

## CONCENTRATION IN THE NORTH EASTERN NIGERIA'S YAM MARKET: A GINI COEFFICIENT ANALYSIS

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### ABSTRACT

*Policy formulation has failed to take cognizance of the fact that production and marketing constitute a continuum and that the absence of development in one retards progress in the other. The study analysed the concentration of yam markets in southern part of Adamawa and Taraba states. It specifically identified the degree of product differentiation, market information dissemination and determined the concentration of yam sellers in the markets. A total of 410 respondents comprising 210 retailers and 200 wholesalers were randomly sampled using simple random sampling techniques from six purposively selected yam markets namely, Ganye, Nadu and Tola markets in Adamawa State and Wukari, Sarkin-Kudu, and Chanchanjim markets, Taraba State. Descriptive statistics, Gini coefficient and Lorenz Curve were the analytical tools used. The common features used in yam differentiation were yam varieties and size or length and market information were majorly disseminated by means of personal contact (verbal message) and telephone (GSM). The Gini coefficient of 0.56 and 0.52 were obtained for wholesaling and retailing, respectively. The concentration of sales was high with high income inequality in yam wholesaling than retailing in the area. This difference could result from the differences in their access to ownership and control of physical marketing facilities, funds availability and market behaviour and conducts. The markets therefore exhibit features of imperfect markets of oligopolistic competition. To reduce high concentration and income inequality among sellers especially in wholesale business, funds, security and physical market facilities should be provided to the yam marketers in the area.*

**Key word:**, Lorenz Curve, Gini Coefficient Analysis, Yam, Nigeria.

### INTRODUCTION

The world production of yam was estimated at 28.1 million tons in 1993. 96% of this came from West Africa, the main producers being Nigeria with 71% of world production; Côte d'Ivoire 8.1%; Benin 4.3% and Ghana 3.5%. In the humid tropical countries of West Africa, yams are among the most highly regarded food products and are closely integrated into the social, cultural, economic and religious aspects of life (www.fao.org/dorep/X5415E). The ritual, ceremony and superstition often surrounding yam cultivation and utilization in West Africa is a strong indication of the antiquity of use of this crop. Nigeria, the world's largest yam producer, considers it to be a "man's property" and traditional ceremonies still accompany yam production indicating the high status given to the plant. White guinea yam (*Dioscorea rotundata*) is the widely grown and preferred yam species. It is also one of the staple food crops grown in

large scale in Taraba State and southern part of Adamawa State. Though Taraba State has been rated as the second largest Yam producing state in Nigeria with about 2,694,000 metric tons in 2006 (NBS, 2007), Adamawa State, particularly the southern part is known for its large production and marketing of yam. The crop has high nutritional and economic relevance to mankind. The tubers are eaten boiled, roasted, fried and mashed or pounded (Komolafe *et al.*, 2001). In fact, it is acknowledged to be one of the starchy foods which provide an important energy in the tropics (Francis, 2001). It is also noted for its contribution to the growth of the Nigeria economy (Asiedu, 1999).

In view of its importance, marketing of the product becomes pertinent to meet the needs of consumers and also to increase income of the producers and the marketers in Adamawa and Taraba States. The performance and structural

characteristics of yam markets in this area is however uncertain. This therefore calls for a research in this aspect of marketing to determine the existing market structure. Olukosi and Isitor (1990) defined market structure as those features of the organisation of a market that change nature of competition and pricing within the market. These characteristics include the number of buyers and sellers in the market, level of product differentiation, ease or barrier of exit and entry into the markets and knowledge of cost, price and market condition among the marketers in the market.

Market structure in the agricultural and food sectors has changed fundamentally and rapidly since 1950s in developed and developing countries (in the latter countries usually with a delay of three decades or more) (McCorrison *et al.*, 2004; Reardon and Timer, 2005). Reardon and Timer (2005) also stated that it is important to understand the market structure especially the producer-retailer relationship because it helps in the analysis of food chain. Efficient and good marketing system can only operate where there is fully utilized good market structure and conduct (Adegeye and Dittoh, 1985). Adekanye (1977) enumerated some basic decision needs to be taken on the food market structure that would lead to more effective market performance as (i) perfect competition (ii) perfect market and (iii) pricing efficiency. Another important variable in market structure analysis as stated by Okereke and Anthonio (1988) is concentration level which shows the nature of the market and pricing system.

In the opinion of Okereke and Anthonio (1988), the grain wholesaling and retailing in the eastern part of Nigeria was that of monopolistic competition. They further described the market as characterized by the presence of large number of buyers and sellers, with greater degree of concentration in the wholesale than in the retail sub-sector of the market. Ada-Okungbowa (1998) and Anuebunwa (2002) on the analyses of yam market structure in Ondo and Abia States respectively indicated high degree of inequality in income distribution among the yam sellers and that the markets were highly concentrated, exhibiting features of oligopoly. Previous studies on the marketing and pricing of staple foodstuffs in different parts of Nigeria have concluded that the marketing and pricing information transmission mechanism are inefficient, although there are many buyers and sellers in the market (Anthonio, 1968; Jones, 1969; Thodey, 1969; Dittoh, 1994; Bila and Bulama 2005; Ndaghu, *et al.*, 2011). The paucity of physical infrastructure such as storage facilities, transportation systems, access roads, communications channels and inadequacy of

economic data for planning and research are some of the factors identified as source of inefficiency. Others include a high number of intermediaries in the marketing chain, high concentration of food stuff marketing at wholesale level, as well as high and erratic prices which will further depress the level of agricultural production. Thus, oligopolistic competition is present in foodstuff marketing in Nigeria (Okoh and Akintola, 2005)

To build a profitable business, food producers seek to establish a preference to their products by differentiating those products, in some ways which are meaningful to consumers (Crawford, 1997). Methods utilized in order to differentiate a product include branding, advertising, packaging and the altering of the goods' physical characteristics such as colour and accessories. Okereke and Anthonio (1988) found out that in marketing of grain in eastern Nigeria, the distributors sell similar but not identical products and products differentiation were in terms of the size, colour and quality of grain sold. Bila and Bulama (2005); Adinya *et al.* (2007) on their studies of market structure of Maiduguri Cattle Market and Ofatura Goat Market showed that the products were differentiated based on the size, age, weight, colour and breeds of the animals.

According to Shephard (1997) and Yu zhou *et al.* (2011) producers and traders require a range of different types of marketing information. In addition to price and supplies, information is required on alternative channels, quality, means of payment and financing. Lyon (2001) reaffirmed that there is need for traders' personal network and social capital in obtaining market information. Market orientation is considered one of the modern powers of growth for the agricultural sector (Okereke and Anthonio, 1988). The role of market information is to reduce the level of risk in decision making. Through market information the sellers find out what the consumers need and wants. Crawford (1997) stated that the most important channels that marketers look out for in information are the transporters, where there is a change in market price of any product or service in the market, those closer to transporters' office get it first. Information can easily flow between sellers and buyers through personal contact (Bila and Bulama, 2005). A number of factors have been documented as influencing or stimulating trade (Anuebunwa, 2002). These include population, migration and urbanization, natural resources endowments, disposable income, ecological differences and demand level (Onyemelukwe *et al.*, 1997). There is dearth of knowledge and information on the structure and conduct of yam marketing in north eastern Nigeria in general

and Adamawa and Taraba States in particular.. The study extends the analysis of the market structure to the retail and wholesale. This is imperative since adequate structured markets and marketing of yam will enhance the activities of the producers and the marketers which invariably improve their standard of living.

## MATERIALS AND METHOD

### Sampling Techniques and Procedure

Multi-stage, purposive and simple random sampling techniques were adopted in selecting respondents for the study. In the first stage, out of the six states that made up the North eastern geopolitical zone, namely; Adamawa, Bauchi, Borno, Gombe, Taraba and Yobe State. Adamawa and Taraba States were purposively sampled based on their relative importance in yam production vis-à-vis marketing. The second stage was also the purposive selection of Adamawa and Taraba southern senatorial districts also based on the knowledge that production and marketing activities of yam take place in those zones more than any other zones in the states. Three local government areas each were sampled from Adamawa and Taraba states; Mayo-belwa, Ganye and Toungo from Adamawa State and Ibi, Takum and Wukari from Taraba State. One most popular yam market was purposively selected out of each of the three Local Government Areas selected. These markets were: Ganye main market in Ganye, Tola market in Mayo-belwa and Nadu market in Toungo as well as Wukari main yam market in Wukari, Sarkin-Kudu yam market from Ibi and Chanchanji yam market from Takum Local Government Areas. Unlike in Taraba state where there were strictly yam markets, in Adamawa State the markets were heterogeneous in nature as lots of other agricultural commodities are found though yam dominate the marketing activities.

The sampling frame for the selection of the respondents were collected from the heads of wholesalers and retailers marketing association. From these lists, each wholesalers and retailers were randomly selected giving a total of 410 respondents from the sampled markets in Adamawa and Taraba States. There were 200 and 210 wholesalers and retailers respectively.

### Analytical techniques

Descriptive statistics, Gini Coefficient and Lorenz Curve were employed in analysing the data. Okereke and Anthonio (1988), Bila and Bulama (2005), and Ndaghu *et al.*, 2011 used

Gini coefficient to determine the degree of market concentration of grains markets, Maiduguri Cattle Markets and vegetable markets respectively and adopted the formula thus;

$$G.C. = 1 - \sum XY$$

Where

$$G.C. = \text{Gini Coefficient}$$

$$X = \text{Percentage share of each class or sellers}$$

$$Y = \text{Cumulative percentage of their sales}$$

The Gini coefficient has values ranging between zero to one. A perfect equality in concentration (low) of sellers is expected if G.C. tends towards zero, while perfect inequality in concentration (high) of sellers is expected if G.C. tends towards one. If G.C. =1, market is imperfect and if G.C. = 0, market is perfect and competitive.

Lorenz Curve was used to give a visualized nature of the sellers' concentration in the markets through a graphical representation. The graph of cumulative percentage of total sales is plotted against the cumulative percentage of the sellers.

It is used in economics to describe inequality in income or wealth (Damagaard, 2008). If all individuals are of the same size, the Lorenz Curve indicates straight diagonal line (45°), called the line of equality, if there is any inequality in size then the Lorenz Curve falls below the line of equality (45°).

## RESULTS AND DISCUSSION

The study revealed that 51.22% of the respondents (wholesalers and retailers) differentiate the product by varieties and 39.51% differentiate by size/length of the product. This indicates that yam tubers in the markets were not considered the same in the eyes of sellers and buyers. This support the definition of product differentiation given by Olukosi and Isitor (1990) that product is differentiated when it looks different in the eyes of the consumers. Investigation also reveals that the common varieties of yam found in the markets were: "MUMUYE, GBONGO, OGOJA, PAPPER and PUNCH". The price attached to yam tubers depend so greatly on the varieties and size or length. This implies that knowing the common features used in differentiating the produce (yam) affects the respondents' income positively.

**Table 1: Distribution of Respondents by Product Differentiation**

Ways of differentiation	No. of respondent	Percentage
Based on yam bark colour	18	4.39
Based on yam bark texture	20	4.88
Based on yam varieties	210	51.22
Based on yam size/length	162	39.51
Total	410	100.00

Source: field Survey, 2008

**Table 2: Distribution of Respondents by Source of Information**

Source of information	No. of respondents	Percentage
Radio/Television	20	4.88
Posters / kleaflet	2	0.49
Transporters /drivers	56	13.66
Other marketers	300	73.17
Others	132	7.80
Total	410	100.00

Source: Field Survey, 2008

**Table 3: Distribution of Respondents by Means of Communication**

Means of communication	No. of respondents	Percentage
Telephone (GSM)	176	43.41
Written letter	8	1.95
Personal contact (verbal message)	220	53.66
Others	4	0.98
Total	410	100.00

Source: Field Survey, 2008

Table 2 shows the source of information in the markets. It reveals that 73.17% of the respondents got market information through other marketers, family members, friends, relatives, neighbours and so on. Other sources of information include transporters/drivers, radio/television and others constituting 13.66% 4.88% and 7.80% respectively. This revelation is in consonant with that of Okereke (1988) that 74% and 77% of wholesalers and retailers respectively obtained market information informally from friends and colleagues meaning that market information are asymmetry. The implication of this asymmetric information according to Rashid (2010) and Rashid and Minot (2011) is that it brings about market segmentation, wider marketing margin and mistrust in the whole marketing system thereby begetting an inefficiency in the market. Table 3 indicates various means in which market

information were passed onto other marketers. The study reveals that verbal message (personal contact) was the most common means of disseminating market information among traders. Another means commonly used was telephone (GSM) with 43.41%. This agreed with findings of Bila and Bulama (2005) that information transfer among sellers and between sellers and buyers were through personal contact in Maiduguri cattle markets. Verbal message was commonly used probably because the receivers get detail market information and questions asked were properly answered. Furthermore, in using this means, message obtained are reliable. Telephone (GSM) was also used because most of the areas were covered with different communication networks. In addition, their literacy level of 85.37% could be an added advantage for using this means.

**Table 4: Computations of Gini Coefficient for Retailers by Monthly Sales in Southern Taraba State Yam Markets**

Monthly sales	No. of retailers	% of retailers	Cum % of retailers	Total value of monthly sales	% of total sales	Cum % of sales (Y)	$\Sigma XY$
0-17,000	2	1.05	1.05	8,555.71	0.12	0.12	<b>0.00001</b>
17,001-34,000	16	8.42	9.47	203,981.69	2.88	3.00	<b>0.00253</b>
34,001-51,000	26	13.68	23.15	551,716.23	7.79	10.79	<b>0.001476</b>
51,001-68,000	28	14.74	37.89	831,343.94	11.74	22.53	<b>0.03321</b>
68,001-85,000	44	23.16	61.05	1,679,121.62	23.71	46.24	<b>0.10709</b>
85,001-102,000	38	20.00	81.05	1,772,048.49	25.03	71.27	<b>0.14254</b>
102,001-119,000	30	15.79	96.84	1,653,115.65	23.34	94.61	<b>0.14939</b>
>119,000	6	3.16	100.00	381,449.13	5.39	100.00	<b>0.03160</b>
<b>TOTAL</b>	<b>190</b>	<b>100.00</b>		<b>7,081,332.46</b>	<b>100</b>		<b>0.48113</b>

Source: Field Survey, 2008

$$\begin{aligned} \text{Mean value of retailers monthly sales} &= \text{N}74,540.34 \\ \text{G.C} &= \frac{1-\Sigma XY}{1-0.48113} \\ \text{G.C} &= 0.52 \end{aligned}$$

**Table 5: Computations of Gini Coefficient for Wholesalers by Monthly Sales in Southern Taraba Yam Markets**

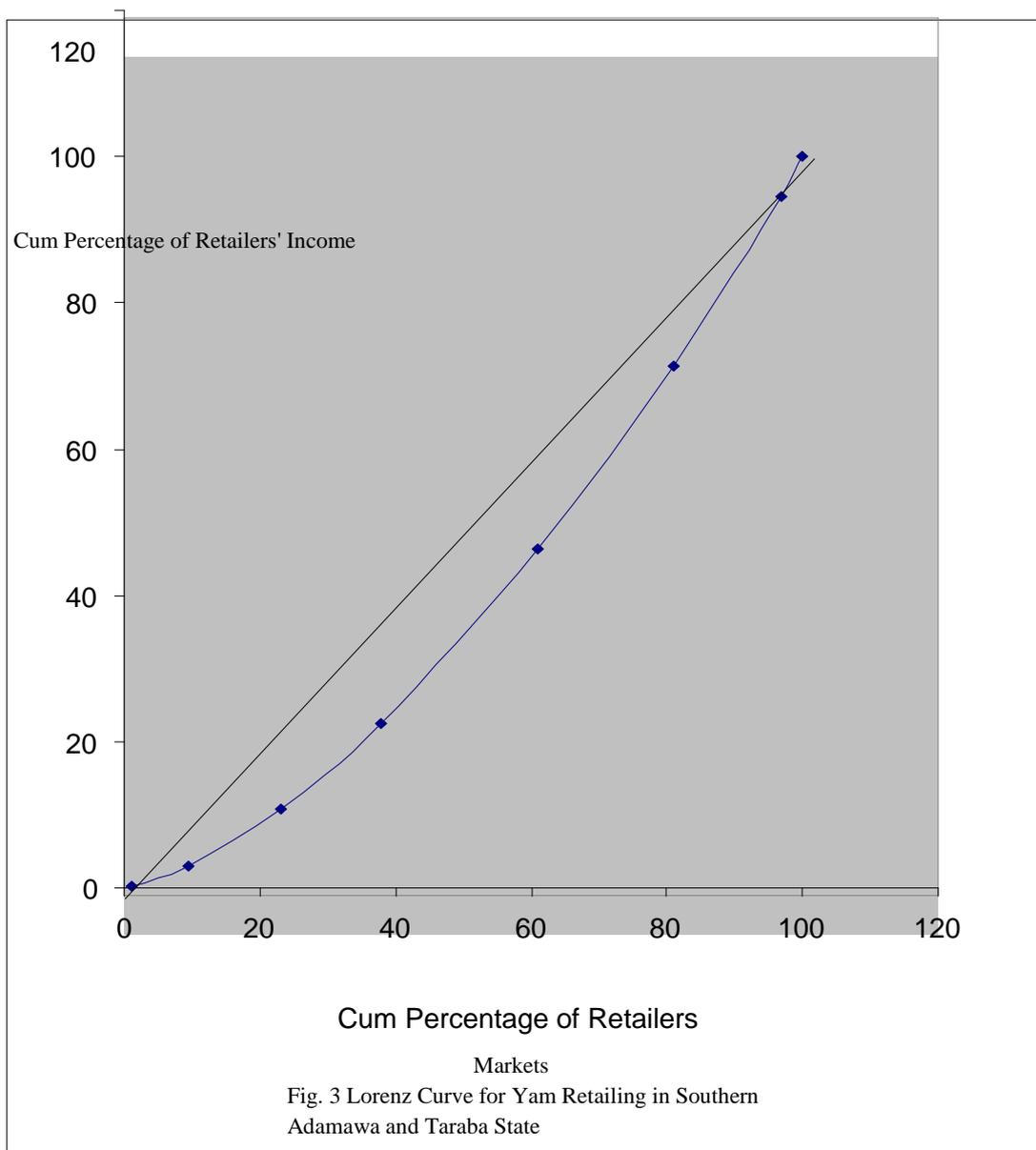
Monthly sales	No. of wholesalers	% of wholesalers	Cum % of wholesalers	Total value of monthly sales	% of total sales	Cum % of sales (Y)	$\Sigma XY$
1-582000	8	3.64	3.64	1,163,330.76	0.62	0.62	0.00023
582001-1164000	64	29.09	32.73	27,915,286.08	14.91	15.53	0.04518
1164001-1746000	72	32.73	65.46	52,339,416.84	27.95	43.48	0.14231
1746001-2328000	30	13.63	79.09	30,530,890.35	16.30	59.78	0.08148
2328001-2910000	18	8.18	87.27	23,552,214.21	12.58	72.36	0.05919
2910001-3492000	10	4.45	91.82	15,992,163.45	8.54	80.90	0.03681
3492001-4074000	12	5.45	97.27	22,679,716.14	12.11	93.01	0.05069
>4074000	6	2.73	100.00	13,084,418.07	6.99	100	0.02730
<b>TOTAL</b>	<b>210</b>	<b>100.00</b>		<b>187,257,435.90</b>	<b>100.00</b>		<b>0.44319</b>

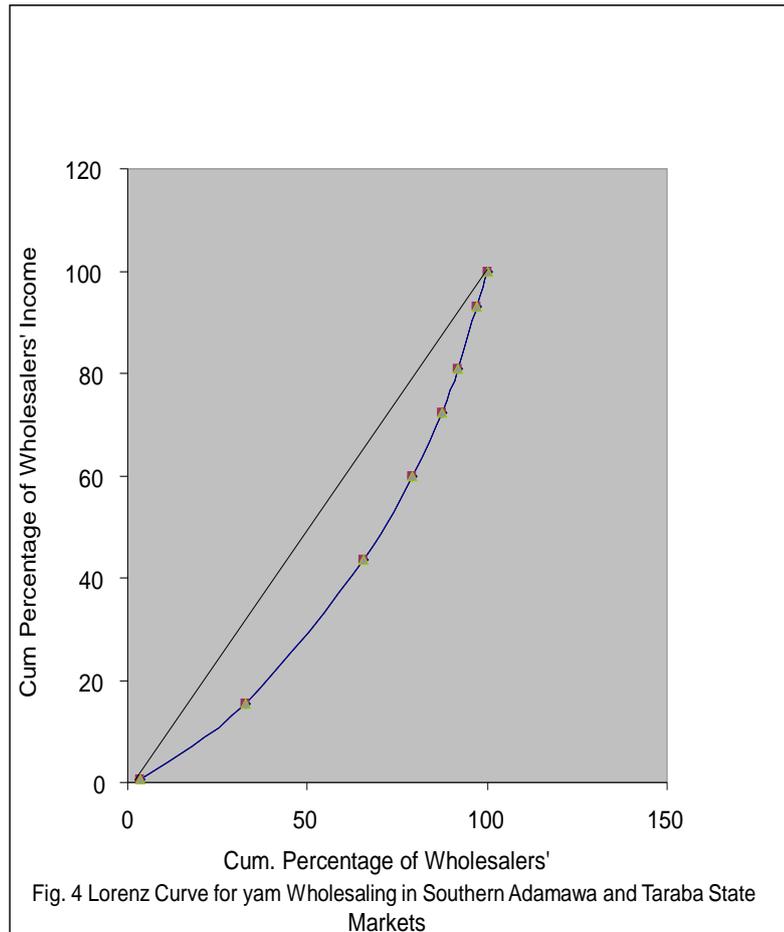
Source: Field survey, 2008

$$\begin{aligned} \text{Mean value of monthly wholesaling} &= \text{N}170,340.00 \\ \text{G.C} &= \frac{1-\Sigma XY}{1-0.44319} \\ \text{G.C} &= 0.5 \end{aligned}$$

The result of Gini coefficient analysis shown in Tables 4 and 5 for retailing and wholesaling, respectively indicates high level of inequality in sellers' incomes and hence high level of concentration. Though, there was a relatively high income inequality and level of concentration in wholesaling (0.56) than retailing (0.52). This result agreed with the separate studies carried out by Ada-Okungbowa (1998) and Anuebunwa (2002) on yam sellers' concentration in Ondo and Abia states that there is high degree of inequality in sellers' income and that the markets were highly concentrated. The Lorenz curves shown in Figure 1 and 2 are for retailing and wholesaling, respectively. The divergence of the observed curves from the line of equal distribution (LED) gives a visual

measure of concentration of both types of sellers in yam marketing in the area. The curve for retailing indicates that 52% of the retailers account for 36.93% of the total monthly sales so that the remaining (48% of the retailers) are responsible for 63.07% of the total monthly sales. In the case of wholesalers, it reveals that 56% of the wholesalers account for 37.2% of the total monthly sales so that the remaining (44% of the wholesalers) are responsible for 62.8% of the total monthly sales in the area. This Gini index therefore, implies that there were income inequality in both retailing and wholesaling thus, high concentration of sellers and market power in the yam markets. These are features of imperfect market of monopolistic nature.





## CONCLUSION

The study revealed that market information is asymmetry in nature. The yam tubers were differentiated in so many ways in the markets. Analysis unfolded that the sellers' concentration was high with high income inequality and market power exhibiting features of imperfect market of oligopolistic nature.

## RECOMMENDATIONS

The exhibit of admixture of yam tubers with different sizes and varieties in the same heap for sale calls for adequate grading and standardization. This encourages collusive behaviour. Some degrees of concentration of sales exist in the yam market with greater concentration in the wholesale market. These features imply that the yam market is oligopolistic in nature and tends to expose the market towards higher profit and higher scope for middlemen exploitation. The study also calls for a good communication network to be established so as to add value to the market.

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