

## HOUSEHOLD DEMAND ANALYSIS FOR COWPEA IN MINNA, NIGER STATE, NIGERIA

Ibrahim Faith Debaniyu

Federal University of Technology Minna, Niger State Nigeria

Corresponding Author's email address: [idfai006@yahoo.com](mailto:idfai006@yahoo.com)

Received 9<sup>th</sup> October, 2017 Accepted 12<sup>th</sup> April, 2019.

### ABSTRACT

There were no recent documented studies that examined cowpea demand at finer levels of disaggregation and at regional levels. Therefore, this study investigated Household demand for cowpea in Minna, Niger State, Nigeria. The study obtained a cross sectional data on consumption expenditure by households for varieties of cowpea through a structured questionnaire. A stratified random sampling based on income groups was used to select 120 respondents from Minna and the data were analysed using the Almost Ideal Demand system (AIDS) model. Estimates of the AIDS model indicated that the expenditure parameters were all negatively related to their respective expenditure shares at  $-0.241$  for white cowpea,  $-0.1174$  for brown cowpea and  $-0.1527$  for green bean. Beans varieties were all normal goods with expenditure elasticities of 0.99, Marshallian own price elasticities of beans varieties are price inelastic while Hicksian cross price elasticity revealed beans varieties as close substitutes. It was recommended that investment should be targeted towards improvement in the production of cowpea especially all year round. The significant level of own price elasticity in all varieties, suggest the need for domestic food policy interventions that promote price subsidies.

**KEYWORDS:** Almost Ideal Demand Model, Expenditure Elasticity, Marshallian Elasticity, Hicksian Elasticity and Cowpea

### INTRODUCTION

Cowpea is a global legume of Africa, it is cultivated around the world primarily as a pulse, but also as a vegetable (for both grains and the green peas) as well as a cover and fodder crop (Faye, 2005). Davies *et al.*, (2005) and Jafferson (2005) observed that cowpea is an ancient crop whose cultivation began in Africa more than 5,000 years ago. Faris (2003) reported that it originated from west and central Africa and was cultivated mostly by poor farmers in dry savannah of tropical and Central Africa. According to Tolera (2006) cowpea can be consumed in two forms in Nigeria, vegetable and grain forms. Vegetable cowpea is used fresh in the derived savannah rainforest belt while the grain cowpea is mostly grown in the climate of the North than in the humid south (Agrawal, 2003).

Demand theory has been widely applied to determine individual or household consumption behaviors. Demand elasticities provide valuable information on how consumers react to

prices and income changes. This information has been useful in designing food policy and research needs for various consumer categories (Jung and Koo, 2000; Abdulai and Auberta, 2004). They also provide information for policy analysts in understanding the pattern of growth of the National food consumption. Specific country elasticities are influenced by both the level of income attained and the quantities of food that are currently eaten by the consumer. Estimation of complete demand functions is very useful not only in obtaining price elasticities, but also in getting reliable estimates of expenditure (income) elasticities (Dawoud, 2005).

The measurement of these elasticities is required for the design of many different policies, for example, intelligent policy design for indirect taxation and subsidies requires knowledge of these elasticities for taxable commodities (Deaton, 1987). Household expenditure on food is influenced by a host of factors which include disposable income, availability and price of food,

culture, taste and preference, region/location, price of other substitutes and seasonality. These factors contribute to significant variation on food expenditure, among households (Ibrahim, 2014).

Nigerians suffer from a combination of protein-energy malnutrition, boosting consumption will go a long way in mitigating problems of food insecurity, malnutrition etc. The demand for protein in diets of most consumers comes from livestock or crops. However, as a result of the increasing need for protein, livestock protein based products unfortunately are highly priced with products such as chicken, fish, pork etc classified as luxuries especially in sub-Saharan Africa (Bett *et al.*, 2012). As a result of this most consumers in Africa resort to meeting their protein needs from crop based products such as cowpea and soybeans (Ayinde *et al.*, 2002). reported that cowpea as a food source provides the cheapest protein supplement to the urban and rural poor in Nigeria. Similar study carried out by Faith *et al.*, (2011) in Niger State, showed that the eating habits of consumers in the study area revolves round cowpea consumption in many forms either through direct cooking of cowpeas, processing into *bean cakes*, *bean pudding*, *dumplings*, as components of other meals such as in cowpea soups, rice and beans among others. The versatility of cowpea in this respect makes it a component of the food consumed in many households (Ayinde, 2005).

The demand for cowpea in the West and Central African (WCA), is increasing because of high population growth from both urban and rural areas and also because of poverty and the demand for low cost food (Coulibaly and Lowenberg-Deboer, 2002; Ayinde, 2005). According to Lowenberg-Deboer (2010) the demand for cowpea in West Africa is very high particularly in Nigeria. Cowpea as reported by Akibode and Meredith (2011) is the most consumed pulse crop in Sub-Saharan Africa, accounting for about 72% of total pulse consumption as at 2006/2008. Additionally, Nnanyelugo *et al.*, (1985) in Ibrahim (2014) reported that, Nigeria is the largest consumer of cowpea in the world. Urban people, particularly the urban poor,

benefit from cowpea because it is a relatively low-cost, high protein food.

Studies by Akintola and Udoh, (2002), Baba *et al.*, (2010) and Udoh *et al.*, (2013) have being carried out on food demand in different parts of Nigeria, however there are no recent documented studies that examines cowpea demand at finer levels of disaggregation and at regional levels. To come up with appropriate food policies that will improve access to cowpea it is essential to gain a thorough knowledge of the determinants of cowpea demand. Insights into changes in consumer's expenditure caused by changes in price and incomes are key information for this knowledge (Ibrahim, 2014). However, this can only be achieved through econometric analyses. The purpose of this study is to estimate the expenditure share of bean varieties in household budget; to-determine the effect of cowpea price on expenditure share of beans and to estimate the expenditure and demand elasticities of cowpea.

#### **Analytical Framework for AIDS Model Estimation**

This study employed the Almost Ideal Demand Model system (AIDs) for its estimation. The AIDs model is based on the consumers' expenditure function; it expresses the budget share of a given commodity as a function of total expenditure and price. This study following Faye (2005); Baba, Goni and Umar (2010), Bett *et al.*, (2012) Udoh *et al.*, (2013) and Ibrahim (2014) used the second stage and own set of cowpea prices. Following Faye (2005); Baba, Goni and Umar (2010), Bett *et al.*, (2012) Udoh *et al.*, (2013) and Ibrahim (2014) the model was used to estimate the expenditure elasticity, the Marshallian price and Hicksian price elasticities.

#### **METHODOLOGY**

This study was conducted in Minna Niger State of Nigeria. Niger State falls within latitudes 6° 30' to 11° 20' North along the equator and longitudes 2° 30' to 10° 30' East of the Greenwich (National population commission NPC, 2006). A stratified random sampling was employed based on the income groups of respondents. The

harmonized salary structure for Niger State civil service was used as a guide to arrive at the income groups and authenticate actual incomes of respondents. Stratification was based on low income group ( $\leq$  ₦18,000); middle income group (₦18,001 – 36,000) and high income group ( $\geq$  ₦36,001). Based on this stratification, 40 household heads/respondents were randomly selected from each group, giving a total of 120 respondents. Questionnaire was administered to elicit information from the respondents.

### Almost Ideal Demand system (AIDs) model

The AIDs model according to Deaton Muellbauer (1980) was employed to estimate the effect of cowpea price on expenditure share of beans category. The model is specified as follows:

$$w_i = \alpha_1 + \sum_j \gamma_{ij} \log P_j + \beta_i \log (X/p_i) + \sum_s \delta_{ij} D_s \quad (1)$$

Where

$w_i$  = Expenditure share associated with the  $i^{\text{th}}$  good in ₦/kg.

$\gamma_{ij}$  = Slope coefficient associated with the  $j^{\text{th}}$  good in the  $i^{\text{th}}$  expenditure share equation;

$P_j$  = Price of the  $j^{\text{th}}$  good (price in ₦/kg paid per household for a particular bean category/ quality)

$X$  = Total consumption expenditure by all households on various qualities of beans in ₦/kg

$P_i$  = Stones price index =  $\sum w_i \log P_i$

$D_s$  = economic factors; disposable income and household size.

$\alpha_1, \beta_i, \gamma_{ij}$  and  $\delta_{ij}$  = Parameters to be estimated

### Expenditure elasticity

The expenditure elasticity was employed following, Faye (2005); Baba *et al.*, (2010), Bett *et al.*, (2012) Udoh *et al.*, (2013) and Ibrahim (2014).

$$e_i = 1 + (\beta_i/w_i)$$

Where

$e_i$  = Expenditure elasticity of beans item  $i$

$\beta_i$  = Expenditure coefficient of beans item  $i$

$w_i$  = Budget share of beans item  $i$

### Marshallian (uncompensated) or Own price elasticity

The Marshallian price elasticity conditional on categories of beans expenditure was employed following, Faye (2005); Baba *et al.*, (2010), Bett *et al.*, (2012) Udoh *et al.*, (2013) and Ibrahim (2014).

$$e_{ij}^m = \frac{\gamma_{ij}}{w_i} - \frac{\beta_i w_j}{w_i} - \delta_{ij} \quad (3)$$

Where

$e_{ij}^m$  = Marshallian price elasticity

$\gamma_{ij}$  = Price coefficient of beans category

$w_i$  = Budget share of beans item  $i$

$w_j$  = Budget share of beans item  $j$

$\beta_i$  = Expenditure coefficient of beans item  $i$

$\delta_{ij} = 1$ , when  $i = j$ , otherwise  $\delta_{ij} = 0$

### Hicksian (compensated) or Cross price elasticity

The Cross price elasticity was specified using Slutsky equation. Following, Faye (2005); Baba *et al.*, (2010), Bett *et al.*, (2012) Udoh *et al.*, (2013) and Ibrahim (2014)

$$e_{ij}^h = e_{ij}^m + w_j \quad (4)$$

Where

$e_{ij}^h$  = Hicksian (compensated) price elasticity

$e_{ij}^m$  = Marshallian price elasticity

$w_j$  = Budget share of beans item  $j$

$e_i$  = Expenditure elasticity

Restrictions of the AIDs model are; Adding up =  $\sum \alpha_i = 1$ ; Homogeneity =  $\sum \gamma_{ij} = 0$ ; Symmetry =  $\gamma_{ij} = \gamma_{ji}$

## RESULTS AND DISCUSSION

### Socioeconomic Characteristics of Households

Socioeconomic characteristics differ significantly among households and have strong influence on food demand. Such factors include level of income, price of food, culture, taste and preference location, and season and household size (population). The socio-economic characteristics examined included gender, age, number of years of education, and household size.

The findings from Table 1 show that 63.33% of the respondents were male while 36.67% were females, implying a dominance of males as household heads.

This reflects same situations and positions across communities worldwide, due to culturally constructed statuses;

**Table 1: Socio-economic characteristics of respondents (n= 120)**

Variables	Frequency	Percentage (%)
<b>Gender</b>		
Male	76	63.33
Female	44	36.67
Total	120	100.00
<b>Age</b>		
20-30	39	32.50
31-41	50	41.67
42-52	29	24.16
>52	2	1.67
Total	120	100.00
Mean	36	
<b>Education (Years)</b>		
1-6(Primary)	2	1.67
7-12 (Secondary)	8	6.67
13-18(Tertiary)	100	83.33
>18 (Post tertiary)	10	8.33
Total	120	100.00
Mean	16	
<b>Household size</b>		
1-6	88	73.33
7-12	29	24.17
>12	3	2.50
Total	120	100.00
Mean	6	
<b>Marital Status</b>		
Married	118	98.33
Single	2	1.67
Total	120	100.00

Source: Field Survey, 2014.

Roles and relationships between men and women instituted through religion, socioeconomic, legal and political arrangement. This finding corroborates that of Baba, (2007) on household consumption studies in the North Eastern part of Nigeria. On the other hand, results of studies from the South Eastern part of Nigeria is at variance with findings of Onyemauwa *et al.*, 2008 and Onyemauwa, 2010.

Findings also reveal that majority of the respondents (74.17%) were within the age range of 20-41 years. The mean age of the respondents was 36 years. This indicates that majority of the respondents were in their active age and very matured to take correct consumption decisions and support the demand for food in their respective households.

The level of education in respect to number of years of educational attainment reflects the attainment of increased

knowledge which can impact on a consumer's consumption behaviour. The results indicated that all the respondents (100%), had acquired one form of formal education or another. Majority of the respondents (83.33%) had 13-18 years of formal education. The mean number of years of education was 16 years, this suggests that majority of the respondents had tertiary education. By implication, the number of years of education offers opportunity for respondents to earn higher income and probably consume more food. This plays a significant role in determining household food demand.

The result of the study shows that majority (73.33%) of the respondents had household sizes of 1-6 persons. This range supports similar results by Baba *et al.*, (2010) for Borno State (Nigeria). The mean size of the household was 6 persons, this result supports findings by Muhammad-Lawal and Balogun, (2007) from household

consumption studies in Kwara State. Larger households are expected to be very responsive to changes in price of food, thus as price of food increases, they are compelled to adjust their consumption pattern to relatively inexpensive commodities all things been equal.

### Effect of Cowpea Price on Expenditure Share of Beans

#### Estimates of AIDs Model

The estimated parameters of the AIDs model are given in Table 2. The dependent variables are the expenditure shares of each variety of beans i.e. ( $w_i, w_j$  and  $w_x$ ) for white, brown and green beans. The independent variables are the own prices of particular varieties i.e. the logarithms of price of beans ( $\gamma_{i1}, \gamma_{i2}$  and  $\gamma_{i3}$ ), the expenditure effects i.e. (the logarithms of total expenditure deflated by the stone price index the  $\beta$ 's) and the economic factors  $\alpha_{ij}$  i.e. household size and disposable income. The diagnostic tests revealed  $R^2$  values of 0.44 (for white beans); 0.55 (for brown beans) and 0.50 (for green beans). This implies that 44%, 55% and 50% of total variability in the expenditure shares of white, brown and green beans respectively, are jointly explained by the specified independent variables in the model. The F-statistics at 14.80, 23.88 and 18.93 were all statistically significant at 1% probability levels. This suggests that the respective  $R^2$  were significant and the results attests to the overall goodness of fit of the AIDs specified regression model.

Estimates of the regression analysis revealed intercepts of 0.1846, 0.3131 and 0.7130 for the three varieties of beans respectively. The own price of white cowpea ( $\gamma_{i1}$ ) and price of brown cowpea ( $\gamma_{i2}$ ) were positively related to their respective expenditure shares ( $w_i$ ) and ( $w_j$ ) and these were significant at 1% and 5% level of significance. It can be suggested that the own price of white and brown cowpeas have significant influence on their expenditure shares. This could be adduced to its availability and close substitutability availing households the opportunity to making informed consumption decision, which invariably affects the expenditure shares.

The real income or expenditure parameters, ( $\beta$ 's) were all negatively related to their respective expenditure shares at -0.241, -0.1174 and -0.1527 and were significant at 1% level. Positive expenditure parameter indicates that an increase in income will increase the budget share, while a negative expenditure parameter indicates that an increase in income will decrease the budget share.

The findings here reveal negative magnitudes which implies that the amounts purchased for these varieties of beans decline with an income increase. Additionally, this indicates that there is less proportionate increase in consumption of these cowpea varieties as income increases. This finding does not agree with that of Faye (2005) from her studies in Senegal, where expenditure parameters were positive at 0.58 for cowpea, 0.11 for white beans, 0.23 for green beans and 0.08 for small peas. This implied that as consumers' income increases budget shares for these food products will increase. This was attributed to the devaluation of the *Franc CFA* currency and the change from imported beans to locally produced beans in Senegal.

This finding suggests that consumers will reallocate their cowpea budgets from these three beans varieties as income increases and probably move towards other protein producing food products such as meat, chicken eggs etc. The coefficient of disposable incomes at  $8.19e-07$  for white beans and  $5.70e-07$  for brown beans varieties, were positively related to their respective expenditure shares and were statistically significant at 1% level of significance. This finding reveals that an increase in disposable income will increase the expenditure share.

The coefficient of household size parameter at 0.104 for white cowpea, 0.0079 for brown cowpea and 0.0025 for green beans; were positively related to the respective expenditure shares. They were also statistically significant at 1% level of significance. This suggests that household size plays an important role as a demand shifter in household's consumption of white, brown and green beans respectively.

This finding agrees with that of Udoh *et al.*, (2013) where household size and income were significant demand shifters. However, Deaton and Muellbauer (1986) in Bett *et al.*, (2012), reported that

the household size has an effect on the consumption of food products in general which varies depending on the composition of the household member

**Table 2: Regression estimates obtained from the AIDS Model**

Weighted shares of	$\alpha$	$\gamma_{11}$	$\gamma_{12}$	$\gamma_{13}$	$\beta_1$	$\alpha_{11}$ (H/size)	$\alpha_{12}$ (Disp income)	R <sup>2</sup>	F-value
White cowpea ( $w_i$ )	0.1846	0.2518 (3.89)**	-0.0934 (-1.58)	0.0224 (0.17)	-0.1241 (-8.02)***	0.0104 (3.49)***	8.19e-07 (3.34)***	0.44	14.80***
Brown cowpea ( $w_j$ )	0.3131	0.0288 (0.58)	0.0886 (2.05)**	0.0682 (0.70)	-0.1174 (-10.56)***	0.0079 (3.53)***	5.70e-07 (2.95)***	0.55	23.88***
Green beans ( $w_x$ )	0.7130	0.0587 (0.78)	0.1004 (1.55)	- 0.0352 (-0.24)	-0.1527 (-9.36)***	0.0025 (0.72)	1.68e-06 (6.93)***	0.50	18.93***

Source: Field survey, 2014

Figures in parenthesis are t-ratios. Level of significance at \*\*\* 1%; \*\* 5% and \*

### Expenditure and Demand Elasticities of Cowpea

#### Expenditure Elasticity

The expenditure elasticity measures the responsiveness of consumer's expenditure on food with respect to change in income. The results in Table 3 reveal that the expenditure elasticities of all varieties of beans were positive an indication that they are all normal goods. Additionally, results show expenditure elasticities of less than one i.e. 0.99 for all varieties estimated. This suggests that white cowpea, brown cowpea and green beans are normal goods. By implication these findings indicate that as incomes of the consumer's increase, households tend to expend proportionately less on these categories of food and more on other food groups. This result corroborates findings of Faye, (2005) which indicated white cowpea was a normal necessity but green bean was a luxury commodity.

#### Marshallian (Uncompensated) or Own Price Elasticity

The concavity or negativity constraint from utility theory implies that own price or uncompensated demand elasticities are negative only (Baba, 2007). The result presented in Table 3 satisfies this theoretical condition. Own price elasticities from Table 3, had the correct signs and ranged from - 0.84 for white cowpea, - 0.89 for brown cowpea and - 0.84 for green beans. This finding suggest that the own price elasticities of all varieties of beans are price inelastic. The implication of this is that a proportionate fall in their prices will lead to a less than proportionate rise in quantity demanded. Similarly, a proportionate rise in price will lead to a less than proportionate fall in quantity demanded. The result affirms further that all the categories of beans are necessary goods.

**Hicksian (Compensated) or Cross Price Elasticity ( $\epsilon_{ij}$ )**

Compensated price elasticities provide most accurate picture of cross price effects, since they are a measure of substitution effects of net income (Baba, 2007 and Molina, 1994). Results in Table 3, presented positive cross price elasticities for all beans varieties. By implication, it shows that the categories of beans reveal substitution effects. Similar studies carried out in

Senegal by Faye, (2005) indicated cross effects of beans categories as substitutes and complements respectively. The findings of Faye (2005) suggests variability in consumer's preferences, hence the capacity of beans accepted as both a compliment and substitute respectively. However, irrespective of the differentiation on beans by testa colour from this study, the utility derived by consumers appears to remain the same, yet consumer's preference of beans reveals close cross effects.

**Table 3: Expenditure elasticities ( $\delta_i$ ); Marshallian (Uncompensated) or Own price elasticity ( $\epsilon_{ii}$ ) and Hicksian (Compensated) or Cross price elasticity ( $\epsilon_{ij}$ )**

Categories of Beans	Expenditure Elasticities	Own Price Elasticity	Cross Price Elasticity
White Cowpea	0.9971	-0.87	42.79
Brown Cowpea	0.9966	-0.89	32.89
Green Beans	0.9963	-0.84	40.78

Source: Field survey, 2014

**Parameter Estimates and Test of Homogeneity**

Any analysis of a demand function is restricted, in that it, must be single valued, with each set of prices and income corresponding to an individual set of goods. Additionally, functions are homogenous of degree zero, meaning that a change in all prices and income in the same proportion will leave the quantity demanded unchanged. The development of flexible demand system to which the Almost Ideal Demand System belongs, enables the imposition and testing of the perennial demand theory restrictions of homogeneity and symmetry. Homogeneity was tested in this study.

Table 4, results revealed that the respective values of  $\sum y_{ij}$  for respective equations were 0.1470, 0.1856 and 0.1239 which were all greater than 0, thus rejecting homogeneity (Gustovsen and Rickertsen, 2003; and Keller, Warrack and Bartel (1994). This is usual in literature and is consistent with earlier results of Blanciforti and Green (1984), Mergos and Donatos (1989), Molina (1994), Soe, Batterham and Bartel (1994), Abdulai *et al.*, (1999), Gustavsen, and Rickertsen (2003). One of the reasons that may lead to the rejection of the restrictions is the neglect of habit effects in the specification of demand equations (Mergos and Donatos, 1989).

**Table 4: Parameter estimates and test of homogeneity**

Items	$\alpha$	$\beta$	$\sum y_{ij}$	F-statistics	P-values	R-square
White cowpea( $w_1$ )	0.1846	-0.1241	0.1470	14.80	0.0000	0.4400
Brown cowpea( $w_2$ )	0.3131	-0.1174	0.1856	23.88	0.0000	0.5591
Green beans ( $w_3$ )	0.7130	-0.1527	0.1239	18.93	0.0000	0.5013

Source: Field survey, 2014

\*From estimated function Table 3

**CONCLUSION**

Expenditure parameters of all beans varieties were negatively related to their respective shares indicating that an increase in the expenditure parameter of respective beans category will reduce their budget shares.

Following the positive expenditure elasticities computed it was concluded that the category of cowpea studied are all normal goods. Given the negative values of own price elasticities, it can be concluded that the varieties of cowpea studied are price inelastic. On the cross effect analysis, the

varieties of beans studied exhibited substitution effects.

### RECOMMENDATIONS

Recommendations from these findings reveal that policy initiatives through investment should be targeted towards improvement and investment in the production of cowpea especially all year round. The significant level of own price elasticity in all varieties, suggest the need for domestic food policy interventions that affect price (price subsidies) to consumers and marketers respectively.

### REFERENCES

- Abdulai, A. and Aurbeta, D. (2004): "A cross – section analysis of household Demand for food and nutrients in Tanzania," *Agricultural Economics*, 31 (1): 67- 79
- Aggrawal, P.K. (2003): The relationship among yield and other characteristics of vegetable cowpea and effects of different trellis management system on pod yield. *Tropical Grain Legume Bull.* 25: 15-20
- Akintola, J.O., Udoh, E.J., (2002): An analysis of beef demand in Nigerian urban city, Glo, *Journal of Pure and Applied Sciences*, 9 (1): 1-12
- Akibode, C.S. and M. Maredia. 2011. Global and Regional Trends in Production, Trade and Consumption of Food Legume Crops. Report submitted to the Standing Panel on Impact Assessment (SPIA) of the CGIAR Science Council, FAO, Rome, March 2011.
- Ayinde, I.A., Afolami, C.A., Aromolaran, A.B., Vaughan, L.O. and Fanimo A.O. (2002): 'Intra-zonal poverty situation among farmers in Ogun State'. *Moore Journal of Agricultural Research* 3(2): 306-312
- Ayinde, I.A. (2005): Market dynamics for cowpeas: weight and measurement issues in kuto market, Abeokuta, Nigeria. Report submitted as part of the market study on: Building a food marketing policy evidence base in Nigeria.
- Baba, B.A. (2007): Analysis of Urban Household Food Demand in Borno State, Nigeria. An M.sc Dissertation submitted to the school of Post graduate studies, University of Maiduguri for the award of the Degree of Master of Science (M.sc) in Agricultural Economics.
- Baba, B.A., Goni, M. and Umar, J. (2010): Demand for Non Alcoholic Beverage among households in Maduguri Borno State Nigeria. In: J. N.Nmadu, M. A.Ojo, U.S Mohammed, K.M. Baba, F.D. Ibrahim and E.S.Yisa (editors). *Commercial Agriculture, Banking Reform and Economic down turn setting a new agenda for Agricultural Development in Nigeria. Proceedings of National Association of Agricultural Economist (NAAE) held on 3<sup>rd</sup> December, 2010 at FUT Minna.*
- Bett, H.K., Musyoka, M.P., Peters, K.J and Bokelmann, W. (2012): Demand for Meat in therural and urban areas of Kenya: A focus on indigenous chicken. *Econometrics Research International* 2012: 1-12
- Blanciforti, L. and Green, R. (1984): "An Almost Ideal Demand System" A comparison and application to food crops. *Agricultural Economics Research* 35: 1-10
- Coulibaly, O. and Lowenberg-Deboer, J. (2002): The economics of Cowpea in West Africa. In: Fatokun, C.A., S.A. Tarawali, B.B. Singh, P.M. Kornawa, and M.Tamo (editors). Challenges and opportunities for enhancing sustainable cowpea production. Proceedings of the World Cowpea Conference III held at the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, 4<sup>th</sup>-8<sup>th</sup> September 2000. IITA, Ibadan, Nigeria.
- Davies, D.W., Oelke, E.A., Oplinger, E.S., Doll, J.D., Hanson, C.V., and Putman, D.H. (2005). Cowpea: *Alternative Field Crop Manual*. Center for alternative plant and animal product Minnesota Extension Services, University of Minnesota and Cooperative Extension Services, University of Wisconsin- Madison.
- Dawoud, S. (2005): An analysis of food consumption patterns in Egypt. Dissertation submitted to the Department of food Economics and consumption



- studies, Faculty of Agriculture of the Christian Albrechts – University Kiel
- Deaton, A. (1987): Estimation of Own- and Cross-price Elasticities from Household Survey Data, *Journal of Econometrics*, 36: 281-309.
- Udoh, E.J., Mbossah, E.R., Udoh, E.S. and Akpan, S.B., (2013): The structure of food demand in Urban city of Nigeria: An application of Linearized Almost Ideal Demand System (LA/AIDS). *Journal of development of Agricultural Economics*, 5:(1) 12 - 18
- Faye, M.D. (2005): Investigations of key aspects for the successful marketing of cowpeas in Senegal. Ph.D thesis Submitted to the Department of Agricultural Economics University of the Free State Bloemfontein South Africa.
- Faith, D.I., Y.C. Jagaba, U.K. Ramatu and I.Y. Ingye, (2011): Cowpea marketing and consumer preference in magama local Government Area of Niger State, Nigeria. *Journal of Agriculture and Social Science*, [www.fspublishers.org](http://www.fspublishers.org) 7:30-34
- Faris (2003): The origin and Evolution of cultivated forms of cowpea. *Journal of Genetics, and Cytology*. 7:433-452
- Gustavsen, G.W. and Rickertsen, K. (2003). "Forecasting Ability of Theory-Constrained Two-stage Demand Systems". *European Review of Agricultural Economics* 30:(4) 539-558.
- Ibrahim, F.D. (2014): Cowpea Market Integration and Consumer Demand Analysis between 2005-2012 in Niger State, Nigeria. A Ph.D Thesis Submitted to the Department of Agricultural Economics and Extension Technology Federal University of Technology Minna, Niger State Nigeria.
- Jafferson, T., (2005): Cowpea: A versatile Crop for Hot Dry conditions. Thomas Jafferson Agricultural Institute, West Nifong Boulevard, Colombia.
- Jung, J. and Koo, W.W. (2000): An econometric analysis of Demand for Meat and Fish Products in Korea. Northern Plain Trade Research Center. Department of Agricultural Economics North Dakota State University. Agricultural Economics Report No.468, May 2000
- Keller, G. Warrack, B. and Bartel, H. (1994): Statistics for management and economics third edition California. *Wadsworth publication company, California*. Pp 707 - 708
- Lowenberg-Deboer, J.M.(2010): Ensuring Africa's future through agriculture. 5<sup>th</sup> World Cowpea Conference, on 27<sup>th</sup> -1<sup>st</sup> October, 2010 at Palm Beach Hotel, Saly, Senegal.
- Mergos, G.J. and Donatus, G.S. (1989): Demand for food in Greece. An Almost Ideal Demand system analysis. *Journal of Agricultural Economics* 40 (2): 83- 93
- Ministry of finance and Economic Planning Niger State (2009): Market calendar budget and planning.
- Molina, J. A. (1994). "Food Demand in Spain: An Application of the Almost Ideal Demand System", *Journal of Agricultural Economics*, 45(2): 252-258
- Muhammed- Lawal, A and Balogun, G.S. (2007): Animal protein consumption among rural households in Kwara State, Nigeria. *African Journal of General Agriculture*, 3 (1): 21-27
- Nnanyelugo, D.O; King, J., Ene-Obong, H.N., and Ngoddy, P.O (1985): Seasonal variations and the contribution of cowpea (*Vigna Unguiculata*) and other legumes to nutrient intakes in Anambra State Nigeria. *Ecology of food and nutrition*, 17:271-287.

- National Population Commission (NPC) 2006.  
National Population Census.
- Onyemauwa, C.S.; Odi, M.A.C.A.; Lemchi, J.I.; Eze, C.C.; Ibekwe, U.C. and C.A. Emenyonu. (2008): Analysis of Household Consumption of Cereals in Owerri Municipality, Imo State, Nigeria. *International Journal of Agric. Research.* 3 (4): 273-280.
- Onyemauwa, C.S. (2010): Analysis of Household Consumption of Cassava Products in Ohaozara, Ebonyi State, Southeast Nigeria. *Researcher 2 (6):1-6.*
- Soe, T. Batterham, R. L., Drynan, R.G. (1994): Demand for food in Myanmar (Burma). *Journal of Agricultural Economics vol II : 207- 217*
- Tolera, T. (2006): Towards improved vegetable use and conservation of cowpea: agronomic and participatory evaluation in Northern Tanzania and genetic diversity study. Ph.D. Thesis, submitted to the Geotg-August University, Geottingen , Germany