigeria accounts for about 43% of the maize grown in West Africa (Smith et al., 1997; Phillip 2001). Maize is the fourth most consumed cereal during the past two decades, below sorghum, millet and rice (FAOSTAT, 2012). Being among the primary food staple, maize consumption is widely spread across the country and among households of different wealth. Maize is also of high industrial use. Maize production, therefore, is of utmost importance to the socio-economic development of Nigeria and sub regions in Sub Sahara Africa.

Based on the usefulness of the crop, universities and research institutes with mandates in cereal improvement in the country are not relenting in their efforts at improving the productivity of the crop. However, these efforts will be in vain if the system saddled with the promotion of the adoption of maize innovations is found wanting. Different improved varieties of maize such as DMR-LSR, ART-98-SW6-OB, ILE-OB, Ife maize- hyb-3 and Ife maize-hyb-4 etc. have been bred and yet to be disseminated to farmers due to epileptic performance of the extension agency (Oluwatosin, 2015). Recent observation across the country revealed that extension service institutions are too weak and showing signals that they cannot anchor anticipated agricultural diversification agenda of government unless there are reforms (NAERLS and NPFS, 2011).

In Nigeria, maize production is estimated to increase by 3.2% per year due to the prospective growth of urbanization and population (IITA, 2010). The crop has also been identified as one in which the three agricultural zones (Southwest, Northwest and North central) of Nigeria have comparative advantage and was thus selected among the crops in which the value chains were being promoted (Federal Government of Nigeria FGN, 2012). It has also been revealed that farmers in some rural communities have never benefitted from the extension service of the ADPs (NAERLS and NPFS 2012), whereas it is an incontrovertible fact that the gate way to self-sufficiency and sustainable maize production in Nigeria is through adequate and effective agricultural extension delivery system. It is also an incontrovertible fact that famers' access to agricultural extension and agro-input services are germane to adoption of improved practices on maize production and consequently increase in productivity of farmers. The need for maize farmers to

have access to extension and agro-input service on maize production technologies cannot be over emphasized as there is need for Nigeria to improve her maize production so as to meet demand for maize in the country. It is against this background that this study sought to examine the accessibility of maize farmers to agricultural extension and input services in Nigeria.

METHODOLOGY

The study area is Nigeria with an area of 923,770 km² and lies between latitude 4° and 14° north of the equator and longitudes 3° and 14° east of the Greenwich meridian (Nworgu, 2006). Nigeria is divided into six agricultural zones, out of which (50%) were purposively sampled because of their comparative advantage in maize production compared to other zones. The zones selected are Northwest, North central and Southwest. Moreover, three states, Kaduna, Niger and Oyo states were also purposively selected due to the location of zonal coordinating research institutes in the states. This was followed by random sampling of the 50% of the zones in the selected states' ADP.

The next stage involved a random selection of the 30% of the blocks in the zones resulting in the selection of 2 blocks from each states ADPs (using list of blocks in the zones as the sampling frame). The third stage involved a random selection of 20% of the cells in the sampled blocks, thus making a total of 57 cells. The last stage involved a random selection of 62, 71 and 65 maize farmers from Oyo, Niger and Kaduna states' ADPs, respectively. This gives a total number of 198 maize farmers. The descriptive statistic methods such as the frequency distribution, means and percentages were used for analyzing the data gathered.

RESULTS AND DISCUSSION

Table 1 reveals that 59.6% of maize farmers were within the age bracket of 41-50 years. This is consistent with Onyegbula, (2015) who reported the age bracket of 41-50 years for most farmers in rain forest and guinea savannah agro-ecological zones of Nigeria. This shows that most of the maize farmers are still in their active years, implying availability of physical strength and mental alertness in adopting improved agro-technologies. The mean age of the farmers was 44.8±7.23 years, which is similar to the finding of Akinbile (2007), who put the average age of most Nigerian farmers at 45.2 years. Majority (95.5%) of the total maize farmers were married as shown in (Table 1). This shows the importance of the institution of marriage in the study area. The disaggregated results on educational levels reveal that 59.2% and 32.3% of the respondents with no formal education were from North central and Northwest zones,

Table 1 Distribution of maize farmers' socio-economic characteristics.

Variable	North West (n = 65)		North Central (n = 71)		South West (n = 62)		Total (n= 198)	
	F	%	F	%	F	%	F	%
Age								
≤ 30	8	12.3	1	1.4	1	1.6	10	5.1
31 – 40	12	18.5	21	29.6	8	12.9	41	20.7
41 – 50	37	56.9	42	59.2	39	62.9	118	59.6
51 – 60	5	7.7	5	7.0	13	21.0	23	11.6
> 60	3	4.6	2	2.8	1	1.6	6	3.0
Mean age	43.9±8.32		44.2±6.80		46.7±6.20		44.8±7.23	
Marital Status								
Single	2	3.1	-	0.0	2	3.2	4	2.0
Married	61	93.9	68	95.8	60	96.8	189	95.5
Divorced	1	1.5	1	1.4	-	0.0	2	1.0
Widowed	1	1.5	2	2.8	-	0.0	3	1.5
Total	65	100.0	71	100.0	62	100.0	198	100.0
Educational level								
No formal	21	32.3	42	59.2	11	17.7	74	37.4
Primary	18	27.7	3	4.2	14	22.6	35	17.7
Secondary	12	18.5	24	33.8	32	51.6	68	34.3
Tertiary	14	21.5	2	2.8	5	8.1	21	10.6
Total	65	100.0	71	100.0	62	100.0	198	100.0
Household size								
1 – 4	6	9.2	5	7.0	32	51.6	43	21.7
5 – 8	33	50.8	31	43.7	30	48.4	94	47.5
9 – 12	20	30.8	20	28.2	-	0.0	40	20.2
> 12	6	9.2	15	21.1	-	0.0	21	10.6
Mean		7.3		6.4		3.6		5.8
Total	65	100.0	71	100.0	62	100.0	198	100.0
Income (₦)								
≤ 100,000	1	1.5	-	0.0	17	27.4	34	17.2
100,000 – 300,000	22	33.8	32	45.1	33	53.2	71	35.9
300,001 – 500,000	24	36.9	39	54.9	9	14.5	72	36.4
500,001 – 700,000	8	12.3	-	0.0	2	3.2	10	5.1
Above 700,000	10	15.4	-	0.0	1	1.6	11	5.4
Mean Annual income	₦339,585.90		₦385,310.25		₦273,490.23		₦332,795.46	
Farm size								
< 1 ha	10	15.4	1	1.4	-	0.0	11	5.6
1 – 3 ha	12	18.5	28	39.4	44	71.0	92	46.5
4 – 6 ha	40	61.5	40	56.4	8	12.9	80	40.4
> 6 ha	3	4.6	2	2.8	10	16.1	15	7.5
Mean								3.54±3.27
Farming experience								
< 5 years	8	12.3	5	7.0	5	8.1	18	9.0
5 – 9 years	20	30.8	11	15.5	5	8.1	36	18.2
10 – 14 years	21	32.3	28	39.4	8	12.9	57	28.8
15 – 19 years	11	16.9	19	26.8	38	61.2	68	34.3
> 20 years	5	7.7	8	11.3	6	9.7	19	9.6
Mean	13.6 ± 10.0		13.1 ± 10.7		18.7 ± 8.9		15.3 ± 11.1	

respectively while more than half of the farmers (51.6%) in Southwest had secondary education. On the whole, 62.6% of the respondents had education ranging from primary six to tertiary level. This implies that majority of the respondents are literate. On household size, the result reveals that half of the respondents (50.8%) in Northwest had household size of 5-8, North central (43.7%) had 5-8 while more than half in Southwest (51.6

%) had household size of between 1-4 persons. The average family size was 5.8 which according to Yekinni, (2010) depict a fairly large family. This has an implication on food security in terms of number of dependents relative to available resources and the availability of labour for farm work. The mean annual income for the maize farmers in the study area was ₦332,795.46 ±25,190.51. Income is an important variable which affects

Table 2. Distribution of maize farmers on their access to extension services.

Extension service	North West (n = 65)			North Central (n = 71)			South West (n = 62)			Total (n = 198)	
	Yes/%	Mean	Rank	Yes/%	Mean	Rank	Yes/%	Mean	Rank	Mean	Rank
Dissemination of information on current farm operations	65 (100)	0.75 ± 0.45	6 th	71 (100)	1.95 ± 0.68	1 st	62 (100)	1.88 ± 0.62	1 st	1.72 ± 0.08	1 st
Dissemination of improved agricultural production practices	65 (100)	1.27 ± 0.65	2 nd	71 (100)	1.95 ± 0.57	1 st	62 (100)	1.88 ± 0.60	1 st	1.67 ± 0.46	2 nd
Linkage with reputable source of inputs	65 (100)	1.03 ± 0.50	5 th	71 (100)	1.61 ± 0.51	5 th	62 (100)	1.69 ± 0.38	4 th	1.42 ± 0.41	4 th
Linkage with source of credits	65 (100)	0.66 ± 0.60	8 th	71 (100)	0.72 ± 0.41	7 th	62 (100)	1.57 ± 0.23	6 th	0.96 ± 0.12	7 th
Linkage with agricultural insurance	65 (100)	0.68 ± 0.42	7 th	71 (100)	1.15 ± 0.11	9 th	62 (100)	0.66 ± 0.21	9 th	0.15 ± 0.13	9 th
Provision of information on agro marketing	65 (100)	1.20 ± 0.78	3 rd	71 (100)	1.50 ± 0.22	6 th	62 (100)	1.44 ± 0.20	7 th	1.36 ± 0.76	5 th
Training for farmers	65 (100)	1.29 ± 0.79	1 st	71 (100)	1.85 ± 0.26	3 rd	62 (100)	1.77 ± 0.32	3 rd	1.60 ± 0.89	3 rd
Linking with equipment hiring outlets	65 (100)	0.60 ± 0.38	9 th	71 (100)	0.33 ± 0.17	8 th	62 (100)	1.10 ± 0.29	8 th	0.57 ± 0.39	8 th
Information on group formation and management	65 (100)	1.18 ± 0.46	4 th	71 (100)	1.75 ± 0.41	4 th	62 (100)	1.66 ± 0.75	5 th	1.11 ± 0.69	6 th

farmers' ability to embrace new technologies, access other livelihood assets and dictate the standard of living of farmers in his community. More than half of the farmers (53.2%) in Southwest had between ₦100,001 - ₦300,000 as their annual income, while 36.9% and 54.9% of respondents from Northwest and North central zones, respectively had annual income ranged from ₦300,001 - ₦500,000. This implies that respondents from Northwest and North central zones realized more income from their maize production enterprise and would be able to earn better living conditions than their counter part from Southwest zone. According to USAID (2010), North central and Northwest zones which are part of the guinea savannah zone provide the best ecological conditions for maize cultivation in

Nigeria. Data on farm size reveals that majority (61.5%) of maize farmers in Northwest possessed farm sizes of between 4-6 hectares, while in North central, a little above average (56.4%) and Southwest majority (71.0%) possessed between 4-6 and 1-3 hectares, respectively. This implies that maize cultivation is still at subsistence level (in the hands of small scale farmers).

Information on farming experience of the respondents reveals that the highest percentage of maize farmers in Northwest (32.3%), North central (39.4 %) and Southwest (61.2%) possessed between 10-19 years of farming experience. The total result reveals that the highest percentage (34.3%) of the maize farmers in the study area possessed over 15-19 years of farming experience, while only 27.3% had below

10 years of farming experience. This shows that most of the respondents possessed requisite farming experience.

Maize farmers' access to extension service

Table 2 reveals that maize farmers in the study area always have access to information on current farm operations (1.72±0.46), improved agricultural production practices (1.67± 0.46) and training (1.60±0.89) on different technologies. Information on current farm operation is always available to farmers because extension agents are always trained fortnightly on current farm operations with a view to disseminate same to farmers on their farms. Improvement in maize farmers' productivity

Table 3. Distribution of maize farmers on access to agro-input services.

Variable	North West (n = 65)			North Central (n = 71)			South West (n = 62)			Total (n = 198)	
	Yes/%	Mean	Rank	Yes/%	Mean	Rank	Yes/%	Mean	Rank	Mean	Rank
Training on agro-chemicals	65 (100)	1.04 ± 0.39	3rd	71 (100)	1.80 ± 0.70	3rd	62 (100)	1.81 ± 0.88	2nd	1.56 ± 0.87	2nd
Technical advice on the use of agro-chemicals	65 (100)	1.30 ± 0.57	2 nd	71 (100)	1.84 ± 0.71	2nd	62 (100)	1.81 ± 0.89	2nd	1.65 ± 0.94	1st
Making improved maize seed available to farmers	65 (100)	1.05 ± 0.64	4 th	71 (100)	1.78 ± 0.69	4th	62 (100)	1.92 ± 0.92	1st	1.46 ± 0.89	3rd
Training on the type and fertilizer dosage	65 (100)	1.84 ± 0.49	1 st	71 (100)	1.92 ± 0.94	1st	62 (100)	1.77 ± 0.65	4th	1.26 ± 0.59	4th

Figures in parenthesis are percentages Source: Field survey, 2015.

is one of the main objectives of extension service which will be achieved as a result of the dissemination of technical information on current farm operations, training and adoption of improved agricultural practices.

Maize farmers' access to agro-input service

The result reveals that majority of the maize farmers in the study area were able to access agro-input service such as technical advice on agro-inputs (1.65 ± 0.94), training on agro-inputs (1.56 ± 0.87) and improved seeds (1.46 ± 0.87). Seed is the most important input in maize farm enterprise. Increased access to farm inputs is one of the key pillars of the defunct Agricultural Transformation Agenda (ATA) with the improvement of selected value chain crops as one of the drivers, hence two principal inputs (seeds and fertilizers) were targeted by the Federal

Government (NAERLS and NPFS, 2012) (Table 3).

Level (Yield) of maize production

Data gathered from the survey reveals that less than half of farmers (46.2%) in the Northwest recorded 2,501 - 4,000 kg/ha, while majority of respondents in the Southwest (88.7%) and North central (97.2%) recorded between 1,001 – 2500 kg/ha hectare and 1,001 - 2,500 kg/ha, respectively. This shows that Northwest with maize yield average (2,813.07 ± 2064.37 kg/ha) had the highest yield among the three zones. This surpassed 1,780 kg/ha which was recorded as the national average in 2011 (NAERLS and NPFS, 2011) and falls within the recommended national average of 2,500 - 4,500 kg/ha (WAAPP, 2011). Respondents from Southwest had the lowest yield average (1,204.03 kg ± 380.49). This is due to the fact the Northern guinea savannah belt where Northwest and Northeast belong supported the growth of maize better than the climatic area of

Southwest zone which is in the rainforest belt (USAID, 2010) (Table 4) .

Relationships between access to extension, agro-input services and maize yield

The result in Table 5 reveals that there was a significant relationship between access to extension service and maize yield in the study area. This underscores the importance of extension service in maize production. According to Sanyaolu (2008), agricultural extension service has been providing the vital links between research and farmers. Furthermore, significant relationship also existed between farmers' access to agro-inputs and maize yield in the study area. Access to agricultural inputs by maize farmers will avail them the opportunity to use improved farm inputs in crop production which will enhance growth, health and quality products, increased output, improved income and livelihood for farmers in Nigeria.

Table 4. Level (Yield) of maize production across the zones.

Variable	North West (n = 65)		North Central (n = 71)		South West (n = 62)		Total (n = 198)	
	F	%	F	%	F	%	F	%
Yield (kg/ha)								
≤ 1,000	4	6.2	-	0.0	6	9.7	10	5.1

Table 4 Contd.

1,001 – 2,500	28	43.1	69	97.2	55	88.7	152	76.8
2,501 – 4,000	30	46.2	2	2.8	1	1.6	33	16.6
> 4,001	3	4.6	-	0.0	-	0.0	3	1.5
Mean yield		2813.07± 2064.37		2176.05±1324.90		1204.0±1340.49		2080.80 ± 1374.3
Total	65	100.0	71	100.0	62	100.0	198	100

Source: Field survey, 2015.

Table 5. Test of relationships between access to extension, agro input services and maize yield.

Variable	r	P	Decision
Maize yield and access to extension	0.291	0.00	Significant
Maize yield and access to agricultural inputs	0.200	0.005	Significant

Conclusion and Recommendations

The findings of the study show that maize farmers in Nigeria had access to extension and agro-input services, as a result farmers are being exposed to different agricultural technologies and inputs needed in the cultivation of maize. Farmers in the Northwest zone produced the highest maize yield per hectare and earned the highest income while farmers in the Southwest had the least yield per hectare and the lowest income among the three agricultural zones studied. There were significant relationships between access to agricultural extension, inputs and maize yield. Based on the findings from this study, the following recommendations are proffered:

- Extension workers should improve on their information dissemination strategy and give room for maize farmers to have more access to their services.
- Agro-input providers should improve on their contact with farmers as access to adequate and quality inputs are germane to increased maize production.
- More extension workers should be recruited in

the southwest zone and focus more on the dissemination of maize production technologies with a view to increase maize yield per hectare in the zone.

(d) Government should encourage farmers to produce more maize by subsidizing the price of all inputs used in maize production.

(e) There should be synergy between agro-input providers and extension workers to promote maize production business in Nigeria.

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