East Asian Journal of Multidisciplinary Research (EAJMR)
Vol. 2, No. 1, 2023 : 455-466

Determinants of Marketable Surplus of African Bush Mango Kernel (*Ogbono*) in Kolokuma/Opokuma Local Government Area of Bayelsa State, Nigeria

Okuduwor A. A[1*], Tuaneh G. L[2], Isikima T[3], Jimmy P. S[4]
Faculty of Agriculture, Rivers State University
Corresponding Author: Okuduwor A. A adibie.okoduwor@ust.edu.ng

A R T I C L E I N F O

Keywords: Determinants, Marketable, Surplus, African Bush Mango, Kernel

Received : 15 November
Revised : 20 December
Accepted: 25 January

A B S T R A C T

The study evaluated the determinants of marketable surplus of African Bush Mango Kernels (Irvingia gabonensis) (ogbono) in Kolokuma/Opokuma Local Government Area of Bayelsa State. Multi-stage saying was used to select a total of 60 respondents for the study. The data used for the study was collected using a well-structured questionnaire. The data collected was analysed using descriptive statistics and multiple regression. The results showed that ogbono in the study area is male dominated business (53.3%), majority of the producers (48.3%) were married, and 53.3% had a household size of 6-10 persons. The coefficient of multiple determination (R2) was 0.959, the quantity of ogbono produced, age of producers, quantity of ogbono for household consumption was significant at $p<0.01$, $p<0.5$ and $p<0.01$ respectively and positively influenced the quantity of ogbono sold. The 5quantity of ogbono given as gift was negative and significant at $p<0.01$. The study concluded that ogbono production in the study area is viable and it was recommended that Government support, improved processing and storage facilities should be provided.

DOI: https://10.55927/eajmr.v2i1.2943
ISSN-E: 2828-1519
https://journal.formosapublisher.org/index.php/eajmr/index

INTRODUCTION

African Bush Mango (*Irvingia gabonensis*) has long been cultivated in Nigeria for its edible seeds used for soup making as food. Also, the edible pulp of the fruit is very nutritious and consumed throughout West Africa. (Omokhua, Ukoima, &Aiyeloja 2012) However, In Nigeria, Irvingia gabonensis can fruit twice per year (April-July and September-October). It is a source of food, income and essential materials for pharmaceutical industries and above all, a potential foreign exchange earner (Omulabi 1994, Omokaro et al 1999). Ladipo (2000) reported that less than 10% of the total annual crop of the fruit or the kernel of bush mango is harvested from planted trees while the rest are collected from natural forests and the harvesting, processing, and marketing is usually done by women and children. The most important product of Irvingia gabonensis is the kernel, which is porpularly known as Ogbono, trade name dika nut and it is categorized as an oilseed. According to Ogungbenle(2014) Irvingia gabonensis seed is a good source of edible oil, protein and essential minerals. Its nutritional potentials enable it to be useful in formulations. Irvingia kernels are produced in the Southern Forest area of Nigeria. (Awe et al; 2012) .

Nkwatoh, Labode, Iyassa, and Nkwatoh (2010) reported that there are four grades of Irvingia kernels. Grade one, which is the best grade, is obtained after cracking fresh fruits with the fleshy mesocarp still intact. Grade two which is the second-best grade is obtained when cracking is done about a week after the rotting away of the fleshy mesocarp. This is because before cracking, the cotyledon must not have started germination. When the seeds are left within the rotten mesocarp for more than 3 weeks before cracking is done, the third grade of mango is obtained. This is because of the initiation of the germination process, which converts some of the stored food of the seed into energy to aid germination, thereby reducing the food value of the cotyledon (kernel) which is the principal market factor. The fourth grade emerges when cracked Irvingia is dried directly using the direct heat from the fire. The heat causes the oily ingredient in the kernels to melt out which in due course stains the face of the kernels. This results in a dark-brown oily unattractive product. These grades can however change in the process of storage. (Nkawtoh et al; 2010).

Marketable surplus is the residual of agricultural produce left with the producer after meeting his requirements of family consumption, farm needs (seed and feed), kind payments and quantity added to end of year stocks. (Awotide, 2004 as cited by Falola, Fakayode, & Ajayi 2013). This marketable surplus in the agricultural sector of developing economies is crucial from economic and welfare perspectives as it contributes to capital formation in the non-agricultural sector, improvement of standard of living by generating income to households and provision of raw materials for industries (Awotide, 2004 as cited by Falola et al;2013).

THEORETICAL REVIEW

The cost price of irvingia kernels and the cost of transporting it, plays prominent role in determining the selling price of the commodity (Awe et al; 2012) However, the extent of price variation of the Irvingia fruit and seed over

the season is such that high prices are experienced at the start when availability is low, then reduced prices as the quantity of product increases, and finally price increase as the product become scarce at the end of the season. (Babalola & Agbeja 2009)

Ojogho and Egware (2014) reported that the initial demand price, mid-season demand price, price substitute commodity were statistically significant in determining the demand for irvingia kernel(ogbono) and that any increase in the initial supply price of the commodity would lead to a corresponding increase in the mid-season supply price. Interestingly, Irvingia kernel marketing provides a means of income as well as earning a living to the sellers. It is therefore essential for traders to be efficient in carrying out their marketing activities so as to improve their living standard. (Shomkegh, Tember & Temo 2008). In marketing, Irvingia kernels pass through various market participants and exchange points before they reach the final consumers. These market intermediaries are wholesalers and retailers. Both play an important role Also, trading of Irvingia kernels offers employment opportunity and has the ability to cater for the daily needs of the traders. (Awe et al, 2012, Pius 2014).

The broad objective of the study was to evaluate the determinants of marketable surplus of African Bush Mango Kernels (Irvingia gabonensis) in Kolokuma/Opokuma Local Government Area of Bayelsa State.
The specific objectives were:

- To describe the socio-economic characteristics of ogbono processors.
- To evaluate the factors that determine the quantity of ogbono marketed.
- To determine the profitability of ogbono marketing in the study area.
- To identify the constraints in the processing of ogbono in the study area.

METHODOLOGY

Study Area

The study on marketable surplus of African bush mango (Irvingia gabonensis) kernel (ogbono) was carried out in Kolokuma/Opokuma Local government Area of Bayelsa State. The State was created on October 1, 1996 out of Rivers State, it is geographically located within Latitudes 040151 North, 050 231 South and Longitudes 050 221 West and 060 451 East. It shares boundaries with Delta State on the North, Rivers State on the East and the Atlantic Ocean on the West and South, (National Bureau of Statistics, NBS, 2012). The state is divided into three (3) Agricultural zones constituting of the eight (8) Local Government Areas (LGAs). The 3 Agricultural Zones include Brass (3 LGAs), Yenagoa (3 LGAs) and Sagbama (2 LGAs). Brass agricultural zone consists of Nembe, Brass and Ogbia. Yenagoa agricultural zone consist of Yenagoa, Kolokuma/Opokuma and Southern Ijaw. Sagbama agricultural zone consist of Sagbama and Ekeremor (Bayelsa State Agricultural Development Project, (BASADP, 2011).

Kolokuma/Opokuma Local government covers an area of 361Km2 and a population of 77292(NPC 2006). Many area of the Local government area is occupied by the Bayelsa National Forest. The Local government area had just

one clan known as Opokuma clan and the following villages are found in this clan; Aya-ama, Ayibabiri, Ayokoroma, Gbarama, Igbanwa, Igbedi, Kalama, Kaiama, Odi, Ofonbiri, Okolobaa, Oloibiri, Oyobu, Sabagreia, Sampou. The predominant occupation of the people includes farming, fishing, petty trading and Lumbering and their language is Kolokuma Ijaw.

Sampling Procedure and Sample Size

The population for the study comprised of ogbono processors in Kolokuma/Opokuma Local Government Area of Bayelsa State. A multi-stage sampling technique was used. The first stage was purposive selection of the two (2) clans Opokuma and Kolokuma Clans, the second stage was random selection of three (3) villages from each clan, making a total of six (6) villages. The third stage was random selection of 10 ogbono proccessors from each of the selected villages, making it a total of sixty (60) respondents. The villages selected from Opokuma clan were Abuwari, Oyobu and Akaranbiri while the villages selected from Kolokuma clan were Odi, Kaiama and Olobiri.

Data Collection

Data for the study was collected from primary sources by administering well-structured questionnaire and by personal interview. Also, an enumerator was used in the data collection process. Information on the socio-economic characteristics of ogbono processors, quantity of ogbono marketed profitability of ogbono marketing and the constraints on ogbono processing,were educed.

Data Analysis

Descriptive statistics such as frequency distribution and percentages were used to achieve objective (i), multiple regression was used to achieve objective (ii) Net production income analysis was used to achieve objective (iii) and mean score was used to achieve objective (iv)

Model Specification

The model is specified using the following functional forms: Linear, Semi-log, Cobb- Douglas and exponential the implicit model of the regression was Y= f(X1, X2, X3, X4, ...X10)

Where:
Y= Quantity of Ogbono Sold (Marketable surplus) (Kg)
X1=Price of Ogbono (N)
X2= Cost of Transport (N)
X3= Quantity of Ogbono Processed (Kg)
X4= Distance from Home to Market (Km)
X5= Quantity of Ogbono for gift (Kg)
X6= Age of Producers (in Years)
X7 = Quantity of Ogbono Reserved for House Consumption (Kg)
X8= Sex of Producers
X9= Level of Education of Producers
X10= Household Size

The three (4) functional forms used included the following
Linear
$Y= a+ \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6X6 + e$
Semi-Log
$Log\ Y= a+ \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6X6 + \beta7X7+ \beta8X8+ \beta9X9 + \beta10X10+ U$
Double Log
$Log\ Y= \beta0 + \beta1\ logX1 + \beta2\ logX2 + \beta3\ logX3 + \beta4\ logX4 + \beta5\ logX5 + \beta6logX6 + e$

Net Income Analysis
NI(profit) = TR - TC (TVC + TFC)

Where :
NI = Net production income (profit)
TR = Total revenue (N)
TVC = Total variable cost (N)
TFC = Total variable cost (N)
TC = Total cost (N)

Likert Scale

Likert scale of 4-point rating was used in the study to measure the extent of constraints. The grading was used in this order, Strongly agree= 4, Agree= 3, Disagree= 2, Strongly disagree = 1. The values of the Likert scale were added to get a 10, which was divided by 4 to get a mean score of 2.5 (i.e. 4+3+2+1=10/4=2.5) Cut off point. The respondents mean score were obtained from each response item such that anyone with higher or equal to 2.5 was categorized as agree while anyone less than 2.5 was categorized as disagree.

RESULTS AND DISCUSSIONS

Table 1. Socio-Economic Characteristics of Ogbono processors

Characteristics	Frequency	Percentage
Gender		
Male	32	53.3
Female	28	46.7
Age		
<20	13	21.7
21-30	19	31.7
31-40	14	23.3
41-50	6	10.0
51-61	7	11.7
>60	1	1.7
Marital Status		
Single	28	46.7

Married	29	48.3
Widow/widower	3	5.00
Household Size (no of people)		
1-5	22	36.7
6-10	32	53.3
>10	6	10
Experience (In years)		
<10 years	17	28.3
11-20 years	21	35.0
21-30 years	17	28.3
30 years	5	8.3
Processing methods Adopted		
Manual	60	100
Mechanized	0	0
Level of engagement		
Part-time	60	100
Full-time	0	0
Source of Ogbono		
Wild	60	100
Farm	0	100

Table 1 shows that males were 32 (53.3%) while females were 28, with (53.3%) of male, indicating that ogbono processing is slightly male dominated in the study area. This is in consonance with the findings of Chah et al (2014) who reported that ogbono farming in Enugu State, was male dominated and this is contrary to the findings of Ugwumba, Wilcox Aniaku (2013) who reported that ogbono processing in Nsukka Local Government Area of Enugu State, Nigeria is gender biased in favour of women. The study area has a role to play on gender dominance in ogbono processing and marketing.

The age range of 21-30 had 31.7%, 31-40 had 23.3%, <20 had 21.7%, 41-50 had 10%, 51-60 had 11.7% and >60 had 1.7%. The age distribution showed that people within age bracket 21-30 are the majority implying that ogbono producers in the study area are still active years this is in contrast with the findings of Ugwumba, Wilcox Aniaku (2013) who reported that the average age of ogbono processors in Nsukka Local Government Area of Enugu State, Nigeria 45.5 years.

Majority of the ogbono producers (48.3%) were married, while 46.7% and 5% were single and widow/ widowers respectively. This implies that the married respondents use ogbonno production to supplement their income and support their families. This agrees with the findings of Awe et al; 2012 who reported that majority of ogbono traders in Akure, Ondo State Nigeria, were married. 53.3% of the respondents had a household size of 6-10 persons, 36.7% had 1-5 persons while 10% had more than 10 persons, implying that majority of the producers had more family labour. This agrees with Ugwumba, Wilcox Aniaku (2013) who reported that most ogbono producers in Nsukka Local

Government Area of Enugu State, Nigeria had an average family size of up to 6 persons.

The findings on the experience of ogbono processors shows that majority (35%) of the respondents in the study area had 11-20 years processing experience, 28.3% had both less than 10 years' experience and 21-30% experience and 8.3% had more than 30 years' experience. 100% of the processors engaged in ogbono procession as a part-time venture due to the seasonality of ogbono fruiting. This is in agreement with the findings of Ugwumba, Wilcox Aniaku (2013) who reported that all the processors in Nsukka Local Government Area of Enugu State, Nigeria combined ogbono processing with farming and non-farming activities. The table also showed that 100% of the processing methods used was manual and 100% of the ogbono fruits were harvested from the wild.

Table 2. Factors Influencing the Quantity of Ogbono Marketed

Variables	**Linear**	**Exponential**	**Semi-log**	**Double-log**
Constraints	-7.754	0.534	- 4.4932	-4.046*
	(0.107)	(0.596)	(0.767)	(0.014)
Price of Ogbono	0 .001	0.000**	-19.649	0.270
	(0.199)	(0.013)	(0.257)	(0.140)
Cost of Transport	0 .001	0.000	8.938*	-0.057
	(0.735)	(0.559)	(0.081)	(0.286)
Quantity of Ogbono Produced	0.961***	0.023	52.032***	1.894***
	(0.000)	(0.304)	(0.000)	(0.000)
Distance from Home to Market	-0.012	0.006	-2.382	0.014
	(0.749)	(0.337)	(0.391)	(0.620)
Quantity of Ogbono for Gift	-1.303***	- 0.019	-0.424	-0.384***
	(0.000)	(0.622)	(0.964)	(0.000)
Age of Producers	0.080	0.000	15.366	0.243**
	(0.020)	(0.985)	(0.153)	(0.034)
Quantity of Ogbono For home consumption	-0.772***	-0.006	-17393*	0.0304***
	(0.000)	(0.798)	(0.068)	(0.003)

Sex of Producers	0.251	-0.135	1.892	0.036
	(0.869)	(0.579)	(0.832)	(0.702)
Level of Education	0.726	0.038	2.113	- 0.029
Of producers	(0.482)	(0.796)	(0.672)	(0.582)
Household Size	0.112	0.083*	0.3687	0.042
	(0.706)	(0.086)	(0.724)	(0.699)
R^2	0.935	0.692	0.752	0.957
R^{-2}	0.930	0.621	0.693	0.950
F	65.5	9.786	12.742	98.8

The average marketable surplus of ogbono products in the study area was 56.8kg. Table 2 showed the factors that influenced the quantity of marketable surplus of ogbono in the study area. Multiple regression analysis was used to identify the quantity of ogbono marketed. Table 2 above shows the results of the multiple regression. Four functional forms (the linear, exponential, Semi-log and double-log model) were fitted to estimate the variables, the double-log model was chosen as the lead equation based on the fact that it gave the best fit for the regression model the values of the coefficient of multiple determination (R^2).

The coefficient of multiple determination (R^2) was 0.959 indicating that 95.9% of the dependent variable marketable surplus of ogbono (quantity of ogbono sold) was explained by the independent or explanatory variables. The results also showed that quantity of ogbono produced, age of producers, quantity of ogbono for household consumption was significant at $p<0.01$, $p<0.5$ and $p<0.01$ respectively and positively influenced the quantity of ogbono sold. The quantity of ogbono given as gift was negative and significant at $p<0.01$.

A positive relationship exists between the quantity of ogbono produced and the marketable surplus (quantity of ogbono sold). This implies that the quantity of ogbono produced affects the marketable sulplus and producers with higher output are able to have much left over for sale after meeting their household needs and other needs than with lower output. This result is in consonance with the findings of Falola et al ;(2013). Furthermore, a positive relationship exists between the age of the producers marketable surplus, implying that an increase in the age range of producers led to an increase in output as the producers gain more experience as they grow older. This result is in agreement with the findings of Ugwumba, Wilcox and Aniaku (2013) who reported that the coefficient of age of respondents was positive and statistically significant at($P<0.05$). Implying that the older the producer, the more the

production experience and resources that would be acquired to enable the producer to invest more and thereby produce more kernels.

Also, the household size of producers was positive implying that the household size influences the output and marketable surplus of ogbono. This is in agreement with the findings of Tiku and Ugbada (2012) who further explained in their work that family labour be used to supplement hired labour thereby reducing the cost of production but it is in contrast with the findings of Adenuga, Fakayode and Adewole (2013) who reported that the household size as well had negative impact on the marketable surplus because family a large household size will most likely consume a higher proportion of the vegetables before reaching the market and this will consequently reduce their marketable surplus as compared with families with smaller household size.

Interestingly, the quantity of ogbono given as gift has a negative coefficient which was significant at 1% ($p<0.01$). This implies that an inverse relationship exists between the quantity of ogbono given as gift and the marketable surplus, In other words, the higher the quantity of ogbono given as gift, the lower the quantity of ogbono available for sale and this is in conformity with the findings of Tiku and Ugbada (2012) who reported in their work that that the higher the quantity of rice given out as gift the lower the quantity of rice available to the market for sale.

Table 3. Profitability of Ogbono Marketing

Cost Variables	**Average amount in Production period (N)**
Average Cost of Ogbono per kg	1570
Average quantity of ogbono produced in kg	56.8 (kg)
Total Revenue	89176
Variable Costs	
Cost of Transportation	847.5
Cost of Packaging	638.3
Miscellaneous	2397.5
Total Variable Cost (TVC)	2397.3
Fixed costs	
Machete	1500
Basins	2500
Storage containers	3000
Total fixed cost (TFC)	7000
Total Cost (TC)	9397.3
Net Income (TR-TC)	79,694.6

Net Income was used to ascertain the profitability of ogbono marketing in the study area and results obtained on table 3 shows that total variable cost (TVC) of ogbono processed in the study area was (N2397.5) which represents expenses on transportation (N847.5), packaging (,N638.3) and other costs (N911.7), while Total fixed cost for ogbono marketing in the study area was (7000) which represents costs for machete (1500), Basins (2500) and storage containers (3000). The total revenue and Net income as shown on the table were N89176 and N79,694.6 respectively, implying that ogbono marketing in the study area is a profitable venture. This is in agreement with the findings of Ugwumba, Wilson and Aniaku (2013) who reported that ogbono production Nsukka Local Government Area of Enugu State, Nigeria is profitable.

Table 4. Constraints in Processing and Marketing of Ogbono in the Study Area

Constraints	**Mean**	**Remark**	**Rank**
Lack of Government Support	3.2	Agree	1st
Lack of adequate Storage facilities	3.17	Agree	2nd
Price instability	3.16	Agree	3rd
Others (waist pain, Finger cuts, insect bites, etc)	3.13	Agree	4th
Lack of Modern technology	3.03	Agree	5th
Lack of organized market	2.76	Agree	6th
Seasonality of ogbono Production	2.43	disagree	7th

Table 4 shows that the results of the constraints of ogbono processing in the study area are as follows Lack of government support (3.2), lack of adequate storage facilities (3.17), price instability (3.16), others (waist pain, finger wounds, stains on the palms, insect bites) (3.13), Lack of modern technology (3.03), Lack of organized markets (2.76). These were accepted as major constraints because they had mean scores that were higher than the accepted likert scale mean score of 2.5. The results are in consonance with the findings of Babalola and Agbeja (2009) who reported that lack of adequate storage facilities, price fluctuations and lack of modern technology were constraints in ogbono production and marketing. On the other hand, constraints such as seasonality of ogbono (2.43), low availability of manpower (2.28), high cost of production (2.08), high cost of transportation (2.05) and low availability of trees (1.97) were not agreed upon as serious constraints in the processing of ogbono in the study area because they had mean scores which were below the generally accepted mean score of the study.

CONCLUSIONS AND RECOMENDATIONS

Ogbono production in the study area is profitable and used as a source of extra income, majority of the producers were married and had a household size of 6-10 persons. All the fruits used for ogbono production in the study area were sourced from the wild and processed by manual labour. The ogbono was mostly for household consumption and the excess was sold. The study identified the quantity of ogbono produced, the age of producers, quantity of ogono for household consumption and quantity of ogbono given out as gift as significant factors influencing marketable surplus of ogbono in the study area. Also, lack of government support, lack of adequate storage facilities, price instability, waste pain, finger injuries, etc. were some of the constraints associated with ogbono production in the study area. The study recommended that government support, improved processing and storage facilities should be provided.

FURTHER STUDY

Researchers in Bayelsa state can also find out the determinants of marketable surplus of other common agricultural produce in the study area.

REFERENCES

Adenuga, A. H., Fakayode, S,B., & Adewole R. A., (2013). Marketing efficiency and determinants of marketable surplus in vegetable production in Kwara State. Nigeria. African Association of Agricultural Economics Fourth International Conference, 22-25

Awe , F., Imoagene, E., Osadebe, C.O., Azeez, F.a., & Eniola, T.S., (2012). Evaluation of Irvingia kernels Marketing in selected markets in Akure, Ondo State, Nigeria. International Journal Of Agriculture and Forestry. 2(3): 113-116

Awotide, D. O., (2004). Resource and use Efficiency and Input Substitution in Upland Rice Production in Ogun State, Nigeria, Unpublished PhD thesis, Department of Agricultural Economics, University of Ibadan, Nigeria

Babalola, F.D & Agbeja, B.O., (2009) Marketing of Irvingia spp (Bush Mango) in Southwest Nigeria: Prospects and Challenge. Research Journal of Agriculture and Biological Sciences, 5(6), 944-953

Chah, J.M., Ani,N.A., Irohibe,J.I., &Agwu, A.E., (2014). Exploitation of Bush Mango (Irvingia wombulu and Irvingia gabonensis) among rural House in Enugu State, Nigeria. Journal of Agricultural Extension 18(2) 44-56

Falola, A., Fakayode, S.B., & Ajayi, E.S., (2013) Determinants of Marketable Surplus of Maize in Osun State, Nigeria. Savannah Journal of Agriculture; 8(2): 38-44

Ladipo, D., (2000). Harvesting of Irvingia gabonensis and Irvingia wombulu in Nigerian forests for the development of sustainable system centre for environment, research and development (CENARD)Ibadan, Nigeria, retrieved from http://www.fao.org/y4496E32.htm

Nwatoh A.F., Labode, P., Iyassa, S.M & Nkwatoh .,F.W., (2010). Evaluation of Irvingia(I.gabonensis and I. wombulu. Bali) Trade; a major Non- Timber Forest product in the Ejagham Forest reserve of South West Cameroon. 3(1), 70-77

Ojogho, O., & Egwere , .R.A., (2014) Determinants of Irvingia specie kernel (ogbono) supply and demand in Delta State Nigeria. The Journal of Agricultural sciences 9(30) 118-128

Ogungbenle, H.N., (2014). Chemical and Amino acid Comosition of raw and defatted African mango (Irvingia gabonensis) kernel, British Biotechnology Journal 4(3)244-253

Omokaro, D.N., Nkanga A, A., & Nya, P.J., (1997). Effects of dedication and rehydrationon the germination of Irvingia gabonensis var . gabonensis excrls seeds. Seed science Technology 27:877-884

Omoluabi, A.C., (1994), Trade in Timber and Non- Timber Forest products in Cros River State of Nigeria, Report prepared by Cross River State forestry project (ODA assisted) Forestry Department Headquarters, Calabar. Nigeria

Omokhua, G.E, Ukoima, H.N., Aiyeloja, A.A., (2012) Fruits and seed production of Irvingia gabonensis and its Economic importance in Edo Central Nigeria, Journal of Agriculture and Social Research (JASR) 12(1) 149-155

Shomkegh , S.A.; Tember, E.T; & Tem. O., (2008). Ethno-botanical survey of non-timber forest products in Markufi Local Government Area of Benue State. In: Poopola, L(ed). Proceedings of the 32nd Annual conference of FAN, held in Umuahia, Asia State Nigeria. pp682-687

Tiku, N.E., & Ugbada G., (2012). Determinants of Rice Marketable Surplus in Yala Local government area of Cross River State, Nigeria. Journal of Production Agriculture and technology (PAT; 8(2): 100-116

Ugwumba C. O. A., Wilcox G. I. And Aniaku C. O; (2013); Economics Of Irvingia Excelsa "Agbono" Kernel Production In Nsukka Local Government Area Of Enugu State, Nigeria; Arpn Journal Of Agricultural And Biological Science 8, (5)