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EFFECT OF COOPERATIVES MEMBERSHIP ON FARMERS' PREFERENCE FOR IMPROVED MAIZE VARIETY ATTRIBUTES IN OYO STATE, NIGERIA

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ABSTRACT

Background. This study was conducted to investigate the effect of cooperative membership on farmers' preferences for improved maize variety attributes in Oyo State.
Material and methods. A multi stage sampling procedure was employed to select 150 maize farmers for the study. Data were analyzed using descriptive statistics, conjoint analysis and an ordered probit regression model.
Results. The results revealed that the majority of the respondents were male (82.5%), married (93.8%), fell within the age range of 41–60 years (45%), belonged to an organization (91.2%), had a family size of 4 to 7 persons (59%), the majority had formal education (57.7%) and few had access to credit (19%). The results further revealed that the preference range that would deliver the most important maize varieties for maize farmers included the following product attributes; high yield (0.233), high resistance to diseases (0.233), big grain size (0.097), yellow maize (0.030) and early maturity (0.034). The findings also revealed that age of respondents (-0.446), gender (0.838), education (0.320), farm size (0.137), and cooperative membership (0.842) significantly influenced farmers' preference for improved maize variety attributes.
Conclusion. It was concluded that breeders should consider the farmers' preferred attributes in the production of improved maize seeds and the formation of cooperative societies should be encouraged and promoted to facilitate easy access to improved maize seeds by farmers as well as to increase their preference for improved maize seeds. Also, the study recommends promotion of farmers' education on the characteristics associated with each variety, about new innovations and about the disadvantages of having a preference for improved maize seeds without considering the localized problems associated with their maize production.

Key words: cooperative membership, farmers, preference, maize varieties, Oyo State

INTRODUCTION

Maize (*Zea mays* L.) is a staple food for millions of people in Nigeria, especially in Oyo State, and it also ensures their food security (FAO, 2014). This could be ascribed to the fact that it provides more calorie (19.5%) than rice (16.5%) and wheat (15.0%). Maize is the most important cereal in the country (Juma, 2010), not only because it is the highest supplier of calories, but also for its mass production and increasing demand. In Nigeria, the demand for maize is currently increasing at a faster rate because of its different economic uses (Sadiq *et al*., 2013). It can be used to produce a wide array of food products

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such as *kunu*, *akamu*, *ogi*, *tuwo*, *donkunnu*, *maasa*, *couscous*, *akple*, *gwate*, *nakia*, *egbo*, *abari*, *donkwa*, *ajepasi*, *aadun*, *kokoro*, *and elekute* in different parts of Nigeria (Ogunsumi *et al*., 2005; Khawar *et al*., 2007; Abdulrahaman and Kolawole, 2008; Olaniyan, 2015). Also, non-food products such as feed for poultry (Ogunniyi, 2011), bio-fuel for energy use and ingredients for medical drugs can be produced from maize (Monsanto, 2014). Despite the economic importance of maize, its production in Nigeria has been insufficient to meet the needs of people, livestock and industry. Maize production in Nigeria currently stands at 10.5 million metric tons and its consumption is 10.9 million metric tons, creating a gap of 0.4 million tons to meet the local demand (FAO, 2017).

Low maize productivity has been traced to an array of factors that plague maize growing areas. Among these factors, insect and disease infestation, and drought are the greatest threats to the survival of maize in the growing areas. For instance, about 65% of yield losses recorded in maize production have been attributed to insect and disease infestation (Ammani *et al*., 2012). Also, periodic drought caused by irregular rainfall distribution reduces maize yields by an average of 15% each year (IITA, 2009; Ammani *et al*., 2012). The effect of all of this is to make the return on maize farming low, as a lot of waste is recorded during harvest. Therefore, in order to overcome these problems, disease and insect resistant maize varieties that are also adaptable to drought have had to be developed. In this regard the International Institute for Tropical Agriculture (IITA) worked with the National Maize Research Programme to incorporate diseases and insect resistance traits into elite adapted maize varieties. They have released many such varieties as well as others in the last few years (IITA, 2009). Presently, there are several maize varieties available to farmers in the market, each having their distinct attributes. Although the advancement of these new varieties is commendable their impact is mitigated by farmers' preference for different maize attributes such as drought tolerant, high disease resistant, early maturity among others.

Maize farmers often encounter difficulties in obtaining maize seeds that meet with their specific preference. This is because the farmers require maize seed varieties with multiple attributes. However, farmers' preference is influenced by a complex set of factors including final product attributes, socioeconomic variables, opinions and attitudes, risk perception, the sociocultural environment, and the information about the improved seed (Hellyer *et al*., 2012). Apparently, most farmers lack knowledge or information regarding the positive attributes of improved seed varieties (Hellyer *et al*., 2012), hence they stick to traditional varieties that are seemingly preferred by the farmers, however, such varieties are not economically efficient (Akpoko and Yiljep, 2001; Cavane and Subedi, 2009; Cavane, 2011). Actually, farmers should prefer maize varieties that have positive attributes regarding the particular problems within their locality, however, this information is not available and accessible to them. This is often ascribed to the weak link between the scientist and end users (farmers) (Morris and Bellon, 2004). As a result, the improved maize varieties might not correspond with the preferences of a majority of the farmers (Sibiya *et al*., 2013).

Information dissemination to farmers is a necessary pathway to guide farmers' preference for improved varieties. However, information may be available, but not physically and intellectually accessible to the farmers (Opara, 2010). Agricultural cooperatives provide their members with information to guide their preference for improved varieties that otherwise would have been difficult to obtain if they were non-members. A cooperative is an organization of people with different characteristics that allows its members to benefits from financial gains and other activities such as educational programmes. Nasiri (2010) and Gasana (2011) noted that aside from financial gains, cooperatives play key roles in dissemination of extension services using group approaches, increase access to input services as well as to the exchange of ideas and educational opportunities through adult education and literacy programmes. However, to the best of our knowledge no study has investigated the effect of cooperative membership on farmers' preference for improved variety attributes, particularly in relation to maize. Consequently, this paper contributes to the literature by assessing the effect of cooperatives membership on farmers' preference for improved maize variety

attributes in Oyo State. This study was guided by following specific objectives; it describes the socio-economic characteristics of maize farmers; evaluates farmers' preferences for improved maize variety attributes; and determines the effect of cooperative membership on farmers' preference for improved maize variety attributes.

MATERIAL AND METHODS

Study Area

This study was carried out in the Oyo State of Nigeria. Oyo State is located in the South-Western part of Nigeria. It is located between latitudes 7°3' and 9°12' north of the equator and longitudes 2°47' and 4°23' east of the Meridian (Fig. 1). It covers a total land area of about 27,249 square kilometres and has an almost 1:1 distribution of male to female in the population (NIPOST, 2009). Based on the prevailing climatic conditions and vegetation types the state has three agroecological zones, namely; rainforest, savannah and derived savannah. The rainforest is characterized by high relative humidity and supports the cultivation of tree crops like citrus, oil palm and cocoa as well as arable crops like cassava, maize and yam. The vegetation of the savannah zone mainly supports the cultivation of crops such as sorghum, maize, cowpea and yam, while the derived savannah combines the peculiar characteristics of the first two. The State produced an average of 171,666.67 tonnes of maize per cropping season between the period of 2001 to 2012 (Ogunbodede and Olakojo, 2001; FAO, 2006; Adeola and Ayoade, 2009; Cadoni and Angelucci, 2013).

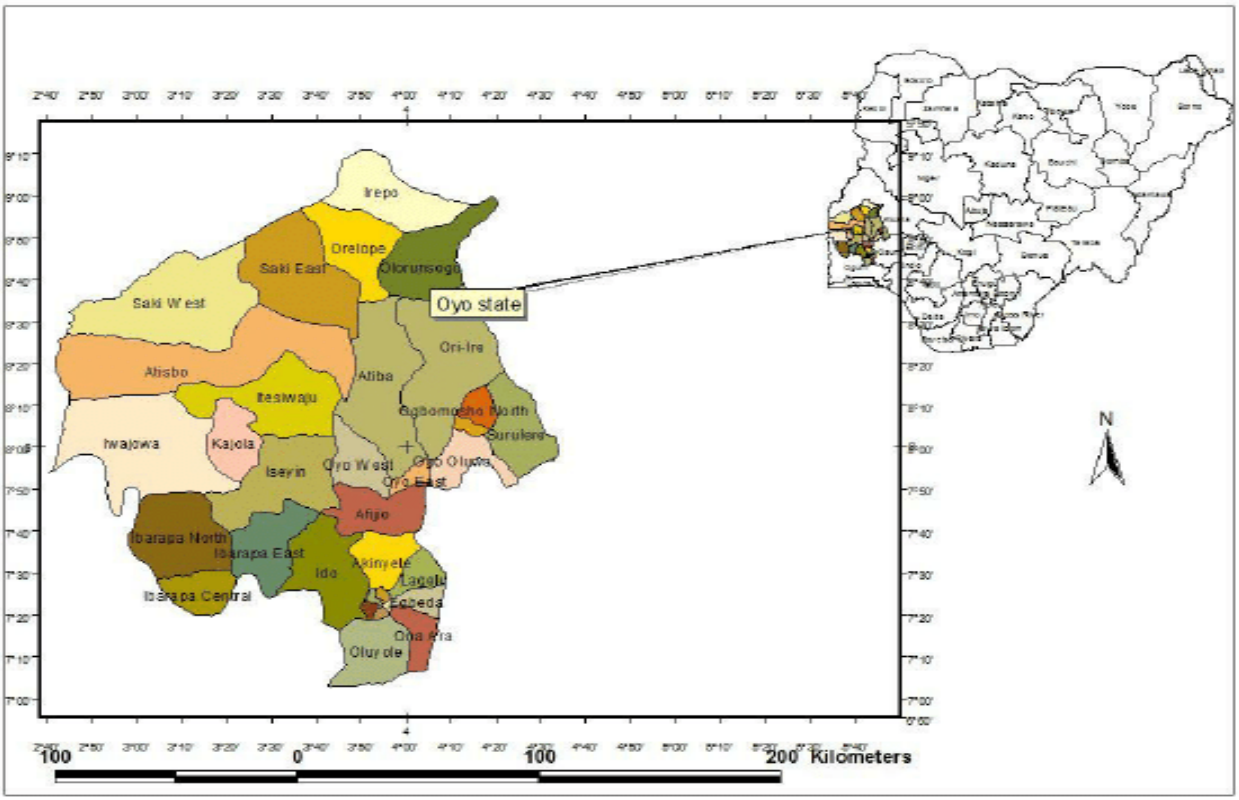

Fig. 1. Map of Oyo State

Sampling technique

A Multi stage sampling procedure was employed to select one hundred fifty (150) maize farmers (Table 1). In the first stage two agricultural zones were selected out of the four zones in Oyo State using purposive selection. The zones were the Ibadan/Ibarapa and Ogbomoso agricultural zones. The selection of the two zones was based on the high volume of maize production in these zones. The second stage involved purposive selection of 3 local government areas in the selected zones. These include Lagelu, Surulere and Ogo-Oluwa Local Government Area respectively, because the maize farmers are more concentrated in these areas. Thereafter in the third stage, 5 villages were selected in each Local Government Area using simple random techniques. In the final and last stage, 10 maize farmers were selected from each of these villages. A total of 150 maize farmers were selected for the study. The sample size of 150 respondents is justified for this conjoint study based on the report of Wittink and Cattin (1989) and Wittink *et al*. (1992), which states that sample size above 100 respondents is appropriate for a conjoint study.

Table 1. Sampling procedure for the study

State	LGAs	Villages		Maize farmers	
		Proportion used	Number of villages	Proportion used	Number of registered farmers
Oyo	Lagelu	5	21	50	63
	Surulere	5	34	50	66
	Ogo-Oluwa	5	47	50	81
Total	3	15		150	210

Analytical techniques

Data collected are age of farmers, gender, marital status, family size, formal education, years of farming, other crops grown, maize farm size, membership of cooperatives and access to credit facilities as well as information about the variety (ies) they planted last season, the quantity harvested last season, they variety (ies) they prefer, why they prefer those variety (ies), how they access the varieties, other attributes they look for in their choice of variety. Then, the data were analyzed using descriptive statistics, conjoint analysis and an ordered probit model.

Descriptive statistics

Descriptive statistics were used to describe the socio-economic characteristics of the maize farmers.

Conjoint Analysis

Conjoint analysis was used to evaluate farmers' preferences for improved maize variety attributes. The rationale behind the selection of the model for this study lies in the fact that it enables estimating consumer's preferences of a product by combining part worth utilities for each attribute to understand how consumers develop preferences for different products or services (Bonilla, 2010). The model is built on the assumption that consumers make complex decisions based not on one feature or attribute at a time, but on several features jointly. Six major attributes were picked due to their prevalence and influence on farmers. The major attributes and level were identified through the gathering of information about the maize farmers from focus group discussion with key informants and in consultation with the current literature. The attributes are maturity, disease resistance, yield, colour, grain size, and drought tolerance (Table 2). The attributes were then used to generate a plan card using the orthogonal array method with the aid of a statistical package for social sciences. These plan cards consist

of different combinations of the earlier specified attributes and these attributes were combined in 64 different ways, including holdouts. However, determining attribute combinations after selecting the attributes produces a full set of stimuli that cannot be evaluated by a respondent at once. This might lead to information overload that will eventually reduce the accuracy of the respondent's preference evaluation. Moreover, respondents cannot provide meaningful evaluations when presented with a large number of choice sets. Consequently, the number of profiles was reduced and an orthogonal design was used to define the optimal number of choice sets. The attributes (six attributes, each with two levels) were combined into ten combinations and made into a structured questionnaire that was administered to the respondents to rank their preferences.

Table 2. Selected maize attributes and levels

S/N	Attributes	Levels
1	Maturity	Early Late
2	Yield	High Low
3	Drought tolerance	High Low
4	Disease Resistance	High Low
5	Colour	White Yellow
6	Grain Size	Big Small

As explained above, each respondent was asked to rate the 10 hypothetical maize variety attribute combinations. Respondents were asked to provide ratings of between 1 and 5 for each of the hypothetical maize varieties' combination in decreasing order, with 1 representing the most preferred, preferred (2), neither preferred (3), not preferred (4) and 5, the most not preferred.

The conjoint analysis is then expressed as follows:

$$Ri = B1 + B2(M1) + B3(M2) + B4(Y1) + B5(Y2) + B6(P1) + B7(P2) + B8(R1) + B9(R2) + B10(C1) + B11(C2) + B12(G1) + B13(G2) + Ei \quad \ldots \quad (1)$$

Where:
Ri = rating given by survey respondent on a scale of 1-5;
M1-M2 = variables for maturity levels: early, late;
Y1-Y2 = variables for yield: low, high;
P1-P2 = variables for drought tolerance: low, high;
R1-R2 = variables for resistance: low, high;
C1-C2 = variables for colour: white, yellow;
G1-G2 = variables for grain size: small, big.

Ordered Probit Model

An ordered probit model was used to determine the effect of cooperatives membership on farmers' preferences for different maize variety attributes. In practice, ordered logit and ordered probit models give very similar results, however, the ordered probit model where the error term is normally distributed was selected. The ordered probit model does not rely on the independence of irrelevant alternatives. It also allows the error term to be correlated across alternatives, and accounts for the fundamental differences between different categories in the estimated order.
The ordered probit uses the following form:

$$y^* = \beta^1 x + € \quad \ldots \quad (2)$$

Where: y* is the dependent variable; β^1 is the vector of estimated parameters; x is the vector of explanatory variable; € is the error term which is assumed to be normally distributed (zero mean and unit variance) with distribution denoted by Φ (.).

Empirically, the model is implicitly expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \ldots\ldots\ldots \beta_7 X_7 + Ui \quad \ldots \quad (3)$$

Y = Preference (1 = drought tolerance; 2 = maturity; 3 = colour; 4 = grain size; 5 = yield; 6 = disease resistance).

The explanatory variables are: X_1 = age of respondent (years); X_2 = Gender (1 = male; 0 = female); X_3 = marital status (1 = married; 0 = otherwise); X_4 = household size (actual number); X_5 = years of formal education; X_6 = farm size (hectare); X_7 = membership of cooperatives (1 = member; 0 = otherwise); Ui = error term. This study incorporates an independent variable based on a review of existing literature (Table 3).

Table 3. Description of variables

Variables	Unit	Expected sign	Description
Age	Year	+	Measured in years
Gender	Dummy	+	1 = male 0 = female
Marital Status	Dummy	+	1 = if farmer is married 0 = otherwise
Household size	Number of persons	+	Measured in number of household members
Farm size	Hectares	+	Measured in hectares
Education	Years spent in school	+	Measured in years spent in school
Cooperative membership	Dummy	+	1 = if farmer belongs to cooperative 0 = otherwise

RESULTS AND DISCUSSION

Socio-economic characteristics of maize farmers

The socio-economic characteristics of maize farmers are presented in Table 4. Most of the respondents (45%) fall within the age range of 41 to 60 years. This shows that the maize farmers are at their peak productive age. This finding concurs with the studies of Onyedicachi (2015) and Ibitola *et al*. (2019). Most of the respondents (82.5%) were male. This result reveals, as expected, that maize farming is dominated by males. Generally, females usually support their spouses with a reduced amount of energetic farming activities. Consequently, only a few female farmers engage in full-time farming. This is however explained by the fact that women tend to spend extra hours on various household chores and childcare. This finding is similar to that of Idrisa *et al*. (2012). The majority of the respondents (93.8%) were married. This indicates that most of the maize farmers were married. This finding agrees with that of Umar *et al*. (2018). Most (59%) of the respondents have a family size of 6 to 10 family members. This implies that the maize farmers have enough hands to serve as family labour for farm operation. This finding is consistent with the studies conducted by Idrisa *et al.* (2012) and Owoeye (2017). Most (57.7%) of the respondents had formal education. The result implies that literate farmers are involved in maize farming. This finding concurs with the studies of Owoeye (2017) and Ibitola *et al*. (2019). The majority of the respondents (92%) were small scale farmers. This implies that maize production mostly took place on smallholdings. This finding concurs with the reports of Jamilu *et al*. (2014) and Mutanyagwa (2017). The average years of farming experience was approximately 25 years. This implies the farmers have many years of farming experience.

This finding is similar to that of Komolafe *et al*. (2014). A very high percentage of the respondents (91.2%) were members of cooperative societies. This is in line with the finding of Umar *et al*. (2018). Just a few of the respondents (19%) had access to credit. This indicates that most of the farmers finance their farm business from their personal capital or savings. This is also in line with the finding of Umar *et al*. (2018).

Table 4. Socio-economic characteristics of maize farmers

Variables	Maize farmers
Age (%)	
20–40	41.2
41–60	45.0
Above 60	13.8
Total	100.0
Male (%)	82.5
Married (%)	93.8
Household size (%)	
1–5	39.7
6–10	58.8
>10	1.50
Total	100.0
Formal education (%)	57.7
Farm size (%)	
Small-scale (below 5 ha)	91.6
Large-scale (above 5 ha)	7.4
Total	100.0
Years of farming experience	25.22
Agric. organization (%)	91.2
Access to credit (%)	19

Farmers' preferences for improved maize variety attributes

The farmers' preference for improved maize variety attributes are presented in Table 5. The most important attributes of improved maize variety to the farmers were yield and resistance to diseases, which each contribute 0.47 to the farmers' total utility of 1.234 while the farmers' most preferred levels of the attributes were high yield and high resistance. This finding suggests the relative importance of yield (productivity) and resistance (ability to withstand diseases) to farmers because the sum of their contribution is more than half (0.94) of the farmers' total utility. The next most important attribute to the farmers was grain size, which contributes about 0.194 to the farmers' total utility of 1.234. The utility estimates indicate that farmers have a preference for big grain size (0.97). This is due to the fact that most of the maize cobs harvested are used as food and in feed mills and in both cases big grained cobs are preferred to small grain cobs. Colour also proved to be important (0.06) and yellow was more preferred than white. For maturity, farmers preferred early maturing maize (0.034). The least important attribute was drought tolerance (0.014), in this case high tolerance was preferred. Drought tolerance coming last may be due to the fact that there is an adequate water supply to maize farms all through the year, either through rainfall or irrigation. Overall, the results indicate that the preference range that would deliver the most utility for farmers would include variety attributes such as high yield (0.233), high resistance to diseases (0.233), big grain size (0.097), yellow maize (0.030) and early maturity (0.034). Scientists that deliver maize varieties within this stated preference range would have successfully delivered a utility of 1.2 out of 1.234. From the results, it is observed that resistance to diseases and yield are the most preferred and most important attributes to the farmers in the study area. The knowledge of importance percentage and the utility range will help the breeders to manage their operations and produce a variety that will be of highest utility and also of importance to the farmers. Although a farmer's choice of a particular improved seed variety is guided by many criteria, it was discovered that most farmers preferred to have most of the attributes of their choice combined in a particular seed variety. This finding concurs with the report of Sonda (2008).

Table 5. Part-worth or utility estimate of maize variety attributes

Attributes	Level	Utility estimate	Utility range	Importance (%)
Maturity	Early	.017*	0.034	15.812
	Late	-.017		
Yield	High	.233*	0.466	16.484
	Low	-.233		
Drought tolerance	High	.007*	0.014	19.357
	Low	-.007		
Resistance	High	.233*	0.466	15.499
	Low	-.233		
Colour	White	-.030	0.060	15.499
	Yellow	.030*		
Grain size	Big	.097*	0.194	17.349
	Small	-.097		
Total			**1.234**	**100.00**

*represents the most preferred level in the Attributes

Furthermore, Pearson's R^2 and Kendall's tau values were used to assess the validity and reliability of the estimates of the conjoint model. The values of Pearson's R^2 (0.958) and Kendall's tau (0.929) were reasonably high. The values suggest a strong correlation between the averaged variety attribute ratings and the predicted utilities from the conjoint analysis model. This finding supports the report of Oyatoye *et al*. (2013) that Pearson's R^2 and Kendall's tau values near to one indicate strong correlation between the average variety attribute ratings and the predicted utilities from the conjoint model (Table 6).

Table 6. Correlations between observed and estimated preferences

Correlation	Value	Significance
Pearson's R^2	0.958	0.000
Kendall's tau	0.929	0.001

Effect of cooperative membership on farmers' preference for improved maize variety attributes

Table 7 shows the results of the estimated ordered probit model. The chi-square statistic is statistically significant (Wald Chi^2 (7) = 37.13; Prob > Chi^2 = 0.000). This justifies the rationale for using the ordered probit model. From the Table, age, gender, education, farm size, and cooperative membership significantly influenced farmers' preference for improved maize variety attributes. The age of the respondents had a negative and significant influence on the probability of farmers' preference for improved maize variety attributes. This implies that younger farmers have a higher preference for improved maize variety attributes. This suggests that the higher the number of aged farmers the lower the probability of preferring early maturing attribute of improved maize variety (by 0.2%), high yield (by 18.6%), yellow colour (by 20%), big grain size (3.6%) and the higher the likelihood of preferring

high drought tolerant (by 1.5%) and high disease resistant (by 0.3%) attributes. This could be attributed to the fact that younger farmers are more innovative and undertake risk, which can make them more likely to prefer improved maize variety attributes.

Table 7. Effect of cooperative membership on farmers' preference for maize varieties

Variables	Coefficient	Std Error	Z value	Marginal effects					
				Early maturity	High Yield	High Drought tolerant	High disease Resistant	Yellow Colour	Big Grain Size
Age	-0.446**	0.276	-1.97	-0.002	-0.186	0.015	0.003	-0.201	-0.036
Gender	0.838**	0.371	2.28	0.079	0.062	-0.036	0.040	0.002	0.016
Marital Status	-1.115	0.753	-1.55	0.051	-0.026	-0.009	0.066	-0.086	-0.010
Household size	-0.035	0.013	-0.36	0.009	-0.004	-0.005	-0.001	-0.013	-0.002
Farm size	0.137*	0.068	1.73	0.079	-0.094	0.061	0.035	-0.029	0.037
Years of education	0.320**	0.202	2.28	0.085	0.161	0.142	0.089	-0.075	0.004
Cooperative membership	0.842***	0.523	2.77	0.161	0.288	0.169	0.142	0.231	0.239
Observation	150								
LR Chi (7)	37.13								
Prob>Chi^2	0.000								
Log likelihood	-93.553								
Pseudo R_2	0.3924								

This result conforms to the findings of Thomson *et al*. (2014), Komolafe *et al*. (2014), and Bashir and Wegrary (2014). Gender had a positive and significant influence on the probability of farmers' preference for maize varieties. This shows that male farmers have a high preference for maize varieties. This suggests that male farmers have the probability of preferring early maturing (by 7.9%), high yield (by

6.2%), high disease resistant (4.0%), big grain size (by 1.6%), yellow colour (by 0.2%) attributes and a lower probability of preferring the high drought tolerant attribute (3.6%). This could be due to the fact that male farmers have access to resources and information and are therefore able to prefer improved maize seeds. This result conforms to the findings of Thomson *et al*. (2014). Farm size had a positive and significant influence on the probability of farmers' preference for improved maize variety attributes. This shows that maize farmers with large farms have a high preference for maize variety attributes. This suggests that an increase in the size of farms possessed by maize farmers would result in a higher probability of preferring an early maturing attribute of improved maize variety (by 7.9%), high yield (by 6.2%), high disease resistant (4.0%), yellow colour (by 0.2%), big grain size (by 1.6%) and a lower likelihood of preferring a high drought tolerant (by 3.6%) attribute. This could be attributed to the fact that farmers with large farms have an opportunity to try out improved seed varieties without compromising the food security of their households. This finding is in line with the finding of Olusegun *et al*. (2011), Bawa and Ani (2014), Owoeye (2017) and Mutanyagwa (2017). Education had a positive and significant influence on the probability of farmers' preference for maize varieties. This shows that literate farmers have a high preference for maize varieties. This suggests that an increase in the years of education of maize farmers would result in a higher probability of preferring early maturing attribute of improved maize variety (by 8.5%), high yield (by 16.1%), high drought tolerant (14.2%), high disease resistant (8.9%), big grain size (by 0.4%) and a lower likelihood of preferring the yellow colour attribute (by 7.5%). This is attributed to the fact that knowledge acquired through education would enable farmers to make informed decision about their farming activities that can make them more likely to prefer improved maize variety attributes. This finding is in line with the finding of Tura *et al*. (2010), Olusegun *et al*. (2011), Jamilu *et al*. (2014), Thomson *et al*. (2014) and Owoeye (2017). Membership of a cooperative had a positive and significant influence on the probability of farmers' preference for maize variety attributes. This implies that maize farmers that are members of cooperatives have a high preference for maize variety attributes. This suggests that cooperative membership increases the probability of preferring early maturing (by 16.1%), high yield (by 28.8%), high drought tolerant (16.9%), high disease resistant (14.2%), big grain size (by 23.9%) and yellow colour (by 23.1%), attributes. This is attributed to the fact that better access to information through cooperative membership would enable farmers to likely prefer improved maize variety attributes. This finding is in line with the finding of Subedi *et al*. (2017) and Kehinde *et al*. (2018).

CONCLUSIONS AND RECOMMENDATIONS

This study investigated the effect of cooperative membership on preferences for improved maize variety attributes in Oyo State, Nigeria. The study concluded that the majority of the maize farmers were male, small scale and at the peak of their productive age. The result further indicates that the preference range that would deliver the most utility for farmers include variety attributes such as high yield (0.233), high resistance to diseases (0.233), big grain size (0.097), yellow maize (0.030) and early maturity (0.034). Scientists that deliver maize varieties within the stated preference range would have successfully delivered a utility of 1.2 out of 1.234. It was concluded that cooperative membership along with other socio-economic characteristics such as age, gender, education and farm size significantly influenced farmers' preferences for improved maize variety attributes. Based on the findings and observations made during the study, it is suggested that breeders should consider the farmers' preferred attributes in the production of improved maize seeds and that the formation of cooperative societies should be encouraged and promoted to facilitate easy access to improved maize seeds by farmers as well as to increase their preference for improved maize seeds. Also, the study recommends promotion of farmer education on the characteristics associated with each variety, about new innovations and about the disadvantages of having a preference without consideration of the localized problems associated with maize production.

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Annex 1. Hypothetical Maize varieties combining six attributes likely to affect farmers' preference

Plan Card	Maturity	Yield	Price	Resistance	Colour	Grain size	Please rank according to your preference
A	Late	Low	High	Low	White	Big	
B	Early	Low	Low	High	Yellow	Big	
C	Late	Low	Low	High	White	Small	
D	Late	High	Low	Low	Yellow	Big	
E	Early	Low	High	Low	Yellow	Small	
F	Early	High	High	High	White	Big	
G	Late	High	High	High	Yellow	Small	
H	Early	High	Low	Low	White	Small	
I	Late	Low	Low	High	Yellow	Small	
J	Late	Low	High	High	Yellow	Small	

WPŁYW CZŁONKOSTWA W SPÓŁDZIELNI NA PREFERENCJE ROLNIKÓW DOTYCZĄCE ULEPSZONYCH ATRYBUTÓW ODMIAN KUKURYDZY W STANIE OYO, NIGERIA

Streszczenie

Badanie przeprowadzono w celu określenia wpływu członkostwa w spółdzielni na preferencje rolników w zakresie ulepszonych atrybutów odmian kukurydzy w stanie Oyo. W celu wyselekcjonowania do badań 150 hodowców kukurydzy zastosowano wieloetapową procedurę pobierania próbek. Dane analizowano za pomocą statystyki opisowej, analizy sprzężonej i uporządkowanego modelu regresji probitowej. Wyniki wykazały, że większość respondentów to mężczyźni (82,5%), żonaci (93,8%), osoby w wieku 41–60 lat (45%), należący do organizacji (91,2%), posiadający rodzinę składającą się z 4 do 7 osób (59%), mający wykształcenie (57,7%) i z niewielkim dostępem do kredytu (19%). Wykazano ponadto, że zakres preferencji, który zapewniłby rolnikom kukurydzę, obejmował następujące cechy produktu: wysoki plon (0,233), wysoką odporność na choroby (0,233), duże uziarnienie (0,097), kukurydzę o barwie żółtej (0,030) i wczesną dojrzałość (0,034). Wyniki wskazały również, że wiek respondentów (-0,446), ich płeć (0,838), wykształcenie (0,320), wielkość gospodarstwa (0,137) i członkostwo w spółdzielni (0,842) znacząco wpłynęły na preferencje rolników w zakresie ulepszonych atrybutów odmian kukurydzy. Stwierdzono, że hodowcy powinni brać pod uwagę preferowane przez rolników atrybuty w produkcji ulepszonego ziarna kukurydzy. Należy zachęcać i promować tworzenie spółdzielni, aby ułatwić rolnikom dostęp do ulepszonego ziarna kukurydzy, a także zwiększyć ich preferencje. Ponadto badanie zaleca promowanie edukacji rolników w zakresie cech związanych z odmianami, innowacjami i wadami w zakresie preferowania ulepszonego ziarna kukurydzy bez uwzględnienia lokalnych problemów związanych z ich produkcją.

Słowa kluczowe: członkostwo w spółdzielni, odmiany kukurydzy, preferencje rolników, stan Oyo