

## HOUSEHOLDS' PREFERENCE FOR SOME SELECTED COWPEA VARIETIES IN OYO STATE, NIGERIA

### PREFERENCIJA DOMAĆINSTAVA ZA NEKE ODABRANE SORTE KRAVLJEG GRAŠKA U DRŽAVI OYO, NIGERIJA

Ajibola Olajide OJEDOKUN\*, Olufemi Adedotun YESUFU\*\*

\*Department of Agriculture, Lagos State University, PMB 0001, Epe Campus, Lagos State, Nigeria

\*\*Department of Agricultural Economics, Obafemi Awolowo University, PMB 13, Ile-Ife, Osun State, Nigeria  
e-mail: adifferentpiece@gmail.com

#### ABSTRACT

*This study was carried out to determine the factors influencing households' preference for some selected cowpea varieties in Oyo State, Nigeria. Primary data were collected from a total of 250 households from five Local Government Areas (LGAs) using the multistage sampling technique. Data were analysed using descriptive statistics and multinomial logit regression model. The study revealed that households mostly preferred the Oloyin variety of cowpea and that households mostly used Oloyin for their different cooking. The age of household head, the primary occupation of household head, years of formal education, income, prices of cowpea varieties, aroma during cooking, ability to tolerate weevil infestation and absence of foreign particles influenced households' preference for cowpea varieties. The study recommends that it is necessary for stakeholders and breeding institutions to give attention to the Oloyin variety if the Agricultural Promotion Policy's aim will be achieved.*

**Keywords:** Preference, Households, Cowpea, Varieties, Multinomial logit.

#### REZIME

*Ova studija sprovedena je kako bi se utvrdili faktori koji utiču na to da domaćinstva preferiraju neke odabrane sorte zrna graška u državi Oyo u Nigeriji. Primarni podaci prikupljeni su od ukupno 250 domaćinstava iz pet područja lokalne samouprave (LGA) koristeći tehniku višefaznog uzorkovanja. Podaci su analizirani korišćenjem deskriptivne statistike i multinomnog logit regresionog modela. Studija je otkrila da su domaćinstva uglavnom preferirala sortu graška Oloyin i da domaćinstva uglavnom koriste Oloyin za različito kuvanje. Starost nosioca domaćinstva, primarno zanimanje nosioca domaćinstva, godine formalnog obrazovanja, prihod, cene sorti zrna graška, aroma tokom kuvanja, sposobnost tolerisanja najezde žičaka i odsustvo stranih čestica uticali su na sklonost domaćinstava prema sortama zrna graška. Studija preporučuje da je potrebno da zainteresirane strane i uzgojne institucije obrate pažnju na sortu Oloyin, ako se želi postići cilj politike podrške poljoprivrede.*

**Ključne riječi:** Preferencija, domaćinstva, kraljci grašak, sorte, multinomna logit regresija.

#### INTRODUCTION

Cowpea (*Vigna unguiculata* L. Walp), generally referred to as beans in Nigeria (Akpan *et al.*, 2014), is consumed by a majority of households in different forms either through direct cooking, processing into bean cake (*Akara*), bean pudding (*Moin-moin*), bean soup (*Gbegiri*) or as components of other meals. The versatility of cowpea in this regard thus differentiates it from other legumes (Ayinde, 2005; Michael, 2016; Opoola, 2016). Also, Kormawa *et al.* (2002) reported that though more urban households demand and consume cowpea than any other grain legume, different members of a household, however, consume cowpea in different forms.

Cowpeas vary according to the size of the grain, skin colour, texture, eye colour, and insect damage tolerance (Murdock *et al.*, 2003). Dominant improved varieties of cowpea grown in Nigeria include IT97K-499-35, IT89KD-288, IT90K-277-2, IT89KD-391, and IT98K-205-8 (ICRISAT, 2011). Although these varieties become difficult to identify by their code varietal names when they reach markets, they have however been categorized in line with their popular local names such as *Oloyin*, *Milk*, *Drum*, *Sokoto*, *Gombe*, *Oloka* amongst others (Afolami, 2002; Oyewale, 2016; Kassali *et al.*, 2018). The different varieties are thus demanded by households for different purposes based on the forms in which they are utilized (Mundua, 2010; Oyewale, 2016).

Furthermore, households' preference for cowpea is yet to be fully understood by researchers as the following questions are frequently being asked: what quantity of the cowpea will be bought? At what price? And most importantly, what variety of cowpea would consumers want if incomes fall and prices increase? (Coulibaly and Lowenberg-DeBoer, 2000). In addition, in the event of high prices of the preferred variety and a decrease in income or lack of enough income, what will be the response of the consumers? (Akanni, 2014). This salient information concerning cowpea consumption in Nigeria as a whole and Oyo State, in particular, is scanty. Hence, this study assessed the preference for cowpea by households, determined the forms of usage and eating forms of cowpea among households, and determined the factors influencing households' preference for cowpea varieties.

The Nigeria government in its current Agricultural Promotion Policy (APP) has earmarked cowpea as one of the most important crops of focus with a dual aim of prioritizing its production and repositioning the sector for better production and marketing. This will help the Nigerian government in achieving the triple goal of quality nutrition, food safety and food security as well as economic improvement, however, these goals can only be achieved if the cowpea variety that households mostly prefer and the factors that drive their preference are fully known, as this will help in choosing what variety to focus on.

## MATERIAL AND METHOD

### Study area

This study was carried out in Oyo State, Nigeria. Oyo State, with a total of thirty-three (33) Local Government Areas (LGAs), has an estimated population of 6,617,720. The State is located in the South-Western part of Nigeria. The State is located between latitudes  $7^{\circ} 3'$  and  $9^{\circ} 12'$  north of the equator and longitudes  $2^{\circ} 47'$  and  $4^{\circ} 23'$  east of the Meridian. It covers a total land area of about 28,454 square kilometres, with a ratio of almost 1:1 distribution of male to female population (Segun-Olasanmi and Bamire, 2010). Though a substantial amount of cowpea is produced in Oyo State, the State also has several major markets for the assembly of cowpea (transported from the major producing States in the Northern parts of the country) where buyers from within and without the State come to purchase either for consumption or sale (Adejobi and Ayinde, 2005; Aluko et al., 2016; Ayinde, 2005). As a result of this, some of the major varieties of cowpea (that is, *Oloyin*, *Drum*, *Milk* and *Sokoto*) available and sold in the markets were used in this study as samples which were shown to households for ease of identification.

### Data collection

A multi-stage sampling technique was adopted for the study. In the first stage, five (5) LGAs were purposively selected out of the 33 LGAs in the State based on their commercial activities. The five LGAs selected were Ibadan South-East, Ibadan North-East, Iseyin, Saki West and Ogbomoso South. In the second stage, one (1) major town was purposively selected from each of the LGAs; the towns include Mapo, Ring Road, Iseyin, Saki and Arowomole. In the third stage; fifty (50) households were systematically selected to arrive at a sample size of two hundred and fifty (250) respondents. The names of the different cowpea varieties used for this study were the local names in the study area. Discussions with some experts have shown that there are no specific trait names for the different varieties. This is due to the fact that varieties of particular crops only have trait names when they are still in the experimental phase. Once the varieties have passed from the experimental phase and have been released into the market, they take on different local names suitable to their features.

### Method of Data analysis

Descriptive statistics such as frequency and percentages were used to describe the socio-economic characteristics of households, identify the preference, forms of usage and the number and types of dishes prepared from cowpeas by households. Multinomial logit regression technique was used to identify the factors that influenced the preference of households for cowpea varieties.

### Multinomial logit

To determine the factors that influenced the preference for cowpea varieties, a multinomial logistic regression model was used. Since the discrete choices have more than two categories in the dependent variable, the multinomial logit model is more applicable and appropriate than other logit or probit models. Preference for cowpea varieties was considered as an outcome variable that has four categories whereas the socio-economic characteristics of household heads and attributes of cowpea varieties were utilized as predictors in this study. To identify the factors influencing preference for cowpea varieties, it is assumed that in a given period, households prefer among the mutually exclusive cowpea varieties those that offer the maximum utility. Following Greene (2003), suppose for the  $i$ th household faced with  $j$  choices, assume the utility choice  $j$  as:

$$U_{ij} = X_{ij}\beta + \varepsilon_{ij} \quad (1)$$

If the household prefers cowpea  $j$  in particular, then it is assumed that  $U_{ij}$  is the maximum among the  $j$  utilities,  $X_{ij}$  is a vector of characteristics influencing cowpea  $j$  for an  $i$ th household and  $\varepsilon_{ij}$  is the error term. So, the statistical model is derived by the probability that choice  $j$  is made, which is:

$$\text{Prob}(U_{ij} > U_{ik}) \text{ for all other } k \neq j \quad (2)$$

For this study, *Oloyin* is the reference preferred variety. The estimated coefficients measure the change in the logit for a one-unit change in the predictor variable while other explanatory variables are held constant. A positive estimated coefficient implies an increase in the likelihood that a household will prefer the alternative cowpea variety while a negative estimated coefficient indicates that there is less likelihood that a household will prefer an alternative cowpea variety.

In line with Greene (2003), the following model was used to determine the factors influencing the preference for the selected cowpea varieties:

$$\text{Prob}(Y_i = j) = \frac{e^{\beta_j X_i}}{\sum_{k=0}^7 e^{\beta_k X_i}}, j = 1, 2, 3, 4 \quad (3)$$

The explicit model was estimated thus:

$$Y_i = \beta_0 + \beta_j X_i + e \quad (4)$$

$$Y_i = \beta_0 + \sum_{n=1}^{n=16} \beta_{nj} X_{ni} + e \quad (5)$$

Where

$e$  = exponential function;

$Y_i$  = cowpea varieties mostly preferred by households;

$\text{Prob}(Y_i = j)$  = probability of mostly preferring any of the selected cowpea varieties (*Oloyin* = 1, *Drum* = 2, *Milk* = 3, *Sokoto* = 4)

$i$  = observation of household;

$j$  = the number of cowpea varieties;

$\beta_0$  = the constant;

$\beta_j$  = the coefficients' vector;

$X_i$  = vector of household characteristics;

$e$  = error term,

where:

$X_1$  = age of household head (years);

$X_2$  = household size (number);

$X_3$  = sex of household head (dummy 1= male and 0= female);

$X_4$  = years spent in education (Years);

$X_5$  = main occupation of household head

(1= civil service and 0 if otherwise);

$X_6$  = marital status of household head

(dummy 1= married and 0= single);

$X_7$  = income of household (₦);

$X_8$  = price of *Oloyin* (₦);

$X_9$  = price of *Drum* (₦);

$X_{10}$  = price of *Milk* (₦);

$X_{11}$  = price of *Sokoto* (₦);

$X_{12}$  = sweetness (1 if sweet, 0 if otherwise);

$X_{13}$  = time taken to cook

(1 if less time is taken to cook, 0 if otherwise);

$X_{14}$  = weevil-damage tolerance

(1 if tolerant to weevil damage, 0 if otherwise);

$X_{15}$  = aroma during cooking

(1 if it has a unique aroma, 0 if otherwise);

$X_{16}$  = absence of foreign particles (1 if absent, 0 if otherwise).

Coefficients of each independent variable in the above model did not represent the impact of the variable on the dependent variable in terms of magnitude or size. Hence, for this study, the marginal effects, which show the magnitude of change in the dependent variable when the independent variable changes, were estimated (Goktolga et al., 2005).

## RESULTS AND DISCUSSION

The results in Table 1 revealed that the majority (86.4%) of household heads were males with an average age of approximately 47 years old with a standard deviation of  $\pm 9.76$ . This shows a true picture of most African societies where males are the head of the home and as such must provide for the daily needs of their family. The result has also shown that household heads are mostly married (80.0%), have an average household size of approximately 5 members and spent an average of 14 years in attaining a formal education. This implies that the higher the number of years of formal education, the higher will be the positive influence on the household heads' ability to know the nutritional composition of foods (Okojie, 2002). The result has also revealed that most (42.0%) of the household heads were civil servants and that all (100.0%) the households produce a meal from cowpea.

Table 1: Socio-economic characteristics of household heads

| Socio-economic characteristics   | Frequency             | Percentage |
|----------------------------------|-----------------------|------------|
| <b>Sex</b>                       |                       |            |
| Male                             | 216                   | 86.4       |
| Female                           | 34                    | 13.6       |
| <b>Age</b>                       |                       |            |
| 31 – 40                          | 80                    | 32.0       |
| 41 – 50                          | 84                    | 33.6       |
| 51 – 60                          | 55                    | 22.0       |
| 61 – 70                          | 31                    | 12.4       |
| <b>Mean (standard deviation)</b> | 47.44 (9.76)          |            |
| <b>Marital status</b>            |                       |            |
| Single                           | 50                    | 20.0       |
| Married                          | 200                   | 80.0       |
| <b>Household size</b>            |                       |            |
| 1 – 5                            | 176                   | 70.4       |
| 6 – 10                           | 74                    | 29.6       |
| <b>Mean (standard deviation)</b> | 4.74 (1.72)           |            |
| <b>Level of education</b>        |                       |            |
| No formal education              | 14                    | 5.6        |
| Primary education                | 5                     | 2.0        |
| Secondary education              | 59                    | 23.6       |
| Tertiary education               | 172                   | 68.8       |
| <b>Years of education</b>        |                       |            |
| 0                                | 14                    | 5.6        |
| 1 – 10                           | 15                    | 6.0        |
| 11 – 20                          | 221                   | 88.4       |
| <b>Mean (standard deviation)</b> | 13.55 (4.09)          |            |
| <b>Primary occupation</b>        |                       |            |
| Civil servant                    | 112                   | 44.8       |
| Private salary earner            | 22                    | 8.8        |
| Trader                           | 70                    | 28.0       |
| Artisan                          | 44                    | 17.6       |
| Farmer                           | 2                     | 0.8        |
| <b>Secondary occupation</b>      |                       |            |
| None                             | 221                   | 88.4       |
| Private salary earner            | 3                     | 1.2        |
| Trader                           | 13                    | 5.2        |
| Artisan                          | 8                     | 3.2        |
| Farmer                           | 5                     | 2.0        |
| <b>Household head income (₦)</b> |                       |            |
| 10,000 – 50,000                  | 132                   | 52.8       |
| 51,000 – 100,000                 | 101                   | 40.4       |
| 101,000 – 150,000                | 17                    | 6.8        |
| <b>Mean (standard deviation)</b> | 61,375.00 (31,605.70) |            |
| <b>Produce meal from cowpea</b>  |                       |            |
| Yes                              | 250                   | 100.0      |

Source: Data Analysis, 2020

## Preference for cowpea varieties by households

The result of households' preference for cowpea varieties as shown in Table 2 revealed that 69.6% of the households mostly preferred *Oloyin* variety of cowpea over other varieties, 7.2% mostly preferred *Drum* over other varieties, 11.2% mostly preferred the *Milk* variety over others and 11.6% mostly preferred *Sokoto* over other varieties. The result thus revealed that all (100.0%) the households that mostly preferred *Oloyin* did so because of its sweetness. The result also showed that the majority (89.5% and 84.2%) mostly preferred *Drum* because of its sweetness and ability to tolerate weevil infestation respectively. Also, the result revealed that all (100.0%) the households that mostly preferred *Milk* did so because of its sweetness, takes less time to cook and ability to tolerate weevil infestation. Finally, the result showed that all (100.0%) the households that mostly preferred *Sokoto* preferred it because of its ability to withstand weevil infestation. These results confirm the findings of Murdock et al. (2003) and Faye et al. (2006) who reported that consumers are generally understood to prefer cowpeas with less insect damage and with high sucrose contents and less cooking time.

Table 2: Preference of households for cowpea varieties

| Cowpea varieties | Mostly preferred | Attributes                   | Frequency (%) |
|------------------|------------------|------------------------------|---------------|
| <i>Oloyin</i>    | 174 (69.6)       | Size                         | 114 (65.5)    |
|                  |                  | Time taken to cook           | 148 (85.1)    |
|                  |                  | Sweetness                    | 174 (100.0)   |
|                  |                  | Aroma during cooking         | 132 (75.9)    |
|                  |                  | Weevil-damage tolerance      | 83 (47.7)     |
|                  |                  | Absence of foreign particles | 81 (46.6)     |
| <i>Drum</i>      | 19 (7.6)         | Size                         | 12 (63.2)     |
|                  |                  | Time taken to cook           | 15 (78.9)     |
|                  |                  | Sweetness                    | 17 (89.5)     |
|                  |                  | Aroma during cooking         | 14 (73.7)     |
|                  |                  | Weevil-damage tolerance      | 16 (84.2)     |
|                  |                  | Absence of foreign particles | 9 (47.4)      |
| <i>Milk</i>      | 28 (11.2)        | Size                         | 18 (64.3)     |
|                  |                  | Time taken to cook           | 28 (100.0)    |
|                  |                  | Sweetness                    | 28 (100.0)    |
|                  |                  | Aroma during cooking         | 26 (92.9)     |
|                  |                  | Weevil-damage tolerance      | 28 (100.0)    |
|                  |                  | Absence of foreign particles | 24 (85.7)     |
| <i>Sokoto</i>    | 29 (11.6)        | Size                         | 26 (89.7)     |
|                  |                  | Time taken to cook           | 21 (72.4)     |
|                  |                  | Sweetness                    | 25 (86.2)     |
|                  |                  | Aroma during cooking         | 26 (89.7)     |
|                  |                  | Weevil-damage tolerance      | 21 (72.4)     |
|                  |                  | Absence of foreign particles | 29 (100.0)    |

Source: Data Analysis, 2020

## Number and types of cowpea dishes consumed by households

The result in Table 3 showed that households prepare approximately 5 dishes from the different varieties of cowpea. This result is in agreement with that of Oyewale (2016) who reported similar findings in his study on cowpea. The implication of this result is that the higher the number of dishes prepared from cowpea, the higher will be the quantity of cowpea that will be demanded by the households. Furthermore, the result in Table 3 revealed that the commonest dish prepared by households was *Moin-Moin* (94.8%), followed by *Akara* (84.4%) and porridge (75.6%). This is in line with Lambot

(2002) who submitted that unlike other legumes, cowpea is multipurpose and as such different meals are prepared from it.

Table 3: Number of dishes and types of dishes consumed

| Types of dishes                    | Frequency   | Percentage |
|------------------------------------|-------------|------------|
| <b>Number of dishes consumed</b>   | 107         | 42.8       |
| 1 – 4                              | 143         | 57.2       |
| 5 – 7                              | 4.70 (1.34) |            |
| <b>Mean (standard deviation)</b>   |             |            |
| <b>Dishes prepared from cowpea</b> | 237         | 94.8       |
| <i>Moin-Moin</i>                   | 211         | 84.4       |
| <i>Akara</i>                       | 189         | 75.6       |
| Porridge                           | 151         | 60.4       |
| Rice and beans                     | 142         | 56.8       |
| Beans and corn                     | 140         | 56.0       |
| <i>Gbegiri</i>                     | 105         | 42.0       |
| <i>Ekuru</i>                       |             |            |

This result thus confirms the versatile nature of cowpea as suggested by Ayinde (2005) that the different varieties of cowpea can be eaten alone, processed into other dishes, or as components of other foods. This versatility of cowpea thus makes it a component of foods consumed in many households in the study area

#### Forms of households' usage for cowpea varieties

The result of the forms of usage of the different cowpea varieties as shown in Table 4 revealed that most (47.2%) of households used the *Sokoto* cowpea variety to make *Moin-Moin*, 57.2% used *Oloyin* to make beans porridge, 32.4% of households also used *Sokoto* to make *Akara*, 36.4% used *Oloyin* to make rice and beans, 33.2% also used *Oloyin* to make beans and corn, 30.0% used *Oloyin* to make *Gbegiri* while 26.4% used *Oloyin* to make *Ekuru*. The result thus showed that households mostly used the *Oloyin* variety of cowpea for their different cooking; this result is not surprising given the households' preference for *Oloyin* over other varieties. This result thus reiterates the submissions of Michael (2016), Opoola (2016) and Oyewale (2016) that the different varieties of cowpea are used in making different dishes based on the preference of consumers.

#### Eating forms of cowpea by households

The result in Table 5 revealed the eating forms of cowpea varieties for different members of a household. The result revealed that 62.8% of fathers mostly preferred to eat their cowpea in the form of *Akara*, followed by *Moin-Moin* (60.0%) and Porridge (44.8%). However, 71.6% of mothers mostly preferred to consume their cowpea in the form of *Moin-Moin*, followed by *Akara* (68.0%) and Porridge (44.8%) while for the children, 71.6% mostly preferred to consume their cowpea in the form of *Moin-Moin*, followed by *Akara* (68.0%) and Porridge (56.4%). The result has shown that whilst household members consume the different cowpea varieties in different forms, they mostly consume their cowpea either as *Moin-Moin*, *Akara*, or Porridge. This result is in agreement with that of Kormawa et al. (2002) who submitted that though households consume cowpea more than any other grain legume, different members of a household however consume cowpea in different forms.

Table 4: Distribution of households by forms of usage of cowpea varieties

| Forms of usage        | Frequency | Percentage |
|-----------------------|-----------|------------|
| <b>Moin-Moin</b>      |           |            |
| <i>Oloyin</i>         | 52        | 20.8       |
| <i>Drum</i>           | 35        | 14.0       |
| <i>Milk</i>           | 32        | 12.8       |
| <i>Sokoto</i>         | 118       | 47.2       |
| <b>Bean porridge</b>  |           |            |
| <i>Oloyin</i>         | 143       | 57.2       |
| <i>Drum</i>           | 13        | 5.2        |
| <i>Milk</i>           | 27        | 10.8       |
| <i>Sokoto</i>         | 6         | 2.4        |
| <b>Akara</b>          |           |            |
| <i>Oloyin</i>         | 59        | 23.6       |
| <i>Drum</i>           | 42        | 16.8       |
| <i>Milk</i>           | 29        | 11.6       |
| <i>Sokoto</i>         | 81        | 32.4       |
| <b>Rice and beans</b> |           |            |
| <i>Oloyin</i>         | 91        | 36.4       |
| <i>Drum</i>           | 16        | 6.4        |
| <i>Milk</i>           | 40        | 16.0       |
| <i>Sokoto</i>         | 4         | 1.6        |
| <b>Beans and corn</b> |           |            |
| <i>Oloyin</i>         | 83        | 33.2       |
| <i>Drum</i>           | 12        | 4.8        |
| <i>Milk</i>           | 44        | 17.6       |
| <i>Sokoto</i>         | 3         | 1.2        |
| <b>Gbegiri</b>        |           |            |
| <i>Oloyin</i>         | 75        | 30.0       |
| <i>Drum</i>           | 19        | 7.6        |
| <i>Milk</i>           | 33        | 13.2       |
| <i>Sokoto</i>         | 13        | 5.2        |
| <b>Ekuru</b>          |           |            |
| <i>Oloyin</i>         | 66        | 26.4       |
| <i>Drum</i>           | 11        | 4.4        |
| <i>Milk</i>           | 20        | 8.0        |
| <i>Sokoto</i>         | 8         | 3.2        |

Source: Data Analysis, 2020

Table 5: Eating forms of cowpea by household members

| Household consumption of cowpea | Frequency | Percentage |
|---------------------------------|-----------|------------|
| <b>Father</b>                   |           |            |
| <i>Moin-Moin</i>                | 150       | 60.0       |
| <i>Akara</i>                    | 157       | 62.8       |
| Porridge                        | 112       | 44.8       |
| <i>Rice and beans</i>           | 103       | 41.2       |
| <i>Beans and corn</i>           | 96        | 38.4       |
| <i>Gbegiri</i>                  | 105       | 42.0       |
| <i>Ekuru</i>                    | 57        | 22.8       |
| <b>Mother</b>                   |           |            |
| <i>Moin-Moin</i>                | 179       | 71.6       |
| <i>Akara</i>                    | 170       | 68.0       |
| Porridge                        | 112       | 44.8       |
| <i>Rice and beans</i>           | 110       | 44.0       |
| <i>Beans and corn</i>           | 92        | 36.8       |
| <i>Gbegiri</i>                  | 104       | 41.6       |
| <i>Ekuru</i>                    | 73        | 29.2       |
| <b>Children</b>                 |           |            |
| <i>Moin-Moin</i>                | 179       | 71.6       |
| <i>Akara</i>                    | 170       | 68.0       |
| Porridge                        | 141       | 56.4       |
| <i>Rice and beans</i>           | 102       | 40.8       |
| <i>Beans and corn</i>           | 85        | 34.0       |
| <i>Gbegiri</i>                  | 114       | 45.6       |
| <i>Ekuru</i>                    | 119       | 47.6       |

Source: Data Analysis, 2020

### Factors influencing households' preference for cowpea variety

The result in Table 6 revealed that the log-likelihood function was -183.73, the pseudo  $R^2$  was 0.2208 and that the entire model was significant at the ( $p < 0.01$ ) level. These diagnostic variables and the significance level reveal the fitness of the entire model. The result revealed that out of the socio-economic variables considered, only age of the household head, the primary occupation of the household head, years of formal education and income significantly influenced households' preference for cowpea varieties. The result has also shown that aroma during cooking, ability to tolerate weevil infestation and absence of foreign particles were the significant attributes that influenced households' preference for cowpea varieties.

The result of the marginal effect in Table 6 showed that a decrease in the years of formal education by 1 year would increase households' preference for *Oloyin* by 1.2%. This implies that those who spent fewer years in attaining formal education would mostly prefer the *Oloyin* variety of cowpea as their main variety. This result is similar to that of Abdul-Latiff and Ayob (2017) who found a positive relationship between

years of education and preference for foreign rice. Also, the result showed that an increase in the price of *Oloyin* by ₦1 would increase households' preference for the variety by 281%. The result further showed that an increase in the price of *Sokoto* variety would decrease households' preference for *Oloyin* by 403%. Finally, the result revealed that an increase in the aroma of *Oloyin* during cooking would increase households' preference for *Oloyin* by 9.8%.

The result also showed that the coefficient of the age of the household head was positive and statistically significant at 1% which means that older household heads as compared to younger household heads will more likely prefer *Drum* as their main cowpea variety. The result of the marginal effect showed that an increase in the age of household heads by 1 year will increase their likelihood of preferring *Drum* as their main variety by 0.5%. This result is similar to that of Mhlanga (2010) who in his study on rice submitted that young consumers are more likely to choose high-quality rice varieties over other rice varieties. The result showed that the coefficients of prices of *Drum* and *Milk* were negatively significant at 10% and 5% respectively which indicates that as the prices of *Drum* and *Milk*

Table 6: Factors influencing households' preference for cowpea variety

| Variable                      | <i>Oloyin</i>                        | <i>Drum</i>                          |                                    | <i>Milk</i>                           |                                     | <i>Sokoto</i>                        |                                     |
|-------------------------------|--------------------------------------|--------------------------------------|------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|
|                               | Marginal effect                      | Coefficient                          | Marginal effect                    | Coefficient                           | Marginal effect                     | Coefficient                          | Marginal effect                     |
| Constant                      |                                      | 216.280<br>(2.35)                    |                                    | 103.652<br>(1.49)                     |                                     | -65.251<br>(-0.89)                   |                                     |
| Sex                           | 0.021<br>(0.18)                      | -1.091<br>(-0.84)                    | -0.078<br>(-1.06)                  | -0.173<br>(-0.17)                     | -0.020<br>(-0.23)                   | 0.867<br>(0.85)                      | 0.076<br>(0.93)                     |
| Age                           | -0.0002<br>(-0.07)                   | <b>0.089***</b><br>( <b>2.68</b> )   | <b>0.005***</b><br>( <b>2.85</b> ) | -0.038<br>(-1.32)                     | -0.004<br>(-1.58)                   | -0.017<br>(-0.59)                    | -0.001<br>(-0.60)                   |
| Marital status                | -0.027<br>(-0.26)                    | 0.617<br>(0.52)                      | 0.042<br>(0.60)                    | 0.350<br>(0.41)                       | 0.036<br>(0.49)                     | -0.490<br>(-0.58)                    | -0.050<br>(-0.74)                   |
| Household size                | -0.016<br>(-0.87)                    | -0.044<br>(-0.24)                    | -0.006<br>(-0.55)                  | 0.098<br>(0.61)                       | 0.008<br>(0.58)                     | 0.183<br>(1.07)                      | 0.014<br>(1.04)                     |
| Years of education            | <b>-0.017*</b><br>( <b>-1.81</b> )   | 0.181<br>(1.48)                      | 0.009<br>(1.25)                    | 0.137<br>(1.52)                       | 0.010<br>(1.36)                     | 0.002<br>(0.04)                      | -0.002<br>(-0.53)                   |
| Primary occupation            | 0.074<br>(1.16)                      | -0.298<br>(-0.47)                    | -0.007<br>(-0.18)                  | -0.073<br>(-0.15)                     | 0.012<br>(0.29)                     | <b>-1.052*</b><br>( <b>-1.75</b> )   | <b>-0.080*</b><br>( <b>-1.66</b> )  |
| Income                        | 0.219<br>(1.45)                      | -0.660<br>(-0.42)                    | -0.013<br>(-0.15)                  | -0.682<br>(-0.55)                     | -0.016<br>(-0.16)                   | <b>-2.377*</b><br>( <b>-1.68</b> )   | <b>-0.190*</b><br>( <b>-1.66</b> )  |
| Price of <i>Oloyin</i>        | <b>2.810**</b><br>( <b>2.31</b> )    | -21.359<br>(-1.55)                   | -0.049<br>(-0.07)                  | <b>-33.995***</b><br>( <b>-2.84</b> ) | <b>-2.233**</b><br>( <b>-2.38</b> ) | -5.585<br>(-0.48)                    | -0.527<br>(-0.66)                   |
| Price of <i>Drum</i>          | 1.362<br>(1.05)                      | <b>-40.366*</b><br>( <b>-1.94</b> )  | -0.209<br>(-0.27)                  | -13.090<br>(-0.79)                    | 0.655<br>(0.70)                     | <b>-21.860**</b><br>( <b>-2.00</b> ) | <b>-1.808**</b><br>( <b>-2.05</b> ) |
| Price of <i>Milk</i>          | -0.401<br>(-0.34)                    | <b>-30.340**</b><br>( <b>-1.99</b> ) | -0.591<br>(-0.90)                  | 1.301<br>(0.11)                       | 1.130<br>(1.33)                     | 4.103<br>(0.34)                      | -0.138<br>(-0.16)                   |
| Price of <i>Sokoto</i>        | <b>-4.031***</b><br>( <b>-4.31</b> ) | <b>19.344**</b><br>( <b>1.98</b> )   | 0.748<br>(1.41)                    | 7.491<br>(0.79)                       | 0.414<br>(0.57)                     | <b>42.267***</b><br>( <b>4.11</b> )  | <b>2.869***</b><br>( <b>4.16</b> )  |
| Time to cook                  | -0.084<br>(-1.08)                    | 0.536<br>(0.71)                      | 0.024<br>(0.55)                    | 0.218<br>(0.33)                       | -0.007<br>(-0.12)                   | 0.809<br>(1.11)                      | 0.067<br>(1.15)                     |
| Sweetness                     | -0.075<br>(-0.67)                    | 0.710<br>(0.61)                      | 0.055<br>(0.82)                    | 1.071<br>(0.94)                       | 0.103<br>(1.06)                     | -0.678<br>(-0.92)                    | -0.083<br>(-1.43)                   |
| Aroma during cooking          | <b>0.098*</b><br>( <b>1.66</b> )     | <b>-1.490**</b><br>( <b>-2.30</b> )  | <b>-0.065*</b><br>( <b>-1.83</b> ) | -0.627<br>(-1.27)                     | -0.034<br>(-0.84)                   | -0.174<br>(-0.34)                    | 0.002<br>(0.04)                     |
| Weevil tolerance              | -0.116<br>(-1.60)                    | -0.360<br>(-0.50)                    | -0.037<br>(-0.91)                  | <b>1.132*</b><br>( <b>1.75</b> )      | <b>0.092*</b><br>( <b>1.68</b> )    | 0.822<br>(1.30)                      | 0.060<br>(1.18)                     |
| Presence of foreign particles | 0.055<br>(0.83)                      | -0.612<br>(-0.83)                    | -0.022<br>(-0.51)                  | <b>-1.095**</b><br>( <b>-1.99</b> )   | <b>-0.093**</b><br>( <b>-2.00</b> ) | 0.651<br>(1.16)                      | 0.059<br>(1.35)                     |
| Log-likelihood                |                                      |                                      | -183.7349                          |                                       |                                     |                                      |                                     |
| Pseudo R-squared              |                                      |                                      | 0.2208                             |                                       |                                     |                                      |                                     |
| Prob>Chi-squared              |                                      |                                      | 0.0001                             |                                       |                                     |                                      |                                     |

Source: Data Analysis, 2020

The figures in parenthesis are the z-values.

\*, \*\*, and \*\*\* denote the level of significance at 10, 5 and 1 per cent respectively

increases, households will less likely prefer *Drum* and *Milk* as their main cowpea variety. The result also showed that the coefficient of the price of *Sokoto* was positively significant at 5% which implies that as the price of *Sokoto* increases, households will more likely prefer *Drum* as their main cowpea variety. Also, the result showed that the coefficient of aroma during cooking was negatively significant at 5%. This implies that households will less likely prefer *Drum* variety of cowpea because of its aroma during cooking as compared to *Oloyin*. The result of the marginal effect showed that the coefficient of aroma during cooking was negatively significant at 10%. This implies that an increase in the aroma during cooking of *Drum* would decrease households' preference for *Drum* by 6.5%.

Furthermore, the result showed that the coefficient of the price of *Oloyin* was negatively significant at 1% which implies that as the price of *Oloyin* increases, households will less likely prefer *Milk* cowpea variety as their main variety. The result of the marginal effect showed that an increase in the price of *Oloyin* by ₦1 would reduce households' preference for *Milk* variety of cowpea by 223%. The result also showed that the coefficient of weevil damage tolerance was positively significant at 10% which means that an increase in the weevil damage tolerance of *Milk* would increase households' likelihood of preferring *Milk* as their main cowpea variety. The result of the marginal effect showed that an increase in the ability of *Milk* cowpea variety to tolerate weevil infestation would increase households' preference for the variety by 9.2%. This result is similar to that of Oyewale (2016) who submitted that consumers would go for cowpea varieties with a high level of insect resistance. However, the coefficient of the absence of foreign particles was negatively significant at 5% which indicates that households will less likely prefer the *Milk* variety of cowpea as their main cowpea variety with an increase in the presence of foreign particles. The result of the marginal effect showed that an increase in the presence of foreign particles would reduce households' preference for *Milk* by 9.3%.

Moreover, the result showed that the coefficient of primary occupation was negatively significant at 10% which implies that households headed by a civil servant will less likely prefer the *Sokoto* variety of cowpea as their main cowpea variety. The result of the marginal effect showed that a change in the main occupation of household heads from civil servant to other occupations would reduce households' preference for the *Sokoto* variety by 8.0%. This could be due to the fact that those in wage employment have a higher tendency to acquire nutritionally-related knowledge which in most cases influence their food consumption pattern (Ogundele, 2014). Also, the result showed that the coefficient of income of the household head was negatively significant at 10% which means that households will less likely prefer *Sokoto* as their main cowpea variety as their income increases. The result of the marginal effect showed that an increase in the income of the household head by ₦1 would reduce households' preference for the *Sokoto* variety by 1.9%. The result also revealed that the coefficient of the price of *Drum* was negatively significant at 5% which implies that an increase in the price of *Drum* would reduce the likelihood of households' preferring *Sokoto* as their main cowpea variety. The result of the marginal effect showed that an increase in the price of *Drum* by ₦1 would reduce households' preference for *Sokoto* by 180%. Finally, the result showed that the coefficient of the price of *Sokoto* was positively significant at 1% which indicates that as the price of *Sokoto* increases, the likelihood of households preferring *Sokoto* as their main cowpea variety would increase. The result of the marginal effect indicates that an increase in the

price of *Sokoto* by ₦1 would increase households' preference for *Sokoto* by 287%.

## CONCLUSIONS

This study was carried out to determine the cowpea variety(ies) households prefer, the forms of usage and eating forms of cowpea among households, and the factors influencing households' preference for cowpea varieties in Oyo State, Nigeria. The study revealed that households mostly preferred the *Oloyin* variety of cowpea because of its sweetness and time taken to cook, that households mostly used *Oloyin* for their different cooking and that different members of a household consume cowpea in different forms. The study also identified the age of household head, the primary occupation of household head, years of formal education, income, prices of cowpea varieties, aroma during cooking, ability to tolerate weevil infestation and absence of foreign particles as the factors that significantly influenced households' preference for cowpea varieties. Since this study established that households mostly preferred *Oloyin* because of some specific attributes, then it is necessary for stakeholders and breeding institutions to give attention to this variety if the APP's aim to prioritize the production of cowpeas and reposition the cowpea sector for domestic and international market is to be achieved. Also, policymakers should target policies that are pricing-related.

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