

ANALYSIS OF INCOME AND EXPENDITURE INEQUALITY AMONG GUM ARABIC MARKETERS IN THE GUM ARABIC BELT OF NIGERIA

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ABSTRACT

Income and expenditure inequality among Gum Arabic marketers in the Gum Arabic belt of Nigeria were analyzed. Data for the study were collected through the use of structured questionnaire and oral interview on 150 respondents in Adamawa, Taraba and Yobe States, Nigeria. Both inferential and descriptive statistics were used for the analysis. Results revealed that Gum Arabic marketing experience and household size were averagely 18 years and 12 people respectively. The income inequality distribution between and within groups of respondents were measured as ₦5.66 and ₦-0.999 respectively. These imply that there were significant variations in income generation between the groups of respondents but statistically insignificant within the groups. Also, the results depicted significant variations in expenditure distribution between (₦ 4.99) and within (₦7.424) groups of respondents due to inequalities in income generation from Gum Arabic by the respondents. The level of income generation among the respondents was evaluated using Z – test statistics; the Z calculated value was 152, which is greater than the critical tabulated Z – value of 1.96 at 5% level. This implies a positive relationship between increased income and Gum Arabic marketing among the respondents. The study suggested governments to assist the poor resource Gum Arabic marketers with soft loans to finance their Gum Arabic business in order to enhance their purchasing power and to bridge the income inequality between them and the richer ones that monopolized the business. This will create better condition for proper competition for a near perfect Gum Arabic marketing environment that will lead to more revenue generation and poverty alleviation in the study area.

Keywords: Gum Arabic, Income, Expenditure, Marketing, Northern Nigeria.

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INTRODUCTION

Acacia species known as Gum Arabic are leguminous plants belonging to the family: *Mimosaceae* – whitish liquid/latex oozing plants. There are over 1100 different species of gum arabic found in Africa. However, only three of these different species of Gum Arabic are of high economic value, namely *Acacia senegal*, *Acacia sayel* and *Acacia seberina* otherwise called grade 1, 2 and 3 Gum Arabic respectively (Nurudeen, 1998 and National

Association of Gum Arabic Producers and Processors of Nigeria, NAGAPPEN, 2002). The gum Arabic producing countries in Africa formed a body called “Network for Natural Gums and Resins in Africa” (NGARA) has 15 member countries namely, Burkina Faso, Cameroon, Chad, Eritrea, Ethiopia, Kenya, Mali, Mauritania, Niger, Nigeria, Senegal, Somali, Sudan, Tanzania and Uganda (Figure 1). Nigeria is the second largest producer and supplier of Gum Arabic globally after Sudan.

Nigeria started gum arabic marketing in 1914, when the then Northern Province Governor, Mr. Howbey R. Palmer visited Sudan and saw how Gum arabic trade was thriving there. He ordered for sample collection of the similar produce in Nigeria and sent to Premier Institute, London for analysis. The result revealed that the produce has the same properties with that found in Sudan. Nigeria started Gum Arabic trading with London and first local Gum Arabic market centers in Nigeria were

Geidam and Damaturu now in the present Yobe state (Baseline Survey on Gum Arabic, 2002). The study thus examined the relationship between Gum Arabic marketing and economic growth, consumption/expenditures and income distribution among gum its marketers in the study areas. There was a prior expectation of positive correlation between Gum Arabic marketing and economic growth, thus Z – Test statistic was used to test the hypothesis.

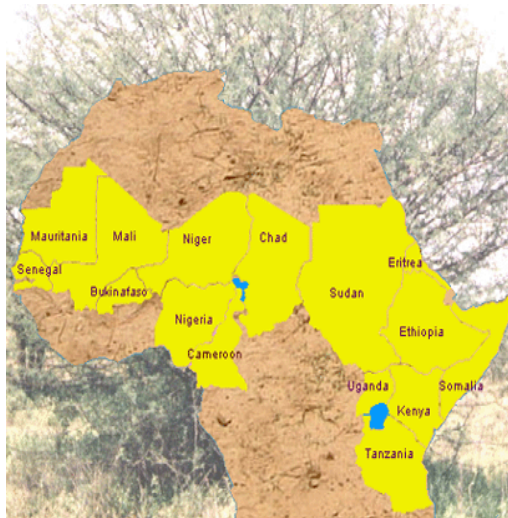


Figure1(a)

Figure 1(a): Map of Africa showing NGARA member countries. Source: www.NGARA.com.

Figure 1(b): A typical Gum Arabic tree with gum exudates

Figure 1 (b).

METHODOLOGY

Study area: The study was carried out in Adamawa, Taraba and Yobe States, North-Eastern Nigeria. 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 (Yobe State Diary, 2000). These conditions promote the production of Gum Arabic (Aghughu, 2004). The major agricultural produce found in these areas includes maize, rice, groundnut, guinea corn, tomato, onion, beans, mango, orange, guava, Gum Arabic among others. The dominant languages spoken in these areas are Hausa, Fulfulde

and Kanuri. Other languages include Kilba, Margi, Bura Bachama, Chamba and Fali among others.

Sampling techniques: A multistage sampling technique was used. Adamawa, Taraba and Yobe states were purposely selected because they are among the leading Gum Arabic producing states in Nigeria. Also, a purposive selection of one Local Government Area from each of the three states were done; while a random selection of 3 communities from each of the Local Governments was carried out, making a total of 9 communities. Lastly, a proportionate sampling of the based on the sample sizes of

Gum Arabic marketers in the 9 communities were randomly selected for administering the questionnaire and a total of 180 respondents (marketers) were interviewed.

Methods of data analyses: Descriptive statistics such as mean, percentages and frequency distribution were used to analyze the variables on house hold size and Gum Arabic marketing experience in the study; while the General Entropy class of measure (b)

as adopted by Aloysius (2008) and Giroh *et al.* (2010) was used to evaluate the income and expenditures distribution among the respondents. The model is stated as:

(a) **Static decomposition method for inequalities between groups distribution:** used to evaluate the degree of income inequality between groups of respondents; and the formula is:

$$Ib = \frac{1}{\alpha^2 - \alpha} \left[\sum_{j=1}^K f_j \left(\frac{\bar{y}_i}{y} \right)^\alpha - 1 \right] \text{----- (1)}$$

Where:

Ib = inequality between groups, **α** = Parameter which represents the weight given to distance between incomes at different parts of the income distribution,

y_i = mean income (₦) of each respondent, **y** = mean income (₦) of total population, and

f_j = population share.

The result from this model helped to depict the level of variations in income generation from Gum Arabic marketers between the entire respondents.

Static Decomposition method for within group inequality distribution: used to evaluate the variations of inequality conditions in the same category of respondents. The formula is given by

$$IW = \frac{1}{\alpha^2 - \alpha} \left[\frac{1}{n} \sum_{j=1}^K \left(\frac{y_i}{y} \right)^\alpha - 1 \right] \text{.....(2)}$$

Where:

IW = inequality within same category; **α** = Parameter which represents the weight given to distances between incomes at different levels; **n** = number of individuals in the sample;

y_i = mean income of each respondent (₦), and **y** = mean income of total population (₦).

The value of GE ranges from zero to infinity (0 to ∞), with zero representing an equal distribution (all incomes identical), and higher values signify levels of inequality (Giroh *et al.*, 2010), while values less than

or equal to 0 (≤ 0) signify insignificant inequality in the distribution.

The Z – Test statistic was used to test the hypothesis in order to determine the relationship between incomes earned from

Gum Arabic marketing and the economic growth of the respondents in the study area.

$$Z_{cal} = \frac{\bar{X}_A - \bar{X}_B}{\sqrt{\frac{X_A^2}{N_A} + \frac{X_B^2}{N_B}}}, \dots\dots\dots (3)$$

Where:

\bar{X}_B = mean income of respondents before engaging in gum Arabic marketing.

\bar{X}_A = mean income of respondents after engagement in gum Arabic marketing.

X_A^2 = variance of income after engaging in gum Arabic marketing.

X_B^2 = variance of income before engagement in gum Arabic marketing.

N_A and N_B = number of respondents, (in this study, $N_A = N_B$).

RESULTS AND DISCUSSION

Scio-economic characteristic of the respondents: Gum Arabic marketing experience: Table.1 depicts the years of experience of the respondents’ in Gum Arabic marketing. Most of the respondents (57.33%) 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). Those with 6 - 20 years experiences constituted 42.66% of the total respondents. The Gum Arabic marketers were thus expected to be efficient based on their long stay in the business as 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 which strengthens the relationship.

Household Size: The household size distribution of the respondents (Table 1) revealed that majority of them (37.33%) lies within the household size of 6 – 10 people. Those with household size of 21 and above had 8.67% of the total respondents. The mean household size of the respondents was 12 persons. This implies that the household size of the respondents is large. This may be due to the polygamous system of marriage commonly practiced in the study area.

Income and Expenditures inequality: The decomposed income and expenditures between and within Gum Arabic marketers in North – Eastern Nigeria is as shown in Table 3. It indicates the result of General Entropy (GE) class of measure for income and expenditures distributions among the respondents in the study area.

Determination of Income inequality distribution between respondents: Using the values in Table 3, the GE Class of Measure for income distribution between respondents was calculated as follows:

$$Ib = \frac{1/1^2 - 1 [150 (14,829,773.63)^1 - 1]}{392,729,630}$$

Where, **Ib** = distribution of income between respondents

1 = α , from the formula which represents the weight given to distance between incomes at different parts of the distribution. Total number of respondents = 150.

yi = ₦14,829,773.63, from the formula which represents mean summation of each group income.

y = ₦392,729,630, from the formula which represents mean summation of total income

Solving the equation therefore gave the result of ₦5.66 income inequality distribution between the respondents which implies that there were some levels of inequality in revenue generation from Gum Arabic marketing among the respondents.

This means that the variation in income distribution of ₦5.66 between groups of respondents was statistical significant. This may be due to variation in the sinking fund in the business of gum arabic among the marketers.

Table 1: Distribution of Household size and Gum Arabic Marketing Experience by the respondents.

Mrkt. Exp. (Yrs)	Frq	%	Household size	Frq.	%
1 – 5	9	6.00	1 -5	17	11.33
6 – 10	17	11.33	6 -10	56	37.33
11 – 15	21	14.00	11 – 15	43	28.67
16 – 20	17	11.33	16 – 20	21	14.00
21 and above	86	57.33	21 and above	13	8.67
Total	150	100.00	Total	150	100.00
Mean	8(yrs)		Mean:	12 (people)	

Source: Field survey, 2012.

Mrkt. = marketing; Exp. = experience; Frq. = frequency.

Income inequality distribution within the respondents: Using the formula of General Entropy Class of Measure, the distribution of income within respondents was calculated, and the result obtained was a negative value (₦ -0.999). This implies that there was no significant variation in terms of income distribution within the Gum Arabic marketers in category of classification in the area (Giroh *et al.*, 2008). This means that each person in a particular group of the respondents requires similar level/type of intervention for improvement in revenue generation from Gum Arabic in the study area.

Expenditures distribution between the respondents: The result of General Entropy formula Class of Measure for expenditure distribution between the respondents was revealed as ₦4.99. Though the variation was little, but it is greater than

zero. It implies that the variation in expenditures among the respondents was only about ₦ 4.99. This could be due to inequality in income generation by the Gum Arabic marketers in the study area since income influences the level of expenditures of individuals.

Expenditures distribution within the respondents: This was calculated as ₦7.424, which implies that there was little variation in expenditures within the group categories of the respondents. It implies that the Gum Arabic marketers in the same group as categorized in this study had little variations in their purchasing powers and this ranged between ₦1.00 and ₦7.424. This could infer that there was similarities/uniformity of economic status of the respondents in the study area couple with the small variation in revenue generated within the group (₦4.99) as obtained in this study.

Table 2: Summary of determination of income and expenditures inequality between and within the respondents:

Ib (₦)	Iw (₦)	Eb (₦)	Ew (₦)
5.66	-0.99	4.99	7.42

Source: Calculated from field survey (2012).

Ib = Income inequality between, **Iw** = Income inequality within; **Eb** = Expenditures inequality between; **Ew** = Expenditures inequality within.

Income status of respondents before and after engaging in Gum Arabic marketing:

Table 4 revealed that before engaging in Gum Arabic marketing, 64% of the respondents were below poverty line as they could not earn up to \$1.00 per day. There were only 17 percent of the respondents that earned above \$2.00 and were considered rich. This confirms to the findings of Ajayi (2004) who reported that 58.15 percent of North – Eastern Nigeria population live in extreme poverty, 27.03 percent moderately poor, and only 15% were rich. On the other hand, the Table shows a drastic change in the income status of the respondents after engaging in the gum Arabic marketing which indicates only 6 percent of the respondents that were below poverty line, 22 percent moderately poor and majority (69.3%) earn above \$2.00. The percentage change in income status among the respondents was 173.3 percent. This implies that Gum Arabic marketing in the area had positive impact on poverty alleviation. This is in line with the study of Giroh *et al.* (2007) on the analysis of farmers’ awareness on Gum Arabic production in selected Local Government of Jigawa state, Nigeria.

The expenditures status of respondents before and after engaging in Gum Arabic marketing is as shown in Table 5 below. Due to the poverty situation of the respondents, the result indicated about 79 percent of the marketers spend less than \$1.00 per day and less than 1 percent spent above \$3.00 a day before engagement in the gum arabic marketing. But after engagement in the Gum Arabic marketing, their income status improved hence their expenditures increased as indicated in Table 5. There were about 53% of the respondents that were moderately poor leaving only about 7 percent still spending less than \$1.00 a day. The percentage change in the purchasing power of the respondents as calculated in this study was 187 percent. This implies that the Gum Arabic business is a good source of poverty alleviation in the area as it has increased the purchasing power of the respondents greatly. This is an indication of poverty alleviation among the respondents. The result lays credence to the work of Zendillo (2008) who found out that agricultural marketing is an important means of poverty reduction especially in developing countries.

Table: 3. Decomposed income and expenditures between and within Gum Arabic marketers in North – Eastern Nigeria

Income Distribution (Revenue ₦)	Fre q.	Total Revenue (₦)	Expenditure Distribution (₦)	Fre q.	Total Expenditure (₦)	% Revenue	% Exp.
1 - 15,000	6	13,600 (2,266.67)*	1 - 20,000	5	14,000 (2,800.00) *	.035	0.19
15,001 – 50,000	15	131,500 (8,766.67)	20,001 – 40,000	9	73,000 (8,111.11)	0.033	1.00
50,001 -85,000	18	338,000 (18,777.78)	40,001 – 60,000	7	115,000 (16,428.57)	0.09	1.58
85,001 – 120,000	17	508,000 (29,882.35)	60,001 – 80,000	9	140,000 (15,555.56)	0.01	1.92
120,001 – 155,000	10	407,600 (40760.00)	80,001 – 100,000	8	193,000 (24,125.0)	0.10	2.64
155,001 – 190,000	8	328,000 (41,000.00)	100,001 – 120,000	16	462,000 (28,875.00)	0.08	6.34
190,001 – 225,000	7	210,000 (30,000.00)	120,001 – 140,000	17	521,000 (30,647.06)	0.05	7.14
225,001 – 260,000	12	494,000 (41,166.67)	140,001 - 160,000	9	305,000 (33,888.89)	0.12	4.18
330,001 – 365,000	10	690,000 (69,000.00)	160,001 – 180,000	28	1,007,500 (35,982.14)	0.17	13.82
365,001 400,000	6	400,000 (66,666.67)	180,001 – 200,000	26	965,200 (37,123.08)	0.10	13.24
540,001 – 575,000	14	1929,000 (137,785.71)	200,001- 220,000	7	425,000 (60,714.29)	0.49	5.83
> 575,000	27	387,279,930 (14,343,701.11)	240,001 – 260,000	4	260,000 (65,000.00)	98.61	3.57
--	--	--	> 260,000	5	2810,000 (562,000.00)	--	38.54
Total	150	392,729,630 (143,934,961.4)**	Total	150	7,290,700 (921,250.7) **	100.00	100.00

Source: Calculated from field survey data, (2012); *= mean value within group; ** = summation of * values

Table 4: Income status of respondents before and after engaging in Gum Arabic marketing

Income Status \$ or (₦/day)	Before Engagement		After Engagement	
	Freq.	%	Freq.	%
0.1 – 0.999 (₦15 – 149.9)	96	64.00	9	6.00
1.0 – 1.999 (₦150- 299.9)	15	10.00	33	22.00
2.00 – 2.99 (₦300 – 449.9)	13	8.67	4	2.67
3.00 and above	26	17.13	104	69.30
Total	150	100.00	150	100.00
Mean (\$)	7,630	-	20.85	-

Source: Field survey, (2012).

Table 5: Expenditures status of respondents before and after engaging in Gum Arabic marketing

Expenditures Status \$ or (₦/day)	Before Engagement		After Engagement	
	Frequency	(%)	Frequency	(%)
0.1 - 0.999 (₦15 - 149.9)	119	79.33	11	7.33
1.00 - 1.999 (₦150 - 299.9)	27	18.00	79	52.67
2.00 - 2.99 (₦300 - 449.9)	3	2.00	38	25.33
3.00 and above	1	0.67	22	14.67
Total	150	100.00	150	100.00
Mean (\$)	0.85	-	2.44	-

Source: Calculated from Field survey, (2012).

Determination of economic growth: Relationship between incomes earned from Gum Arabic marketing and the level of economic growth among the respondents was evaluated using Z – test statistic. The calculated value, 152 is greater than the critical tabulated Z – value of 1.96 at 5% level (Table 6.). This implies a positive relationship between economic growth and gum arabic marketing among the respondents. Therefore, since the value (152) is positive and statistically significant, it depicts that there was economic growth and poverty alleviation among the Gum Arabic marketers in the study area.

Table 6: Z –Test Result showing relationship between incomes and the level of economic growth among respondents

Income Status of Respondents	Mean	Std Deviation	Mean Std error
Before Gum Arabic Marketing (1)	7.6253	1603.79	130.94
During Gum Arabic Marketing (2)	20.8461	32.57	2.66

CONCLUSION AND RECOMMENDATION

- Positive relationship exists between increased income and Gum Arabic marketing among the respondents.
- Income and expenditures analyzed indicated that there were some levels of inequality in the distributions

among the respondents. The inequality in income generation among the respondents was reflected in their expenditures.

- The study suggested governments to assist the poor resource Gum Arabic marketers with soft loans to finance their Gum Arabic business in order

to enhance their purchasing power and also to bridge the income inequality between them and the richer ones that monopolized the Gum Arabic business. This will create better condition for proper competition for a near perfect Gum Arabic marketing environment that will lead to more revenue generation and poverty alleviation in the study area.

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