



ECONOMICS OF PROCESSED *Parkia biglobosa* SEEDS (DADDAWA) MARKETING IN IBADAN, NIGERIA

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ABSTRACT: The study examined the marketing of processed Daddawa in Ibadan metropolis, Nigeria. The sampling technique adopted in the study area was multistage sampling technique which involved first, the random selection of six local government areas within the City; three each from Ibadan Urban and Ibadan Semi-urban. Of the listed foodstuff markets in the selected LGAs, ten markets were randomly selected for the study as they are not well distributed within the LGAs, without replacement. Every Daddawa seller encountered was sampled due to their fewness in the selected markets with the use of pre-tested structured questionnaire. Data were analyzed using descriptive statistics and multivariate regression model. Findings indicated that all the marketers were females. Average revenue per kg was ₦472 (\$2.9), average cost per kg was ₦211.3 (\$1.32), while average gross margin per kg of ₦257.4 (\$1.6) was realised with an average marketing margin of ₦251.95 (\$1.57). Total variable-cost accounted for 97 percent of the total cost while the return-on-investment was 1.14. This implies that *Parkia* seeds processing and Daddawa marketing in the study area as a business is very profitable. Estimates of the regression model indicated age, experience, amount of seeds and marketing costs as important variables influencing the monthly revenue accruable to the marketers. The study recommends that there is the need for extensive awareness creation and motivation for farmers, gatherers, interested small-scale agro-processors and other individuals to adopt this enterprise.

Keywords: Processed Daddawa, Marketing margin, Multivariate regression model

1. INTRODUCTION

It is generally recognized that Nigeria is a protein deficient country (Umoh and Udoh 2005), but what worries nutritionists most is the affordability of protein sources. Animal protein sources have been found to be expensive especially in the southern part of the country. The country is blessed with some non-timber tree crops that can serve as good sources of protein. Of these non-timber tree crops is *Parkia biglobosa* generally known as Igba (Yoruba) tree. In areas where this crop grows in the wild, the fruits are often picked by gatherers and processed for the seeds to generate income. It is a leguminous tree crop, found mostly in West African Savannah region; it belongs to the family *Leguminosae*, subfamily *Mimosoideae* (Hopkins 1983). It is called African locust beans or monkey cutlass tree, a native of Africa. This tree's products are used for making dyes, soaps, and fish poisons and medicinally for a range of ailments. The pulp is a very good source of folic acid

with up to 30% proteins, vitamins and minerals. In West Africa the seeds are usually extracted, pre-heated and washed to remove the cotyledons which is then fermented to make a condiment called Soumbala, Budubu, Houle (Wolof), Nere (Bambara), Daddawa (Hausa) or Iru (Yoruba) in local languages. The processed seeds can be consumed directly as well as being used in making cookies. Ibadan people and those of Oyo generally, add the condiment to various foods like *Cochorus olitorus*, Okro, pepper stew – an indigenous stew for eating rice and a host of other meals during preparation. When added, the aroma and taste of such foods change for the best. Hence, it enhances the palatability of most indigenous foods. A large majority of Nigerians richly appreciate the taste. So far, there has not been any information on the cultivation of *Parkia biglobosa* by Nigerians.

Agricultural production is not complete until products get to the consumers' table (Jibril *et al.* 2007). Getting

them to the consumers' table at the right time and place is that aspect that marketing ensures. The Nigerian market for agricultural goods is beclouded by inadequate standards of measurement and appropriate storage facilities, inadequate transport systems, wide price variations (George and Adedigba 2007). In Nigeria, Daddawa storage and preservation is very poor (Akintan *et al.* 2013) as this may go a long way in affecting the profitability of the business, based on inadequate technical knowhow by the local processors who are the major marketers coupled with poor power supply in the country. One common way of identifying these marketers is the use of calabash containers covered with straw-trays as the commodity is hawked within the market yards. At times they are found seated at strategic points around market places. It is often wrapped in local leaves when dispensed to buyers. One will wonder what is being sold and bought, if seen for the first time. These set of retailers are either those that picked the fruits from the wild or those that purchased the processed and dried seeds from intermediaries. As there are very few studies on the marketing of *Parkia biglobosa* in Oyo state, capital being Ibadan City; thus, it becomes important to look at the marketing of this local condiment, its profitability, factors that contribute to its gross revenue as well as identify the marketing problems faced by the marketers. The objectives of this study therefore are: to describe the socio-economic characteristics of Daddawa sellers; to examine the costs, returns and profitability of Daddawa marketing as well as identify the marketing channels.

2.0 METHODOLOGY

2.1 The Study Area

Ibadan city was purposely chosen for the study based on the fact that major whole-sale *Parkia biglobosa* seeds markets exist in the city, while the city harbours a large number of Nigerians from different ethnic groups. It is the capital of Oyo State with a population of about 3.5millions (National Bureau of Statistics 2012), in the Southern-western part of Nigeria. It is the largest and most populous in Nigeria and third in Africa It is located between 7o 23` 47''North and 3o 55.0'' East, in the region. The State has 27,249 Sq. km of land mass and it is bound by Ogun State in the South, Kwara State in the North, Osun State in the East and Republic of Benin in the West; of the 33 LGAs in the State out of which Ibadan city hosts 11. The principal inhabitants of Ibadan city are mostly Yorubas as well as other ethnic groups within the country. The people of Oyo State are well known for *Parkia biglobosa* fruit collection in the wild and the consumption of Daddawa; a condiment they love in food preparations.

2.2. Data Collection

Ibadan city consists of 11 local government areas (LGAs), subdivided into Ibadan Urban (5) (Ibadan North, Ibadan North-east, Ibadan North-west, Ibadan South-east and Ibadan South-west), and Semi-urban (6) LGAs (Akinyele, Egbeda, Ido, Lagelu, Ona-Ara and Oluyole). Each LGA has at least a major or a near-by market that serve the inhabitants. Of the major markets within the city are Oja-Oba, Bode, Oje, Gege, Oritamerin, Bodija, Alesinloye, Shasha, Idi-arere, Agbowo, Ojo, Sango, Eleyele, New Gbagi market, Amuloko etc. The sampling technique adopted for the study was multistage sampling technique which involved first, the random selection of six LGAs within the City; three each from Ibadan Urban and Semi-urban. Of the listed foodstuff markets in the selected LGAs, ten markets were randomly selected for the study, as they are not well distributed within the LGAs (i.e. being urban, not everyone has a major food stuff market) without replacement viz: Oja Oba, Bode, Oje, Orita merin, Bodija, Alesinloye, Shasha, Oje, Sango and New Gbagi foodstuff Market. Every Daddawa seller encountered was sampled. Structured questionnaire was used for the collection of primary data. A total of 65 questionnaires were administered and fully retrieved. Information were collected on the socioeconomic characteristics of the marketers, costs and revenues of the sellers, years of marketing experience, type of packaging (leave/nylon wrapped), etc. Information on weights was collected by converting traditional measuring units to conventional equivalent weights with the use of weighing scales. Personal Interviews were also conducted for *Parkia biglobosa* seed wholesalers and retailers, using a well-designed and pre-tested interview schedules to elicit some responses. The study was carried out between April and June, 2013.

2.3. Data Analysis

The data were analysed using the budgetary technique to calculate the profitability of the business and multivariate regression model was to ascertain the determinants of Daddawa marketers' profits.

2.3.1. The budgetary technique

Following, Ugwumba and Omojola (2012) and Garoma *et al.* (2013), the gross margin model adopted is as follow:

$$GM = TR - TVC \dots\dots\dots 1.$$

$$\sum_{n=1}^{65} GM = \sum_{n=1}^{65} TR - \sum_{n=1}^{65} TVC \dots\dots\dots 2$$

Where: GM = Gross Margin obtained from sales of Daddawa (Fermented *Parkia biglobosa* seeds) (₦)

TR = Total revenue from Daddawa (₦),

TVC = Total variable cost of processing Daddawa (₦),

Where

$$TR = Q * P_q \dots\dots\dots 3$$

Q = Quantity of Daddawa/Iru, P_q = Selling Price of Daddawa/Iru

$$TVC = \sum_{i=1} X_i P_{x_i} \dots\dots\dots 4$$

Where X_i = Quantity of boiled *Parkia biglobosa* seeds (kg)

P_x = Price per kg of unprocessed *Parkia biglobosa* seeds (₦)

The Total Revenue was computed using the formula; TR = QP, where Q = Quantity of *Parkia biglobosa* purchased, P_q = Price/kg of processed *Parkia* seeds (₦). NI = Net Income (Naira) = GM – part FC i.e. GM less part fixed cost

Where FC = Fixed cost here refers to part fixed cost per processing,

Gross margins for Daddawa processing/marketing were the differences between sales and purchase prices of the commodity as also indicated by Husain *et al.* (2013).

2.3.2. The regression model

The Regression model is as specified below:

$$Y = f(X_1, X_2, X_3, X_4, \dots, X_n) \dots 5$$

Rewritten as:

$$Y_i = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_n X_n + e_i \dots 6$$

Where n = 1, 2,n,

b₀ = Constant of the equation, b₁b_n = Coefficients of the explanatory variables, X_i = the explanatory variables, Y = Monthly Revenue (₦) from Daddawa marketing, where : X₁ = Age (years), X₂ = Education (years), X₃ = Household size (number), X₄ = Marketing experience (years), X₅ = Seed per month (Quantity of *Parkia* seeds processed - kilogram), X₆ = Access to loan (dummy, if available, 1; otherwise 0), X₇ = Membership of Association (dummy, if a member, 1; if not, 0), X₈ = Marketing Costs (₦), U_i = error term

Processing costs like production consist of variable and part fixed costs. The part fixed-costs involve costs of processing facilities e.g. machines and durable assets with longer life span and are not used up in the processing process. The processors' fixed-cost involve costs of local pots for boiling, indigenous baskets and calabash bowls for fermentation, as the processing technique is very crude. The variable costs include costs of Daddawa seed, leaves and or nylon materials for wrapping the products, wood, salt and potash, imputed cost of family labour and wages for hired

labour. Labour costs were imputed costs as most of these processors-traders engage family members in their processing activities.

3. RESULTS AND DISCUSSION

3.1. Socio-demographic characteristics of the respondents

The mean age of the respondents was 45 years, age ranging between 23 and 67 years. It is interesting to note that all Daddawa processors cum marketers in Ibadan city were female (100%). This agrees with Babalola (2012)'s work on the evaluation of the marketing chain for *Parkia biglobosa* in South-western, Nigeria. Therefore, Daddawa processing and marketing is an all-female affair and gender specific activity. From a cursory review it is so in most places in the western part of Nigeria. The level of education of the respondents was very low, 37% were educated with an average of two year primary education, indicating that a large percentage of them are either illiterates or drop-outs. Most of the respondents are married (85%), this also agrees with Babalola (2012). Mean household size was five persons with marketing experience of 14years. The mode of entry into the business is free, no charges while membership of trade association/cooperative society was low (38.4%) among the marketers.

Table 1: Socio-Demographic Characteristics of the Respondents

Variable	Frequency	Percentage
Age		
< 30	12	18.5
31-40	13	20
41-50	15	23
51-60	13	20
61-70	12	18.5
>70	0	0
Education		
Zero	41	63
Primary	24	37
Secondary	0	0
Sex		
Male	0	0
Female	65	100
Household size (No.)		
1-5	41	63
6-10	24	37
Association membership		
0	25	38.4
1	40	61.6
Experience (Year)		
2-10	24	37
11-20	28	43
21-30	8	12.3
> 30	5	7.7

Source: Data Analysis (2013)

Table 2: Summary of Statistics of the Respondents

Var.	Age	Edu.	Hhz	Exp	Qty pr	Price/kg	Rev/mth	Mkt margin
Mean	45	2	5	14	3.37	79	38268	20876
Max	67	6	10	35	15	90	96	57100
Min	23	2	1	2	0.75	60	10800	4068
Var	196	7.02	4.74	70.83	5.67	43.14	6.05	62.03
S.E	14.0	0.33	0.27	1.04	0.29	0.81	0.045	0.05

Source: Data analysis (2013)

3.2. Packaging-materials Utilization

The mean analysis of the type of packaging materials used indicated that the marketers use leaves (84.6% of the respondents) to wrap the processed *Parkia* for sale; it is placed inside local calabash bowls for those that use local leaves as wrappers and it's the usual scene for all processors of *Parkia*, as the use of polythene wrappers is still at very low ebb. They never forget to use the calabash bowl as basin upon which lies local trays made from straw; on this, the wrapped pieces of processed *Parkia* are placed for sale: at times the circular shaped product placed inside the bowl is counted for the buyer before wrapping. This is an indication that the packaging techniques for this product are still crude. The sources of *Parkia* seeds for the processors are the wholesaler traders for dry seeds and the gatherers of *Parkia* pods, dry seeds are purchased at an average price of ₦79.00 (\$0.49) per kilogramme. The selling price per small pack of about 10gms goes as low as ₦5.00 (\$0.03).

3.3. Marketing Channel for Processed *Parkia biglobosa* Seeds – Daddawa

Marketing channels are the routes through which agricultural products move from producer to consumer. They are the chain of intermediaries through whom the products pass from producers/gatherers to consumers. The length of channel varies from product to product depending on the quantity to be moved, the form of consumer demand and the degree of regional specialization in production (Sarode 2009). The marketing channel for processed *Parkia* seeds (Daddawa) involves the producers/processors, retailers and consumers. The common procedure is for processors to either sell directly to consumers or pass through retailers who then sell to final consumers. Here, there are no agency fees as the business of *Parkia biglobosa* seeds processing is highly regarded as a small retail family enterprise. In study area, Daddawa processors carry out the production activities by themselves and sell directly most times to consumers. We have few of these marketers as retailers who buy in bulk from the processors for sales to consumers. Hence, two marketing channels were identified for processed Daddawa in the study area as follow:

Channel I = Processor – Consumers

Channel II = Processor – Retailers - Consumers

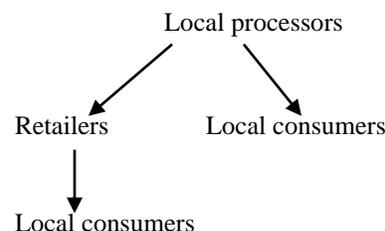


Fig 1: Marketing channel for processed *Parkia biglobosa* in Ibadan Metropolis

Source: Field Survey (2013)

This finding follows Babu *et al.* (2003), who also identified two channels for Chili in India: channel 1, from local Chili producers to consumers and channel 2, from local producers to village merchants to wholesalers to retailers to local producers. The only intermediaries identified by this study were the retailers and there are no agents, so no agency fees. Most of the products pass directly from the producers to the consumers. The marketing costs incurred by the respondents were on transportation to retail and wholesale markets, local government market-fees and costs of local leaf/polythene wrappers. This study did not look at the differences in the marketing margins by the different channels.

3.4. Profitability Analysis for processed *Parkia biglobosa* marketing

Table 3 presents the profitability analysis with respect to the marketing margin of the respondents. The variable costs include cost of seeds, wood as fuel, salt, potash, transportation, labour cost, local packaging materials (dry leaves of cocoa, locally called 'Ewe koko') and other operating expenses, while fixed costs covered cost of local stove called Adogan, local cooking pot ('Ikoko onirin'/clay pots), local woven baskets and trays with more than two years life span. The results showed that the mean monthly revenue of the Daddawa sellers was ₦37,305 (\$233.16) while the average variable cost per month was ₦17,024 (\$106.4) for all the sellers. Also, the average cost per kg was ₦211.3 (\$1.32); while the average fixed cost and

average total cost were ₦369 (\$2.31) per month and ₦17,393 (\$108.7) respectively. The revenue per kg for the selected Daddawa marketers was ₦472 (\$2.95), while the gross margin per kg was ₦257.4 (\$1.61); and the average marketing margin was ₦251.95 (\$1.57). Total variable cost accounts for 97 percent of the total cost of production while the return on investment (ROI) was 1.14 (114 percent) which was over a hundred percent gain on every unit of investment. This implies that Daddawa processing and marketing in the study area as a business is very profitable only that many people in the study area do not really feel that *Parkia* processing is a worthy investment. So, they do not venture into it, they also see it as family business; hence entrepreneurial training in the business is not common.

3.5 Estimates of the multivariate regression analysis

The Regression estimate was carried out to determine the factors influencing revenue generation in Daddawa production in the study area. The tool was used to measure the amount of variability of the dependent variable that can be explained by the independent variables. The variables' regression coefficients indicate the amount of change that will be observed in the value of dependent variable when the independent variables are altered.

The regression equation

$$Y = 105.43 + 90.88X_1 + 127.55X_2 + 99.5X_3 \\ + 209.57X_4 + 676.59X_5 \\ + 84.01X_6 + 736.59X_7 + 0.367X_8 \\ + e_i \dots \dots 7$$

The equation shows the level of variation in the monthly revenue (Y) from processed *Parkia biglobosa* seeds explained by the independent variables. The linear regression function was used, giving a $R^2 = 0.987$, Adj R = 0.985, F value = 551.77***. The R^2 indicates that 98.7% of the variations in the revenue of the marketers were jointly explained by the independent variables; while the F value of 551.77 was significant which shows that the model fit the variables included. As indicated in Table 4 below, age of the respondents, marketing experience, average monthly amount of seeds processed and marketing cost were the significant variables that jointly influenced the monthly revenue accruable to the marketers. The coefficient for age ($\beta_1 = 90.88$, $\rho = 0.05$), exhibits a positive and significant relationship with monthly revenue; which tells us that as age increases the average monthly revenue from *Parkia* processing business increases. This is against the a priori expectation which upholds that as age increases, productivity decreases in agricultural productions (Muhammed-Lawal *et al.* 2012). For Daddawa processing it appears different. This could be based on the fact that its processing is very simple, not

tedious; all that it requires is boiling and testa removal. Increases in revenue as age increases in this type of business could be also be adduced to increases in capital base of the respondents; the more the age, the more the capital accumulation/investment in the business. Traditionally, Daddawa processing business is inheritable, coupled with the interest that old people have in this product as a traditional condiment age long. On education, the coefficient for this variable was positive, but not significant ($\beta_1 = 127.55$; $\rho = 0.42$), it indicates a positive relationship between education and revenue from Daddawa production. This goes to explain that with formal education, there is the tendency for increased revenue derivable from the business of processing; even though formal education does not have any significant contribution to revenue in the study. Non-significance of formal education in the determination of the respondents' revenue despite its role in enhancing human capital may not be unconnected with the fact that only 63% of respondents received formal education. The significant negative contribution of marketing experience to monthly revenue indicates that having a higher marketing experience by the marketers does not culminate into higher revenue and consequent profit for the marketers. This is an indication that processors with more marketing experiences may not be efficient in the utilization of their productive resources. Length of marketing experience also may not really add to gross income if the marketers do not add value to the product, as most of the old aged processors still use cocoa leaves as wrappers during sales. The young processors used more of polythene wrappers in dispensing the product – a better way of handling the product. In addition to the use of polythene, some make use of disposable plastic bowls in packaging 100gms and 500gms net-weight products. These, as expected add value with ease of product display and sales that culminates into higher revenue. An indication that additional formal education/schooling would add value to Daddawa marketing than longtime experience without formal education. The variable for quantity of seeds processed per month was observed to have a direct relationship with revenue. However, marketing costs had a negative coefficient and contributed significantly to the respondents' monthly revenue which indicated that as efficiency increased with reduced marketing costs, their monthly revenue from *Parkia* processing increased resulting in higher profits. However, quantity of *Parkia biglobosa* seeds processed was found to be a very strong factor in increasing revenue from the business.

3.6 Marketing constraints of the respondents

Observed marketing problems of the respondents were high level of illiteracy (63%), inadequate access

to finance (26.1%) and low level of technology (16.4%) especially in the area of packaging techniques. Only 26.1% of the respondents had access to funding, through friends (4.6%), relatives (20%) and cooperative societies (1.5%) but none through banks. The high level of illiteracy noted among the processors could be adduced to the fact that the business is dominated by people from the suburb areas of Ibadan metropolis as well as rural areas outside the study area, where schooling is of low importance especially for girls who eventually become women (mothers). Again, many people feel

that *Parkia biglobosa* seeds processing as a business is a traditional and family-lineage business that does not worth any big investment; so, hardly could one find educated youths in the business, most importantly where one does not belong to such lineage. It could not just occur to one to join such a business. It was found out that a number of retailers who buy from processors are largely new comers into the business without engaging in processing.

Table 3: Costs and Returns to Processed *Parkia biglobosa* Seeds Marketing in Ibadan Metropolis, Oyo State

Variables	Values (Total)/Month	Values (Mean)/Month	% of Total Cost
Quantity of <i>Parkia</i> Seeds Processed (kg)	2701.4kg	42kg	-
Quantity of Daddawa sold (kg)	5269kg	81kg	-
Cost of <i>Parkia biglobosa</i> seeds	₦ 212410	3,268	18.8
Cost of Labour	₦ 26600	₦ 409	2.3
Cost of Processing	₦ 451056	₦ 6,939	39.8
Production Cost	₦ 663466	₦ 10,207	58.6
Marketing Costs	₦ 443,080	₦ 6,817	39.2
Part Fixed Cost	₦ 24,000	₦ 369	2.1
Total Variable Cost	₦ 1,106,546	₦ 17,024	97.8
Total Cost	₦ 1,130,546	₦ 17,393	-
Total Revenue	₦ 2,424,810	₦ 37,305	-
Gross Margin	₦ 1,318,264	₦ 20,290.98	-
Marketing margin	₦ 1,294,264	₦ 19,911.75	-
Average cost/kg	₦ 211.30	₦ 211.30	-
Average revenue/kg	₦ 472	₦ 427	-
Gross margin/kg	₦ 256.40	₦ 257.40	-
Marketing margin/kg	₦ 251.95	₦ 251.95	-
Ratio of Part fixed cost: Total cost	0.02		
Ratio of Total variable cost: Total cost	0.97		
Rate of Return (ROR)	1.14		

\$ rated as \$1= ₦160 in 2013 Source: Data analysis (2013)

Table 4: Estimates of the regression analysis on the effect of socioeconomic characteristics of the marketers on monthly revenue

Variables	β Coefficients	Std error	t values	ρ values
Intercept	105.43	1972.60	0.05	0.95
Age	90.88*	44.66	2.03	0.05
Educ.	127.55	160.14	0.79	0.43
Hhz	99.50	157.89	0.63	0.50
Mass	736.59	66.17	1.11	0.27
Loanacc	84.01	733.58	0.11	0.91
Mktxp	-209.57***	64.88	-3.23	0.002
Seedmth	676.59***	25.95	26.06	5.32E-33
Mktcost	-3.15***	1.32	-2.38	0.02
R2	0.98			
F value	551.77			

*Significant at 5%, ***Significant at 1% Source: Data Analysis (2013).

4. CONCLUSION

The paper looked at the marketing of processed *Parkia biglobosa* seeds in Ibadan Metropolis, Nigeria. From the study:

1. Two marketing channels were identified, often times the product move directly from the producers to the consumers. The implication of this is that the consumer would buy cheaper while the processors/sellers would retain a large percentage of the marketing margin.
2. The revenue per kg for the selected Daddawa marketers was ₦472 (\$2.95), while the gross margin per kg was ₦257.4 (\$1.61); and the average marketing margin was ₦251.95 (\$1.57).
3. Total variable cost accounts for 97 percent of the total cost of production while the return on investment (ROI) was 1.14 (114 percent) which was over a hundred percent gain on every unit of investment. This implies that *Parkia* seeds processing and Daddawa marketing in the study area as a business is very profitable.
4. However, quantity of *Parkia biglobosa* seeds processed was found to be a very strong factor in generating more income from the business.

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