Awareness of Small Scale Farmers and Their Willingness to Adopt the Growth Enhancement Support (GES) Scheme In Oyo State, Nigeria

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Abstract

Fertilizer and seeds have been recognized as two of the most critical farm inputs needed to enhance and sustain increased farm productivity in Nigeria. However, total fertilizer use remain far below the potential and economic demand. This study examined the awareness of small-scale farmers and their willingness to adopt the Growth Enhancement Support (GES) scheme. The scheme encourages the resource-constrained farmer and the critical actors in the fertilizer value chain, to work together to improve productivity, household food security and income. Data were obtained from 200 farmers, selected through a multi-stage sampling technique. Probit and Logistic Regression models were employed for analysis. Results showed that most of the respondents were aware of the GES scheme as well as the type of farm inputs supported under the scheme. While factors such as years of farming experience (β= 0.078), farm size (β=1.648) and membership of farmers' association (β=0.053) significantly influenced the level of awareness of the farmers about the scheme at 5 and 1% level of significance respectively, farmers' willingness to adopt the scheme was influenced by land ownership (1%), access to subsidized inputs (1%) among others. Awareness and access to timely and relevant information about a scheme play a central role in the adoption decision process of small-scale farmers. To enhance the adoption of schemes such as the GES, there is the need for capacity building programmes as well as the identification of the key determinants of the willingness of small-scale farmers to adopt such schemes.

Keywords: Awareness, farmers, GES scheme, Oyo state, willingness to adopt.

Introduction

The increasing global population and economic growth drives the need for a shift from traditional agricultural practices to mechanized farming systems through the use of new and improved technologies, fertilizers and improved seeds and seedlings (Foresight, 2011; FAO, 2011a). Owing to its potential to increase production, promote input use and raise the net income gains from a given level of input use, agricultural input subsidies have been widely extended to support farmers, especially in the developing world. After all, improved seeds and fertilizers are complementary inputs implying that the highest levels of yield are only achieved by a simultaneous increase of both types of inputs in the correct proportions (Ayoola, 2001).

Farm subsidy programs are not new in Nigeria. However, despite the continued application of subsidy and the several

studies in the past, and in recent times the recognition that fertilizer and seeds as two of the most critical farm inputs needed to enhance and sustain increased farm productivity, total fertilizer use remains far below the potential and economic demand (IFAD, 2012). Although as at 2009, fertilizer use in Nigeria was estimated at 13 kg/ha by the Federal Ministry of Agriculture and Rural Development (just above the average for the African region estimated 9 kg/ha) as against the 200 kg/ha recommended by the United Nations Food and Agricultural Organization, the ministry set ground-breaking goals to increase the fertilizer use to 50 Kg/ha (FAO, 2011b; FMARD, 2011). Consequently, a number of attempts have been made by the government and the International Fertilizer Development Center (IFDC) to address the situation. Sadly, the problem still lingers. Factors such as corruption and policy inconsistencies, ambiguities and instabilities leading to arguments regarding its basis, application, impacts and sustainability have been found to be responsible for the ineffectiveness of the various fertilizer subsidy programmes put in place by the Nigerian government over the years (Adesina, 2013).

The decline in productivity of a typical Nigerian farmer over the years, for instance, has been largely attributed to untimely access to critical farm inputs such as fertilizer, improved seedlings at the right quality (FMARD, 2008). This might not be unconnected to a corrupt and totally inefficient fertilizer and seed sector where the government spends huge amounts of money on direct procurement and distribution of subsidized fertilizer and less than 11% of fertilizers purchased and distributed by government get to the genuine farmers (Oyeleye, 2012). On one hand, fertilizers acquired by Government were found in markets and in foreign countries where it was sold at prevailing market prices such that middlemen and rent seekers benefited from the billions of naira spent every year on fertilizer subsidies (Freeman, 2010). On the other hand, Nigerian farmers wallowed in abject poverty. Furthermore, some of the fertilizer delivered contained more sand than fertilizer which also applied to the seed sector where middlemen and briefcase contractors masqueraded as seed companies and conducted brisk business, supplying seed to Government (Adesina, 2013).

As a result of this, the Federal Government of Nigeria under the Agricultural Transformation Implementation Council (ATIC) in 2012 inaugurated the GES scheme (International Fund for Agricultural Development, 2012). The scheme was designed to break the inefficient fertilizer support delivery to farmers, eliminate political/spurious farmers, fertilizer vendors/traffickers and ensure that the country's huge investments in the sub-sector reaches the target beneficiaries, which are the real farmers and deliver the relevant economic benefits (Federal Ministry of Agriculture and Rural Development, 2012). This was to be accomplished through a cash support to be loaded on farmer's mobile wallet as an electronic voucher system to which only farmers in a validated data base of 4.7

million farmers were expected to have access to subsidized agricultural inputs. The cell phones distributed under the scheme was to also allow them to have market information on the price, quantity and quality of fertilizers and improved planting material available and where they can be procured. As a result, the small-scale farmers would be able to bargain better and save themselves from the middlemen who often exploit them by paying them very low prices for their produce. Though promising, the desired goals of the GES scheme cannot be realized on the basis of the government's view alone. Efforts have to be made to ascertain the level of awareness of target farmers about this scheme and examine their willingness to adopt it. Hence, this study attempts to assess awareness and willingness to adopt the GES in Oyo state as well as identifying the factors influencing them.

Materials and Methods

This study was carried out in Oyo State in 2014 when the GES was being implemented in the state. Oyo state occupies a land area of 35,743 km^2 and has a total population of 6,617,720 people that are mainly Yoruba speaking. It has an equatorial climate with dry and wet seasons and relatively high humidity. The dry season is from November to March while the wet season starts from April to October. The vegetation pattern is that of rainforest in the south and Guinea Savannah in the North with a mean daily temperature ranging between 25°C and 35°C almost throughout the year. Most of the people in the state are farmers cultivating crops such as maize, yam, cassava, millet, rice, plantain, cashew, oil palm amongst others (www.oyostate.gov.ng).

Primary data used in this study were collected from representative small-scale farmers using a multistage sampling procedure. In the first stage, three out of the four Agricultural Development Project zones in Oyo state were purposively selected owing to the fact that it is one of the Southwestern states where the GES was fully implemented. The second stage involved the random selection of five blocks in Ibadan, two in Ogbomosho and three in Oyo while the third stage involved the random selection of two cells from each block. In the final stage, 20 households were randomly selected from each cell to make up a total of 200 small-scale farmers which formed the sample size of this study.

Primary data were collected through the use of well-structured questionnaires and analyzed using descriptive statistics like frequencies, percentages and means to analyze respondents' socio-economic characteristics such as gender, age, marital status, level of education, household size, among others. Likert scale was employed to assess the level of awareness of small-scale farmers about the GES scheme. As a result, the mean ranking for the awareness statements was calculated from the awareness index generated. The degrees of awareness and being not aware were determined by the mean score above and below the benchmark respectively (Likert, 1932). The average of the respective ranks of the frequency of responses was estimated and was used to decide the agreement level per statement. Probit and Logistic regression models were used to examine the factors influencing the level of awareness and willingness to adopt the scheme.

The Probit model

The Probit Regression Model was used to examine the factors influencing farmers' awareness of the GES. The decision of the i^{th} small-scale farmer with respect to awareness about the GES depends on the unobservable utility index Y that was determined by the explanatory variables in such a way that the larger the value of index Y, the greater the probability of the respondents' awareness about this scheme. The index is expressed as;

$Y_i^* = \beta_0 + \beta_{ij}X_{ij} + e_i$ ……(1)

Where Y_i^* is an underlying index reflecting the difference between the utility of adopting and not adopting; β_o is the intercept, β_{ij} is a vector of parameters to be estimated; X_{ij} denotes the independent variables.

$P(Y_i^* = 1|x) = F(\beta_0 + \beta_{ij}X_{ij})$ ……(2)

$P(Y = 1|x) = \beta_1 + \beta 2\ X_i$ ……(3)

While Y_i is the observed response for the i^{th} observation of the response variable Y, X_i represents the explanatory variables.

$Y = 1/X$ for a farmer that is highly aware of the GES

$Y = 0/X$ for if otherwise.

The specified Probit model for this study is as follows:

$Y = \beta_0+\beta_1X_1 + \beta_2X_2 +\beta_3X_3+\beta_4X_4+\cdots+\beta_{11}X_{11} + \epsilon$ ……(4)

Where:

Y = Awareness about the GES (High level of awareness =1 and 0 if otherwise)

X_1= Primary Education (1 =Yes and 0 if otherwise)

X_2= Secondary Education (1 =Yes and 0 if otherwise)

X_3= Tertiary Education (1 =Yes and 0 if otherwise)

X_4 = Age (in years)

X_5 = Sex of the Respondents (1=Male and 0 if otherwise)

X_6 = Respondent belongs to a Farmers' association (1 if Yes and 0 if otherwise)

X_7= Respondent has access to information (1= has access, 0 if otherwise)

X_8= Training (1 if received training about the scheme and 0 if otherwise)

X_9 = Farm Size (Possession of 1-3 hectares of land) (1= Yes and 0 if otherwise)

X_{10} = Farming Experience (Years)

X_{11} = Contact with Extension Agents (1 = Yes and 0 if otherwise)

The Logit model

Logistic Regression analysis was used to examine the factors influencing small-scale farmers' willingness to adopt the Growth Enhancement Support Scheme. Following Kalyebara (1999), the general form of the Logit model to be estimated is as follows;

Prob (Y = 1) F(X)…… (5)

Prob (Y = 0) 1- F(X)…… (6)

Where Y_i is the observed response for the i^{th} observation of the response variable Y

Y = 1 for a farmer who is willing to adopt the GES

Y = 0 for a farmer who is not willing to adopt the GES

The specified Logit model for this study is stated explicitly as follows:

$Y = \beta_0+\beta_1X_1 + \beta_2X_2 +\beta_3X_3+\beta_4X_4+\cdots+\beta_{15}X_{15} + \epsilon$ ……(7)

Where:

Y = Willingness of small-scale farmer to adopt the GES (willing to adopt=1, 0 if otherwise).

X_1= Primary Education (1 = Yes and 0 if otherwise)

X_2= Secondary Education (1 = Yes and 0 if otherwise)

X_3 =Tertiary Education (1 = Yes and 0 if otherwise)

X_4 = Farm Size (Possession of 1-3 hectares of land) (1= Yes and 0 if otherwise)

X_5 =Age (in years)

X_6 =Farming Experience (Years)

X_7 =Income from Farm Proceeds (Naira)

X_8 =Sex of the Respondents (1= male and 0 if otherwise)

X_9 =Farmer's Awareness of the GES scheme (1= aware and 0 if otherwise)

X_{10} =Farmer's Access to Subsidized Inputs (1=Yes and 0 if otherwise)

X_{11} =Farmers Engagement in other schemes aside the GES (if farmer is engaged =1 and 0 if otherwise)

X_{12}=Membership of Association (Yes =1 and 0 if otherwise)

X_{13}=Land Ownership (Yes=1 and 0 if otherwise)

X_{14}=Contact with Extension Agents (1 = Yes and 0 if otherwise)

X_{15}=Farmers Credit Accessibility (1 if farmer has ever borrowed from formal source and 0 if otherwise)

Results

Table 1 presents selected socioeconomic characteristics of the respondents. Results showed that more than half of the farmers were male and aged between 41 and 60 years with a mean age of 57.9 years. A sizable number of the respondents had one form of formal education or the other but with majority having primary education. Almost all (95.5%) of the farmers were married with household size of between 6 and 10 members constituting the majority among the respondents in the study area. The mean household size stood at about 7 members per household. Most (88%) of the farmers had registered under the GES scheme with more than half having acquired 11-20 years of farming experience.

Table 1: Socioeconomic characteristics of the respondents

Variables	Frequency	Percentage
Age (in years)		
21-30	9	4.5
31-40	34	17.0
41-50	64	32.0
51-60	49	24.5
>60	44	22.0
Mean ±SD	57.9±13.0	
Sex		
Male	110	55.0
Female	90	45.0
Educational Status		
No Formal Education	56	28.0
Primary Education	77	38.5
Secondary Education	28	14.0
Tertiary Education	39	19.5
Marital Status		
Married	191	95.5
Single	8	4.0
Widowed	1	0.5
Household Size		
1-5	46	23.0
6-10	108	54.0
11-15	30	15.0
>16	16	8.0
Mean ±S.D	7.0±3.3	
Years of Farming Experience		
1-10	40	20.0
11-20	110	55.0
21-30	20	10.0
>31	30	15.0
Mean ±SD	22.4±14.7	
Registration under GES		
Registered	176	88.0
Not Registered	24	12.0
Total	**200**	**100.0**

Source: Field Survey

Table 2 showed that respondents were highly aware of the GES scheme as the mean score of all the respondent's awareness statements fell above the average of 1.5. Specifically, about 78.4% of the respondents were highly aware of the government support to farmers under the GES scheme while only about 11% were aware at low level. Also, more than half of the respondents were highly aware of the farm inputs supported by the Government, how the support was provided and the intended beneficiaries of the scheme. Furthermore, over half (58.5%) were highly aware of the type of fertilizers and varieties of seeds distributed under the GES scheme.

An analysis of the factors influencing the level of awareness of small-scale farmers about the GES is presented in Table 3. The significant chi-square value of 63.54 indicates that the model is well fitted. Out of the eleven variables included in the model, eight variables were significant in explaining the level of awareness of the GES in the study area. These variables include; tertiary education of the household head, sex of household head, age of household head, years of farming experience of household head, household farm size, access to media of household head, contact with extension agent and membership of farmers' association. Specifically, while tertiary education, sex, years of farming experience, farm size, access to media, contact with extension agent and membership of farmers' association positively influenced the level of awareness of the respondents, the age of the respondents, however, showed a negative effect on the level of awareness of the respondents.

Table 2: Awareness of respondents about the GES scheme

Awareness Statement	Total Score	AW		IN		NA		Mean score
		F	%	F	%	F	%	
I am aware of the government support to farmers under GES	558	156	78.4	22	11.1	22	11.1	2.79
I am aware of the farm inputs supported by government under GES.	468	117	58.5	58	29.0	25	12.5	2.34
I am aware of how the support is being provided.	452	105	52.5	65	32.5	30	15.0	2.26
I am aware of the intended beneficiaries of the GES scheme.	456	116	58.0	51	25.5	33	16.5	2.28
I am aware of the type of fertilizers and varieties of seeds distributed under GES.	468	123	61.5	45	22.5	32	16.0	2.34

Source: Field Survey
*AW=Aware; IN=Indifferent; NA=Not aware

As presented in Table 4, majority (63%) of the respondents were willing to adopt the Growth Enhancement Support (GES) Scheme. This could be linked to the fact that majority of the respondents had at least primary education and as a result, their level of awareness about the scheme was high.

Table 3: Factors influencing farmers' level of awareness of the GES scheme

Variables	Coefficient	Z	Marginal effects
Primary education	-0.204	-0.24	-0.029
Secondary education	-0.828	-1.07	-0.111
Tertiary education	1.253	1.71*	0.234
Age	-0.579	-1.89*	-0.004
Sex	1.141	2.09**	0.004
Farmers' association	0.053	3.39***	0.053
Access to media	1.226	2.62***	0.008
Training	1.857	0.01	0.075
Farm size	1.648	2.29**	0.199
Years of Farming experience	0.078	2.26**	0.001
Contact with extension agent	1.937	2.39**	0.001

Source: Field Survey
* ** and *** represent significance level at 10%, 5% and 1% respectively
Number of observations = 200; LR chi^2 (11) = 63.54; Pseudo R^2 = 0.5786
Prob>chi-square = 0.0000; Log likelihood = -23.141362

Table 4: Farmers willingness to adopt the GES scheme

Willingness to adopt	Frequency	Percentage
Yes	126	63.0
No	74	37.0
Total	200	100.0

Source: Field Survey

Table 5 presents the Logistic regression analysis on farmers' willingness to adopt the Growth Enhancement Support (GES) scheme. The Chi-square value of 48.75 and its significance at 1% indicates that the explanatory variables jointly explain the farmers' willingness to adopt the scheme and that the model is well fitted. Six variables were found to be significant in explaining the willingness of farmers to adopt the GES scheme in the study area. Awareness about the scheme, sex, land ownership, access to subsidised inputs under past schemes, engagement in other schemes positively influenced farmers' willingness to adopt the Growth Enhancement Support (GES) scheme, while income from farm proceeds, however, negatively influenced farmers' willingness to adopt the Growth Enhancement Support (GES) scheme.

Table 5: Factors influencing farmers' willingness to adopt the GES Scheme

Variables	Coefficient	Z	Marginal Effects
Primary education	0.575	1.00	0.059
Secondary education	0.134	0.29	0.017
Tertiary education	-0.465	-1.05	0.071
Farm size	-0.006	-0.01	-0.001
Age	-0.034	-1.60	-0.005
Years of Farming experience	-0.256	-0.45	-0.040
Income from Farm proceeds	-0.372	-2.07**	-0.004
Sex	1.068	2.49**	0.156
Aware about GES	1.323	1.92*	0.260
Access to subsidized inputs	2.214	3.45***	0.226
Engagement in other schemes	1.073	1.96**	0.283
Farmers' association	-0.289	-0.64	-0.041
Land Ownership	1.775	2.98***	0.375
Contact with extension agents	-0.055	-1.05	-0.074
Access to credit	-0.223	-0.52	-0.032
Constant	-2.967	-1.07	-0.212

Source: Field Survey, 2013

Note: * ** and *** represent significance level at 10%, 5% and 1% respectively

Number of observations = 200; LR chi^2 (15) = 48.75; Pseudo R^2 = 0.6586 Prob>chi-square = 0.0000; Log likelihood = - 89.932015

Discussion

Results of the descriptive statistics with respect to age stressed the age-long dominance of males in agriculture. This could be attributed to the social roles associated with farming in the rural areas in Oyo state. The mean age of the farmerssuggests an ageing farming population, which could be owing to the lack of or declining number of active youths engaged in farming in the study area. This finding is consistent with the findings of Akpan (2010) in which the farming population in Nigeria was found to be ageing. The age of farmers also explains the average years of farming experience of over 20 years.

With respect to the respondents' level of awareness of the GES scheme, the mean awareness score indicates that respondents were highly aware of government support to farmers under the GES scheme as well as the type of farm inputs supported under the scheme. On the other hand, respondents were least aware of how the support was being provided and the intended beneficiaries of the GES scheme because some non-farmers also benefited from the scheme.In all, it can be deduced that the majority of the respondents had a high level of awareness about the GES scheme and its mandates.

Generally, farmers' educational level had a positive effect on awareness of a technology and its adoption. It is a likely factor in influencing the readiness to accept and properly use an innovation. The marginal effects of the determinants of level of awareness of farmers showed that having tertiary education increased the probability of being aware of the GES scheme by 23.4% relative to farmers with no formal education. It is believed that education exposes an individual to change, making him or her appreciate the need to adopt a technology (Paudel *et al*., 2008). Also, the positive and significant effect of sex indicates that being a male farmer increased the probability of being aware of the GES scheme by 0.4% in relation to their female counterparts. This finding, however, differs from the findings of Kaliba *et al*. (1997) and Burton *et al*. (1999) in which the awareness of female farmers about a scheme was higher than that of male farmers.

Furthermore, access to media, used as a proxy for access to information, was positive and significant, suggesting that having access to information increased the probability of being aware of the GES scheme by 0.8% relative to those without access. In other words, access to information influences the farmers' awareness and creates opportunities for the farmers to adopt the innovation. In the same vein, the positive effect of contact with extension agent indicates that having contacts with extension agents increased the probability of being aware of the GES scheme by 0.1%. Extension agents serve as a source of technical information to farmers. Such services provide the farmer with information about the technology and its benefits. This result corroborates the findings of Baidu-Forson, (1999), Faturoti *et al*. (2006) and Mazvimavi and Twomlow, (2009).

Membership in a local organization reflects to a certain level, the social capital a farmer possesses. Membership of farmers' association was positively associated with awareness of the GES scheme, inferring that farmers who were members of one association or the other

have a slightly higher probability of 0.1% of being aware of the scheme than those who were not members of any association. This finding reflects the potential of social capital in internalizing economic externalities and thus helping in the adoption of technologies and is in agreement with the findings of Maddison (2006). Also, years of farming experience and farm size had positive and significant effects, implying that having farming experience and bigger farm sizes increased the probability of being aware of the scheme by 0.1% and 19.9% respectively. This could be attributed to the fact that such farmers have the ability to afford and embrace new innovations which will increase their income in the long run. More-so, farm size is assumed to represent the labour input to the farm and is sometimes related to the wealth of a farmer. Further, farmers with higher experience appear to often have full information and better knowledge, and are able to evaluate the advantage of the scheme (Chilot, 1996).

Conversely, age had a negative effect indicating that the level of awareness decreased with increase in the age of the farmers. Specifically, a year increase in age decreased the probability of being aware of the scheme by 0.4%. This is expected as older farmers are often more reluctant to adopt new technologies while younger ones are better prepared for the adoption of technological innovations as stipulated in the Human Capital theory (Sidibe, 2005). This result agrees with the findings of Fufa and Hassan (2006) who found out that as age increased, the probability of being aware of new schemes decreased but differs to the findings of Awotide *et al.* (2012) who reported that age of rice farmers was positively related to their level of awareness of National Cereal Research Institute (NCRI)/Africa Rice.

There are varied effects of gender on technology adoption. However, depending on the socio-economic conditions in which an activity is carried out, technology selection and adoption tends to be non-neutral although technologies are gender neutral (Lubwama, 1999). The positive effect of sex of household head implies that being a male farmer increased the willingness to adopt the GES scheme by 15.6% relative to their female counterparts. As expected, land ownership had a positive effect on willingness to adopt. Specifically, owning land increased the willingness to adopt the scheme by 37.5%. This could be because land ownership provides the farmer with ownership and user rights that can be used to access credit facilities to fund new investments. In the same vein, access to subsidized input under past schemes was positive and significant. That is, having access to inputs at a reduced price under past schemes increased the willingness to adopt the GES scheme by 22.6% and influenced the adoption of new and improved technologies.

Awareness of the potential benefits of a technology is necessary to trigger its adoption. In other words, awareness creation about new products generally leads to increase in knowledge and a higher tendency that such technology will be adopted (Chinnici *et al*., 2002). Awareness about the GES scheme had a positive effect on the willingness of farmers to adopt the GES. This indicates that being aware of the scheme increased farmers willingness to adopt the scheme by 26.0% relative to farmers that were not aware of the scheme. On the other hand, the negative effect of income from farm proceeds indicates that a naira increase in income from farm

proceeds reduced farmer's willingness to adopt the GES scheme. This could be the case where the farmer does not see any need to invest or purchase any fertility enhancing input. Engagement in other schemes aside GES however had a positive effect. Specifically, being engaged in other schemes increased the willingness of farmers to adopt the GES scheme by 0.4%. This is expected as a farmer who had previously been exposed to the benefits of other technologies and programmes may be motivated to adopt new technology.

Conclusion

This study found out that encouraging the organization of farmers into groups or associations, where timely and relevant information can be disseminated, through farmers' close contact with extension agents is pertinent among other factors for increased awareness of the scheme. However, to enhance its adoption, key determinants need to be examined. Although the central role that awareness and access to timely and relevant information about a scheme play in the adoption decision process of small-scale farmers is clear, the need for capacity building programmes to enhance adoption of this scheme and future schemes, as well as its reach to the intended beneficiaries,should not be ignored.

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