FACTORS INFLUENCING HOUSEHOLDS' CONSUMPTION PREFERENCE FOR COWPEA-BASED PRODUCTS IN WESTERN ZONE OF BAUCHI STATE, NIGERIA

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ABSTRACT
The study examined the factors influencing households' consumption preference for cowpea-based products in Western zone of Bauchi State, Nigeria. A multi-stage random sampling technique was employed in the selection of 210 households for this study. Data were collected using questionnaire and analyzed with descriptive statistics and multinomial logistic regression. The result revealed that 44.3% of the households preferred to consume *alale*, followed by *kosai* with 23.3%. The result further showed that 99.0% and 91.4% of the households considers health benefit and nourishment as reasons for using cowpea-based products. The result of multinomial logistic regression analysis showed that, age of the household heads, household size, marital status, income of the household heads, price, taste, and weevil damage tolerance significantly influenced household consumption preference for cowpea-based products. The study concluded that, households prefer to consumed *alale* as cowpea-based products and considers health benefit as a strong reason for used. It was recommended that, there is need to encourage more utilization of cowpea by households' in different products in order to exploit its potential and generate income to low income families; and cowpea farmers should be encouraged to produced cowpea varieties in commercial quantity so as to meet the demand of consumers and consequently reduce the price of cowpea.

Keywords: Consumption, Cowpea, Household, Nigeria, Preference, Product.

INTRODUCTION
Cowpea (*Vigna unguiculata)* is one of the most ancient crops known to man. It is a broadly adapted highly valued crop, cultivated around the world primarily for grain but also as a vegetable (for leafy green, green pods, fresh shelled green peas and shelled dried peas), a cover crop and for fodder (Ayodeji *et al.,* 2014). Cowpea is often referred to as the poor man's meat as it is a significant source of protein, minerals, and vitamins for the rural poor who have limited access to protein from animal sources such as meat and fish (Therese *et al.,* 2019). Economically, cowpea has a great value in internal trade in Nigeria because it promotes trade between the producing area and the non- producing area. It also serves as a source of income to middlemen who embark on its transportation from one place to another (Girei *et al.,* 2013). In year 2012, Nigeria was the largest producer and consumer of cowpea in the world with estimated production and consumption index of over two million metric tons and 2.27 million metric tons respectively (Food and Agriculture Organization [FAO], 2015).

Domestic production of cowpea in the study area were in the hands of small-scale farmers, who obtain low yields due to subsistence level of production usually characterized by lack of improved technologies, inputs and agronomic practices (Amaza, 2016). Consumers make decisions by allocating their scarce income across all possible goods in order to obtain the greatest satisfaction. Formally, we say that consumers maximize their utility subject to budget constraint. Utility is defined as the satisfaction that a consumer derives from the

consumption of a good. As noted above, utility's determinants are decided by a host of non-economic factors. Consumer value is measured in terms of the relative utilities between goods. These reflect the consumer's preferences (Anonymous, 2020). Consumer preferences are defined as the subjective (individual) tastes, as measured by utility, of various bundles of goods. They permit the consumer to rank these bundles of goods according to the levels of utility they give the consumer. Note that preferences are independent of income and prices. Ability to purchase goods does not determine a consumer's likes or dislikes. One can have a preference for Porsches over Fords but only have the financial means to drive a Ford (Anonymous, 2020).

According to International Institute for Tropical Agriculture (IITA, 2015), all parts of the cowpea crop are used as all are rich in nutrients and fibre. In Africa humans consume the young leaves, immature pods, immature seeds and the mature dried seeds. The stems, leaves and the vines serve as animal feed and are often stored for use during the dry season. Fifty-two percent of Africa's production is used for food, 13% as animal feed, 10% for seeds, 9% for other uses and 16% is wasted. Regional preferences occur for the different seed size, colour texture of the seed coat. For example, Ghanaians are willing to pay a premium for black-eyed peas while Cameroonians would lower their prices for them. More than 4 million tons of peas of all sorts are consumed worldwide, with 387,000 tons consumed in Africa. Cowpea seed is a nutritious component in livestock feed. Its forage contributes significantly to animal feed mainly during the dry sea- son when the demand for feed reaches its peak. Epidemiological studies in over 40 countries of the world show a direct link between consumption of dry beans and reduced incidences of chronic diseases including cancer, and it is also used to enhance child survival (USAID, 2003). Furthermore, cowpea is an important legume in Nigeria which serves as a source of farm income (Afolami, 2002). Cowpea is used at all stages of growth as a vegetable crop. It is cultivated mainly for its seeds which can be processed into flour which is used to make cake, akara balls, etc., into paste to make moi-moi (pudding), or even cooked and eaten alone. It gives the working mothers the opportunity to prepare this favourite meal with the comfort it provides (Ezeoha *et al.,* 2019). Despite the economic and nutritional importance of cowpea to consumers and producers, a major problem of cowpea production is the mismatch between improved varieties of cowpea and consumers preference.

According to Faye *et al.* (2012) the characteristics of improved varieties of cowpea are not necessarily those priced by consumers. Ayinde *et al.* (2002) reiterated that cowpea as a food source provides the cheapest protein supplement to the urban and rural poor in Nigeria. The eating habits of most rural and urban poor thus revolves round cowpea consumption in many forms either through direct cooking of cowpeas, processing into bean cakes, bean pudding, dumplings, components of other meals such as in cowpea soups, rice and beans etc. The versatility of cowpea in this respect makes it a component of the food consumed in many households in Nigeria (Ayinde, 2005). Several researches have been conducted in order to describe production of improved cowpea varieties. However, reports on the households' consumption preference for cowpea-based products are inconsistent.

The broad objective of the study was to determine the factors influencing households' consumption preference for cowpea-based products in western zone of Bauchi State. The specific objectives were to: describe the level of preference for cowpea-based products among households; and determine the factors influencing households' preference for cowpea-based products.

MATERIALS AND METHODS
The Study Area

The research was conducted in two (2) Local Governments Areas (LGAs) from western zone of Bauchi State, namely: Dass and Bauchi. It occupies a total land area of 49,119 km². It is located between latitudes 9° 3' and 12° 3' north and longitudes 8° 50' and 11° east. According to National Population Commission (NPC, 2006), the population of Bauchi state was 4, 476, 465 segregated to 2, 426, 215 males and 2, 250, 250 females. According to the National Bureau of Statistics (NBS, 2019) with the rate of population growth of (3.5%per annum) the study area has a total of 7, 057, 045 people both males and females. Most of the people of Bauchi state engage in crop, livestock, fisheries productions etc. either in mixed farming or specifics are their dependable occupation (BSADP, 2019).

Sampling Procedure and Sample Size

Multi-stage sampling techniques were employed in the selection of households. In the first stage, two (2) LGAs were purposively selected from western zone. This is based on the high prevalence of cowpea producers and consumers in the area. In the second stage, three (3) communities were randomly selected from each of the LGA, given a total of 6 communities across the zone. In the third stage, from each of the communities selected, a total of 210 households were proportionately (8%) selected, to constitute the sample size.

Method of Data Collection

Primary data were collected by the used of structured questionnaire administered to 210 households' heads or their representatives with the help of well-trained enumerator's.

Method of Data Analysis

Data were analyzed using descriptive statistics to describe the level of preference for cowpea-based products among households. Multinomial logistic regression was used to determine the factors influencing household preference for cowpea-based products among households. Consumption preference for cowpea-based products was considered as an outcome variable that has five categories whereas the socio-economic characteristics of household heads and reasons for preference for the cowpea-based products were utilized as predictors in this study.

For this study, *Alale* is the reference preferred cowpea-based product. 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 (Ojedokun, 2020). As adopted by Jimoh (2017), the following model was used:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + e \qquad \ldots(1)$$

where;

Y = Consumption Preference for Cowpea-Based Products (Dependent variable): Y= 1 (*Kosai*), Y= 2 (*Alale*) Y= 3 (Cowpea porridge) Y= 4 (Cowpea soup), Y= 5 (*Dan wake*).

X_1 = Age of the household head (in years)

X_2 = Sex of the household head (dummy 1 = male, 0 = female)

X_3 = Household size (No. of persons)

X_4 = Marital status (dummy 1 = married, 0 = single)

X_5 = Educational level of household head

X_6 = Occupation of household head

X_7 = Household income (₦)
X_8 = Price of *Kwankwasiya* (₦)
X_9 = Price of *Kanannado fari* (₦)
X_{10} = Price of *Silver* (₦)
X_{11} = Price of *Jan wake* (₦)
X_{12} = Time taken to cook
X_{13} = Weevil damage tolerant (1 if tolerant to weevil damage, 0 if otherwise)
X_{14} = Palatability (1 if palatable, 0 if otherwise)
X_{15} = Taste (1 if taste is regarded as a factor in choosing preferred cowpea variety, 0 if otherwise)
β_0 = constant;
$\beta_1 - \beta_{15}$ = Coefficients
e = error term

The key terminology used in the study were *Kosai*: Cowpea fried cake, *Gwaten wake*: Cowpea porridge, *Alale*: Cowpea pudding, *Miyan wake*: Cowpea soup, and *Dan wake*: Cowpea dumpling.

RESULTS AND DISCUSSION
Consumption Preference for Cowpea-Based Products by Households'

Table 1 shows the distribution of households according to preference for cowpea-based products by households. The result revealed that 44.3% of the households preferred to consume *alale*, followed by *kosai* with 23.3%. While, 6.2%, 17.1% and 9.0% of the households preferred porridge, cowpea soup and *dan wake,* respectively. In Nigeria, it is enjoyed by millions of people daily (Clyde, 2020). Obinna (2020) reported that *alale* has always been a staple food in Nigeria that's traditionally cooked with no sugar and highly rich in protein and other essential nutrients that play an important role in human bodies. Scientist have associated this delicacy with excellent health benefits such as, antioxidant properties, contributes to weight loss, promotes bowel movements, help for diabetic patients, among others (Obinna, 2020). The result is in line with Onu (2018) in his study preference for imported and Nigerian rice among rural households in Imo State who reported that respondents preferred consuming fried rice formed by imported rice than jellof rice formed by Nigerian rice.

Table 1: Consumption preference for cowpea-based products by households

Products	Frequency	Percentage
Kosai	49	23.3
Alale	93	44.3
Cowpea Porridge	13	6.2
Cowpea Soup	36	17.1
Dan wake	19	9.1
Total	**210**	**100.0**

Source: Field Survey, 2020

Reasons for using Cowpea-based Products

Table 2 revealed that majority (99.0%) of the households considers health benefit as a strong reason for using cowpea-based products. Cowpea is good for diabetes, maintains standard cholesterol levels, control blood cholesterol, removes free radicals and most of the cowpea contains almost all essential vitamins and minerals including vitamin A, B1, B2,

B3,B5, B6, C, folic acid, iron, potassium, magnesium, calcium, selenium, sodium, zinc, copper, phosphorus (Nilankeeta, 2019). The results also reveal that 91.4% of households consider nourishment as a reason for using cowpea and its products. Cowpea also has high protein content and can substitute animal protein. 73.3% of households consider readily available as a reason for use and 21.9% of the households have considered stable price of cowpea as a reason for using cowpea. This means that the higher the price of food items, the lower its consumption cert-paribus. The findings agree with Oyinbo (2014), reported that local rice is perceived to be more palatable and nutritious than foreign rice.

Table 2: Reasons for using cowpea-based products among households'

Reasons	*Frequency	Percentage
Health benefit	208	99.0
Nourishment	192	91.4
Readily available	154	73.3
Stable price	46	21.9

*Multiple responses were recorded
Source: Field Survey, 2020

Factors influencing Households' Consumption Preference for Cowpea-based Products
        Table 3 revealed that the log-likelihood function was -215.869, the pseudo R^2 was 0.2616, and this means that the full model containing the independent variable represents a 26.16% improvement in fit relative to the null model. The Prob>chi-square shows that the entire model was significant at ($P>0.01$) level of significance indicating the fitness of the entire model. The result also revealed that, age of the household heads, household size, marital status, and income of the household heads significantly influenced household consumption preference for cowpea-based products. The result revealed that price of cowpea varieties, taste and weevil damage tolerance were the significant reasons for preference that influenced households' consumption preference for cowpea-based products.

        Similarly, the coefficient of age was negative and statistically significant at ($P<0.05$) for *kosai* and cowpea soup, respectively. This means that for a unit increase in age of the household heads, the likelihood for preferring *kosai* and cowpea soup as the main cowpea-based product decreases relative to *alale* as the main based product. This indicated that an increase in age of household head by 1 year would reduce the households' preferences for *kosai* and cowpea soup by 6.26% and 10.8%. This also implies that older household heads will less likely prefer *kosai* and cowpea soup than the younger ones due primarily to their issues of preference. The finding is in line with Mfikwa and Kilima (2014) who reported that age of the households positively influences pulses consumption in urban area of Tanzania with no significant relation in the rural area. The result further indicated that the coefficient of household size was positive and statistically significant at ($P<0.05$) for *kosai*, cowpea porridge and *dan wake* products, respectively. This means that increase in household size by 1 person would increase the households' preference for *kosai,* cowpea porridge and *dan wake* by 13.62%, 26.60% and 13.32%. This implies that the likelihood for preferring *kosai*, cowpea porridge and *dan wake* relative to *alale* as the main cowpea products tends to increases as large household size tends to consume more *kosai*, cowpea porridge and *dan wake* than small household size. This is contrary with the study of Fakayode *et al.* (2010), reported that household size coefficient was negative, implying that the probability of the household consuming either a combination of local and imported rice or the imported rice only relative to

the local rice increases as the household size decreases. The study also revealed that the coefficient of marital status was positive and statistically significant at (P<0.05) for cowpea soup. This means that the likelihood for preferring cowpea soup as the main cowpea products as compared with *alale* tends to increase by 63.14% as their main cowpea products. This implies that household heads that are married would likely prefer cowpea soup as their main cowpea product than those household head that were single. The findings from the study showed that the coefficient of income of the household heads was positively significant at (P<0.05) in *kosai*. This implies that as income of the household heads increases the likelihood for preferring *kosai* as the main cowpea products increases relative to *alale* as the main cowpea product. This means that as income of the household head increase by ₦1 would increase household preference for *kosai* by 0.05%. The findings agree with Fakayode (2010) who found that income of the households preferring local or imported rice were positive indicating that the probability of consuming a combination of local and imported rice or the imported rice only relative to the local rice increases as the income increases.

Furthermore, the result also showed that the coefficient of price of *kwankwasiya* variety were negative and statistically significant at (P<0.1) and (P<0.01) for *kosai* and cowpea porridge, respectively. This implies that an increase in price of *kwankwasiya* variety for *kosai* and cowpea porridge by ₦1 would decrease the household preference for *kosai* and cowpea porridge by 1.65% and 5.35% as compared to *alale* as the main cowpea product. Also, the findings revealed that the coefficient of price of *kanannado fari* was negative and statistically significant at (P<0.1) in kosai which indicates that as price of *kanannado fari* increases household will less likely prefer *kosai* as their main cowpea product. This implies that as price of *kanannado fari* for kosai increase by ₦1 would reduce the household preference by 55.4%.

Table 3: Factors influencing households' consumption preference for cowpea-based products

Variables	*Kosai*	Cowpea porridge	Cowpea soup	*Dan wake*
Constant	10.2346**	-4.4663	3.2962	9.4957
	(0.014)	(0.557)	(0.512)	(0.186)
Age	-0.0626**	-0.0410	-0.1084**	-0.1385
	(0.050)	(0.327)	(0.018)	(0.222)
Sex	0.6482	-1.8349	1.2049	2.2216
	(0.217)	(0.143)	(0.470)	(0.942)
Household size	0.1362**	0.2660**	0.2423	0.1332**
	(0.033)	(0.043)	(0.201)	(0.017)
Marital status	-0.1650	0.2318	0.6314**	-0.6592
	(0.924)	(0.747)	(0.036)	(0.107)
Educational level	-0.2448	0.6481	0.2111	0.0643
	(0.236)	(0.120)	(0.439)	(0.845)
Occupation	0.1127	0.4176	0.1933	2.5653
	(0.535)	(0.990)	(0.356)	(0.963)
Income	0.0005**	3.2506	-1.6606 4.0706	
	(0.027)	(0.827)	(0.941)	(0.822)
Price of *kwankwasiya*	-0.0165*	-0.0535***	-0.0240 -0.0442	
	(0.084)	(0.008)	(0.435)	(0.401)
Price of *kanannado fari*	-0.5584*	0.2370	0.2777	1.7260*
	(0.071)	(0.462)	(0.209)	(0.090)
Price of silver	-0.8370***	0.2869	0.1666	-0.8820
	(0.000)	(0.562)	(0.108)	(0.342)
Price of *Jan wake*	-0.6943*	-0.5748	0.2780*	1.6788
	(0.092)	(0.330)	(0.071)	(0.173)
Time taken to cook	0.1005	0.4158	0.3890	0.4384
	(0.706)	(0.241)	(0.143)	(0.284)
Taste	-0.0172	0.8932*	-0.0087	1.0891*
	(0.908)	(0.088)	(0.963)	(0.093)
Palatability	-0.1054	1.3967	0.2201	-0.3587
	(0.599)	(0.163)	(0.442)	(0.364)
Weevil tolerance	-0.1077	1.5903***	-0.2324	0.1029
	(0.426)	(0.000)	(0.183)	(0.767)

Note: *, ** and *** = Significant level at 10%, 5% and 1% levels. Log likelihood=-215.869
Pseudo R-square: 0.2616 Prob>chi-square: 0.0000; * Figures in parentheses are z-values; the reference category is: *Alale*
Source: Field Survey, (2020).

However, the result (Table 3) also revealed that the coefficient of *kanannado fari* was also positive and statistically significant at (P<0.1) in *dan wake* which also indicates that as price of *kanannado fari* for *dan wake* increases b ₦1 would increase the household preference by 172.6%. Furthermore, the coefficient of price of silver variety was negative and statistically significant at (P<0.01) for *kosai* which means that as price of silver variety increases, the likelihood of preferring *kosai* as the main cowpea variety would decrease by 83.7%. Finally, the coefficient of price of *Jan wake* was negative and statistically significant at (P<0.1) for *kosai* but positively significant in cowpea soup, respectively. This implies that increase in price of *Jan wake* variety would decrease the household preference for *kosai* by 69.43% as their main

cowpea product but tend to increase the household preference for cowpea soup by 27.8% as their main cowpea product. This is contrary to Onu (2018), reported that price of imported and Nigerian rice was positive in influencing preference for both imported and Nigerian rice. Taste was found to be the most significant contributor in household consumption preference for cowpea product.

The result also shows the coefficient of taste was positive and statistically significant at (P<0.1) for cowpea porridge and *dan wake*, respectively. This indicates that as taste of cowpea porridge and *dan wake* increases the likelihood of household preferring cowpea porridge and *dan wake* increases by 89.3% and 8.91%, respectively as compared to *alale* as the main cowpea product. The result agrees with the findings of Onu (2018) who posited that taste in Nigerian rice was positively, indicating that Nigerian rice has better taste than imported rice. It agrees with Ogundele, (2014) who reported that consumers believe that Nigerian rice has better taste and more nutritious than imported rice. The coefficient of weevil tolerance was positive and statistically significant at (P<0.01) for cowpea porridge which implies that an increase in weevil tolerance of cowpea processed in to porridge would increase the likelihood of preferring cowpea porridge relative to *alale* as the main cowpea-based product. This result is similar to that of Oyewale (2016) and Ojedokun (2020) who all submitted that consumers would go for cowpea varieties with a high level of insect resistance that would be processed to one form or the others.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, it can be concluded that, majority of the households' highly preferred *alale* followed by *kosai* as cowpea-based product. Most of the households consider health benefit, nourishment, and readily available as reasons for using cowpea-based products. Age, household size, marital status, income, price, taste and weevil damage tolerance were statistically significant in determining the factors influencing households' consumption preference for cowpea-based products. It was recommended that:

1. There is need to encourage more utilization of cowpea by households' in different products in order to exploit its potential and generate income to low income families.
2. Cowpea farmers should be encouraged to produce cowpea in commercial quantity so as to meet the demand of consumers and consequently reduce the price of cowpea.

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