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Estimating Farmers' Willingness to Pay for Stress Tolerant Maize (STM) in Nigeria: A Heckman Model Approach

Opeyemi Eyitayo Ayinde[1], Olawumi Christiana Daramola[1], Adewale Henry Adenuga[2,3]* and Tahirou Abdoulaye[4]

[1]Department of Agricultural Economics and farm management, Faculty of Agriculture, University of Ilorin, Ilorin, Kwara PMB 1515, Nigeria
[2]Agricultural and food Economics Branch, Agri-Food and Biosciences Institute (AFBI), Newforge Lane, Belfast BT9 5PX, United Kingdom
[3]Gibson Institute for Land Food and Environment, School of Biological Sciences, Queen's University, Belfast BT7 1NN, United Kingdom
[4]International Institute for Tropical Agriculture, Ibadan, Oyo 200001, Nigeria

ABSTRACT

Maize constitutes an important source of calories and plays a crucial role in the livelihoods of most Africans. However, maize productivity in the continent remains low relative to other regions of the world. To improve the productivity of maize in the continent, the International Maize and Wheat Improvement Center (CIMMYT), launched the Stress Tolerant Maize for Africa (STMA) project in 2016. Employing a combination of the contingent valuation methodology and Heckman's two-step model, farmers' willingness to pay (WTP) for the STM and levels of payment was analysed. The factors influencing farmers' WTP and their levels of payment was also investigated. Data from 165 randomly sampled maize-based farming households was analysed to achieve the study objectives. Results of the study showed that about 75% of the farmers were willing to pay for the STM varieties with an average price of N261.52/kg ($US0.8/kg). Farm income, years of experience in farming, membership of social group and price of other maize seeds were found to be statistically significant factors influencing farmers' WTP. The payment level was found to be influenced by farm size, level of education of the household head and access to credit. Based on the results of the study, it is recommended that governments and other stakeholders in the development

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E-mail addresses:

opeayinde@gmail.com (Opeyemi Eyitayo Ayinde)
darawumi@gmail.com (Olawumi Christiana Daramola)
aadenuga01@qub.ac.uk , adewale.adenuga@afbini.gov.uk (Adewale Henry Adenuga)
t.abdoulaye@cgiar.org (Tahirou Abdoulaye)
*Corresponding author

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sector should encourage credit institutions to grant farmers access to credit to enable them to invest on improved technologies such as the STM in order to raise their productivity.

Keywords: Contingency valuation method (CVM), Heckman model, maize, willingness to pay (WTP)

INTRODUCTION

Maize is a strategic crop in Africa, grown in 48 of the 49 countries in sub-Saharan Africa (SSA) for food security and daily livelihood (Abate et al., 2017). It occupies the largest area of all major staples (maize, millet, sorghum, cassava, cowpea, rice, beans, groundnut, yams, and barley) occupying about 36 million ha of land (Abate et al., 2017). Thanks to laudable projects such as Improved Maize for African Soils (IMAS) and the drought-tolerant maize for Africa (DTMA) implemented by the International Maize and Wheat Improvement Center (CIMMYT) and the International Institute of Tropical Agriculture (IITA), the productivity of maize in SSA has experienced an increasing trend in recent years (Abate et al., 2017; Ayinde et al., 2013). In spite of this progress however, the average performance of maize in SSA is the lowest among all world regions and has failed to reach its full potential achievable with improved seed varieties and better agronomic management practices. In fact, there has been a decline in per capita maize production by about 10 % since 1970 (Minot, 2008).

Of the major maize growing countries in Africa, Nigeria occupies a pivotal position as the largest producer in West Africa and fifteenth in the world producing about 12 % of total maize grown in Africa coming only behind South Africa (Daly et al., 2016). Maize is widely grown across all regions of the country mostly by small holder farmers cultivating between 1 and 1.5 hectares (Abate et al., 2014; Liverpool-Tasie et al., 2017). Maize constitutes a major calories source and plays a crucial role in the livelihoods of the majority of Nigerian rural and urban population (Ayinde et al., 2010; Iken et al., 2002; Liverpool-Tasie et al., 2017). Just like other African countries however, maize productivity is still below its full potential in Nigeria with food insecurity and poverty dominating in the maize based agricultural production households in the country. The supply of maize has not kept pace with demand and the country remains a net importer of the grain (Abate et al., 2014, Ammani, 2015). Though there has been increase in maize production over the years especially in the last decade, more of the increase has come from growth in area of land cultivated rather than increased productivity. For example, while the national average growth rate in area of maize planted and production between 1994 and 2012 was about 3.8 and 4.7% respectively the rate of productivity growth was less than 0.5 % over the same period (Ammani, 2015). With the Nigeria population projected to surpass the 300 million people mark by 2050 (United Nations, 2017), the current level of productivity growth is totally inadequate. In addition to being threatened by climate change and deteriorating environmental

conditions, such as flood, droughts, insect pests, diseases, poor soil fertility among others, low level of awareness and use of improved seed varieties, lack of good management practices as well as institutional and policy issues, including research capacity, level of input use and access to financial resources have been identified as the major constraint to improved maize productivity in Nigeria (Abate et al., 2014; Food and Agricultural Organisation [FAO], 2017; Liverpool-Tasie et al., 2017). Increased agricultural productivity and resource use efficiency are identified as principal instruments for stimulating economic growth, increasing food security and alleviating poverty of resource-poor farm families in Nigeria (Bamire, 2007; Mozumdar, 2012; Thirtle et al., 2003; Prabha & Chatterjee, 2010).

Studies have shown that the adoption of improved maize varieties combined with better management techniques can minimize losses from maize yield by about 40% (Hendrix & Glaser, 2007). To contribute to increased maize production and productivity such that farmers are provided with the opportunity of overcoming the challenges of maize production and improving their livelihood the Stress Tolerant Maize for Africa (STMA) project was launched in 2016 by the International Maize and Wheat Improvement Center (CIMMYT) and its partners. The project is aimed at the developing and disseminating improved multiple stress tolerant maize varieties. With a low level of adoption of improved maize varieties in the past especially in West Africa where adoption rate is only 36%, the success of the project will to a large extent depend on farmers' willingness to pay for the improved maize varieties and their conviction of the value they add. The low adoption rate is connected to the fact that most maize farmers do not purchase improved maize varieties for a plethora of reasons ranging from economic to cultural reasons.

The objective of this study is to evaluate the level of awareness of the STM varieties, analyse farmers' willingness to pay for the STM varieties and determine factors influencing farmers' willingness to pay for the STM varieties in Kwara state, Nigeria. Analysing farmers' awareness of the new technology and the relative prices farmers are willingness to pay will serve as a vital contribution to the enhancement of the maize sector by presenting some important policy suggestions based on empirical findings. It will also contribute to future research and development initiatives especially in terms of helping authorities to make informed decisions. This is particularly vital given that the percentage of farmers employing purchased inputs such as improved maize varieties in Nigeria is low (Ajeigbe et al., 2009; Liverpool-Tasie et al., 2017). For example, Jayne et al. (2003), found that the size of the maize market was constrained by high costs of adopting improved technology relative to farmers' willingness to pay (WTP) for maize. This is because a lot of the resource-poor farmers are influenced by their behavioural and institutional characteristics (Wale & Yalew, 2007). Farmers' awareness

and willingness to pay for improved maize varieties is a prerequisite to increasing maize productivity. There is need to make farmers to be aware of the high yielding maize varieties that are resistant to pests and diseases and are able to withstand stress such a drought and other climatic condition.

Studies on WTP for improved agricultural technology in Africa are few. For example, Kassie et al. (2017) analysed farmers' preferences and WTP for maize traits (drought tolerance) employing the choice experiment approach. They found from their analyses that maize farmers were WTP a premium for the drought tolerant trait in maize relative to other traits. Asrat et al. (2004) examined the factors influencing farmers' WTP for soil conservation practices in Ethiopia's southeastern highlands. In their study, they found that farmers were happy to spend more time and employ more labour for soil conservation practices rather than paying cash. Ulimwengu and Sanyal (2011) analysed farmers' WTP for a variety of agricultural services in Central Africa using a multivariate probit approach. They showed from their results that land ownership and farmers' income significantly influenced WTP for agricultural services. Asrat et al. (2010) analysed farmers' preferences for different crop varieties in Ethiopia and the factors influencing their preferences employing a choice experiment approach. The results of their analyses showed that environmental adaptability, household resource endowments yielded stability, access to extension services, and farming experience and were the major factors influencing farmers' preferences for improved seed varieties. This study is the first to access farmers' awareness of the STM varieties and their willingness to pay for it in Nigeria using a combination of the contingency valuation methodology and the Heckman model. In actual sense, the STM variety was introduced in 2016, and its success will depend on farmers' willingness to adopt and pay for it.

The remaining part of this paper is structured into five sections: Section 2 discusses the tress Tolerant Maize for Africa (STMA) project. The description of the database and methodology for the study is presented in section 3 while section 4 presents the empirical results and gives an interpretation of the main results obtained in the light of economic theory while section 5 gives an overview of the paper's conclusion and provide important policy implications.

Stress Tolerance Maize for Africa (STMA)

Building on previous projects such as the "Drought Tolerant Maize for Africa" (DTMA) and the "Improved Maize for Africa Soils project" (IMAS), the Stress Tolerant Maize for Africa (STMA) project was launched by the International Maize and Wheat Improvement Center (CIMMYT) and its partners. The project is undertaken working together with the national agricultural research institutions of participating countries. It is a four-year project (2016 -2019) funded by the Bill & Melinda Gates Foundation and the United States Agency for International

Development (USAID) in twelve Sub-Sahara Africa countries; Nigeria, Benin, Ghana, Ethiopia, Kenya, Malawi, Mali, Uganda, South Africa, Tanzania, Zambia and Zimbabwe. These countries constitute about 72% of the total maize area in sub-Saharan Africa covering more than 26 million households, or well over 176 million people whose livelihoods depends to a large extent on maize-based agricultural production. The project also promotes the adoption and commercialization of multiple-stress-tolerant maize varieties and hybrids and its successful adoption is expected to increase maize productivity by 30 to 50% and improving the competitiveness of the maize sub-sector thereby alleviating poverty and improving food security of resource-poor farm families in sub-Saharan Africa (SSA).

MATERIALS AND METHODS

The data for this study was obtained through a painstaking data collection process and analysed using descriptive statistics and Econometric model. Descriptive statistics was employed to analyse the socio-economic and demographic characteristics of maize farmers and the level of farmer's awareness of STM varieties in the study area. The Contingent valuation method (CVM) was used to determine how much farmers were willing to pay for STM varieties in the study area, while the Heckman regression model was employed to analyse the factors influencing the farmers' WTP for STM varieties and the amount farmers were willing to pay for it.

Study Area

The study was conducted in Kwara State, Nigeria. The state is one of the 36 states in Nigeria and has a predominantly farming population constituting about 70% of the 2.4 million total population with the majority living in rural areas (Adenuga et al., 2013). The state has an estimated land area of about 32,500km^2 out of which 75.3% is cultivable. The state experiences both the wet and dry seasons each lasting for about six months providing a conducive environment for growing different categories of crops (Adenuga et al., 2013; Ajadi, et al., 2011). Maize is one of the most important crops grown in the region and along with other cereals constitute the main staple food (Olanrewaju, 2009). The crop is usually grown twice a year however its productivity has been hampered by climate change. The state is divided into four main agricultural development zones based on cultural practices and ecological characteristics by the Kwara state Agricultural Development project (KWADP), namely: Zone A: Baruteen & Kaima; Zone B: Edu and Patigi; Zone C: Asa, Ilorin East, Ilorin South, Ilorin West & Moro; and Zone D: Ekiti, Ifelodun, Irepodun, Isin, Offa, Oke-Ero & Oyun (Kwara State Agricultural Development Project [KWADP], 2006).

Sampling Techniques

A four-stage sampling technique was adopted for this study. The sampling of the maize-based rural households began with the purposive selection of two of the agro-ecological zones (zones C and D)

where maize was widely grown and played an important role in food security. This was then followed by a random selection of two local government areas from zone C and three local government from zone D proportionate to the size of each of the zones. Three villages were selected from each of the selected local government area resulting in a total of 15 villages, after which we randomly selected 11 farming households from each of the villages. In each case the sampling frame was the list of maize based farming households in the village. In all, 165 farming households were randomly sampled from each village household list. Relevant data was collected with the aid of questionnaire. A pilot survey was carried out across the study area and with different kinds of maize farmers included in the population to test the design of the survey and validate the questions.

The Contingent Valuation Method (CVM)

The "contingent valuation method (CVM) is a stated preference method which involve the hypothetical choices in an administered and well-designed sample survey, based on the direct elicitation of individual's preference (Arrow et al., 1993)". Willingness to pay usually refers to the maximum amount of money a consumer is ready to commit towards a purchase of a product or service and is therefore a reflection of consumers demand for the product/service (Kalish & Nelson, 1991). CVM has been widely used in WTP studies given its many advantages. It is flexible and relatively easy to implement compared to other methods (Misra et al., 1991; Tao et al., 2012). Though some researchers have suggested the methodology might be a poor indicator of actual WTP because of its hypothetical nature (Carson et al., 2001). Nevertheless, it is supported by most experts in the field, and more careful WTP estimates are encouraged because of this (Sattout et al., 2007). To guarantee the collection of accurate and limit bias especially with respect to farmers' response, an open-ended WTP questionnaire which ensures that the farmers are not constrained by defined values was used. Missing responses were minimized by proper explanations of the questions making use of face-to-face interviews. Also, WTP for the STM varieties was estimated based on the expression in equation (1).

$$E = WTP = \sum_{i=1}^{N} \beta_i P_{ri} \quad (1)$$

The equation (1) expression is the weighted mean of the WTP in different payment level according to the distribution of WTP frequency. Where E is the amount farmer i is willing to pay, $P_{ri} = \frac{n_i}{N}$ is the probability that farmer I will pay that amount, with n_i being the number of farmers whose WTP is ß$_i$ and N is the total number of observations or the sample size of farmers whose WTP is positive. Recent studies that has applied similar methodology include Kong et al. (2014), Gebremariam et al. (2013) and Xiu et al. (2012).

Heckman's Two-step Model

Different studies have analysed factors

influencing consumers' willingness to pay for improved technology using mainly Logit, Tobit and multiple regression models. For example, Babatunde et al. (2016), Jiang and Wen (2011), Poudel and Johnsen (2009) and Ulimwengu and Sanyal (2011). However, the above models are subject to the problem of selection bias (Kong et al., 2014). They are also not able to simultaneously analyse the determinants of WTP and the payment levels. The Heckman's two-step model is able to overcome these shortcomings of other models including the prevention of selection bias (Bett et al., 2013; Briggs, 2004; Kim & Jang, 2010) only very few studies (Kong et al., 2014), have combined the CVM and the Heckman's two-step model to analyse the determinants of 'WTP and levels of payments. The model is more efficient and provides more information than other models. It provides information on the respondent's decision on whether to pay, together with the level of payments. The model is made up of two steps: First is the modelling of the respondent's decision on whether to pay or not. The amount the respondent is WTP is modelled in the second step. The probit model is first employed to test the factors influencing WTP after which multiple linear regression model is employed to analyse the determinants of the payment levels. The models are expressed as given in equations (2) and (3) respectively:

Where Y is the probability of the maize farmers' WTP for STM maize varieties (1 if Yes or 0 if No). α_o, α_1, α_2, ... , α_n are the parameters to be estimated, X_1, X_2, ... , Xn are the explanatory variables hypothesized to influence WTP for the STM varieties and μ is the error term.

$$Z = \delta_0 + \delta_1 X_1 + \delta_2 X_2 + \cdots + \delta_n X_n + \lambda\gamma + \phi \quad (3)$$

Z in equation (3) is the dependent variable, in the second stage of the Heckman model used to analyse the determinants of levels of payments for the STM varieties while δ_0, δ_1, δ_2, ... , δn and λ are the parameters to be estimated. *Y* is the Mills ratio added to overcome the selection bias (Kong et al., 2014). In this paper as recommended by (Johnson et al., 2012). X_1, X_2, ... , X_n are the explanatory variables hypothesized to influence the payment levels while Φ is the error term. Based on review of literature, the following variables were hypothesized to influence WTP for STM varieties and the amount they are willing to pay. They include: age of the household head measured in years (X_1), farm size measured in hectares (X_2), household size (X_3) level of education of the household head measured by years of schooling (X_4), access to extension service measured by number of visits (X_5), income from farming measured in Naira (X_6), experience in maize farming measured in years (X_7), Access to credit measured as a dummy variable (X_8), membership of social group measured as a dummy variable (X_9), price of other maize seeds measured in Naira (X_{10}). The hypotheses to be tested with these variables are, on the one hand, that farmers WTP for STM varieties increases with younger farmers (age), farmers that have large household size, or possess higher level of awareness (level of education access

to extension services and membership of social group), are more involved in farming activities (percentage of income derived from farming) or their technical skills are higher (level of experience) (Asrat et al., 2004; Faye & Deininger, 2005; Holden & Shiferaw, 2002). On the other hand, the hypothesis that farmers WTP for STM varieties increases with larger farm size or when farmers have better access to credit financing was also tested.

RESULTS AND DISCUSSION

This section deals with the empirical findings and discussion of the results obtained from descriptive and econometric analysis. A summary of the socioeconomic characteristics of the respondents is given in Table 1.

84.8% of the maize farming households are male-headed and. 82.4% are married. About 65.5% of the farmers are within the range of 30-49 years with a mean age of 47 years. The average household size of the respondents was about 6 persons per household. About 80% of the farmers had one form of formal education or the other. The mean annual farm income of the respondents was ₦121, 515.15 ($US1 = ₦325). This amount is less than the official annual minimum wage in the country. Also, the mean farming experience of the farmers was 18.27 years. This implies that a lot of the maize farmers are highly experienced. About 54.5% indicated that they have not been visited by an extension agent in the last one year. This reflects the low extension worker to farmer ratio in the study area. The results also showed that only about 21.8% of the respondents have access to credit.

Table 1
Summary statistics of variables used in the analysis

Characteristics	Frequency	Percentage
Gender		
Male	140	84.8
Female	25	15.2
Total	165	100
Marital status		
Married	136	82.4
Single	10	6.1
Widow	18	10.9
Separated	1	0.6
Total	165	100
Education		
Tertiary	42	25.5
Secondary	46	27.9

Table 1 *(Continued)*

Characteristics	Frequency	Percentage
Education		
Primary	39	23.6
Adult	5	3
No formal	33	20
Total	165	100
Age in years		
20-29	18	10.9
30-39	59	35.8
40-49	49	29.7
50-59	30	18.2
>60	9	5.5
Total	165	100
Household size		
1-3	1	0.6
4-6	51	30.9
7-9	95	57.6
10-12	18	10.9
Total	165	100
Times visited by extension workers		
Nil	90	54.5
Once	49	29.7
Twice	25	15
More than twice	1	0.6
Total	165	100
Annual farm income in Naira		
50,000-100,000	16	9.70%
101,000-150,000	35	21.2
151,000-200,000	30	18.2
201,000-250,000	40	24.2
251,000-300,000	44	26.7
Total	165	100
Distribution with respect to access to credit		
Access to credit	36	21.8
No access to credit	129	78.2
Total	165	100

Awareness of STM Varieties

As shown in Table 2, the level of awareness of the STM varieties is relatively low with only about 33.9% of the respondents being aware of it.

Almost half (46.5%) of those that were aware of the STM varieties got their information from friends and relatives. This is an indication that a lot more still need to be done especially through extension agents given that only 21% of the interviewed respondents claimed they got their information from extension agents. In terms of sources of seed, majority of the maize farmers (about 48%) got their seeds from the reservation of previous season. Only about 30% claimed they bought their seeds from the local market and about 8% from agricultural shops.

Analysis of Willingness to Pay

The analysis of WTP based on equation (1) shows that the farmers were willing to pay ₦261.52 ($US1 = ₦325) per kg of STM varieties. The maximum amount the farmers were willing to pay was ₦ 400 per kg of STM varieties. This result is an indication that the farmers are prepared to pay a reasonable amount for the STM varieties to raise their productivity.

Table 2
According to awareness of STM varieties

Awareness of STM varieties	Frequency	Percentage
Aware	56	33.9
Not aware	109	66.1
Total	165	100
Source of information		
Extension agent	12	21.4
Agricultural shows	7	12.50
Friends/relatives	26	46.5
Agro-dealers	11	19.6
Total	56	100
Sources of Seeds		
Reserve from last season	79	47.9
Relatives and other farmers	12	7.3
Local market	50	30.3
Agricultural development project	11	6.7
Agric shops	13	7.9
Total	165	100

Factors Affecting Farmers Willingness to Pay for STM Varieties

The parameters of the Heckman regression model were estimated using Stata statistical package and the results are presented in Table 3 and Table 4. The Chi-square statistic significant at 1% shows that the model gave a good fit for the analysis. The result shows that farm income (X_6), experience (X_7), membership of social group (X_9), and price of other seeds (X_{10}) are the significant factors influencing farmers' willingness to pay for STM varieties. Variables in the second stage of the analysis has been included based on information obtained from literature regarding the factors influencing the amount farmers are willing to pay for improved technologies (Ajayi, 2006; Kassie et al., 2017).

Table 3

First-stage probit analysis

Variables	Coefficients	Std. Err.	Z	P>|z|
X_1	0.106	0.174	0.610	0.544
X_2	-0.194	0.129	-1.49	0.135
X_3	-0.074	0.248	-0.30	0.765
X_4	-0.049	0.102	-0.48	0.634
X_5	0.339	0.557	0.61	0.542
X_6	-0.276***	0.100	-2.76	0.006
X_7	0.475***	0.167	2.85	0.004
X_8	0.216	0.367	0.59	0.556
X_9	0.589**	0.290	2.03	0.042
X_{10}	-0.876***	0.262	-3.34	0.001
Constant	1.159	0.997	1.16	0.245

Table 4

Second-stage multiple linear regression analysis

Variables	Coefficients	Std. Err.	Z	P>|z|
X_{10}	4.591	5.062	0.91	0.364
X_2	10.956**	4.681	2.34	0.019
X_4	8.906***	3.264	2.73	0.006
X_6	3.495	3.644	0.96	0.338
X_8	18.833**	11.306	1.67	0.096
Constant	341.864***	20.517	16.66	0.000

Note: Number of observations =165; Log likelihood = -716.968. Wald chi2 (7) =23.34 Prob > chi2 =0.0015. ***, ** and * are significant at 1%, 5% and 10%, respectively

Membership of social group is significant at 5% and positively affect farmers' willingness to pay for STM varieties. This implies that farmers that are members of social group are more likely to pay for STM varieties compares to farmers that are not members. This may be because those who belong to social group have access to information on new agricultural technologies such as improved seed varieties that can help them improve production compared to those that does not belong to any social group. One would expect farmers with high farm income to be willing to pay for STMA varieties more readily than their low-income colleagues. However, the result of this study gave a reverse trend. This could result from the fact that those who earn high income from their farm operations are likely engage in other businesses apart from farming that they invest their farm income in. This may explain the negative significance of farm income in relation to ability of the farmers to pay STM varieties. Another reason could be that, given that they are earning much already from their farming, they may not see any reason to change their current production technique compared to farmers with low income who will be more enthused to change their production techniques so as to increase their income stream. Experience in farming is found to affect farmer's willingness to pay positively at 10% significance. This could be that farmers who have stayed long in maize farming are more willing to pay in order to avoid facing some of the production problems they have faced in past years compared to those who have less experience in maize farming. Price of other seeds was found to negatively affect farmer's willingness to pay for STM varieties and it was significant at 1%. This could be that the farmers expect price of other maize seeds to be relatively low compared to the STM varieties being an improved technology. Farm size (X_2) is statistically significant with the payment levels and shows a positive coefficient. Thus, farmers having WTP and possessing more arable land will have higher payment levels; That is, farmers who have more arable land are willing to pay higher sums in order to increase their productivity. Access to credit (X_8) was found to have positive effect as expected and significant at 5% significance level. This shows that farmers who have access to credit are willing to pay higher amount for STM varieties compared to those who do not have access to credit. Educational level (X_4) was found positive and significant at 1%. This implies that the higher the educational level of the household head, the more likely the amount he would be willing to pay for STM varieties. **T**his result is consistent with results from previous studies that found that education has a positive relationship with willingness to pay for improved technologies (Asrat et al, 2004; Holden & Shiferaw, 2002).

CONCLUSIONS AND RECOMMENDATIONS

Traditionally, maize production is produced with limited inputs and less attention for management. However, decreasing

soil fertility, pest and diseases, heat and drought are the most pressing problems that maize farmers faced. One of the important strategies to reduce the stress posted by these factors requires increasing agricultural technology development in form of improved seeds like STM varieties. In this regard, improved seeds, such as STM varieties render greater advantage because of its higher yield potential, ability to withstand drought, resistance to heat, pest and diseases. This study, therefore, was initiated to investigate farmers WTP and factors affecting farmers' WTP for stress tolerant maize for Africa in Kwara State, Nigeria. It can be inferred from the study that most of the farmers are not aware of STM varieties because majority (66.1%) of the households interviewed have not heard about STM varieties, nevertheless, about 75.2%of the sampled maize-based farming households were willing to pay for STMA varieties. Majority of the farmers were willing to pay not more than N350/kg for each of the STM varieties. It can be concluded that the rural households are willing to pay for stress tolerant maize for Africa varieties if the varieties are available at their access and at affordable prices. The results of the study are able to provide decision-makers with a broad range of information to facilitate the implementation and adoption of STM varieties. Based on the findings of this study the following recommendations have been made: Policy makers should support farmers through provision of adult education which should empower them to understand new agricultural technologies such as STM varieties. Government and stakeholders should encourage the credit institutions to grant farmers access to credit to enable them to invest on improved technology in order to increase their productivity.

It is important to emphasize that some level of care is needed in the generalisation of the study results to other Africa regions. This is because Kwara state, Nigeria where the study has been carried out may exhibit some level of differences in social and economic structure relative to other regions of Africa where the project has been implemented. Nevertheless, this study will serve as a good benchmark for other studies and also contributes to the literature on WTP for improved seed varieties

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