



Marketing of bambara nut (okpa): Unlocking its potential for food and income security in Udenu Local Government Area, of Enugu State, Nigeria

Nnamani, N. G., Okoronkwo, F. C. and Nnamani, V. C.

Department of Agricultural Economics, Michael Okpara University of Agriculture Umudike, Abia State Nigeria

e-mail: nnamani.nwanneka@mouau.edu.ng

Abstract

The work was carried out to analyze marketing of Bambara nut : unlocking its potential for food and income security in Udenu Local Government Area of Enugu State, Nigeria. Considering its perceived high consumption in the study area and following some challenges in the supply of the produce. The specific objectives of the study described the various marketing functions performed by the marketers; estimated the cost and returns associated in bambara nut marketing in the study area; ascertained the factors that influence the net return from bambara nut marketers and identified the constraints faced by bambara nut marketers in the study area. Two (2) major markets in the study area were purposively selected; random sampling technique was used in selecting the respondents for the study. Data were collected from 80 respondents using a structured questionnaire. Data were analyzed using descriptive statistical tools such as; percentage, mean and frequencies, budgetary techniques and Ordinary Least Square (OLS) regression. The most common marketing functions performed by the marketers were identified to include exchange and physical functions. Result showed that mean net return from bambara marketing was ₦205251.12; cost benefit ratio was 1.26 and profitability index of the marketers was 0.21. The significant variables that affect net returns include household size (1%), marketing experience (1%), sex (1%), access to credit (10%), cooperative membership (1%), purchase cost (1%). However, high cost of transportation was the major constraint to marketing in the area. Marketers were recommended to undertake facilitating function which is used to describe those activities which make the exchange and physical distribution processes possible such as product standardization and grading, market promotion, financing, risk bearing and market intelligence.

Keywords: *Bambara nut, marketing, marketing function, cost and returns, Udenu LGA*

Introduction

The global population increases daily and requires considerable increase in food production and supply. Bambara nut is an important staple food crop capable of supplying essential nutrients to the body and providing the farmers with income, yet it is underutilized (Falola, *et al.*, 2022). Bambara nut is an important crop for the smallholders' farm families, processors and marketers livelihood as an important source of income and high protein.

Agricultural organizations and policymakers have recognized the role and untapped potential of Neglected and Underutilized Crops (NUS) such as bambara nut for food and nutrition security, generating income in rural areas (Ani *et al.*, 2013). The crop has been labeled an underutilized crop in Nigeria because of the localization of its production and utilization, specifically, to a restricted geographical location and niche markets as well as the dearth of research activities in the crop

(Hillocks *et al.*, 2012). According to International Plant Genetic Resource Institute (IPGRI) (1997), bambara nuts and its products are often perceived as a local snack or food supplements, but not as lucrative cash crop. As a result of this underutilized characterization, the livelihood impact of bambara nuts, among the largely smallholder producers, processors and marketers, stands to be obscured with little policy recognition. Boulay and Khan (2020), also pointed out that indigenous crops such as bambara nut are neglected in development research. With about 60 percent of the food supply coming from rice, wheat, and maize (Adzawla *et al.*, 2016), massive underutilization exists among many other crop species, subsequently reducing these crops, including bambara nuts and their marketing.

Most of the foodstuffs consumed in Nigeria are limited to majorly cereals, roots, tuber crops and a few legumes, which have, over the years, been appreciated at a price per unit of any of the food commodities. Nonetheless, there are other sources of foodstuffs that can supply nearly equal or even more than the quality of nutrients available in the current diet, but for some reason, the potentials of some of these species are yet to be harnessed. One among such crops which have been greatly sidelined and underutilized is the Bambara nut (*Vigna subterranea*). It is a legume grain crop capable of supplying necessary and important nutrients to the population. Increasing leguminous crop marketing would increase the availability of bambara nut in space and time, improve on the income of the marketers which in turn, improve their standard of living. Additionally, bambara groundnut is recognized as a sustainable and low-cost source of various nutrients and efforts to address value chain bottlenecks and raise awareness about its benefits are

seen as crucial for encouraging more widespread local uptake and market access (Tan, *et al.*, 2020). Furthermore, bambara nut is a complete food source due to its substantial carbohydrate (65%) and protein (about 18%) content. Bambara groundnut contains micronutrients such as zinc, iron, calcium and potassium. Red-seed varieties have almost twice as much iron as the cream seeds. Thus, they are especially valuable in areas where iron deficiency occurs (Muimba-Kankolongo, 2018; Tan *et al.*, 2020).

According to the American Marketing Association AMA (2017), marketing is the activity, set of institutions and processes for creating, communicating, delivering and exchanging offerings that have value for customers, clients, partners and society at large. Kotler, (2012), defines marketing as the science and art of exploring, creating and delivering value to satisfy the needs of a target market at a profit. Bambara nut marketing in Udeno local government area has been a major source of revenue generation for both wholesalers and retailers due to its high demand and consumption in the area. In Udeno local government area, marketing of Bambara nut (okpa) is predominant. The nuts are sold at the local markets and the processed ones vended by women in the markets and road sides in the communities. Among the bamabara nut marketers, the income from their sales represent major components of personal savings, investment in children education, feeding, and so on. For the past few years,

Many related researches have been conducted on bambara nut production, processing, utilization (Faola *et al.* 2022; Onuche *et al.*, 2020; Mubaiwa *et al.*, 2018) and related study done on bambara marketing (Ibe *et al.*, 2022). This work was carried out to analyze the marketing of bambara nut (okpa): unlocking its potential

for food and income security in Udeno Local Government Area, of Enugu State, Nigeria. This is important considering the perceived high consumption of bambara nut in the study area, following some challenges in the supply of the produce. Considering that bambara nut is not produced in good quantity in the study area, there exist marketing challenges in the marketing of bambara nut which the study addressed.

The specific objectives of the study were the followings:

- i. examine the socio-economic characteristics of bambara nut marketers in the study area;
- ii. describe the various marketing functions performed by the marketers;
- iii. estimate the cost and returns associated in bambara nut marketing in the study area;
- iv. ascertain the factors that influence the net return from bambara nut marketers and
- v. identify the constraints faced by bambara nut marketers in the study area;

Methodology

The study was carried out in Udeno Local Government Area of Enugu State. Udeno LGA is one of the seventeen (17) LGAs that make up Enugu State, South-east geopolitical zone of Nigeria. The headquarters are in the town of Obollo-Afor with the LGA sharing boundaries with Nsukka at Nru Nsukka with Orba-Udulekenyi (popularly known as Orba). The towns that make up Udeno LGA include Amalla, Obollo-Afor, Ezimo, Imilike, Obollo-Eke, Obollo-Etiti, Ogbodu-Aba Udunedem, and Orba. Geographically, it has an area of 248 km² and a population of 178,466 at the 2006 census (NPC, 2006), the population of Udeno LGA has grown from 178,687 in 1991 to 256,500 in 2022 (NBS,

2023). Working population of Udeno are semi-skilled, traders, farmers etc. Trade flourishes in Udeno LGA with the area hosting a number of markets such as the Obollo-Afor and the Orié Orba International markets. Other important economic activities engaged in by the people of Udeno LGA include the making and sales of the popular okpa delicacy which is a key feature in the cuisine of the area residents.

Sampling Technique

The two (2) major markets in the study area were purposively selected, which were; Obollo-Afor and Orié Orba main markets. A random sampling technique was used in selecting the respondents of the study. Forty (40) marketers were selected from each of the market, making a total of eighty (80) respondents which were used for the study

Method of Data Collection

Primary data were collected with a structured questionnaire which was administered to the respondents, and oral interview schedule. Data were collected on monthly sales of the respondents for the month of July, 2021. Data were collected on social-economic characteristics, sources of bambara nut, various marketing functions performed by the marketers, cost items, sales and constraints faced by the respondents.

Method of Data Analysis

Data collected were analyzed using different analytical tools to address the various objectives of the study. Objective i, ii, iii and vi were analyzed using descriptive statistical tools such as; percentage, mean and frequencies. Objective iv which was to estimate the cost and returns associated in bambara nut marketing in the study area was analyzed using budgetary techniques. Objective v which entails to ascertain the factors that influence the net return by bambara nut marketers was achieved using

Ordinary Least Square (OLS) regression analytical tool.

Model Specification

The model is specified implicitly as follows;

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9)$$

Where;

Y = Net return of bambara nuts in Naira

X₁ = Age of the marketer (Years)

X₂ = Educational level (Years)

X₃ = Household size (Number of persons)

X₄ = Marketing experience (Years)

X₅ = Sex (Male =1, Female =0)

X₆ = Access to marketing credit (Yes =1, No =0)

X₇ = Membership of market cooperative (Members =1, Non members =0)

X₈ = Marketing cost (Naira)

X₉ = Purchase cost (Naira)

Results and Discussion

The socio-economic characteristics of the bambara nut marketers is presented in Table 1. The characteristics include age, sex, marital status, educational level, household size, marketing experience, access to credit and cooperative membership.

The mean age of the respondents was 38.4 years, implying that the respondents are young and actively participating in the marketing of Bambara nut. This finding is similar to that of Karwani, *et al.*, (2021), that young people especially those below the age of 41 years, are actively involved in the production as well as marketing of bambara nut due to their better understanding of the product and its market opportunities. Majority (80.0 %) of the bambara nut marketers were male while 20.0% were females. This implies that bambara nut marketing activities were mainly carried out by males in the study area. Majority (75.0%) of the respondents were married. This implies that married individuals dominated in the marketing of bambara nut marketing the study area. However, being married has a positive implication on rendering assistance

in the marketing processes. The mean household size of the respondents was 7 persons. This suggests that the marketers maintain a relatively large and sizeable household which could serve as readily available source of labour/assistance in the marketing activities.

About (91.3%) of the respondents had formal education, implying that majority of the respondents are literate while 8.7% of the respondents had no access to formal education. However, high level literacy rate among the respondents might influence their marketing performance. This finding collaborates with the finding of Amaza (2020) who reported that education greatly influence marketing efficiency. The mean marketing experience of the respondent was 11.0 years. This result implies that the respondents had relatively several years of experience in their bambara nut marketing and may be considered quite experienced. Therefore, the marketers, given their years of experience would have advantage in the marketing process such as in market information on when to buy and sell, where to buy etc. Furthermore, the number of years the respondents have spent in bambara nut marketing may indicate practical knowledge he has acquired on how he could overcome certain inherent bambara nut marketing challenges. About 60.0% of the respondents had access to credit. However, access to credit by majority of the respondents could imply an increase in the financial base/marketing capital of the respondents. Access to credit could facilitate storage of bambara nut among the marketers during the peak season, which when sold may yield higher returns. There by creating utility of time and place by the marketers. Majority (70.0%) of the respondents were cooperators. This indicates that the marketers are aware of the need for belonging to a marketing association.

Table 1: Socio-economic characteristics of the marketers

Age	Frequency	Percentage	Mean
15-24	7	8.7	
25-34	22	27.5	
35-44	25	31.3	
45 and above	26	32.5	38.4
Sex			
Male	64	80.0	
Female	16	20.0	
Marital Status			
Single	20	25.0	
Married	60	75.0	
Household size			
1-3	8	10.0	
4-6	34	42.5	
7-9	28	35.0	
10-12	10	12.5	6.7
Educational Qualification			
No formal education	7	8.7	
FSLC	14	17.5	
WAEC/SSCE	37	46.3	
OND/ND	22	27.5	
HND/B.Sc	0	0.0	
M.Sc/Ph.D	0	0.0	
Marketing Experience			
1-5	24	30.0	
6-10	18	22.5	
11-15	15	18.7	
16-20	14	17.5	
20 and above	9	11.3	11.0
Access to credit			
Yes	48	60.0	
No	32	40.0	
Cooperative membership			
Yes	56	70.0	
No	24	30.0	

Source: Field survey, 2021

Marketing Functions Performed by the Bambara nut Marketers

The various marketing functions were performed by the marketers are presented in Table 2.

The most common marketing functions performed by the marketers were identified

to include exchange and physical functions. Buying, selling, bagging, storage and transportation. This finding implies that the marketers create time, place and possession utility to consumers of bambara nut products in the study area. According to Ashok, (2017), marketing functions involve

actualizing potential exchanges, converting potential exchanges into realized ones, and directing the flow of goods and services from producer to consumer or user. Proskurnina, (2020), reported that marketing functions plays a crucial role in ensuring innovative development of retail enterprises, with marketing becoming an intermediary between producers and retail operators. Le Meunier-FitzHugh, (2021), asserted that

marketing encompasses various marketing functions that ensure customers receive the products and services they desire, when they desire them, and in the manner they desire. Yulia, (2021) in a related study in Indonesia, also identified that white pepper marketing functions included exchange (purchase and sales), physical (storage, transportation, and physical form change), and information/risk management/standardization/grading.

Table 2: Distribution of respondents according to the various marketing functions performed by the marketers

Marketing functions	Frequency	Percentage
Buying	80	100.0
Selling	80	100.0
Processing	29	36.3
Packaging	49	61.3
Transportation	80	100.0
Storage	56	70.0

Source: Field survey, 2021

Cost and Returns Associated in Bambara Nut Marketing in the Study Area

Cost and returns associated in bambara nut marketing in the study area was analyzed using budgetary approach and is presented in Table 3. The variable cost of bambara nut marketing include; transportation cost, cost of nylon bags, cost of preservatives, loading and offloading and levy while the fixed cost items was rent/month. Obviously, the respondents realized Total Revenue (TR) of ₦991,975.25, Total Marketing Cost (TMC) which is made up of (TFC + TVC) = ₦786,724.13. The mean net return from marketing was ₦205,251.12. The cost benefit ratio was 1.26 implying that bambara nut marketing business in the study area was viable as ₦12.60k naira was gained from every ₦1.00 spent. This suggests a favorable

return on investment for the marketing of bambara nuts in the area. The profitability index of the marketers was 0.21, implying that for every unit of Naira added to the bamabara marketing, there is a marginal profit of 21%. This result indicates that bambara ground nut marketing in the study area is a profitable enterprise. Marketing efficiency of 26.10% was reported from the study. This result is a pointer to the fact that bambara nut marketing in the study area is profitable and should be taken up as a source of livelihood. Ibe *et al.*, (2022) in a related study reported that bambara groundnut marketing in Enugu Metropolis, Nigeria, is profitable with household size, access to credit, and market information positively influencing sales.

Table 3: Costs and return associated with monthly bambara nut marketing in the study area

	Mean Unit Price/100kg (₦)	Mean Value (₦)
Revenue		
Sales of bambara nut	68,940	982,395.00
Sale of jute bags		9,580.25
Total Revenue		991,975.25
Fixed Cost		
Rent		4,580.00
Total Fixed Cost		4,580.00
Variable Costs		
Purchase price	52,415	746,913.75
Transportation cost		13,750.00
Nylon bags cost		1,978.13
Cost of preservatives		2,400.25
Loading cost		6,900.00
Offloading cost		8,201.50
Levy		2,000.50
Total Variable Cost		782,144.13
Total	Marketing	
Cost(TVC+TFC)		786,724.13
Net Return(TR-TMC)		205,251.12
BC-Ratio (TR/TMC)		1.26
Profitability Index (NR/TR)		0.21
Marketing		
Efficiency(ME)(Net return/TMC×100)		26.10

Computation from field data, 2021.TVC= Total variable cost; TFC=Total fixed cost; TR=Total revenue; NR=Net return; BC-Ratio= Benefit-cost ratio.

Factors that Influence the Net Return Generated from Bambara Nut Marketing

The Ordinary Least Square result of the factors that influence the net return generated from bambara nut marketing in the area is presented in Table 4. The linear functional form was chosen as the lead equation. This was based on statistical, economic and econometric reasons which include the magnitude of the coefficient of multiple determination, the number of significant variables, the agreement of the signs borne by the coefficients of the variables as well as the significance of F-ratio. The coefficient of multiple determination (R^2) was 0.660 which implies that 66.60% of the variations in the performance of bambara nut producers was

explained by the independent variables included in the model; household size (1%), marketing experience(1%), sex (1%), access to credit (10%), cooperative membership (1%) and purchase price (1%) while 54.90% unexplained was due to error. F-statistic ($F = 18.07, p < 0.001$) indicates that the regression model provides a best fit for the analysis with its associated probability value of 0.0000; that some of the independent variables in the regression model contribute significantly to explaining the variance in the dependent variable and was statistically significant at 1.0% level.

The coefficient of household size was statistically significant at $p < 0.01$ and negatively related to the net return of the

respondents. This result implies that a unit increase in the number of household size of the respondents results there is a probability of ₦8.22 decreases in their net return. This finding may be attributed to the fact that large family size exerts pressure on the marketers by reducing their marketing surpluses. Lusaya and Mulunda (2022) in a study found that household size negatively influenced household income which further affected their savings.

The coefficient of marketing experience was statistically significant at $p < 0.01$ level and positively related to the net return. This implies that an increase in the experience of the respondent results in a corresponding increase in their net return level. However, the number of years the respondents have spent in bambara nut marketing business may give an indication of practical knowledge he has acquired on how he could overcome certain inherent Bambara nut marketing challenges, how to minimize cost and how to increase their net return.

Sex of the bambara nut marketers was significant at $p < 0.01$ level and positively related to the net return. This suggests that male marketers made higher net returns than their female counterparts.

The coefficient of access to credit was significant at $p < 0.10$ level and positively related to the net return of the respondents. This implies that if the any marketer had access to ₦1.00 credit, the probability that the marketer's net returns increases by ₦13.22k. This is probably because; access to credit increased the financial base/marketing capital of the respondents.

Coefficient of cooperative membership was significant at $p < 0.01$ level and positively related to net return. This indicates that there is a strong association between cooperative membership and the net return, meaning that members of cooperatives tend to have a higher net return compared to non-members.

This positive relationship suggests that cooperative membership can lead to better financial performance and potentially higher returns for its members. This result is in line with Oluwatayo *et al.*, (2018), who reported that membership of co-operative societies has advantage of accessibility to micro-credit, input, management information, subsidy and also an avenue through which innovation can occur.

The coefficient of purchase cost with the value -0.1179 was statistically significant and negatively related to the net return of the respondents at 1%. This result implies that an increase in purchase cost of marketers of bambaranut results in a corresponding decrease in their net return level. This is probably because increased purchase cost reduces the net returns from Bambara nut marketing in the study area.

Constraints Faced by Bambara Nut Marketers in the Study Area

Constraints faced by bambara nut marketers in the study area are presented in Table 5. The most common constraints associated with the marketing in the study area in their order of their magnitude include: High cost of transportation, availability of produce, high cost of purchase, inadequate storage facilities, marketing cost, poor access road, rain and inadequate capital. However, high cost of transportation was the most common constraint to bambara nut marketing in the study area. This is possible because of high cost of fuel, volume of the produce and dilapidated nature of infrastructure such as road in the study area. Major constraints faced by Bambara nut marketers as identified by Ibe *et al.*, 2022 included inadequate finance, seasonal price fluctuations, poor road network, weevil attacks and high cost of goods.

Table 4: Factors that influence the net return from bambara nut marketing

Variables	+Linear	Exponential	Semi log	Double log
Intercept	8111.464 (4.00) ***	5.4627 (13.77) ***	104359 (4.30) ***	29.5767 (0.66)
Age (X ₁)	-5.854 (-1.56)	0.006 (0.94)	-66.3656 (-1.92) *	0.0017 (0.03)
Education (X ₂)	562.276 (-1.174)	0.006 (1.00)	-43.9526 (-2.17) **	0.0284 (0.76)
Household size (X ₃)	-8.2211 (-5.32) ***	0.0001 (0.47)	83.3681 (3.74) ***	-0.0028 (-0.07)
Marketing experience (X ₄)	1.6969 (3.38) ***	0.0001 (1.21)	33.9522 (3.03) ***	0.0492 (2.37) **
Sex(X ₅)	65.7474 (7.90) ***	-0.0009 (-0.56)	-214.0882 (-7.95) ***	-0.1539 (-3.08) ***
Access to Credit(X ₆)	13.2173 (1.74) *	-0.0003 (-0.21)	12.8892 (0.51)	0.1229 (2.65) ***
Cooperative membership(X ₇)	32.0149 (3.89) ***	0.0010 (0.65)	-0.033 (-0.163)	-148.807 (-0.010)
Purchase price (X ₈)	-0.1179 (-3.98) ***	-0.0000 (-2.28) **	-105.3208 (-4.17) ***	-0.2294 (-4.91) ***
Marketing cost (X ₉)	0.0002 (0.91)	0.4300 (85.23) ***	-21539.21 (-4.29) ***	-5.0851 (-0.55)
R²	0.699	0.994	0.650	0.385
R⁻²	0.660	0.993	0.611	0.316
F-ratio	18.07***	1310.56***	16.50***	5.56***

Source: Field survey, 2021. Note: +Lead equation, ***1% level of significance, ** 5% level of significance, *10% level of significance, Values in parenthesis are the t- value

Table 5: Distribution of respondents according to the constraints faced by bambara nut marketers in the study area

Variables	Frequency*	Percentage	Rank
Inadequate capital	57	71.25	8 th
Market location	67	83.75	5 th
Cost of produce	70	87.50	3 rd
Inadequate storage facilities	68	85.00	4 th
Poor access road	65	81.25	6 th
Marketing cost	67	83.75	5 th
Adverse weather (rain)	58	72.50	7 th
High cost of transportation	72	90.00	1 st
Availability of produce	71	88.75	2 nd

Source: Field survey, 2021 * Multiple response

Conclusion

The most common source of supply of bambara nut to the majority (90.0%) of the respondents was cooperative society. The various marketing functions performed by the marketers shows that most common

marketing functions performed by the respondents are: buying, selling, bagging, storage and transportation. The result of cost and return associated with marketing shows that the respondents realized total revenue of ₦991, 975.25. The enterprises had a mean

net return of ₦205,251.12. On the average, the profitability index of respondent was 0.21. The cost benefit ratio of 1.26 implied that bambara nut marketing business in the study area was viable as ₦12.6 naira was gained from every ₦1.00 spent.

Recommendations were made based on the findings of the research that bambara nut marketers through corporatizations could acquire transportation facilities to reduce cost. Furthermore, marketers of bambara nut are recommended to explore facilitating function such as market promotion, financing, risk bearing and market intelligence which will further enhance exchange and physical distribution processes.

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