Assessment of Maize Farmers' Access to Improved Inputs and Technologies in Selected Local Government Areas in Kaduna State, Nigeria

A.O. Lawal, D. Baba and A.A. Wahab
National Agricultural Extension and Research Liaison Services, Ahmadu Bello University, Zaria, Nigeria

Nigerian Journal of Agricultural Extension, Vol. 18, Number 3, September 2017

Abstract

This study assessed small-scale maize farmers' accessibility to improved technologies in some selected LGAs of Kaduna North Senatorial Zone, Kaduna State. Questionnaires were used to collect relevant information from two hundred and eighty farmers. Maize farmers who are non-beneficiaries of NGOs' agricultural intervention programmes were purposively selected for the study across three randomly selected local government area councils - Ikara, Kubau and Makarfi within the zone. The collected data were analyzed using descriptive statistics and multiple regressions. The result showed that Oba Super variety of improved maize was the most (88.5%) accessed improved technology by the farmers. This was followed by herbicides and pesticides (73.2%), fertilizer (53.2%) while credit facility was the least (15%). The improved technologies accessed by the farmers indicated a significant relationship with the farmers' age, gender, household size, farm size and number of farms (r^2 = 0.8800, p=0.000). The study concluded that majority of the farmers within these communities had access to most improved technologies; only 15% had access to credit to further boost their production activities. It is recommended that extension personnel within these communities should link these farmers up with banks and other credit agencies so as to benefit from available agricultural and rural development loans.

Keywords: Maize farmers, improved technology, accessibility

Introduction

Nigeria agriculture is faced with various problems that prevent reasonable development and cause decline in the sector. This decline is due to the nature of its production and the problems underlying its improvement (Arimi and Adekoya, 2009). According to Oyemade (2003), improved farm technology is used to improve farming condition, the natural environment or to carry out other socioeconomic activities. This technology, as indicated by Odoemenem and Obinne (2010), includes fertilizers, herbicides or pesticides etc. Small-scale farmers need to transform their agricultural industry from depending on traditional inputs with low productivity to modern inputs with higher productivity.

Globally, efforts are being made to move from primitive ways of farming to modern farming methods, with improved technologies; and Nigeria is not left out. In order to be at par with advanced and other advancing countries in the area of agricultural development, Federal government launched the Agricultural Transformation Agenda (ATA) in 2012. The programme document recognized the need to increase and sustain access and utilisation of key production inputs (improved maize seed, fertiliser and to some extent, machinery) to increase the productivity and competitiveness of maize production and its supply to markets (FMARD, 2012).

Improved farming technologies are required if agriculture is to move from the subsistence and primitive condition in which it is currently practiced in the country. However, the extent of sustained use and factors influencing the access to improved farm technologies in Maize production are not precisely known. It is therefore, imperative, to assess maize

farmers' accessibility to improved farming technologies. This will help to identify the areas these farmers have access to and assist in making policy that favours maize production. This is because maize plays a predominant role in the farming systems and diets of millions of Nigerians. It is a very versatile crop used for domestic consumption in addition to its industrial use by flour mills, breweries, confectioneries and animal feed manufacturers. Consequently, increasing maize yields and its cultivation particularly in high production potential areas of the county (areas which enjoy a comparative advantage for maize production) can startup a second maize green revolution in the country (ATA, 2012). This study therefore, focused on maize producers especially in the area of technology adoption. The objectives of the study are to: identify the social-economic characteristics of maize farmers in the study area; assess farmers' access to improved farm technology in the study area and; and ascertain the relationship between socioeconomic characteristics of the maize farmers and the access to improved farm technologies.

Methodology

The study was conducted in the Northern Senatorial Zone of Kaduna State (Figure 1). The zone comprises of eight Local Government Areas (LGAs). The major ethnic groups in the study area are Hausa, Fulani, Kadara and Kurama. English and Hausa language are widely spoken (NAERLS, 2010). The data for the survey was collected using structured questionnaire administered to the respondents. A multistage purposive sampling method was employed to select the respondents. This involves the purposive selection of 3 LGAs of Ikara, Kubau and Makarfi LGAs. The second stage involves a random selection of two villages from each district making a total of 28 villages. In each village, 2 communities were randomly selected. Five farmers per community farmers were randomly selected for interviews. Babban Gona was a NGO body that gives farmers farm input.

A sample of 5 farmers per community, two communities per village and 2 villages per district for 14 districts brings the sample population to 280 farmers. The villages selected were: Auchan, Furana, Gadas, Gimi, Gubuchi, Ikara, Janfalan, Kargi, Kurmi-Kogi, Makarfi, Mayere, Paki, Pala and Saulawa. Primary data were generated with the use of structured questionnaire. The collected data were analyzed using descriptive statistics and the accessibility to different inputs such as improve seed, fertilizer, herbicide, tractor and other implements were composed into a single variable named as technology accessibility index, as the dependent variable whereas the other socioeconomic and institutional variables were incorporated as independent variables a multiple regressions were used to examine the relationship between dependent and independent variables included in the model.

Results and Discussion

Socioeconomic characteristics of respondents

The result of the socioeconomic characteristics of the respondents as shown in Table 1 revealed that 40% of the maize farmers in the study area were within the age range of 30-39 years old. This was followed by 40-49 age range with 29.6%. The least age range was 70 years and above with just 1.1%. Those that fell within 20-29 years, 50-59 years and 60-69 years were accounted for 8.9%, 17.5% and 2.9% respectively. Their mean age was 40 years. This result is in line with Nlerum (2013) which showed in the finding that farmers with this age were at their productive age. This is in contrary to the expectation that as a result of rural-urban migration, farming as being left to the very old people and this could reduce the number maize farmers within these communities.

Majority (87.5%) of the maize farmers in the study area were male. This is in line with Ogbonna et al. (2014) in their study which indicated that majority of the farmers were male. This implies that men pre-dominate maize production in the study area. About 37% of the respondents had their primary school attempted with only 7.5% had post-secondary school.

Those that completed primary school, attempted secondary schools and completed secondary school were 13.6%, 22.5% and 19.6% respectively.

Furthermore, most (41.8%) of the respondents had household size of 6-10 persons followed by 11-15 persons with 25.4%, while 21-25 persons had the least (1.4%). Household size of 1-5, 16-20, 26-30 persons had 23.6%, 6.1% and 1.8% respectively. This is in line with Ogbonna et al. (2014) in their study who indicated that most of the farmers had household size of 6-10. The farmers had a mean household size of 9. This means that the farmers had a fairly large household which could possibly serve as family labour for their farming activities and can be dependent on in case there is a shortage of hired labour during farming period. This is in line with Sule et al., (2002) who affirmed that household size has a great role to play in family labour provision in agricultural sector. The result of this household size is also very close to the observation made by Enete and Okon (2010) that 60% of farmers had household size ranging from 5-8 people. Besides, about 86% of the farmers were household heads. This can help in facilitating adoption by all the members of the household. The result also shows that (61.8%) of the farmers had farm size of less than 1.5 hectares for their farming activities, followed by those with 1.5-2.5 ha farm size with 31.8%. The least of the farm size was 3.7- 4.7 ha with 0.4%. Mean farm size was 1.4 hectares. Almost 74% of the farmers had farm land 1-2 farms. Both 3-4 farms and 5 above had 18.5% and 7.2% respectively with mean number of farms as 2.

Result as shown in Table 2 indicated that most (41.4%) farmers harvested maize between 1,626 and 2010 Kg/Ha, with the least (2.9%) between 1240 and 1625 Kg/Ha. Certain percentage (5.7%) of farmers got up to 3,166 and 3550 Kg/Ha. This set might be among the farmers that had access to improved farm technology; although they could get more than this if everything works perfectly.

Access to improved farm inputs and technologies

There were multiple responses as all the farmers had access to more than one improved farm technology. Figure 2 showed that Oba Super variety of improved maize variety was the most (88.5%) accessed improved input by the farmers. This was followed by herbicides and pesticides (73.2%) while credit facility was the least (15%). About 40% of the farmers had access to farm machinery for their land preparation. This is not a good development for the farming activities in the area and could be the reason why majority of the farmers in the area had low farm size ranging from 0.4 – 1.4 hectare of land. Almost average, 58.6% and 53.2% of the respondents had access to extension services and fertilizer respectively.

Relationship between Socioeconomic characteristics of respondents and accessibility to improved technologies

The result of the regression analysis as shown in Table 3 (values in parenthesis are standard error and p-values) indicated that there was a positive and significant relationship between the farmers' age 16.95 (0.008, $p<0.000$), gender 6.22(0.0136, $p<0.000$), household head 4.14 (0.0130, $p<0.000$), type of input accessed 1.64(0.0025, $p<0.1$), average farm size 3.10(0.0054, $p<0.000$), average maize yield per farm 2.27 (0.002, $p<0.05$) with accessibility to improved farm technologies, at different level of significant ($r^2 = 0.8800$, $p=0.000$). This means that variables having a positive significant relationship increases bring about increases in accessibility of technology whereas those showing a negative relationship imply an increase in each of them will result in a relative decrease of the accessibility to technology. The co-efficient of each variables produced the rate at which they exert increase or decrease on accessibility to technology. Age for instance was 0.0144 implying a unit increase in age result in 0.0144 unit increase in access to technology, whereas average farm size had 0.0166 which suggested that a unit increase in farm size result in 0.0166 increase in access to technology.

Nevertheless, crop diversification and number of farms owned or cultivated by the farmer result in -0.0179 and -0.0201 respectively decrease in access to technology. This implies that a unit increase in crop diversification will result in 0.0179 unit decrease in access to technology, while a unit increase in number of farms cultivated result in 0.0201 unit decrease in access to technology. The implication here was farmers with smaller farms number and did not diversify using different crops have more access to improve technology. This because inputs distribution between the period under review was basically cater for only small scale farmers with marginal farm size and basically for maize, rice or soybean farmers as such having this abnormal trend can be attributed to this policy. It means an extra access to improved farm technology increases the probability of having additional maize yield per farm. This confirms the prior expectation that the more farmers' access to improved farming technology or input, the higher the output. Moreover, old farmers had access to farm input than younger ones. Possibly, they used their old age to influence the chances of getting improved farm technology.

Similarly, male farmers had more access to improved farm technology than their female counterpart. This could be so because majority of these male are household head which might have influenced the way they disburse the resources that is meant for the family.

Conversely, there was negative significant relationship between the respondents' household size, number of farm possessed and the accessibility to improved farm technologies. This means that the access to improved farm technologies reduces as the household size increases, this implies that larger household have less access to improve farm technologies. This might be attributed to the fact that larger family has more responsibility to perform than the smaller ones. However, crop diversification index did not make any significant difference at all. That is, irrespective of cropping system that a farmer practice, the rate at which he/she getting more access to farm input would neither increase, nor decrease.

Conclusion and Recommendation

The study concluded that majority of the farmers within these communities had access to improved maize seed variety of Oba Super (88.5%); only 15% had access to credit facility. About average of the Maize farmers in the area had access to extension services. It is thus recommended that extension personnel of both ADP and NGOs in extension within these communities should link these farmers up with banks and other credit agencies so as to benefit from available agricultural and rural development loans. More so, similar study should be conducted in other LGAs of the State in order to assess the farmers' access to improved inputs and technologies.

References

Arimi, K. and Adekoya, A.E. (2009). Determinants of rice farmers' technology utilization in Ekiti and Ogun states, Nigeria: Implication for achieving sustainable in rice production as well as food security. *New York Science Journal*, 6(9): 89 – 94.

Enete, A.A. and Okon, U.E. (2010). Economics of waterleaf production in Akwa Ibom State. *Field Action Science Reports*, 4:18 – 25.

Federal Ministry of Agriculture and Rural Development (2012). *Agricultural Transformation Agenda: We will grow Nigeria's agricultural sector. Agricultural Transformation blue prints.* Abuja; FMARD.

National Agricultural Extension and Research Liaison Services and National Food Reserve Agency (2009). *Agricultural Performance Survey of 2009 Wet Season in Nigeria.* Zaria; NAERLS Press.

Nlerum, F. E. (2013). Determinants of adoption of agricultural extension of green river project among rural households of Niger Delta, Nigeria. *Journal of Agricultural Science and Technology*. 284-288.

Odoemenem, I.U. and Obinne, C.P.O. (2010). Assessing the factors influencing the utilization of improved cereal crop production technologies by smalls-cale farmers in Nigeria. *Indian Journal of Science and Technology*. 3(1).

Ogbonna, O.I., Onwubuya E.A. and Akinnagbe O.M. (2014). Adoption of green river project for fish farming technologies by farmers in Niger Delta region of Nigeria. *Journal of Agricultural Extension,* 18(1): 38-54.

Oyemade, B.T. (2003). Influence of socioeconomic factors on continued use of selected postharvest technologies among women processors in Oyo State. MSc project, Department of Agricultural Extension and Rural Development, University of Ibadan, Nigeria.

Sule, A.M., Ogunwale S.A. and Atala T.K. (2002). Factors affecting adoption of fishing innovation among fishing entrepreneurs in Jebba Lake community. *Journal of Agricultural Extension,* 6: 48 – 60.

Table 1: Socioeconomic characteristics of respondents (n=280)

Variables	*Frequency*	*Percentage (%)*	*Mean*
Age (years)			
20 - 29	25	8.9	
30 - 39	112	40	
40 - 49	83	29.6	40
50 - 59	49	17.5	
60 - 69	8	2.9	
70 and above	3	1.1	
Sex			
Male	245	87.5	
Female	35	12.5	
Educational Level			
Primary school attempted	38	13.6	
Primary school completed	103	36.8	
Secondary school attempted	63	22.5	
Secondary school completed	55	19.6	
Post-secondary school (ND, NCE, HND, first degree)	21	7.5	
Household Size			
1—5	66.08	23.6	
6—10	117.04	41.8	
11--15	70.12	25.3	9
16 - 20	17.08	6.1	
21 - 25	3.92	1.4	
26 - 30	5.04	1.8	
Household head			
No	67	13.9	
Yes	413	86.1	
Average Farm Size (Ha)			
0.4 - 1.4	173	61.8	1.4
1.5 - 2.5	89	31.8	
2.6 - 3.6	13	4.6	
3.7 - 4.7	1	0.4	
≥ 4.8	4	1.4	
Number of Farms			
1—2	208	74.3	2
3—4	52	18.5	
5 above	20	7.2	

Source: Field Survey, 2014

Table 2: Distribution of respondents according to maize yield (n=280)

Maize Yield (Kg/Ha)	*Frequency*	*Percentage (%)*
1240 - 1625	8	2.9
1626 - 2010	116	41.4
2011 - 2395	65	23.2
2396 - 2780	47	16.8
2781 - 3165	28	10
3166 - 3550	16	5.7

Source: Field Survey, 2014

Table 3: Regression analysis of socioeconomic characteristics of respondents and farmers' accessibility to improved technologies

Technology accessibility index	*Co-efficient*	*Std. Error*	*t- Value*
Age	0.0144	0.0008	16.94 ***
Gender	0.0846	0.0136	6.22***
Household size	-0.0019	0.0008	-2.23**
Household head	0.0537	0.0130	4.14***
Type of input Accessed	0.0041	0.0025	1.64 *
Average Yield Per Farm	0.00454	0.0020	2.27**
Average Farm Size	0.0166	0.0054	3.10***
Number of Farms	-0.0201	0.0051	-3.95***
Crop diversification Index	-0.0179	0.0191	-0.94 NS
Total Maize Output by Farmer	-0.0017	0.0010	-1.77*
Intercept	-0.1787	0.0506	-3.54***
F- value			145***
R-squared			0.8810
Adjusted R-squared			0.8800

NB: *** significant at 1%; ** Significant at 5%; * Significant at 10%; NS Not Significant
Source: Field Survey, 2014

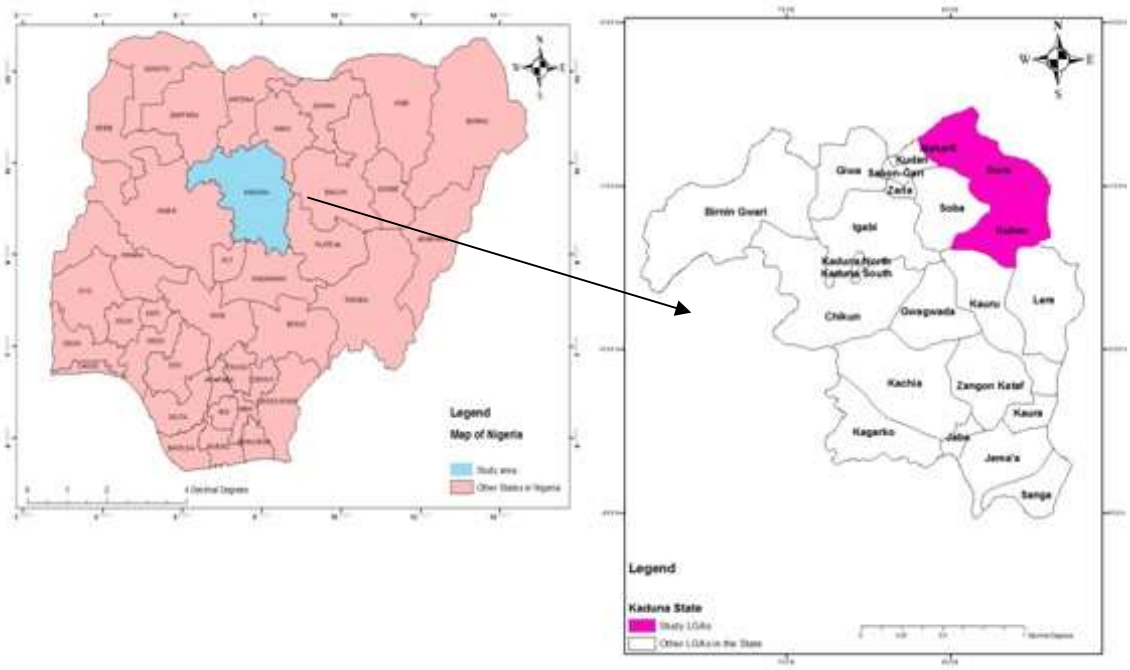

Figure 1: Map of Nigeria and Kaduna State showing the LGAs covered in the study

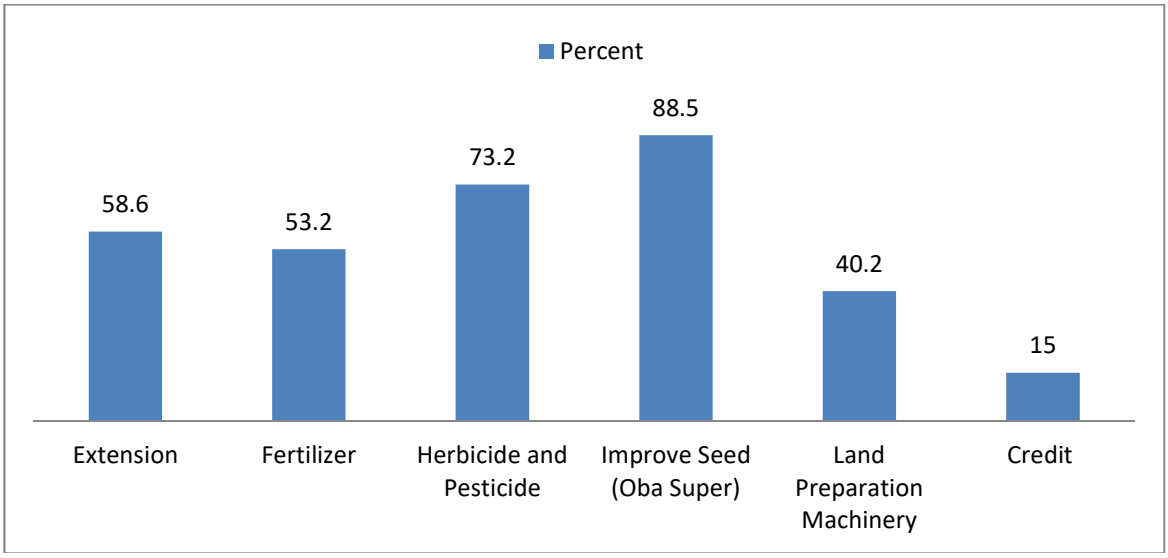

Figure 2: Access to improved farm inputs and technologies