



## ANALYSIS OF INCOME AND EXPENDITURES DISTRIBUTION AMONG GUM ARABIC MARKETERS IN NORTH-EASTERN NIGERIA

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### ABSTRACT

The study examined the income and expenditures distribution among gum arabic marketers in North-Eastern Nigeria. There are over 1100 different species of *Acacia*, called gum arabic found mainly in Africa. Three of these species; *A. senegal*, *A. sayel* and *A. seberina* happened to be the most economic ones as they are demanded worldwide for usage in virtually all human endeavours. Nigeria is the second largest producer and supplier of gum arabic globally after Sudan. Data for the study were collected through the use of structured questionnaire and oral interview on 150 gum arabic marketers in Adamawa, Taraba and Yobe states Nigeria. Descriptive statistics and General Entropy class of measure models were used to analyse the data. Results revealed respondents' mean age, gum arabic marketing experience and household size as 53, 18 years and 12 people respectively. The results for General Entropy class of measure indicate income inequality distribution between and within groups of respondents as ₦ 5.66 and ₦ -0.999 respectively. These imply that there were significant variations in income generation between the groups respondents but statistically insignificant within the groups. Also, the results depict significant variation in expenditures distribution between and within groups of respondents with statistical values as ₦ 4.99 and ₦ 7.424 respectively. The variations could be due to inequalities in income generation from gum arabic by the respondents. The study suggested government to assist the poor resource gum arabic marketers with soft loans to finance their gum arabic business in order to bridge the income inequality gap among the marketers. 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, Marketing, Income, Expenditures, General Entropy Class.

### INTRODUCTION

There are over 1100 species of *Acacia* species which are called gum arabic. The plants belong to the legume family, *Mimosaceae* – whitish liquid/latex oozing plants. Some of the gum species however do not yield gum; others though produce gum but are uneconomical. According to Nurudeen (1998) and NAGAPPEN (2002), only three of these different species are of high economic value, namely *Acacia senegal*, *Acacia sayel* and *Acacia seberina* otherwise called grade 1, 2 and 3 respectively. The others species serve as either forage for grazing animals only, while some are even poisonous to animals. Nigeria is the second largest producer and supplier of gum arabic globally after Sudan.

In 1998, the Joint FAO/WHO Expert Committee on Food Additives (JECFA) specification modified that also include *talha* (grade 2 gum) in food use, which hitherto only included *hashab*, (grade 1 gum). Cheaper than *hashab*, *talha* has inferior technical properties for some gum arabic's important uses such as in the soft drinks industry. However, its chemical properties are the same and it substitutes well for *hashab* in the confectionary industry where larger quantities of gum arabic are required in the final products. The general function of all the species of *Acacia* is the fixing of nitrogen in the soil being legumes plants which helps to enhances soil fertility.

The local market for Gum arabic 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. Immediately he came back to Nigeria he ordered for sample collection of similar produce he saw in northern Nigeria and sent it to Premier Institute, London for analysis. The result revealed that the produce was similar to 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). It is unfortunate that since then the gum arabic market in Nigeria has been unregulated as its farm gate price is quite unstable. Farmers/collectors of gum arabic have no specific market location or union. Only the middle men purchasing gum arabic that have unions (Umar, 2006). The price for raw gum arabic varies from state to state and season to season. The grade 1 gum arabic (*Acacia senegal*) which is most patronized is usually processed in to powder form by the only local processing industry in the country, (DANSA FOODS) Company located in Kano to add value.

The seasonal price variations of gum arabic in Nigeria indicates that there has been a remarkable increase in price of gum arabic during the period under review with Yobe state having the highest off – season price of ₦ 500,000/tonne in 2005 (Ligali, 2005). However, for various grades of gum arabic, Kano state indicated highest prices than other states; this is probably due to the fact that it is the biggest gum arabic marketing centre in the country. RMRDC (2004) also reported that due to some factors which include irregular supply of the product, gum arabic is always short of its demands by the local industries in Nigeria. This led Nigeria to import about 129,550 kg refined gum arabic in just 2001 at a total cost of ₦ 39.64 million. This amount would have been saved if the local processing industries of gum arabic are encouraged.

### CONCEPTUAL FRAME WORK

**Income:** This refers to the total financial earning of an individual or group of persons. It is usually earned through paid wages/salaries, rents and profit/interest on businesses (Ernest, 2007). Income earned is measured either on daily

bases, monthly or annually. The income level of people influences their consumption/expenditures. It is mathematically stated as  $Y = C + S$ .

Where  $Y$  = income,  $C$  = consumption and  $S$  = saving.

The net income obtained from a business determines its profitability and the motivation of the entrepreneur. Most agricultural marketing produce are profitable, but peasant marketers usually lacks adequate finance for proper execution of the businesses (Alibi and Adebayo, 2008).

**Expenditure:** This refers to consumption or spending of person/group of persons. In life, expenditures/consumption is the ultimate objective of economic activities. Personal expenditure is the sum total of current consumption on goods and services in order to meet his needs and wants (Ernest, 2007 and Alabi, 2010). Consumer expenditures are divided into durable and non –durable goods. The durable goods include houses, cars or washing machines; while none –durable goods are food, clothes and services such as medical treatments or water supply.

Income and expenditures distribution among people in a society depict the relative levels of poverty and/or well being of the people. These depend much on the ability of individuals and the community as a whole the proper utilization of the available natural resources in the area.

**METHODOLOGY**

**Study Area:** The study was carried out in Adamawa, Taraba and Yobe States of 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 (Yobe State Diary, 2000). These conditions promote the production of gum arabic (Aghughu, 2004). There are diverse ethnic groups well over 50 different tribes found in these states with major languages spoken as Hausa, Fulfulde and Kanuri. Other languages include Kilba, Margi, Bura Bachama, Chamba and Fali among others.

**Sampling Techniques:** A multistage sampling technique was used. The area of study was first stratified into a unit, that is, Adamawa, Taraba and Yobe states. They were purposely selected because the states are among the leading gum arabic producing states in Nigeria.

The first stage of sampling involved the purposive selection of one Local Government Area from each of the three states making a total of 3 Local Governments. The second stage involved random selection of 3 communities/villages from each of the Local Governments making a total of 9 communities. Finally, 20 Gum arabic marketers were randomly selected from each of the 9 communities making a total of 180 respondents (marketers). The list of the total gum arabic marketers from the three states were obtained from the Ministries of Agriculture and Environment of each state, totaling Adamawa = 57, Taraba = 90 and Yobe = 105 which is the sampling frame of this study. It is from this sampling frame that the sample size was drawn taking cognizance of the marketers from the selected Local Governments.

**Data Source and Collection:** Primary data were used for the study. The data were collected through the use of questionnaire administered through oral interviews on gum arabic marketers in the study area.

**Methods of Data Analyses:** Descriptive statistics such as mean, percentages and frequency distribution were used in analyzing the socio economic variables in the study; while the General Entropy class of measure was used to evaluate the income and expenditures distribution among the respondents. The General Entropy class of measure as adopted by Aloysius (2008) and Giroh, Igbinsa and Umar (2010) is stated as:

(a) Static Decomposition method for inequalities between groups distribution:

This is used to evaluate the degree of income inequality between groups of respondents; and the formula is:

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

Where:

Ib = inequality between groups,

$\alpha$  = 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.

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

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

Where:

IW= inequality within same category,

$\alpha$  = 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  $\infty$ ), with zero representing an equal distribution (all incomes identical), and higher values signify levels of inequality (Giroh, Igbinsosa, Umar, 2010), while values less than 0 signify insignificant inequality in the distribution. The outcome from these models were used to explain the levels of variation that exist within each particular group of gum arabic marketers in the study area based on income generated from the gum arabic marketing.

## RESULTS AND DISCUSSION

### Socio-economic Characteristics of the Respondents

**Age:** The age distribution of the respondents is presented in Table 1. The result shows that only 1.33% of the gum arabic marketers were either 20 years old or less than. Those with ages of 41 - 60 years constituted 56.66% of the total respondents. The respondents' mean age was 53 years.

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

Age (Years)	Frequency	Percentage (%)
≤ 20	2	1.33
21 – 30	12	7.33
31 -40	6	4.00
41 -50	41	27.33
51 – 60	44	29.33
61 - 70	41	27.33
71 and above	5	3.33
<b>Total</b>	<b>150</b>	<b>100.00</b>
<b>Mean</b>	<b>53 (years)</b>	

Source: Field survey, 2012.

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 youth usually don't have the patience to undergo these processes, which agrees with the findings of Adigun, Awoyemi and Omonona (2011) who said that older/Middle Ages persons usually have higher ability of patience than the younger ones, and patience in business influences higher gains for the entrepreneur. The result can also infer that the elderly people in the study were willing to bear the possible risk in the business, while the young ones were of risk averters in the business. This is in line with the finding of Giroh, Umar and Yakub (2010) who reported that elderly people have relatively higher degree of risk bearing than the young people in agricultural business.

**Gum arabic Marketing Experience:** Table.2 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.

**Table2: Distribution of Experience in Marketing of gum arabic by the Respondents**

Marketing Experience (Years)	Frequency	Percentage (%)
1 – 5	9	6.00
6 – 10	17	11.33
11 – 15	21	14.00
16 – 20	17	11.33
21 and above	86	57.33
<b>TOTAL</b>	<b>150</b>	<b>100.00</b>
<b>Mean</b>	<b>18 (years)</b>	

Source: Field survey, 2012.

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 strengthening the relationship.

**Educational status:** The educational status of the respondents (Table 3) revealed that most of the marketers (64.67%) did not have formal education. There was only 1.33% that 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 would be poor management of the gum arabic 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 among the larger population (70%) in North – Eastern Nigeria (Eboh, *et al.* 2006).

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

No. of years spent in Formal school	Frequency	Percentage (%)
(0)	97	64.67
(1 – 6)	30	20.00
(7 - 12)	21	14.00
(13 - 17)	2	1.33
<b>Total</b>	<b>150</b>	<b>100.00</b>
<b>Mean (Years)</b>	<b>8.8</b>	

Source: **Field survey, 2012.**

**Occupational Distribution of Respondents:** The occupational distribution of the respondents (Table 4) indicated that most of the marketers (70.00%) are also farmers. There was high proportion (63.33%) of applicants among the respondents with only 13.33% as civil servants.

**Table 4: Main Occupational Distribution of Respondents\***

Occupation	Freq.*	Percentage (%)
Farming	105	70.00
Marketing	92	61.33
Civil servant	20	13.33
Applicant	95	63.33

Source: **Field survey, 2012.**

\* Multiple responses

This shows that gum arabic marketing can be an alternative means for school leavers and jobless people to engage them for a living. It also implies that the business of gum arabic marketing may be used to reduce the high rate of unemployment in Nigeria which is put at about 24% (NBS, 2013).

**Household Size:** The household size distribution of the respondents (Table 5) 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.

**Table 5: Household size Distribution of the Respondents**

Household size	Frequency	Percentage (%)
1 -5	17	11.33
6 -10	56	37.33
11 – 15	43	28.67
16 – 20	21	14.00
21 and above	13	8.67
<b>Total</b>	<b>150</b>	<b>100.00</b>
<b>Mean:</b>	<b>12 (people)</b>	

Source: **Field survey, 2012.**

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.

**Determination of Income and Expenditures Inequality Between and Within the Respondents:** The result of General Entropy (GE) class of measure for income and expenditures distributions among the respondents in the study area are given in Table 6.

**(i) Determination of Income inequality Distribution between the Respondents**

Using the formula of GE Class of Measure, the distribution of income between respondents was calculated as follows:

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

$I_b$  = distribution of income between respondents

$1 = \alpha$ , from the formula which represents the weight given to distance between incomes at different parts of the distribution.

150 = total number of respondents.

14,829,773.63 =  $y_i$ , from the formula which represents mean summation of each group income (₦).

392,729,630 =  $y$ , from the formula which represents mean summation of total income (₦) (Table 6).

Solving the equation therefore gave:

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

$$= [150(14,829,773.63)/ 392,729,630] - 1; \text{ this gives } = \text{₦ } \underline{\underline{5.66}}$$



is even less than zero (Giroh, Igbinosum, F.O., Ogwuche, P. and Wuranti, V 2008). This also corroborate with the Table 4.7 and Table 4.10 in this study where it clearly shows that only 18% of the total respondents monopolized the gum arabic market while the majority population (82%) had insignificant variation in revenue generated from gum arabic marketing in the area.

### (iii) Determination of Expenditures distribution Between the Respondents

To determine the expenditure distribution between the respondents using the General Entropy formula Class of Measure, we have:

$$Eb = 1[150 (921250.7/7,290,700) - 1]$$

Where:

Eb = expenditures between

1=  $\alpha$ , from the formula which represents the weight given to distance between expenditures at different parts of the distribution.

150 = total number of respondents.

921250.7 =  $y_i$ , from the formula which represents mean summation of each group expenditures (₦)

7,290,700 =  $y$ , from the formula which represents mean summation of total expenditures (₦)

Therefore solving the equation gave:

$$= 1(43687605/7290700) - 1$$

$$Eb, = 5.9922374 - 1 = \text{₦ } 4.99$$

The calculated result for expenditure distribution between the respondents (₦ 4.99) was little, but 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.

### (iv) Determination of Expenditures Distribution Within the Respondents

Using the formula of General Entropy Class of Measure for expenditures distribution within respondents, it was calculated as follows:

$$\begin{aligned} EW &= [1/150(921,250.7/7290,700) - 1] \\ &= 1[(921,250.7/150 \times 7290,700) - 1] \\ &= (921,250.7/1093605000) - 1 \\ &= 8.42398 - 1 \\ EW, &= \text{₦ } 7.424 \end{aligned}$$

The result for expenditure distribution within the respondents as calculated (₦7.424) 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.

## SUMMARY AND RECOMMENDATIONS

Gum arabic marketing is one of the sources of income to many people in Northern Nigeria. The business started since 1914 during the colonial masters; and the first gum Arabic market centers in Nigeria were Gaidam and Damaturu both in the present Yobe state. Income and expenditures among respondents from gum Arabic were analysed to determine the levels of inequality distributions using General Entropy class of measure. The results indicated that there inequality in income generation among the respondents which reflected the variation in their expenditures. The study suggested government to assist the poor resource gum arabic marketers with soft loans to finance their gum arabic business in order to bridge the income inequality among the marketers. 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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