



Economics of Maize (*Zea mays*) Production In Igabi Local Government Area, Kaduna State, Nigeria

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Abstract: This study evaluated economics of maize (*Zea mays*) production in Igabi Local Government Area of Kaduna State, Nigeria. Specifically, the objectives of this research study were set out to: examine the socio-economic or demographic characteristics of sampled maize farmers; evaluate the costs and returns of maize production; identify the factors that influence gross income from maize (*Zea mays*) production; examine the major constraints and recommend solutions to problems encountered in maize (*Zea mays*) production in the area of study. A simple random sampling technique adopted and was used in selecting one hundred (100) maize farmers in the area of study. Data were analyzed using descriptive statistics, farm budgeting technique, financial analysis, and multiple regression technique. The analysis of farm budgetary technique shows and reveals that maize (*Zea mays*) production in the area of study is a profitable enterprise with a gross margin of ₦ 64,500, and net farm income (NFI) of ₦ 61,700. The coefficient of gross ratio was 0.49; this implies that 49% of gross income of maize went to off-set total farm costs. Returns on naira investment (RNI) was 1.06. This implies that for every ₦1.00 invested by farmers in maize production, ₦1.06K is their profit. The results of multiple regression analysis shows that the coefficients of land (area planted), hired labour; family labour; expenses on seeds, chemical and insecticide; fertilizer inputs and income from other enterprises were positive, which is also significant at probability level measured at $P < 0.01$. Inadequate capital; high costs of fertilizer and other farm inputs; bad road; high cost of labour; and poor storage facilities were identified as a major production constraints encountered by maize farmers. This study recommends that farmers are encouraged to form cooperative societies to enhance bulk purchase of input which will reduce input cost and ensure timely supply of farm inputs.

Keywords: Economics, Maize (*Zea mays*), production, Kaduna State, Nigeria

1. Introduction

The Federal Government of Nigeria, for several years have neglected the agricultural sector, now begin to give attention and reform or readjust or restructure the agricultural sector; Nigeria Federal Government implemented recently a new strategy now called the Agricultural Transformation Agenda (ATA), (ATA, 2011-2016), and another policy document called Agricultural Promotion Policy (2016-2020), this is to make necessary readjustment to address the challenges in the agricultural sector. Nigeria is currently facing two key gaps in agricultural sector (APP, 2016): firstly, it does not meet food requirements needed domestically, and secondly, it does not have the ability to export food at required quality levels for any successes in the market. The earlier or former one of the problem stated, may largely be that of a challenge of productivity which results from an aging or old

population of farmers', also majority of farmers are faced with: inadequate seed inputs; inadequate fertilizers; lack of irrigation equipment's or facilities; and lack necessary support to be successful in the enterprise (APP, 2016). For Nigeria's agricultural sector to grow and solve these two gaps, necessary actions is needed such as: produce enough or quantity of fresh food, produce food of high quality levels which will successfully serve the Nigerian market as well as export market and will also bring in foreign exchange for the country. As productivity increased, food produced domestically will improve, and standard levels are raised for all food produced in Nigeria, it is believed that export market will benefit tremendously and this will impact in a positive manner on the balance of payment in Nigeria.

Maize (*Zea mays*) remains one of the priority areas the policy document focuses on. About 7000

years ago, the cereal grain was believed to have originated from Mexico actually from wild grass. It is an important cereal in Nigeria and in many developed and developing countries of the world; maize is widely used for animal feed and, for industrial raw materials in developed countries. Maize over the years does not only serve as the source of food for man and livestock but also as a source of income and foreign exchange. Ransom et. al. (2003) reported that maize dominates the agricultural sector of Terai, employing 60% of labour force, and contributes 28% of gross domestic product (GDP). Maize ranks third, sorghum ranks second and, millet ranks first among the most important cereal in Nigeria (Ojo, 2000). Faranti (2005) reported in his results or analysis that maize farming was profitable enterprise which gives a gross margin and net returns of ₦2, 637.80 and ₦2, 141.00 respectively. Food grains produced in Nigeria are: soybean, maize, sorghum, rice, cowpea, millet and groundnut. Currently, Nigeria produces about 7.0 million tons with a gap of 0.5million tons to meet the local demand (APP, 2016). This deficit is connected but not limited to the fact that many farmers depend mainly on traditional method of farming and therefore, does not make use of the available resources effectively. This might make the maize enterprise less profitable. Profit is key to the sustenance of any enterprise. Profitability can be said to be the main or primary goal of all business enterprises. Profitability is very important for any business enterprises; otherwise, that business enterprise will definitely not survive in the future or in the long run. So, evaluating or measuring the present and past profitability and, or forecasting or projecting the future trend in analysis of profitability is very

essential or important for the maize subsector in Nigeria. In production economic analysis, inputs or resources or otherwise called factors of production are what are used in the process of production to produce output. Land, labour and capital are the basic factors of production.

The main or broad objective of this research study is to evaluate the economics of maize (*Zea mays*) production in Igabi Local Government Area of Kaduna State, Nigeria. The specific objectives are to: -

- (i) identify the socio-economic and demographic characteristics of maize farmers,
- (ii) analyze the costs and returns of maize production,
- (iii) evaluate the factors that can influence gross income from maize production in the area of study,
- (iv) identify problems encountered in maize production by farmers,
- (v) proffer solutions to problems encountered in maize production.

2. Methodology

2.1. Study Area

This study was done and conducted in Igabi Local Government Area Kaduna State, Nigeria. The state is located within Latitudes $10^{\circ} 20^{\circ}$ N and Longitudes $7^{\circ} 45^{\circ}$ E. Kaduna State has total land area of 46,053 Km² with a population of 6,113,503 people (NPC, 2006). Igabi Local Government Area is located within Latitudes $10^{\circ} 47^{\circ}$ N and Longitudes $7^{\circ} 46^{\circ}$ E with a population of about 180,860 people (NPC, 2006). Agricultural is main source of livelihood of the people. Enterprises in the area include: maize production, poultry farming, fish farming, blacksmith, crop production etc.



Figure 1. Map of Kaduna State showing Igabi Local Government Area

2.2. Sampling Techniques and Sample Size

A purposive sampling technique adopted and, this was used in selecting the districts and villages in the area of study. The selection of the districts and villages was due to the predominant of maize production in the area. Four (4) districts were selected out of the thirteen (13) districts. A Simple random sampling technique was adopted to select twenty-five (25) respondents from each of the four (4) districts selected making the total sample size of one hundred (100) maize farmers .Producers were equally distributed among the four (4) districts.

2.3. Method of Data Collection

Data were obtained from primary source. Data used were collected using structured questionnaires. Data collected were based on the socio-economic and demographic variables such as: sex or gender, age, farming experiences, educational status, household size and income level of the respondents as well as profitability variables, and factors influencing maize production in the area of study.

2.4. Method of Data Analysis

Descriptive statistics, examples of which include: the mean, frequency-distributions, and percentages were used in analyzing specific objectives one (1) and four (4). This tool of analysis was employed to have summary characteristics and descriptions of the data that were collected.

Farm budgeting can be defined as a detailed or complete physical and financial document or plan which is used for the operation of a farm basically

for a certain period of time (Olukosi and Erhabor, 2005). The total cost incurred during the production period is obtained by multiplying the various input resources by their unit market prices, while the revenue refers to the sum of outputs multiplied by their unit price. The farm budgeting model applied in this study is estimated as

$$NFI = TR - TC \quad \text{----- (1)}$$

Where,

NFI = Net Farm Income (₦)

TR = Total Revenue (₦)

TC = Total Cost (₦)

Furthermore, fixed cost was computed using straight line method of the asset depreciation. It was estimated as:-

$$D = \frac{P - S}{N} \quad \text{----- (2)}$$

Where,

D = Depreciation (₦)

S = Salvage Value (₦)

N = Number of Years

P = Price of the Asset

Equations one and two stated were used to achieve and realize the specific objective two (ii).

Financial analysis is done in order to evaluate the financial position and strength of the farm at a point in the production process. Gross ratio, operating ratio and return per naira invested were

considered. The gross ratio is used to measure or evaluate the overall financial successes of a farm or an enterprise. The lower or the smaller the value of gross ratio, then the higher the return per naira invested. The rule says a gross ratio less than one (1) can be said to be desirable or good for any farm business. An operating ratio that is less than one (1) indicates that the total farm revenue is able to offset the cost variable input used in the farm (Olukosi and Erhabor, 2005). The ratios are estimated as follows:

$$GR = \frac{TC}{GI} \quad \text{--- (3)}$$

Where,

GR = Gross Ratio (Unit)

TC = Total Cost (Naira)

GI = Gross Income (Naira)

$$OR = \frac{TVC}{GI} \quad \text{--- (4)}$$

Where,

OR = Operating Ratio

TVC = Total Variable Cost (₦)

GI = Gross Income (₦)

$$RNI = \frac{NFI}{TC} \quad \text{--- (5)}$$

Where

RNI = Return per Naira Invested

NFI = Net Farm Income (₦)

TC = Total Cost (₦)

Equations three, four and five were used to achieve and realize specific objective two (ii).

Multiple regression model was used in order to examine factors that can influence gross income

from maize (*Zea mays*) production in the area of study as stated in specific objective three (iii). The implicit model that was used for the study according to Olayide and Heady (1982) is specified as:

$$Y = F (X_1, X_2, X_3, X_4, X_5, X_6, U_i) \quad \text{--- (6)}$$

Where,

Y = Gross Income Obtained from Maize (₦)

X₁ = Land (Area Planted) in Ha

X₂ = Hired Labour (₦)

X₃ = Family Labour (Mandays)

X₄ = Expenses on Seeds, Chemical and Insecticides (₦)

X₅ = Fertilizer Inputs (₦)

X₆ = Income from other Enterprises (₦)

U_i = Error Terms

The explicit functions are stated thus:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + U_i \text{ (Linear)} \quad \text{--- (7)}$$

$$\text{Log } Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + U_i \text{ (Double-Log)} \quad \text{--- (8)}$$

$$Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + U_i \text{ (Semi-Log)} \quad \text{--- (9)}$$

Where,

b₁ – b₁₀ = Regression Coefficients

b₀ = Constant Term

U_i = Error Term

The best fit of the model was selected based on four (four) criteria:

- (i) Coefficient of Multiple Determinations (R²),
- (ii) F-Value
- (iii) t-ratio, and
- (iv) Significance of regression coefficients relative to apriori expectations

Table 1. Description of variables and apriori expectations in the multiple regression model

Variables	Unit of Measurement	Apriori Expectation
(a) Land (Area Planted) (X_1)	Hectares	Positive (+)
(b) Hired Labour (X_2)	Naira	Positive (+)
(c) Family Labour (X_3)	Mandays	Positive (+)
(d) Expenses on Seeds, Chemicals and Insecticides (X_4)	Naira	Positive (+)
(e) Fertilizer Input (X_5)	Naira	Positive (+)
(f) Income from other Enterprises (X_6)	Naira	Positive or Negative (\pm)

3. Results and Discussion

3.1. Socio-Economic or Demographic Characteristics of Maize Farmers

Table 2 reveals the socio-economic or demographic characteristics of maize farmers in the area of study. Majority or most of the farmers (75%) were male (Table 2). This implies that male dominated maize production in the area of study. The result agrees or is in conformity with the work of Bappa (2008) who reported that due to the cultural belief, males in the Northern part of Nigeria engage in outdoor economic activities, while the female mostly stay indoor as housewives, and participated in some micro enterprises. The age of the farmers ranged from 20-60 years with 37 years mean age. About 64% of sampled maize farmers were within the age bracket of 20-40 years. It signifies or implies that maize farming in the area of study is embraced predominantly by middle-aged men between the ages of 20-40 years (Table 2). The role of age of farmers is very critical in agricultural production. Ogundari et. al., (2007) observed that rising age of farmers would lead to a decline in their level of efficiency. Farmers within the active age groups are able to withstand stress and put more time in various farming operations (Udoh and Nyienekuma, 2008). Older farmers maybe expected to have more resources and this may make the probability high for the old farmers or make them more likely to try new technologies. Old people are less energetic and less receptive to agricultural innovations, and hence can develop inefficient production routines and practices (Asongwa et. al., 2011). Results of this study reveal that 45% of the farmers had household size of 10 people (Table 2). In most agrarian communities, family size is seen as an advantage to household head as it signifies the availability of farm labour. About 57% of sampled

farmers had between 6-15 years' experience in maize production.

Experience in farming expressed in years can be linked to age of the farmers. The older the farmer the more experienced he is in farming and it is expected that this will lead to higher yield and higher net farm income (Nathan et. al., 2015). About 79% of maize farmers had formal education. The more educated a farmer is, the more the chances that the farmer will adopt innovation than the uneducated ones (Oluwatayo et. al., 2008).

3.2. Production Parameters of Sampled Maize Farmers

The sizes of the farmers maize farms are shown in Table 3. The distributions according to farm size indicate that maize farmers were made up of small, medium and large-scale farmers. This is based on Olayide and Heady (1982) classification of farmers as follows: 0.1-5.0 hectares (small-scale); 5.1 to 10 hectares (medium-scale); 10 hectares and above (large-scale). About 85% of maize farmers had farm sizes between 0.1 to 5.0 hectares. The average farm size was 2.53 hectares. Since the majority of farmers have farm holding between 0.1 and 5 hectares, it means that these farmers cannot achieve economies of large-scale production. Small farm size is an impediment to agricultural mechanization. Because using farm machineries like tractors to control weeds will be difficult. The result in Table 4 shows the frequency-distributions of maize farmers based on number of years of membership in cooperatives. About 35% of maize farmers had 10 or less year's membership in cooperative societies. The mean number of maize farmers measured in years who is a registered member of a cooperative society was 12.6.

Farmer's membership in any cooperative society's enables them interact among themselves or mixed up with each other, share ideas or

experiences, and help each other. Interaction among maize farmers is a platform or an avenue or means through which innovation diffusion can occur (Oboh et. al., 2008). Farmers' membership in any cooperatives societies will enable them to acquire more land compared to those who were not members (Idi et. al., 2006). Table 5 shows maize

farmers access to agricultural credit. About 80% of maize farmers had access to agricultural credit. Inadequate agricultural credit can inhibit timely execution of agricultural activities and this could affect maize yield.

Table 2. Socio-economic or demographic characteristics of sampled maize farmers in the area of study

Variable	Frequency	Percentage
Sex		
Male	75	75.0
Female	25	25.0
Age in Years		
20-30	23	23.0
31-40	41	41.0
41-50	27	41.0
51-60	9	9.0
Mean	37.2	
Household Size (Units)		
1-5	27	27.0
6-10	18	18.0
11-15	28	28.0
16-20	27	27.0
Mean	10	
Years of Farming Experiences		
1-5	22	22.0
6-10	27	27.0
11-15	30	30.0
16-20	21	21.0
Mean	8	
Education Level Attained		
Primary	41	41.0
Secondary	24	24.0
Tertiary	14	14.0
Non-Formal	21	21.0
Total	100	100.0

Source: Field Survey, 2017

Table 3. Distribution of farmers according to land size in hectares

Land Size (Ha)	Frequency	Percentage
0.1 – 5.0	85	85.0
5.1 – 10.0	15	15.0
Total	100	100.0

Field Survey, 2017, Mean = 2.53 Hectares

3.3. Average Costs and Returns Analysis for Maize Production per Hectare

The net farm income statement can be defined as a summary description of revenue and expenses usually given for an accounting period. It can sometimes be called either an operating statement or rather a profit and loss statement. The purpose of

net farm income (NFI) in this study is used to measure or evaluate the difference between revenue and expenses. If the difference is positive, it indicates or shows or means a profit or positive net farm income for the accounting period. The average costs incurred and the output in monetary value obtained per hectare was estimated for determining the net farm income of maize farming in the area of

study. As revealed and shown in Table 6, the total cost of labour is ₦21, 000 constituting 36.02% of the total cost. Seeds, transportation and pesticides constitute 1.71%, 0.86% and 5.15% of the total cost respectively. As revealed and shown in Table 6, also the total variable cost was ₦55, 000. The fixed cost evaluated was ₦2, 800. Hence, the total cost of production was ₦58, 300. An average of 1000Kg yield was obtained per hectare and total value product (return) was ₦120, 000. Gross margin realized was ₦64, 500. The net farm income (NFI) was ₦61, 700. This result is in agreement with the finding of Ogaji (2010). Similarly, the results in Table 6 show the coefficient of gross ratio was 0.49, which implies that 49% of gross income of maize farmers went to off-set total farm costs. The gross ratio measures or evaluates the overall financial success of the enterprise. The lower the gross-ratio, it is expected the higher the return per naira invested. The coefficient of operating ratio was 0.46, implying that about 46% of the gross income goes to cover the total variable cost.

Returns on naira investment (RNI) was 1.06. The interpretation of this result is that for every ₦1.00 invested in maize, production N1.06K is their profit.

3.4. Factors Influencing Gross Income of Maize Production in the Area of Study

The Cobb-Douglas regression result presented in Table 7 shows the best fit out of the functional forms employed. The results show the land (area planted) of the farmers had positive coefficient and significant at $P < 0.01$. This implies or indicates that the increase in land area planted the higher the gross income of farmers. Similarly, hired labour; family labour; expenses on seeds, chemicals and insecticides; fertilizer input; an income from other enterprises had positive coefficient and significant at $P < 0.01$, respectively. The coefficient of multiple determinations (R^2) was 0.889. This indicates or implies that about 88.9% variation in gross income of maize farmers was influenced by the explanatory variables included in the economic model. The F-value was 630.16 and significant at probability level measured at $P < 0.01$, showing the joint effects of the explanatory or endogenous variables on the dependent or exogenous variable. This result agrees or is in consistent or in line with the results or findings of Shehu et. al., (2010) who observed that the estimated coefficient of seed and labour inputs were positive and significant at probability level measured at $P < 0.01$. This shows or implies or signifies that the more seeds is applied and the more labour employed the more gross income of maize farmers.

Table 4. Distribution of maize farmers according to membership of cooperatives

Membership of Cooperatives (Years)	Frequency	Percentage
1 – 5	11	11.0
6 – 10	24	24.0
11 – 15	27	27.0
> 15	38	38.0

Mean = 12.6 Years

Table 5. Access to farm credit

Access	Frequency	Percentage
Yes	80	80.0
No	20	20.0

3.5. Major Constraints Faced or Encountered by Sampled Maize Farmers in the Area of Study

The problems confronting the maize farmers in the area of study are shown and presented in Table 8. The results further show that majority (43.8%) of the maize farmers complained of inadequate capital as the problems militating

against their operations in the enterprise. About 8.8% of the farmers reported that road networks in the study area were bad. A good, efficient and, comfortable transport system is of priority and this is critically necessary or important for efficient agricultural marketing. If transport services are bad or of poor quality or high price or expensive, then

maize farmers will absolutely be at disadvantage at Nigeria, transports from crop producing area to the the market when they sell their farm produce. In buying urban markets are made over rough road.

Table 6. Profitability analysis of maize production in the area of study (Per Hectare)

Variables	Average/Ha	Total (₦)	Percentage (%)
Variable Cost			
Land Preparation		15,000	25.73
Labour	60 MD	21,000	36.02
Seeds	10.88 Kg	1,000	1.71
Transportation		500	0.86
Fertilizers	144.231 Kg	15,000	25.73
Pesticides	5.72 Lt	3,000	5.15
Total Variable Cost		55,500	95.19
Fixed Cost			
Cost of Renting Land		1,000	1.71
Depreciation of Farm Tools		300	0.53
General Administrative Expenses		1,000	1.71
Interest		500	0.86
Total Fixed Cost		2,800	4.81
Total Cost of Production		58,300	
Returns			
Maize Yield		1000 Kg	
Maize Price (₦/Kg)		120	
Total Revenue (TR)		120,000	
Gross Margin (GM)		64,500	
Net Farm Income (NFI)		61,700	
Return on Naira Investment (RNI)		1.06	
Gross Ratio		0.49	
Operating Ratio		0.46	

MD = Mandays, Source: Field Survey, 2017

Table 7. Results of multiple regression analysis

Variables	Regression Coefficients	Standard Error	t-Statistics
Constant	598	1300	0.46
Land (Area Planted) (X ₁)	9.4980	0.30471	31.17***
Hired Labour (X ₂)	15276	4291.011	3.56***
Family Labour (X ₃)	14390	5599.22	2.57***
Expenses on Seeds, Chemical and Insecticide (X ₄)	0.09062	0.02552	3.55***
Fertilizer Inputs (X ₅)	1.13450	0.05324	21.31***
Income from other Enterprises (X ₆)	110475	11147.83	9.91***
R ²	0.889		
Adjusted R ²	0.886		
F-Value	630.16***		

Source: Field Survey, 2017, ***, **, * - Significant at 1%, 5%, 10% level of probability, respectively.

This results in lower prices, crop losses due to spoilage and higher cost of farm inputs (Sieber, 1999). About 5% of the sampled farmers reported poor storage facilities. Poorly stored planting materials turn moldy and lose its viability and quality.

3.6. Suggested Solutions to Problems Encountered in Maize Production by Farmers in the Area of Study

Table 9 shows that 22% of the sampled maize farmers suggested that government should provide good road network to ease the transportation of their farm produce from farm to the market. The study further revealed that 19.7% of the sampled

maize farmers suggested that fertilizers and farm inputs should be made available to farmers at a subsidized rate to increase maize production in the area of study respectively. This is consistent or in line or agrees with the results or findings of Onuk et. al. (2010).

Table 8. Constraints faced by sampled maize farmers

Constraints	*Frequency	Percentage
Inadequate Capital	175	43.8
High Cost of Input	65	16.0
Bad Roads	35	8.8
High Cost of Labour	45	11.3
Shortage/High Cost of Fertilizer	55	13.8
Poor Storage Facilities	25	6.3
Total	*400	100.0

*Multiple Choices

Table 9. Suggested solutions to the problems encountered in maize (*Zea mays*) production in the area of study

Suggested Solutions	*Frequency	Percentage
Provision of Good Road	75	22.1
Provision of fertilizers at Subsidized prices	67	19.7
Provision of Capital/Loan	56	16.5
Provision of Storage Facilities	65	19.1
Provision of Farm Inputs	77	22.6
Total	*340	100.0

*Multiple Choices

4. Conclusions and Recommendations

Based from the results or findings of this study, it has been established that maize production in the area of study gives high returns hence it is profitable. This was evidenced in the net farm income of the maize farmers in the area of study. The study shows that land (area planted), hire labour; family labour; expenses on seeds, chemical and insecticides; fertilizer input, an income of maize farmers significantly influence gross income from maize production in the study area. Based on the results or findings of this research, the under listed recommendations were made:-

(a) Farmers are advised and encouraged to form and join cooperative societies to enhance and enables them buy bulk purchase of inputs which will reduce input cost and ensure timely supply of farm inputs.

(b) Formal credit facilities should be providing to maize farmers through loan with less cumbersome administrative procedures, this will increase maize production in the study area.

(c) Government should provide good roads linking maize produce by farmers to nearby urban markets.

(d) Farmers should be advised on how to allocate, and used of their resources in other to enhance their net farm income, productivity, food security, and poverty status.

Government should make tractors available to maize farmers at subsidized rate. Mechanization leads to increase in maize production and lower cost of production.

References

APP (2016). Agricultural Promotion Policy. Nigeria retrieved from

- www.fscluster.org/nigeria/document/agriculturalpromotion-policy-2016-2020.
- Agricultural Transformation Agenda (ATA) (2011): We Will Grow Nigeria's Agricultural Sector. Agricultural Transformation Blueprint, Federal Ministry of Agriculture and Rural Development, Abuja, Nigeria.
- Asogwa, B.C, Penda, S.T and F.O Ogebe (2010). Profitability Analysis of Cocoyam Production in Anambra State, A guide for sustainable food security proceedings of 11th Annual National Conference of National Association of Agricultural Economist (NAAE), held at New Lecture Theatre, School of Agriculture and Agricultural Technology, Federal University of Technology, Gidan Kwano, Minna, Niger State, 30th Nov – 3rd December, Pp212 – 216.
- Bappa, A.A (2008). Analysis of the Structure and Performance of Egg Marketing in Damaturu Metropolitan Area, Yobe State, Nigeria. A Project Submitted to the Department of Agricultural Economics and Extension, University of Maiduguri, Nigeria.
- Faranti (2005) Economic Analysis of Maize Production in Osun State: A Case Study of Ilesa East and West of Osun State. *Journal of Economics and Sustainable Development* 6 (9): 268-272.
- Idi,A; Maimako,I; Adamu, H (2006). Seropravalence of Newcastle Disease and Infectious Burial in Local Chicken Commercialized in Niamey, Niger. *INFPD Newsletter Volume 9 No 1*.
- NPC (2006). National population Commission, Nigeria 2006 Census Population Figure. Nathan, S.M, Moses, J.D. Jimjel, Z and J.M. Altine (2015) Profitability Analysis of Cowpea Production in Gombe Local Government Area of Adamawa State, Nigeria *International Journal of Advances in Agricultural Science and Technology* 2 (11):1-8
- Oboh, G Radatz, H, and Henle, T (2008). Antioxidant properties of Polar and Non-Polar Extracts of Some Tropical Green Leafy Vegetables. *Journal of Sciences, Food and Agriculture* 88:2486-2492
- Ogaji, A (2010). Analysis of Farmer technical Efficiency in Maize Production in Kogi State, Nigeria. Unpublished M.Tech Thesis Submitted to Department of Agricultural Economics and Extension Technology, Federal University of Technology, Minna, Niger State, Nigeria.
- Ogundari, K and Ojo, S.O (2007). Economic Efficiency of Smallscale food crop Production in Nigeria. *Stochastic Frontier Approach. Journal of Social Sciences* 14 (2): 123-130.
- Ojo, S.O. (2000). Economic Analysis of Maize Production in Osun State: A Case Study of Ilesa East and West of Osun State. *Journal of Economics and Sustainable Development*.6(9):268-272
- Olukosi, J.O and Erhabor, P.O (2005). *Introduction to Farm Management Economics: Principles and Applications*, Agitab Publishers Zaria, Nigeria.
- Olayide, S.O and E.O Heady (1982). *Introduction to Agricultural Production Economics* First Edition Ibadan, Ibadan University Press.
- Oluwatayo, I.B; Sekumade, A.B; and Adesoji, S.A (2008). Resource Use Efficiency of Maize Farmers n Rural Nigeria: Evidence from Ekiti State. *World Journal of Agriculture Sciences* 4(1)
- Onuk, E.G; Ogara,I.M; Yahaya,H, and Nannim,N (2010). Economic Analysis of Maize Production in Mangu Local Government Area of Plateau State. *PAT* 6(1): 1-11. www.patsukjournal.net/currentissue.
- Ransom, J. K., Paudyal, K. & Adhikari, K. (2003). Adoption of improved maize variety in the hill of Nepal: *Agricultural Economics* 29, pp. 299-305.
- Shehu, J.F; J.T Iyortyer; S.I Mshelia; and A.A.U Jangur (2010). Determinants of Yam Productivity and Technical Efficiency among Yam Farmers in Benue State, Nigeria. *Journal of Agriculture and Social Sciences* 3:4
- Udoh, A.J and Nyiena Kuma, M.G (2008). Examining Socio-Economic Characteristics and Adoption Trends of Artisanal Fishers of Akwa Ibom State in West Africa. *Journal of Agriculture Social Science* 4:141-146.