

# Factors influencing profitability among gum arabic marketers in North-Eastern Nigeria

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## Research Paper

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### ABSTRACT

The Gum arabic marketing in Nigeria started since 1914, when the then Northern Province Governor, Mr. Howbey R. Palmer visited Sudan and saw how Gum arabic business was thriving there; he immediately ordered for sample collection of similar produce he saw in northern Nigeria and sent it to Premier Institute, London for analysis. Gum arabic is an economic tree crop commonly found in Sahelian and Savannah of tropical zones. There are over 1100 different species of the plant. Three of these are of economic value due to the role they play in manufacturing industries worldwide such as in the manufacture of many industrial goods like ink, pharmaceuticals, paint, textiles, papers etc. The study thus analysed the factors influencing revenue generation from gum arabic among its marketers in Adamawa, Yobe and Taraba states, Nigeria. 150 respondents were randomly interviewed in three Local Governments of the states using structured questionnaire. Both descriptive and inferential statistical models were used for the analyses. The results revealed that age, education, operating cost and fixed cost had negative

coefficients while family size, purchasing cost, volume of gum arabic sold; labour cost and gum Arabic marketing experience had positive coefficients. These imply that an increase on those variables with negative coefficients will decrease revenue generation in the sales of gum arabic in the area; while an increase in those variables with positive coefficients will lead to increase in the revenue generation in gum arabic marketing in the study area. The economic advice was that gum arabic marketers should reduce allocation of fixed items and operating costs which had inverse relationship with revenue and increase allocation of the variables with positive coefficients in order to be more efficient in the gum arabic business in the area. Also, as age and education had negative coefficients in the result, it is advised that older and educated people should venture into other businesses that economically benefit their status.

**Key words:** Gum arabic, Marketing, Profitability, Revenue generation, North-East Nigeria

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### INTRODUCTION

Gum arabic is an economic tree crop commonly found in Sahelian and savanna zones. There are over 1100 different species of the plant. Three of these are of economic value due to the role they play in manufacturing industries worldwide (Abdul, 2002). Nigeria is blessed with abundant human and natural resources. The country is well over 150 million people, with an average household of about 6 people (Dimeji and Sarah, 2006). It is unfortunate that the discovery of oil in Nigeria seemed to have trifle the agricultural sector as it was allocating only 3% of the annual budget in the 1970s, which dropped to just 1% in the late 1980s (Oyedipe, 2001). The budget allocation only rose to 4% in 2011

despite the strategic significance of agriculture in the socio – economic development of every nation, especially the developing ones like Nigeria. This created laziness, dependence on foreign imports and poverty among Nigerians especially the rural people (Abdul, 2002). The Gum arabic marketing in Nigeria started since 1914, when the then Northern Province Governor, Mr. Howbey R. Palmer visited Sudan and saw how Gum arabic business was thriving there; he immediately ordered for sample collection of similar produce he saw in northern Nigeria and sent it to Premier Institute, London for analysis. The result revealed identical produce with that found in Sudan. Nigeria thus started Gum arabic trade

with London. The first gum arabic market centers in Nigeria were Geidam and Damaturu both in the present Yobe state (Baseline Survey on Gum arabic, 2002). Nigerians suppose be efficient and technocrats in the business of gum arabic as Wood (2008) stated that greater impacts of marketing objectives are gained through experience. The principle governing trade and marketing is the magnitude of gains/losses associated with it. With trade/marketing, each individual, region or nation is able to concentrate on producing commodities that it has comparative advantage, and also to import/buy commodities that it has comparative disadvantage in their production/marketing (Lipsey, 1979). De Wilde (1984), opined that, normally, production of cash crops in Africa is highly motivated by their cash income generated through its marketing. The better the market situation of a crop is, the more for production encouragement it has on the farmers. This implies that one of the major factors that influence marketing of agricultural products is associated with the magnitude of demand and supply forces of the commodity in question. Ligali (2005) reported that the attractive increase in price of gum arabic (₦24, 000/50 kg or ₦480/kg) in Yobe State triggered farmers to put more efforts in gum arabic production.

Most northern states in Nigeria, in trying to revamp agricultural production and marketing to arrest poverty, keyed into the programmes of the Federal Government of Nigeria, such as the "Vision 20 2020", and the National Economic Empowerment and Development Strategies (NEEDS). The cardinal principle of the Programmes was identification of crops with high economic potentials to improve their production and marketing status that will stimulate increase in income per capita of farmers and marketers in Nigeria.

In this vein, *Acacia species* known as gum arabic was one of the tree crops selected. There are over 1000 species of *Acacia* grown in Nigeria, out of which *Acacia senegal* (grade 1), *Acacia sayel* (grade 2) and *Acacia saberina* (grade 3) were found to be of higher economic value and are demanded worldwide for industrial uses. The tree is a perennial plant, mostly grows wild with only few domesticated (established Gum arabic farms) in northern Nigeria. It takes 4-5 years to mature after planting (Nigeria Export Promotion Council, 1999). The high demand for the products necessitated the Federal Government of Nigeria emphasis for its development especially grade 1 and 2 gum arabic (Giroh et al., 2007).

Available data indicates that Yobe State has established 1, 700 hectares, while Taraba and Adamawa have 30 and 20 hectares respectively of gum arabic government owned farms in addition to over 20,000 hectares covered with wild gum arabic in the zone (Bello, 1998, Baseline Survey, 2002). Many farmers have also adopted the practice of gum arabic intercropping technique with arable crops. This is expected to enhance the socio-economic status of farmers and marketers of

gum arabic in the area as Zendillo, (2008), reported to have said in every case where a poor nation has significantly overcome its poverty, has achieved so while engaging in production for export market and opening up itself to the influx of foreign goods. In the same vein, Joachim (2003) also stated that the stunted growth of the less developed countries was a consequent of export instability. This implies that marketing is a great business that develops the socio-economic status of nations and individuals. As revealed from literatures, gum arabic is long been marketed in Nigeria but what made it yet to be well developed despite its high demand worldwide?

The objective of the study was to examine the factors the influences profitability in gum arabic marketing in the study area which may give an insight into the cause of stunted growth of gum Arabic marketing industry despite its age long practice in Nigeria.

## RESEARCH METHODOLOGY

### The study area

The study was carried out in Adamawa, Taraba and Yobe states North-Eastern Nigeria. Geographically, the states are in Semi-Arid zone with a mean annual rain fall of 160.2 mm, and temperature fluctuating between 14°C to about 44°C (Adamawa and Yobe States Diary, 2005 and 2004 respectively). These conditions promote the production of gum arabic (Aghughu, 2004). Adamawa state has land area of 36,917 Km<sup>2</sup> with of population of 3,737,223 people (NPC, 2006) and 21 Local Government Areas (Adamawa state Diary, 2005). The GDP is \$ 4.58 billion and \$ 1.417 per capita. Taraba: 54,473Km<sup>2</sup>, with total population of 2,688,944 people. The GDP is \$ 3.4 billion and income per capita of \$ 1.446 (NPC, 2006). Yobe, the land area is 45,502Km<sup>2</sup>, has a population of 2,532,395 people (Nigerian Export Promotion Council, 2003). The people in the zone are predominantly farmers and marketers of agricultural produce. Their major crops include coffee, tea, groundnuts, sugar cane, cotton, rice, maize, mango, guava, orange, cocoyam, sorghum millet, sesame, onion, tomatoes, pepper, cocoyam, cassava, tea, yam and gum arabic.

### Data Source and Sampling Techniques

Adamawa, Taraba and Yobe states were purposively selected for the study being among the major gum arabic producing states in Nigeria. Primary data were collected through the use of structured questionnaire administered in 1 Local Government Area randomly selected in each of the states. Also, in each of the Local Government Area, 3 communities were purposively selected based on the availability of gum Arabic marketers. From each community, the questionnaire was administered on 20

**Table 1.** Age distribution of the Respondents.

Age (Years)	Frequency	Percentage (%)
≤ 20	6	4.00
21 – 30	12	8.00
31 -40	6	4.00
41 -50	36	24.00
51 – 60	42	28.00
61 - 70	39	26.00
71 and above	9	6.00
Total	150	100.00
Mean	53 (years)	

Source: Field survey, 2012.

Gum arabic marketers randomly selected. This gave a total of 180 respondents (marketers) out of the total list of the of 252 gum arabic marketers obtained from the Ministries of Agriculture and Environment of the states.

### Methods of data analyses

Descriptive statistics such as mean, percentages and frequency distribution were used in analyzing the socio economic variables of the marketers; while Gross Margin and regression techniques using Ordinary Least Square (OLS) method were used to determine the profitability and factors that influenced revenue generation in gum arabic marketing among the respondents in the study area.

**Gross margin:** Gross margin model was used to determine the profitability of Gum arabic marketing among the respondents. The gross margin formula is expressed as follows:

$$GM = TR - TVC \quad (1)$$

$$GM_{fk} = (TR - TVC)/N \quad (2)$$

$$GM_{kg} = (TR - TVC)/kg \quad (3)$$

$$NP = GM - TFC \quad (4)$$

Where:

GM = Gross margin for gum arabic marketing (₦)

TR = total revenue realized from gum arabic marketing (₦)

TVC = total variable cost incurred in gum arabic marketing (₦)

GM<sub>fk</sub> = gross margin per marketers of gum arabic (₦)

GM<sub>kg</sub> = gross margin per kilogramme of gum arabic sold in the study area (₦)

Kg = total quantity of gum arabic sold in the study area (Kg)

N = total number of respondents

NP = net profit for gum arabic marketing of the respondents (₦)

TFC = total fixed cost incurred during gum arabic marketing (₦)

Depreciation on fixed cost items were computed using straight line method for easy computation and accurate values for the items used.

The regression model is explicitly expressed as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, \mu) \quad (5)$$

Where:

Y = revenue generated from sales of gum arabic (₦)

X<sub>1</sub> = age of marketer (years)

X<sub>2</sub> = marketing experience (years)

X<sub>3</sub> = Labour cost (₦)

X<sub>4</sub> = Cost of fixed inputs (calculated by straight line depreciation method) (₦)

X<sub>5</sub> = Purchasing cost of the produce (gum arabic) (₦)

X<sub>6</sub> = Quantity of gum arabic sold (Kg)

X<sub>7</sub> = Family size (in number)

X<sub>8</sub> = Operating/ Variable cost (₦)

X<sub>9</sub> = Educational level (formal school)

μ<sub>i</sub> = error term.

Three functional models (linear, Semi- log and Cobb - Douglas) were tried. Using the economic theory, statistical criteria and coefficient of determinations (R<sup>2</sup>), the regression result with the best line of fit was selected for interpretation of the study as adopted by Maiangwa (2007) and Mesike et al., (2007). The functional models are:

$$\text{Linear: } Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e \quad (6)$$

$$\text{Semi - log: } Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e \quad (7)$$

$$\text{Cob - Douglas: } \log Y = b_0 + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b_5 \log X_5 + b_6 \log X_6 + b_7 \log X_7 + b_8 \log X_8 + b_9 \log X_9 + e \quad (8)$$

Where:

b<sub>0</sub> = constant,

b<sub>1</sub> – b<sub>n</sub> = coefficients,

Y = dependent variables,

X<sub>1</sub> – X<sub>n</sub> = independent variables, and

e = error term.

### RESULTS AND DISCUSSION

The age distribution of the respondents is presented in (Table 1). The result shows that only 4% of the gum arabic marketers were either 20 years or less. Those with ages of 41 - 60 years constituted 52% of the total

**Table 2.** Distribution of Experience in Marketing of gum arabic by the Respondents.

Marketing Experience (Years)	Frequency	Percentage (%)
1 – 5	9	6.00
6 – 10	21	14.00
11 – 15	27	18.00
16 – 20	33	22.00
21 and above	60	40.00
TOTAL	150	100.00
Mean	18 (years)	

Source: Field survey, 2012.

**Table 3.** Educational Distribution of the Respondents.

Years in Formal School	Frequency	Percentage (%)
( 0 )	54	54.00
(1 – 6)	42	28.00
( 7 - 12)	21	14.00
(13 - 17)	6	4.00
Total	150	100.00
Mean (Years)	8.8	

Source: Field survey, 2012.

respondents. The respondents' mean age was 53 years. This indicates that gum arabic marketing in the study area was dominated by middle age people. The reason may be due to the laborious nature of the processes involved in gum arabic marketing such as moving from village to village searching for the produce, careful sorting according to grades, shade drying of the produce and bagging.

The youths or the old people usually don't have the patience to undergo these processes. This is contrary to the findings of De –Wilde (1984) who opined that income generated from cash crops is the major motivating factor of people participation in its business. Of course labour involved is also a major factor.

### Gum arabic marketing experience

Table 2 depicts the years of experiences of the respondents' in gum arabic marketing. Most of the respondents (40.00%) indicated that they have been in the business for twenty one years and above. Only 6% of the respondents were new in the business of gum arabic (1-5 years). The gum arabic marketers were thus expected to be efficient based on their long stay in the business as opined by Wood, (2008) stated in his study on measuring experience that the greater impacts of marketing objectives are gained through experiences.

Thus experience may serve as a useful factor in determining the effectiveness of marketing events among marketers (Wood, 2008). This is due to the fact that experience creates behavioural confidence in the business and increases buyers – sellers' engagement

and stronger relationship.

### Educational status

The educational status of the respondents (Table 3) revealed that most of the marketers (54.00%) did not have formal education.

There was only 4.00% had tertiary education. The average age spent in formal school by the respondents was 8.8. This does not cover up to completion of secondary education. It thus indicates a high level of illiteracy among the gum arabic marketers. This conforms to the findings of Eboh (2006) who said that literacy rates have deteriorated to about 30 % in Nigeria since 1991.

The implication of this high illiteracy among the respondents to gum arabic business in the area would be poor management of the businesses as education is a crucial factor to the quality and performance of entrepreneurship. This explains the fact that despite the abundance of gum arabic in the area as well as its high demand worldwide, poverty prevails in the area as the larger population (70%) in North – Eastern Nigeria are below the poverty line (Eboh, 2006).

### Household size

The household size distribution of the respondents (Table 4) revealed that majority of them (38.00%) lies within the household size of 6 – 10 people. Those with household size of 21 and above had 8.00% of the total respondents. The mean household size of the study was 12 people.

**Table 4.** Household size Distribution of the Respondents.

Household size	Frequency	Percentage (%)
1 -5	15	10.00
6 -10	57	38.00
11 – 15	36	24.00
16 – 20	30	20.00
21 and above	12	8.00
Total	50	100.00
Mean	12 (people)	

Source: Field survey, 2012.

**Table 5:** Gross Margin and Profitability Analysis of Gum arabic Marketing.

Variables (Items/Activities)	Total Value (₦)/Marketer
(A) Depreciated Fixed cost:	
(i) Scales	3312.34
(ii) Head pans	1216.33
(iii) Mudus (Measures)	233.34
Total fixed cost	4,762.0
(B) Variable cost:	5962.89
(i) Labour cost	3910.17
(ii) Operating cost	261,863.67
(iii) Purchasing cost	271,736.73
Total variable cost:	276,498.73
(C) Total cost	2,618,197.533
(D) Total revenue (TR)	2,346,461.00
(E) Gross margin (GM) (D - B)	3.74
Gm/Kg (E/H)	2,341,698.8
(F) Net profit (NP) (D - C)	3.74
NP/Kg (F/H)	150
(G) Total respondents	626,465.00 Kg
(H) Total Quantity of gum arabic sold	

Source: Calculated from Data collected on field survey, 2012.

This is larger than the average household size in Nigeria which is about 6.09 people (Dimeji and Sarah, 2006). This may be due to the polygamous system of marriage commonly practiced in the study area.

### Profitability analysis

Table 5 depicts the profitability analysis of gum arabic marketing in the study area using Gross Margin model (GM). The result indicates a total of 626,465.00 Kg of gum arabic was sold by the 150 respondents; and generated total revenue of ₦2,618,197.533. The total gross margin was ₦ 2,346,461.00; and the gross margin per marketer was ₦ 15,643.07; while the GM per kilogramme of gum arabic sold was calculated as ₦ 3.74. On the other hand, the total net profit calculated was ₦ 2,341,698.8, and the net profit per marketer was ₦15611.33. This implies that gum arabic marketing was

highly profitable in the study area. This result conformed to Ligali (2005) who reported that better prices of gum Arabic in Yobe state has triggered many investors to invest more in gum Arabic in the state.

### Regression analysis of factors influencing the profitability of gum arabic marketing

Three regression models (Linear, Semi – log and Double - logs or Cobb -Douglas) were ran, and the results are presented in (Table 6). Base on the statistical significance of their coefficient of determinations ( $R^2$ ), the magnitude of the standard errors, and the coefficients signs and levels significance, the Semi – log functional model happened to be the lead equation among the three functional forms, having the best fit. It has a coefficient of determination ( $R^2$ ) value of 0.692, highest F–ratio (22.583) and lowest standard errors. There were also six

**Table 6:** Regression Analysis.

Variable	Linear		Semi log		Double log	
Variable name	Coefficient	t-Value	Coefficient	t-Value	Coefficient	t-Value
Constant	-1.395 <sup>-8</sup>	- 0.220	-10.657	19.531**	10.490	6.931**
Age (X <sub>1</sub> )	- 1.137 <sup>-7</sup>	- 0.976	- 0.004	- 0.437	- 0.18	- 0.62
Education (X <sub>2</sub> )	- 1.137 <sup>-7</sup>	- 0.976	- 0.004	- 0.437	- 0.18	- 0.62
Family size (X <sub>3</sub> )	-326.412	- 0.910	0.020	1.121*	0.101	2.429*
Purchasing cost(X <sub>4</sub> )	489.641	4.305**	1.2005 <sup>-4</sup>	4.308**	1.993 <sup>-6</sup>	7.270**
Quantity of G.A. sold(X <sub>5</sub> )	9668.48	- 0.997	4.227 <sup>-5</sup>	2.451**	5.626 <sup>-5</sup>	4.221**
Operating cost (X <sub>6</sub> )	-2464.96	-4.247**	-1.240	-0.432	5.514 <sup>-6</sup>	0.633
Labour cost(X <sub>7</sub> )	1.320	0.772	2.066 <sup>-5</sup>	6.968**	1.044 <sup>-5</sup>	1.565*
G.A.Mrkt Exp.(X <sub>8</sub> )	2.423	1.255*	0.027	2.712**	0.026	1.024
Fixed cost(X <sub>9</sub> )	572.108	1.756*	-1.149	-0.522	-0.043	-0.885
R <sup>2</sup>	0.567		0.692		0.828	
F – Value	4.216		22.583		13.397	

\*\* = significant at 1% level, \* = significant at 5% level, Dependent variable = Revenue, G.A. Mrkt.Exp = Gum arabic marketing experience Source: Data Analysis from Field Survey, 2012.

variables that directly fitted into the regression line compare to that of double log which has five. The result of semi log model was thus chosen for interpretation of the study.

The (R<sup>2</sup>) value of 0.692 implies that 69.2% of the variation in the output (Revenue generated) was jointly explained by the independent variables used in the regression analysis while the remaining 30.8% (100 – 69.2%) could be due to non inclusion of some important independent/explanatory variables in the model and/or error in the estimation. The results for age (X<sub>1</sub>), education(X<sub>2</sub>), Operating cost (X<sub>6</sub>) and Fixed cost (X<sub>9</sub>) had negative coefficients and not significant. On the other hand, the coefficient for household size (X<sub>3</sub>), in the analysis had positive value of 0.020 and significant at 5% level of probability. This implies that a unit increase in the variable will lead to an increase in the revenue generation by ₦0.020 and vice versa. This also indicates that gum arabic marketers with large household size earned more revenue than those with small household size. This could be attributed to the fact that large households' sizes have more family labour which contributes in enhancing the activities of the gum arabic marketing (Nwankwo and Okolie, 2011).

Purchasing cost (X<sub>4</sub>), had positive coefficient value of 0.00012 in the result and significant at 1% level of probability. This implies that an increase in the variable will lead to an increase in the revenue generation from gum arabic equal to the magnitude of the coefficient; that is ₦ 0.00012 and vice versa. This is in agreement with the a priori expectations; increase in purchasing cost, will lead to more quantity of gum arabic to be purchased and consequent higher revenue from sales of gum arabic.

Quantity of gum arabic sold (X<sub>5</sub>) had positive coefficient of 0.00043 and significant at 5% level of probability. This indicates that an increase in the variable will lead to an increase in the revenue generation from gum arabic

marketing. This is also in agreement with the a priori expectations that, with increase in quantity of gum arabic purchased will lead to increase in the revenue.

The result for labour cost (X<sub>7</sub>) had positive coefficient of 0.000066 and was significant at 1% level of probability. This means that the variable played one of the greatest influences in revenue generation of gum arabic from the area. Statistically, it implies that an increase in the labour cost will translate into higher revenue from sales of gum arabic in the area. This shows the significance of employing more labour in the business. The finding conforms to the study of Giroh et al.,(2007) in their study on the Analysis of Farmers' Awareness on Gum arabic Production in Selected Local Government Areas of Jigawa state, Nigeria.

Gum arabic marketing experience (X<sub>8</sub>) had positive coefficient (0.027) in the analysis and was significant at 1% level of probability. Statistically, it infers that an increase in gum arabic marketing experience will lead to an increase value of ₦ 0.027 in revenue generation from sales of gum arabic. This conforms to the finding of Wood (2008) who reported that experience may serve as a useful factor in determining the effectiveness of marketing events among marketers.

## SUMMARY AND CONCLUSION

The study was conducted in Adamawa, Taraba and Yobe states, Nigeria. The state is blessed abundantly with both human and natural resources, but poverty incidence remains high (70%) among her citizens (Eboh, 2006). Gum arabic marketing is viewed as a possible panacea for the poverty situation in the state. Jalingo, being one of the biggest gum arabic market centres in the state was chosen for the study. Factors influencing revenue generation from gum arabic among the respondents were

analysed using descriptive and regression models. The results indicate that most of the respondents (52%) were between the ages of 41 and 60 years. Also, 40% of the marketers had more than 20 years experience in gum arabic marketing. There was high level of illiteracy (54%) among the respondents. The regression results revealed that  $R^2$  as 69.2%. Age, education, operating cost and fixed cost had negative coefficients while family size, purchasing cost, volume of gum arabic sold, labour cost and gum Arabic marketing experience had positive coefficients. The implication of these is that an increase in the variables with negative coefficients will decrease revenue generation in the sales of gum arabic while an increase in the variables with positive coefficients will lead to increase in the revenue generation in gum arabic marketing in the study area. The economic suggestion for the gum arabic marketers is to reduce allocation of fixed items and operating cost which had negative coefficients with the revenue and increase allocation of the variables with positive coefficients in order to be more efficient in the gum arabic business in the area. Also, as age and education had inverse relationship with the revenue, it is advised that older and educated people should venture into other businesses that economically benefit their status.

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