Households' Preference and Utilization for Selected Spices in Ibadan Metropolis in Oyo State, Nigeria

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Abstract
This study assessed households' preference and utilization for selected spices in Ibadan metropolis in Oyo state of Nigeria. Multi-stage sampling technique was used to collect data from 150 respondents using structured questionnaire. Data collected were analysed using descriptive statistics, likert scale and linear regression. Result showed that most of the respondents (80.67%) were females while majority were within the age range 26 and 40 with mean household size of 4 persons. A substantial proportion of the respondents (40%) consumed spices because of its taste. Onion was the most preferred spice in terms of taste, small chilli pepper was the most preferred in terms of market price and locust bean was the most preferred in terms of flavour. The likert scale revealed that onions were consumed more regularly than other selected spices. The result of the linear regression indicated that income, expenditure on food, gender, education and reason for consumption of spices have a positive significant relationship with consumption of spices. Based on the findings, it is recommended that nutrition policy in Nigeria should lay more emphasis on increasing consumers' awareness of the health benefits of the selected spices to encourage their consumption.

Keywords: Households, Preference, Utilization, Spices, Regression

Préférence et Utilisation Des Ménages Pour Les Séletionnees Métropole Ibadan Dans L'état D'Oyo, Nigéria

Résumé
Cette étude a évalué la préférence et l'utilisation des ménages pour certaines épices dans la métropole d'Ibadan, dans l'État d'Oyo, au Nigeria. Une technique d'échantillonnage en plusieurs étapes a été utilisée pour recueillir des données auprès de 150 répondants au moyen d'un questionnaire structuré. Les données recueillies ont été analysées à l'aide de statistiques descriptives, d'une échelle de likert et d'une régression linéaire. Les résultats ont montré que la plupart des répondants (80,67 %) étaient des femmes, alors que la majorité se situait dans la tranche d'âge 26 et 40 ans et que la taille moyenne du ménage était de 4 personnes. Une proportion importante des répondants (40 %) ont consommé des épices en raison de leur goût. L'oignon était l'épice la plus préférée en termes de goût, le petit piment était le plus préféré en termes de prix du marché et le caroube était le plus préféré en termes de saveur. L'échelle de likert a révélé que les oignons étaient consommés plus régulièrement que d'autres épices sélectionnées. Le résultat de la régression linéaire a indiqué que le revenu, les dépenses en nourriture, le sexe,

l'éducation et la raison de la consommation d'épices ont une relation significative positive avec la consommation d'épices. Sur la base des résultats, il est recommandé que la politique de nutrition au Nigeria mette davantage l'accent sur la sensibilisation des consommateurs aux bienfaits pour la santé des épices sélectionnées afin d'encourager leur consommation.

Mots clés : Ménages, Préférence, Utilisation, Épices, Régression

Introduction

A spice is a dried seed, fruit, root, bark or vegetative substance primarily used for flavouring, colouring or preserving food (Dziezak, 1989; Iwu, 1993; Manandhar, 1995; Olife *et al.,* 2013). Plants used as spices and condiments are usually aromatic and pungent (Achinewhu *et al.*, 1995). Spices can also be used to hide other flavours and many of them have antimicrobial properties. The flavour of a spice is derived in part from compounds that oxidise or evaporate when exposed to air and lose their colour, taste and aroma over time after harvesting. Processed spices lose flavour more easily than unprocessed ones. This is because spices that have been cut or ground into powder have more surface area exposed to air and so lose flavour more rapidly than unprocessed spices. An unprocessed dried spice has the longest shelf life, so it can be purchased and stored in larger amounts, making it cheaper on a per-serving basis. The shelf life of an unprocessed spice is roughly two years; of a ground spice, roughly six months. However, the "flavour life" of a ground spice can be much shorter. A fresh spice, such as ginger, is usually more flavourful than its dried form, but fresh spices are more expensive (Tainter and G.A.A, 2001; Marcelle, 1995).

Spices have a long history of both culinary and medicinal uses and they are integral parts of the daily diet (Tapsell *et al.,* 2006) and also regarded as one of the first real functional foods, though largely forgotten in the modern, westernized diet. Spices stimulate appetite, add flavour and texture to food, create visual appeal in meals and they have other uses such as religious activities, cosmetic and perfume production (Olife *et al.,* 2013). Spices also play a key role in nutrition as good sources of micro- and macronutrients. Ogunka-Nnoka and Mepba (2008) conducted a proximate analysis of some Nigerian spices and found them to be fairly rich in nutrients. Many of the spices are good sources of calcium, phosphorus, magnesium and zinc. Also, spices provide health benefits such as speeding up of metabolic rate and mitigating of risks of chronic inflammation. As ingredients in numerous local medicines they are used in the treatment of ailments such as dysentery, gastrointestinal troubles, fever, postpartum pain, tapeworms, inflammation of the throat and tonsils, and as carminatives (e.g. the *Aframomum* species - *A. melegueta*, and *A. danielli*) (Ajaiyeoba and Ekundayo, 1999; Odukoya *et al.,* 1999).

Global demand for organically produced food is growing rapidly in Europe, USA, Japan and Australia and other advanced countries. Therefore, food professionals continually search for new and unique spice flavour because of the growing demand for authentic ethnic and cross-cultural cuisines. Consumers are also seeking for foods with natural preservatives for a healthy lifestyle (RMRDC, 2013). The global market for spices is valued at USD 2.3 billion and import is growing at an average of 8.5% annually. According to a FAO report (2005), the US is the largest importer of spices, followed by Germany and other parts of Europe and the middle-East. India export spices to more than 150 countries worldwide. World major

producers of spices include India (1.6 million tonnes/annum), China (99,000 tonnes/annum), Bangladesh (48,000 tonnes/annum), Pakistan (45,000 tonnes/annum) and Nepal (15,000 tonnes/annum). In Nigeria, production of spices was estimated at 146,500 tonnes in 2000, while available FAO statistics for 2008, put spices production at 377,500 tonnes on the average.

Spices have major stake in the production system and in the foreign earnings of the country and they have great role in transforming farmers as producers for market instead of producing merely for subsistence (Dessalegn, 2015). They also have a prominent place in ensuring rural development, self-sufficiency, food security and ultimately human development. Nigeria with a population of over 180 million people has a huge potential market for spices. If the country is to take advantage of the over expanding world spice market, attention should be given to the domestication, processing and utilisation of indigenous wild species that abound in Nigeria because spices like other non-timber products, have significant potential in terms of creating employment (Soladoye and Sonibare, 2003). In addition, the major cause of dietary deficiency and food insecurity is the decreasing diversity of diets which results in increasing incidence of diseases, poor health and reduction in life span (M'Kaibi *et al.,* 2017). Therefore, there is need for awareness creation to use spices to control disease.

Several studies have been conducted on the production and marketing of spices (Tesfa, *et al.*, 2017; Akinpelu *et al*., 2011; Hassan, 2015) but little or no studies have been carried out on the preference for and utilization of spices. It is essential that spices be exploited and processed for commercialization as raw materials for local use and export (FAO, 1986). This is in line with the present economic programme of the Nigerian Government which aims at getting the Nigerian economy back on the track of sustained economic growth and self-sufficiency. As a result of this, the study examined households' preference and utilization for selected spices in Ibadan metropolis, Nigeria.

Methodology

Study Area

The area of study was Ibadan metropolis in Oyo state of Nigeria. The city comprises of five local government areas, which are Ibadan North-West, Ibadan North, Ibadan North-East, Ibadan South-West and Ibadan South-East (Agboola and Bloxom, 1996). Ibadan Metropolis is bounded in the east by Egbeda Local Government Area and in the west by Ido Local Government Area. It is also bounded in the north by Akinyele Local Government area and to the south by Oluyole Local Government area. Ibadan metropolis has a land area of about 3,123,30km^2 (Ayeni, 1994). Ibadan is located between latitude 3°3'N and 4° 10'N and longitude 7° 2'E and 7°40'E. It has an average rainfall of between 1000mm and 1350mm. The temperature is between 22°C and 31°C. The principal occupation of the residents of Ibadan metropolis is trading. Others include commercial driving, civil servants, carpentry etc. Major markets include Dugbe, Agbeni and Bodija.

Data Collection Method and Sampling Techniques

The sample frame for the study included household heads who prefer and utilize the following spices: Scent leaf, Ginger, Small Chili Pepper, Bird Chilies, Curry leaf, Alligator Pepper, Locust Beans, Garlic, Onions, Bush buck and Turmeric as shown in (Table 1). The questionnaire was structured to elicit information on preference and utilization of the selected spices.

Multistage sampling technique was employed

in selecting the representative households in the study area. The first stage was the selection of three local Government Areas, which are Ibadan North-west, Ibadan North and Ibadan South-west from the five Local Government Areas (LGAs). The second stage involved random sampling of five communities from each of the LGAs. These included Ekotedo, Onireke, Eleyele, Jericho, Ayeye from Ibadan northwest LGA; Sango, Agbowo, Yemetu, Mokola, Idi-Ape from Ibadan north LGA; Iyaganku, Oke bola, Ososami, Molete and Odo-ona from Ibadan southwest LGA. In the third stage, 10 households were randomlyselected from each of the 15 communities. A total of 150 respondents from the households were interviewed from the 15 selected communities. One respondent was interviewed separately from each household.

Data Analysis

Descriptive statistics such as frequency distribution and percentages, Likert scale and logistic regression model were employed for the study. Descriptive statistics was used to describe the socioeconomic characteristics of the respondents, Likert scale to elicit preferences and utilization of selected spices and linear regression was used to examine the factors influencing consumption of spices.

The Likert scale used ranged from 1 to 3 (where Agree =3, Undecided =2 and Disagree =1). The range gives the weight of the responses. The scoring was done by multiplying each frequency by their numeric values and then total summation to get the scores and ranking. (Ngodigha, 2016)

The linear regression was expressed as:

$Y= b_0+b_1X_1+ b_2X_2+ b_3X_3+ b_4X_4+ b_5X_5+ b_6X_6+ b_7X_7+ b_8X_8+e_i$

Where;

Y = Consumption of spices (naira per month)

X_1 = Gender of the respondent (Male =1, otherwise = 0)

X_2 = Age of the respondents (in years)

X_3 = Marital Status of household head (Married =1, otherwise = 0

Table 1: List of selected spices used for this study

Common name	Botanical name	Yoruba	Igbo	Hausa
Scent leaf (Basil)	*Ocimum gratissimum*	Efirin	Nchanwu	Daidoya
Ginger	*Zingiber officinale*	Ataile	Jinja	Citta
Small Chili Pepper	*Capsicum annuum*	Atawewe	Ose nkiri	Borkwono
Bird Chilies	*Capsicum frutescens*	Tatase/Atarodo	Ose	Borkwono
Curry leaf	*Murraya Koenigii*	Efirin oso	Nchanwu	Dooday
Alligator Pepper	*Aframomum* melegueta	Atare	Ose oji	Kanin fari
Locust Beans	*Parkia Biglobosa*	Iru/Tokoro	Ogiri-igala	Dawadawa
Garlic	*Allium sativum*	Aayu	Galiki	Tarfanuwa
Onions	*Allium cepa*	Alubosa	Yabasi	Alibasa
Bush buck	*Gongronema latifolium*	Madumaro/Arokeke	Utazi	Daniya
Tumeric	*Curcuma longa*	Ata ile pupa	-	Gangamau

Source: Olife et al. (2013)

X_4 = Educational level of the Household (educated =1, not educated = 0)
X_5 = Reason for consumption (flavour =1, others = 0)
X_6= Households Income (in Naira)
X_7= Household expenditure on food (Naira)
X_8= Household size (number)
e_i= error term

Results and Discussion

Socioeconomic Characteristics of Respondents in the Study Area

Majority (81%) of the respondents were females while 19.33% were males (Table 2). The average age of the respondents in the study area was 35 years. The minimum age was 20 years while the maximum age was 70 years. Consumers aged between 26 and 40 had the highest percentage 52%, implying that the respondents are in their economic active age. The result also revealed that most (64.67%) of the respondents were married while 30% were single (Table 2). The majority of the respondents (97.33%) had formal education while 2.67% were uneducated, indicating a very high level of literacy among the respondents.

Respondents who earned between ₦20,000 and ₦30,000 were 31.33% and those with income ranging from ₦40,000 to ₦50,000 were 29.33%. Those with income above ₦ 80,000 were the least (5.33%) (Table 2). Respondents who spent between ₦10,001 and ₦20,000 on food monthly formed the majority group (56%). Respondents who consumed spices because of their taste formed the largest group (40.00%) while those that consumed them for medicinal purposes were the least (28.67%). The majority of respondents (68.00%) had between 1 to 5 members in their households while 27.33% had between 6 to 10 members (Table 2).

Preferences of Households in Terms of Taste

The spice with the most preferred taste was onion with a score of 423 while the spice with the least preferred taste was bush buck with a score of 224 (Table 3). The scent leaf, locust bean and ginger were found to be at the upper side of the preference of the respondents in terms of taste; at 2nd, 3rd and 4th positions, respectively. Small chilli pepper and curry leaf came 5th and 6th respectively while alligator pepper, garlic, bird chilli and turmeric placed 10th, 9th, 8th and 7th respectively (Table 3).

Preferences of Households in Terms of Market Price

The spice with the most preferred market price was the small chilli pepper with a score of 390 while the spice with the least preferred market price was bush buck with a score of 191, as shown in Table 4. The alligator pepper, onion, bird chilli, turmeric and curry leaf placed 2nd, 3rd, 4th, 5th and 6th positions, respectively. Locust bean, scent leaf, garlic and ginger ranked 10th, 9th, 8th and 7th respectively. With 80% of the respondents (120 out of 150) preferring the market price of small chilli pepper, it could imply that the market price for small chilli pepper is favorable for both the low income and high income earning consumers since they can all afford to buy it.

Preferences of Households in Terms of Flavour

The spice with the most preferred flavour was the locust bean with a score of 419 while the spice with the least preferred flavour was the Alligator pepper with a score of 210 which ranked 11th (Table 5). Scent leaf, onions, small chilli pepper, ginger and curry leaf were found at the upper side of the preference scale of the respondents in terms of flavour as they placed 2nd, 3rd 4th, 5th and 6th, respectively, while bush buck, garlic, turmeric and bird chilli settled

Preferences of Households in Terms of

Table 2: Socioeconomic Characteristics of Respondents in the Study Area

Variables	Frequency (150)	Percentage (%)
Gender of household head		
Male	29	19.33
Female	121	80.67
Age of household head		
18-25	30	20.00
26-40	78	52.00
41-55	38	25.33
>55	4	2.67
Level of Education of household head		
None	4	2.67
Primary	3	3.33
Secondary	22	14.67
Tertiary	119	79.33
Marital Status of household head		
Single	45	64.67
Married	97	30.00
Divorced	2	1.33
Widowed	6	4.00
Income (naira)		
< 10,000	21	14.00
20,000-30,000	47	31.34
40,000-50,000	44	29.33
60,000-70,000	26	17.33
Above 80,000	12	8.00
Monthly Expenditure on food		
1,000-10,000	45	30.00
10,001- 20,000	84	56.00
20,001-30,000	14	9.33
Above 30,000	7	4.66
Reason for consumption		
Flavour	47	31.33
Medicinal Purposes	43	28.67
Taste	59	40.00
Household Size		
1-5	102	68.00
6-10	41	27.33
>10	7	4.00

Source: Field Survey, 2019

Table 3: Preference of Households in Terms of Taste

Spices	Agree	Undecided	Disagree	Score	Rank
Scent leaf	127 (84.6)	-	23 (15.4)	404	2nd
Ginger	98 (65.3)	3 (2.0)	49 (32.7)	349	4th
Small chilli Pepper	98 (65.4)	2 (1.3)	50 (33.3)	348	5th
Bird chilli	56 (37.4)	6 (4.0)	88 (58.7)	268	8th
Curry leaf	110 (73.3)	-	40 (26.7)	370	6th
Alligator Pepper	30 (20)	15 (10)	105 (70)	225	10th
Locust Bean	124 (82.7)	-	26 (17.3)	398	3rd
Garlic	48 (32)	9 (6.0)	93 (62)	255	9th
Onions	133 (88.7)	7 (4.7)	10 (6.6)	423	1st
Bush buck	32 (21.3)	10 (6.7)	108 (72)	224	11th
Turmeric	58 (38.6)	5 (3.3)	86 (57.3)	270	7th

Table 4: Preferences of Households in Terms of Market Price

Spices	Agree	Undecided	Disagree	Score	Rank
Scent leaf	45 (30)	7 (4.7)	98 (65.3)	247	9th
Ginger	65 (43.3)	4 (2.6)	81 (53.9)	284	7th
Small chilli Pepper	120 (80)	-	30 (20.0)	390	1st
Bird chilli	110 (73.3)	10 (6.7)	30 (20.0)	380	4th
Curry leaf	89 (59.4)	-	61 (40.6)	328	6th
Alligator Pepper	117 (78)	5 (3.3)	28 (18.6)	389	2nd
Locust Bean	36 (24)	-	114 (76)	222	10th
Garlic	53 (35.4)	12 (8.0)	85(56.6)	268	8th
Onions	118 (78.6)	-	32 (21.4)	386	3rd
Bush buck	16 (10.6)	9 (6.0)	125 (83.4)	191	11th
Turmeric	96(64)	11(7.3)	43(28.7)	353	5th

down the scale at 10th, 9th, 8th and 7th respectively (Table 5).

Preferences of Households in Terms of Health Benefits

The most preferred spice in terms of health benefits was onion with a score of 398 while the spice that was least preferred in terms of health benefits was alligator pepper with a score of 117 (Table 6). The locust bean, scent leaf, ginger, garlic and turmeric were found at the upper side of the preference scale of the respondents as they placed 2nd, 3rd, 4th, 5th and 6th, respectively while bush buck, bird chilli, curry leaf and small chilli pepper placed 10th, 9th, 8th and 7th respectively. This result is in agreement with the study by Van Wyk and

Wink (2005) who reported that most households consume onions because it helps to treat appetite loss, prevents arteriosclerosis, minor digestive disturbances and for other uses such as colds, cough, asthmas and diabetes treatment.

Households Utilization of Selected Spices (using the Likert scale)

The most utilized spice was onion with a score of 743, placing it at 1st position while the least utilized spice was the bush buck with a score

Table 5: Preference of Households in Terms of Flavours

Spices	Agree	Undecided	Disagree	Score	Rank
Scent leaf	130 (86.7)	-	20 (13.3)	410	2nd
Ginger	102 (68)	6 (4.0)	42 (28.0)	360	5th
Small chilli Pepper	106 (70.7)	3 (2.0)	41 (27.3)	365	4th
Bird chilli	56 (37.3)	7 (4.7)	87 (58.0)	269	7th
Curry leaf	108 (72)	-	32 (21.3)	356	6th
Alligator Pepper	35 (23.4)	10 (6.7)	85 (56.7)	210	11th
Locust Bean	130 (66.0)	9 (6.0)	11 (7.3)	419	1st
Garlic	46 (30.7)	4 (2.7)	100 (66.7)	246	9th
Onions	127 (84.7)	-	23 (15.3)	404	3rd
Bush buck	35 (23.3)	4 (2.7)	111 (74)	224	10th
Turmeric	50 (33.3)	9 (6.0)	91 (60.7)	259	8th

Table 6: Preference of Households in Terms of Health Benefits

Spices	Agree	Undecided	Disagree	Score	Rank
Scent leaf	98 (65.3)	42 (28.0)	10 (6.7)	388	3rd
Ginger	101 (67.3)	33 (22.1)	16 (10.6)	385	4th
Small chilli Pepper	14 (9.3)	42 (28.0)	94 (62.7)	220	7th
Bird chilli	9 (6.0)	13 (8.7)	128 (85.3)	181	9th
Curry leaf	9 (6.0)	21 (14.0)	120 (80.0)	189	8th
Alligator Pepper	9 (5.9)	9 (6.1)	132 (88)	177	11th
Locust Bean	112 (74.7)	22 (14.7)	16 (10.6)	396	2nd
Garlic	95 (63.3)	32 (21.4)	23 (15.3)	372	5th
Onions	115 (76.6)	18 (12.1)	17 (11.3)	398	1st
Bush buck	7 (4.6)	15 (10.1)	128 (85.3)	179	10th
Turmeric	58 (38.7)	24 (16.0)	68 (45.3)	290	6th

of 382, which placed the 11th (Table 7). Locust bean, small chilli pepper, scent leaf, curry leaf and ginger were found at the upper level of the consumption scale as they placed 2nd, 3rd, 4th, 5th and 6th positions respectively while alligator pepper, garlic, turmeric, bird chilli placed 10th, 9th, 8th and 7th respectively. This result is in consonance with the findings of Achinewhu *et al*. (1995) that onions are more utilized by households because onions impart aroma and taste to food preparations and sometimes mask undesirable odours.

Factors Influencing Households Consumption of Spices

Linear regression with eight explanatory variables were specified. The adjusted R^2 shows that 59.7% of the variation in the total consumption expenditure of spices is explained by the independent variables. The F-value was 92.534 and highly significant at 1% level of significance indicating a regression of best fit. It also implies that the joint influence of all the explanatory variables on consumption of spices was quite strong. The factors that influence consumption of spices are income, household expenditure on food, gender, education and occupation. As revealed in Table 8, income was significant at 1% and has a positive influence on consumption of spices. This shows that with an increase in income, there would be an increase in consumption of spices. Household expenditure on food is also positive and significant at 1%. This indicates that as household expenditure on food increases consumption of spices increases. The respondents being mostly female also had a significant positive relationship with consumption of spices, which implies that expenditure on spices increases with more females. The coefficient of education was also positive and significant at 5%. This implies that an additional year gained in acquiring formal education will lead to a corresponding increase in consumption of spices in the study area. Table 8 further disclosed that the reason for consumption (dummy variable) has a positive relationship with monthly expenditure on spices. This confirms what was reported in Table 2 that respondents largely consume spices because of its taste compared to other benefits provided by spices.

Table 7: Households Utilization of Selected Spice (using the Likert scale)

Spices	Regularly	Occasionally	Undecided	Rarely	Never	Score	Rank
Scent leaf	63 (42.0)	70 (46.7)	4 (2.67)	11 (7.3)	2 (1.3)	631	4th
Ginger	34 (22.7)	83 (55.3)	4 (2.7)	24 (16.0)	5 (3.3)	567	6th
Small chilli Pepper	96 (64.0)	29 (19.3)	14 (9.3)	8 (5.3)	3 (2.0)	657	3rd
Bird chilli	36 (24.0)	67 (44.7)	14 (9.3)	15 (10.0)	18(12.0)	538	7th
Curry leaf	55 (36.67)	86 (57.33)	2 (1.3)	4 (2.7)	3 (2.0)	636	5th
Alligator Pepper	14 (9.3)	59 (39.3)	10 (6.7)	52 (34.7)	15(10.0)	455	10th
Locust Bean	116 (77.3)	14 (9.3)	1 (0.7)	15 (10.0)	4 (2.7)	673	2nd
Garlic	33 (22.0)	34 (22.7)	12 (8.0)	53 (35.3)	18(12.0)	465	9th
Onions	146 (97.3)	3 (2.0)	-	-	1 (0.7)	743	1st
Bush buck	29 (19.3)	19 (12.7)	17 (11.3)	25 (16.7)	60(40.0)	382	11th
Turmeric	43 (28.7)	39 (26.0)	7 (4.7)	36 (24.0)	25(16.7)	489	8th

Table 8: Regression Result Showing Factors Influencing Consumption of Spices

Variable	Coefficient	Standard error	t-value
Income	0.152***	0.054	2.80
Household expenditure on food	0.001***	0.365	0.27
Gender	0.273**	0.119	2.28
Age	0.005	0.005	0.95
Marital status	-0.064	0.068	-0.94
Education	0.165**	0.072	-2.30
Household size	-0.056	0.048	-1.16
Reason (dummy)	0.102***	0.037	2.77
Constant	1.306	0.521	2.50
R^2	0.444		
Adjusted R^2	0.412		

*** = *Significant at 1%* ** = *Significant at 5%*

Conclusions

Based on the findings from this study, it can be concluded that females consumed these selected spices more because women most times are decision makers on what is eaten in most households, in the process they make use of these selected spices. Also onions, locust bean, scent leaf, small chilli pepper were the most preferred and consumed while Bush buck and Alligator pepper were least preferred and consumed. The findings of the study also showed that income, expenditure on food, gender, level of education and reason for consuming spices had significant relationship with consumption of the selected spices.

Recommendations

Based on the findings, the following recommendations were made:

The nutrition policy in Nigeria should lay more emphasis on increasing consumer awareness of the health benefits to be derived by consuming these spices. This will help consumers to appreciate what they stand to gain in terms of health benefits and thus increase the consumption level of these spices.

The government should encourage more farmers to produce spices by providing incentives in terms of financial support to ensure availability to consumers at affordable prices.

The government should also make effort towards improving the standard of living of the low income consumers and also create job opportunities for the people since income has significant relationship on the consumption of these selected spices.

References

Achinewhu, S.C., Aniena, M.I. & Obomanu, F.G. 1995. Studies on spices of food value in the south eastern states of Nigeria. Antioxidant properties, *Journal of African Medicinal Plants* 18: 135-139

Achinewhu, S.C., Ogbonna, C.C. & Hart, A.D. 1995. Chemical composition of indigenous wild herbs, spices, fruits,

nuts and leafy vegetables used as food. *Plant, Food and Human Nutrition Journal* 48: 341 - 348

Agboola, O.D. & Bloxom, W. R. 1996. Profile of Ibadan metropolitan area. A report for the sustainable Ibadan project.

Ajaiyeoba, E. O. & Ekundayo, O. 1999. Essential oil constituents of *Aframomum melegueta* (Roscoe) K. Schum seeds (alligator pepper) from Nigeria. *Flavour and Fragrance Journal* 14 (2): 109 - 111.

Akinpelu, C.A., Adebayo, O.S., Adelaja, B.A., Adesegun, E.A., Aminu-taiwo R.B. & Adeoye I.B. 2011. An economic analysis of spices marketing in three selected states of Nigeria. *International Journal on Crops, Farming and Agri-Management* 12 (3): 817-821

Ayeni, B. 1994. The metropolitan area of Ibadan, its growth and structure. Department of geography, University of Ibadan.

Dessalegn, G. 2015. Analysis of factors determining the supply of Ethiopian cardamom spice (*Aframomum corrorima*): A Case from Bench Maji Zone of SNNPR, Ethiopia. *European Journal of Business and Management* 7(1): 56-63.

Dziezak, J.D. 1989. Innovative food trends and spices. *Journal of Food Technology* 43(1): 102- 116

Food and Agricultural Organization 1986. Food and nutrition: household food security and forestry, an analysis of socio-economic issues.

Food and Agricultural Organization 2005. Food and Agricultural Organization Statistics. http://www.fao.org/statistics/en/

Food and Agricultural Organization 2008. Herbs, spices and essential oils, post–harvest operations in developing countries. *http://www.fao.org/3/a-ad420e.pdf*

Hassan, M.A. 2015. Factors affecting market access among Spice farmers in Zanzibar. A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Arts in rural development of Sokoine University of agriculture. Morogoro, Tanzania.

Iwu, M.M. 1993. Handbook of African medicinal plants. Boca Raton CKC Press. 435

Manandhar, N.P. 1995. Substitute spices in Nepal. *Journal of Herbs, Spices and Medicinal Plants* 3: 71-77

Marcelle, G.B. 1995. Production, handling and processing of nutmeg and mace and their culinary uses. Grenada Produce Chemist Laboratory. FAO Regional Office for Latin America and The Carribean.

M'Kaibi F.K, Steyn N.P, Ochola S.A & Du Plessis L. 2017. The relationship between agricultural biodiversity, dietary diversity, household food security, and stunting of children in rural Kenya. *Food Science and Nutrition Journal* 5: 243 - 254.

National Population Commission 2006. Population Census of the Federal Republic of Nigeria. Analytical Report at the National Population Commission, Abuja, Nigeria; 2006.

Ngodogha, S. 2016. Re: How to score a likert Scale? Retrieved from: https://www.researchgate.net/post/How_to_score_a_likert_scale/56d83bb4b0366deda52522531/citation/download

Odukoya, O. A., Houghton, P. J. & Raman, A. 1999. Lipoxygenase inhibitors in the seeds of *Aframomum danielli* K. Schum (Zingiberaceae). *Phytomedicine* 6 (4): 251-256.

Ogunka-Nnoka, C. U. & Mepba, H. D. 2008. Proximate composition and antinutrient contents of some common spices in Nigeria. *Open Food Science Journal 2*: 62-67.

Olife, I. C., Onwualu, A.P., Uchegbu, K. I. & Jolaoso, M.A. 2013. Status Assessment of Spice Resources in Nigeria. *Journal of Biology, Agriculture and Healthcare* ISSN 2224-3208 (Paper) ISSN 2225-093X (Online) 3(9)

Raw Material Research and Development Council, RMRDC 2013. Studies on some Nigerian Indigenous Spices for Domestic/Export Markets. RMRDC Publication Series 024. Onwualu, A.P., Jolaoso, M.A., Uchegbu, K. I. and Olugbemi, B.O. (eds).

Soladoye, M.O. & Sonibare, M.A. 2003. Non-timber forest products of Old Oyo National Park and their sustainability. *Nigerian Journal of Botany* 16:16 - 32.

Tainter, D.R & G.A.A. 2001. Spices and Seasoning: A food technology handbook. John Wiley and Sons Inc. New York. pp.248

Tesfa, T., Bayu, W., Gashaw, A. & Beshir, H. 2017. Spice Production, Marketing, and Utilization in South Wollo, Ethiopia. *East African Journal of Sciences* 11(1): 27-36

Tapsell, L. C., Hemphill, I., Cobiac, L., Patch, C. S., Sullivan, D. R., Fenech, M., and Inge, K. E. 2006. Health benefits of herbs and spices: The past, the present, the future. *Medical Journal of Australia* 185(4): 4 – 24.

Van W. & Wink, M. 2005. Medicinal Plants of the World. Briza Publications, Pretoria, South Africa. pp. 38- 349.