



# SPATIAL CONCENTRATION OF TRADERS IN SPECIALIZED AGRICULTURAL FOOD-PRODUCTS MARKETS OF KANO METROPOLIS, NIGERIA

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## Abstract

**T**his study examined the degree of spatial concentration of traders in specialized agricultural food product-markets in Kano Metropolis. Census was undertaken to establish the number of traders in the markets. The sampled respondents were drawn using simple random sampling technique. Also, data on amount of sales were collected using interview schedule. The period of the data collection was from January to December, 2011. Spatial indices, i.e. Location Quotient, Gini Co-efficient and Lorenz Curve, were used to measure the degree of spatial concentration of the traders. The absolute concentration showed that the number of the participants was large, which is an indication that the markets were large in size, which would provide impetus for competition. The Location Quotient showed higher concentration of suppliers and wholesalers in Dawanau market and higher concentration of retailers in Yan Kaba market. Gini Coefficient indicated that the markets as regards suppliers (0.05) and retailers (0.29) were unconcentrated. For wholesalers, higher values (0.38) of the Gini values meant medium concentration. The Lorenz Curve of wholesalers revealed a relatively wider area, between the equality and concave lines, than those of suppliers and retailers. This is an indication of relatively higher concentration. Generally speaking the indices revealed the efficiency and importance of the markets in the area. To improve the efficiency of the markets by reducing concentration it was recommended that there should be provision of market infrastructure, institutional credits support by marketing cooperatives, efficient and technical extension services and easy access to market information.

**Keywords:** Market Structure, Efficiency, Location Quotient, Suppliers

## INTRODUCTION

The world over, growth of cities resulting from urbanization has continued at an exponential rate, although it is fastest and most expansive in developing areas of the world. Due to growth of cities and consequent increase in poverty, there is the need to understand how distribution of urban food systems works and finding ways to ensure that they remain sustainable. In Nigeria, high demand for food requires urgent supply response to prevent widespread famine, especially among low income consumers (Akinlade *et al.*, 2013). However, Porter *et al.* (2004) observed that despite the rapid urbanization and increasing levels of urban poverty, urban food systems were rarely adequately considered in African urban development studies and, therefore, suggested the need for knowledge about how food marketing systems operate in order to assist and support the growing number of urban and peri-urban food producers and producer-marketers now in existence. This becomes especially imperative for Kano which has long been a great centre of demand for food, eliciting



spontaneous responses from farmers and traders over a wide territory. The wholesale or regional markets in Kano Metropolis have their influences extended into other parts of Nigeria and neighbouring countries; they serve the double functions of consumption centres and break-of-bulk and transshipment points (Ariyo *et al.*, 2001).

It has been observed that indigenous marketing systems in developing countries were generally exploitative, collusive and economically inefficient (Ajala and Adesehinwa, 2008), and markets for agricultural products in Nigeria were not perfectly competitive due to collusive tendencies of sellers who form associations for particular products (Diaet *et al.*, 2013). There is the need to ascertain these assertions, particularly with respect to markets for agricultural food products in Kano Metropolis.

Different aspects of markets of Kano Metropolis have been investigated: evolutionary trend and spatial distribution of markets (Ibrahim, 2014), challenges in marketing of agricultural food products and the implications on food security (Gambo, 2014), market organization for specialized agricultural food products (Gambo, 2015b), post harvest spoilage fungi associated with sweet oranges traded (Bukaret *et al.*, 2009), profitability analysis of rice processing and marketing (Inuwa *et al.*, 2011), profitability analysis of fruits trade in Yan Lemo market (Gambo, 2015a), spatial and temporal pricing efficiencies of fruits in Yan Lemo market (Gambo, 2015c) and selected vegetables of Yan Kaba market (Gambo, 2015f), wholesale operational efficiency of grains trade in Dawanau market (Gambo, 2015e), marketing margin for selected agricultural food products (Gambo, 2015d) and variability of concentration of freight vehicles in specialized agricultural products market (Gambo and Farouq, 2015).

One aspect that needs research attention now is market concentration of traders, which is an important determinant of competition. In fact, it is the most important element of market structure because it depicts a situation in which a few large firms have the largest share of the business (Tiku *et al.*, 2012). Level of concentration has attracted research attentions in different parts of the world. On industrial concentration, Naude (2006) identified previous researches in USA, France and New Zealand, and examined level of concentration of the manufacturing industry in South Africa. Studies were conducted on spatial concentration in the Irish pharmaceutical industry (Egeraat, 2013) and employment in India (Chandrasekhar and Sharma, 2014). On markets, some of the studies included effects of concentration in markets affecting agriculture in USA (Domina and Taylor, 2009), principle of crop concentration in Cauvery basin region of Tamil Nadu in India (Yuvaraj, 2014) and market concentration and product variety under spatial competition for retail gasoline in Austria (Gotz and Gugler, 2006).

As a notable area of commercial activities, Kano Metropolis requires research attention on market concentration. Thus, this study was conducted to address this issue. The aim of the study is to examine the number of traders and amount of sales in specialized agricultural food product-markets in Kano Metropolis so as to determine the degree of spatial concentration. To achieve this aim, three objectives were set: (i) to identify and establish the number of traders and amount of sales in the markets; (ii) to assess the levels of concentration of the traders; and (iii) to compare between the markets in terms of the trader concentration.



## **THEORETICAL AND CONCEPTUAL BASES**

### **New Trade Theory**

The new trade theory was established between 1980s and 1990s. Prominent among the theorists was Paul Krugman. The theory gives explanation of the actual pattern of trade between countries that are similarly endowed with regard to factor endowments, tastes, technology, etc., different from traditional trade theory that explains trade between differently endowed countries either in terms of technology, according to David Ricardo or in terms of factor endowments, as put forward by Heckscher-Ohlin. The main objective of the new trade theory is to explain trade patterns based on increasing returns, monopolistic competition of product differentiation and large scale production (Peet and Hartwick, 2009; Ahmed, 2012).

In terms of level of concentration, increasing returns and the differentiation of products can provide important information. The more developed countries or areas are the more they are going to attract the very successful industries or other business activities. As countries have similar levels of wealth, then the concentration is going to be weak. On the other hand, greater concentration of the activities is going to be determined by important differences of incomes (Ceapraz, 2008).

### **Market Concentration**

One of the most important aspects of structure is the degree of market concentration (Punitha (2007), which describes the size distribution of buyers and sellers in the market (Musa, 2003). Market concentration is a measure of the proportion of the total market share accounted for by the top largest firms in an industry, and it is a function of the number of firms and their respective shares of the total production or sales. With increase in market concentration, there is decrease in competition and efficiency, and consequently chances of collusion and monopoly increase. The implication is that a higher concentration measure means a higher level of lack of competition, so that few participants dominate the market (Kanyenga and Mangisoni, 2014). Market concentration is related to market power, which exists when one buyer or seller in a market has the ability to exert significant influence over the quantity of goods and services traded or the price at which they are sold. With market power, effective competition will not be present (Domina and Taylor, 2009).

There are two dimensions of market concentration: economic and spatial. Economic concentration involves calculations of basic statistical measurements where the geographical properties of the data do not play any role (Ajala and Adesehinwa, 2008). The number of functionaries operating in the market and distribution of trade among them influence the market competition, and that "if the prices are to be competitive, the trade should not be concentrated in the hands of few buyers so that a few large traders do not exert any market power to manipulate the prices by collusive tactics" (Punitha, 2007).

Spatial concentration can be defined as the analysis of the location in the space of some defined sectors (like industrial or marketing activities) and classified in two ways (Ceapraz, 2008): (i) in an absolute sense which involves analysis of size distribution of an industry between the various selected geographical areas, with no attempt to relate to the average of the size distribution or with other



activities of the industry and (ii) in a relative manner involving analysis of the size distribution of the activities of an industry compared to the average of the distribution of the whole of the activities and other activities.

### **Market Structure**

Market structure has been defined “as those characteristics of the organization of a market which seem to influence strategically the nature of competition and pricing within the market” and the ideal market structure for optimum efficiency is pure competition (Olukosi *et.al*, 2005). According to Moro (1996) market structure means “power relationships between buyers and sellers and how well the market performs” or as “the characteristics of a market with respect to where it falls in the level of competition between monopoly and competition”. So, a combination of competition and market gives market structure.

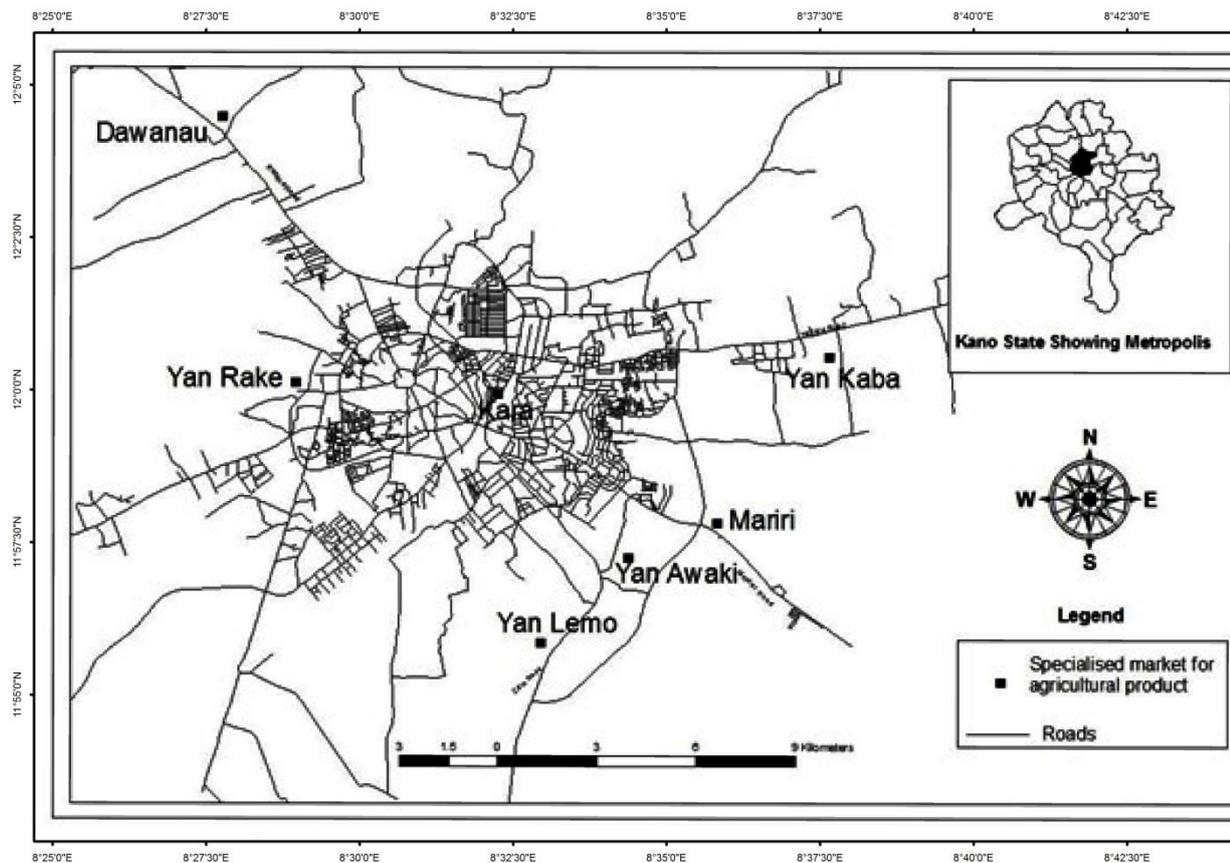
The factors that are considered in determining market structure are number and size of sellers and buyers, nature of products, entry and exit conditions and market knowledge. These give rise to four types of seller market structures: (i) Atomistic (or pure) competition, which is characterized by many sellers of standardized products, with no barriers to entry. It becomes perfect competition when there is perfect market knowledge (ii) Monopolistic competition, which has to do with many sellers of differentiated products, with no barriers to entry. (iii) Oligopoly. This is divided into pure oligopoly, which is characterized by few sellers of standardized products and differentiated oligopoly that is characterized by few sellers of differentiated products, all with barriers to entry. (iv) Monopoly. It is characterized by one seller of unique product, with barriers to entry (Olukosi *et al.*, 2005).

### **Specialized Markets**

Specialized markets are the ones that specialize in the sale of a particular or collection of similar commodities. These types of markets can be agricultural and non-agricultural. In Kano Metropolis, there are seven main specialized markets for agricultural products: Dawanau for grains and tubers, Yan Lemo for fruits, Yan Kaba for vegetables, Mariri for kola nut, Yan Awaki for animals, Kara for animals and Yan Rake for sugarcane (Gambo, 2015e).

### **STUDY AREA**

Kano metropolis is located between latitudes 11° 54'N to 12° 06'N and longitudes 8° 25'E to 8° 40'E (Fig. 1). It is the largest industrial and commercial centre in Northern Nigeria experiencing a rapid growth rate (Nabegu, 2008). There have been two levels in commercial hierarchy of the metropolis. At the apex, there are three commercial units: the Kurmi, the Sabon Gari market and Central Business District (CBD). At the lower level are four all-purpose markets (Wambai, Rimi, Tarauni and Gama) and sixteen specialized markets (Kwari, Kofar Ruwa, Yan Kaba, Kwanar Singa, Dawanau, Yan Lemo, Kara Abattoir, Farm Centre, Akija, Yan Goro of Mariri, WAPA, Yan Katako, Yan Kekuna, Yan Taya, Yan Itace and Yan Rake ). The specialized markets for agricultural food products came into being in the post-colonial time. Before, they were part of all-purpose markets (Falola, 2002; Liman and Adamu, 2003; Ibrahim, 2014).



Source: Kano State Ministry of Land and Physical Planning (2008)

Figure 1: Location of Specialized Agricultural Products Markets in Urban Kano

The study centres on specialized agricultural food products markets in the metropolis with particular attention to Dawanau, Yan Lemo and Yan Kaba markets. Dawanau Grains and Tubers Market is located along Katsina road some 20km outside Kano and falls in Dawakin Tofa local government area. Its relative location and functions in the urban Kano justify its consideration and inclusion in this research. Yan Lemo Fruits Market is located at Maikalwa in Kumbotso local government area, along Zaria road, about 11 km from the ancient city of Kano. Yan Kaba Vegetable Market is located at Yan Kaba along Hadejia road, in Nassarawa local government area. The main reason that influenced their choice each of the markets specializes in the marketing of a large scale of products especially important in the diet: tubers and grains, vegetables and fruits.

## MATERIAL AND METHODS

### Method of Data Collection for the Study

The data obtained include number of traders and amount of sales. Market census was conducted to identify the number of traders. Interview schedule was used to establish the amount of sales of the traders. In all the markets, three different interview schedules were used to collect data from suppliers, wholesalers and retailers, who formed the population for the study. The sampled respondents were drawn using 33% sample size and simple random sampling technique, based on Neuman (2003). In Dawanau Market, 434 samples were drawn from a population of 1315 suppliers, 984 samples from a population of wholesalers and 152 samples from a population of 461 retailers. In



Yan Lemo Market, 707 samples were drawn from a population of 2142 suppliers, 161 samples from a population of 488 wholesalers and 75 samples from a population of 227 retailers. For Yan Kaba Market, 393 samples were drawn from a population of 1191 suppliers, 467 samples from a population of 1415 wholesalers and 630 samples from a population of 1909 retailers. The period of the data collection was from January to December, 2012. Informal discussions were held with the traders so as to shed more light on their number and amount of sales.

### Method of Data Analysis

The number of traders and average amount of sales (of the monthly fluctuations) were converted to percentages for the determination of the spatial concentration. Location Quotient, Gini Co-efficient and Lorenz Curve were the indices used to measure the degree of spatial concentration of the traders (Waugh, 1995; Robinson, 1998; Ajala and Adesehinwa, 2008; Tiku *et al.*, 2012). The application of the indices was done with the aid of Microsoft Excel 2007.

Location Quotient compares an area's share of a particular activity with the area's share of some basic or aggregate phenomenon. High values of the Location Quotient, i.e. greater than 1, indicate high degree of concentration of a particular activity in area. Low values, i.e. of less than 1, show that the area's share of the activity is less than as is generally found among the areas. If the value of Location Quotient is equal to 1, it is an indication that the distribution is the same as the general average.

$$LQ = \frac{a_x/c}{b_x/d}$$

where

LQ = Location Quotient

$a_x$  = Number of traders of a given marketing function in a particular market

$c$  = Total number of traders for the markets

$b_x$  = Amount of sales in a particular market

$d$  = Total amount of sales

For data in percentages, the equation becomes:

$$LQ = \frac{x}{y}$$

where

$x$  = percentage of activity  $x$  in an area

$y$  = percentage of activity  $y$  in an area

Gini Co-efficient, as an alternative measure of dissimilarity, compares the distribution of an attribute within a population with a hypothetical distribution. The range of Gini coefficient is from 0 to 100, which expresses the extent of market concentration or dissimilarity. At 0, there is unconcentration or perfect equality in the size and distribution of market functionaries. Gini values between 0 and 33% show low market concentration or high similarity. Between 34% and 50%, there is medium concentration or dissimilarity. Above 50%, there is high concentration, which becomes maximum or perfect at 100%.

$$G = \frac{1}{2}(x-y)$$

where

G = Gini Coefficient

x = Percentage values of one attribute

y = Percentage values of another attribute

Lorenz curve was used to vividly illustrate the spatial inequalities in the distribution of the traders in the markets. Perfectly even distribution is represented by a diagonal line or line of equality. The degree of concentration of the traders is represented by curved line (Figure 2). The greater the inequality (high concentration) of the distribution, the greater will be the curvature of the line. To construct the Lorenz Curve, cumulative percentages of x and y are used.

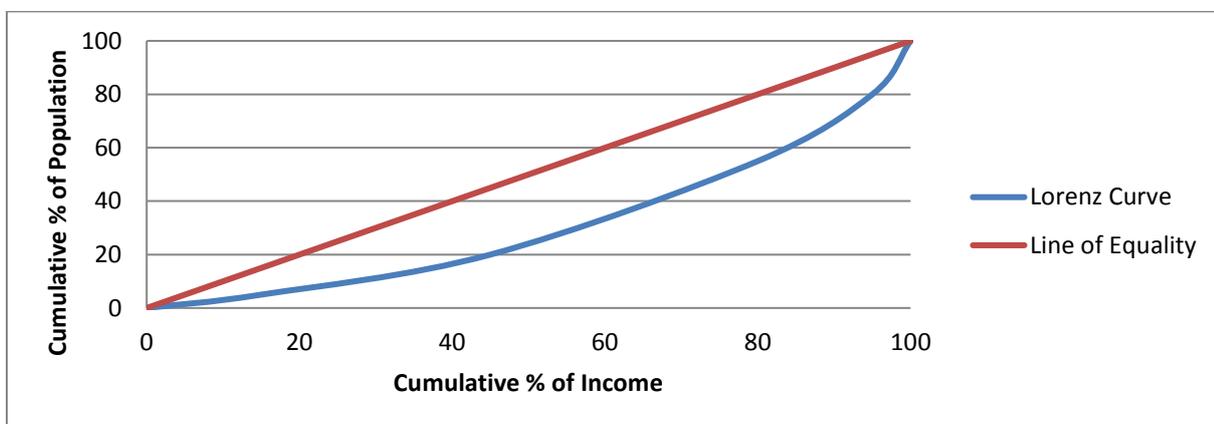


Figure 2: Lorenz Curve

## RESULTS AND DISCUSSION

### Absolute Spatial Concentration

Yan Lemo market recorded the highest average number of suppliers (707) because of its diverse sources of supply. However, a supplier at Dawanau and Yan Kaba markets could be dealing with different number of products. Also, it had the highest amount of sales (Table 1). Dawanau market had the largest concentration of wholesalers (984) because of the large number of products available. Yan Lemo market had the lowest number of wholesalers but highest amount of sales because a particular wholesaler could deal with many suppliers (Table 2). Again, there were more retailers at Yan Kaba (630) because of constant demand of the products by households, and also, had high amount of sales. The lowest number of retailers was in Yan Lemo market (75) because the demand for its products is not as with other markets, and most of the retail activities is outside the market, in different neighbourhoods of the city and beyond (Table 3). The number of the participants is large, which is an indication that the markets are large in size. The general observation is that large market places will be associated with high volume of attendance because it could provide the required threshold for a variety of goods and services. The existing marketing system of fruits and vegetables is characterized by a large number of small traders and competition (Babatola, 2004).



## Relative Spatial Concentration

### (i) Spatial Concentration of Suppliers

Table 1 provides Location Quotient, Gini Coefficient and cumulative percentages of suppliers. The location quotient of suppliers, above 1, shows relatively high concentration in Dawanau market. For Yan Kaba market, the value is almost 1 which indicates medium concentration. In Yan Lemo market, there was low concentration as indicated by low location quotient, below 1. The location quotients for the three markets were further presented in Figure 6.

For Gini Coefficient, the low values of 05(0.05) show that the markets had very low concentration. That shows that the markets, as regards suppliers, were spatially similar. There was relatively equal distribution of traders in comparison with their amount of sales. Dia *et al.* (2013) in their analysis of honey trade flow obtained a much higher value (0.63), which was an indication of inequality in the seller concentration in relation to sales revenue.

For the Lorenz Curve (Figure 3), the concave line is not far from the equality line, which indicates fairly equal distribution (low concentration) of suppliers in relation to amount of sales. This is almost in line with Akanni (2012) in Southwestern Nigeria who established a close distance between the equality line and the Lorenz Curve for maize grain, which indicated equality in the distribution among marketers. The implication he observed was that a major share of the quantity transacted was controlled by many marketers. However, there was greater equality for Yan Lemo because it is at a point where the concave line meets the equality line (100, 100), indicating a ratio 1% amount of sale for every 1% supplier. The curve widens at Dawanau and Yan Kaba markets, which is an indication of high concentration. This shows that less number of suppliers controlled the market in relation to amount of sales.

**Table 1: Location Quotients, Gini Coefficients and Cumulative Percentages of Suppliers**

Markets	No. of Traders (x)	Amount of Sales (y)	% (x)	% (y)	Location quotient (x/y)	Gini C. $\frac{1}{2}$ (x-y)	Cumulative % of x	Cumulative % of y
							0	0
Dawanau	434	353040	28	23	1.22224	05	28	23
Yan Kaba	393	385955	26	25	1.01239	05	54	48
Yan Lemo	707	786167	46	52	0.89412	00	100	100
Total	1534	1525162	100	100		05		

Source: Fieldwork (2012)

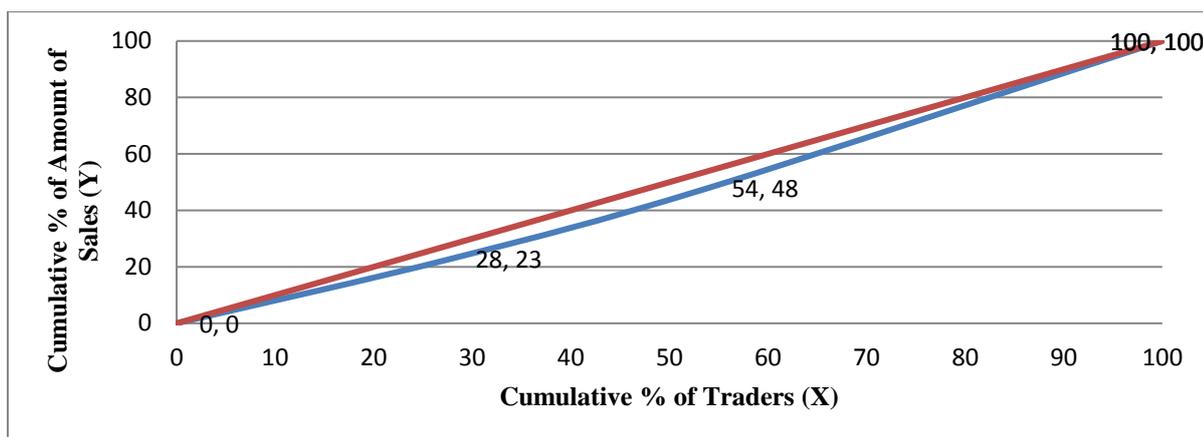


Figure 3: Lorenz Curve for Concentration of Suppliers

### (ii) Concentration of Wholesalers

In Table 2, Location Quotient shows that there was greater concentration of wholesalers in Dawanau market (2.60). The location quotient values for Yan Lemo and Yan Kaba markets were highly unconcentrated (all far below 1). Figure 6 further illustrates these.

The Gini Coefficient value of 38 (0.38) is illustrative of relatively medium concentration of wholesalers in the markets (Table 2). In the analysis of marketing of Fresh Okra in Ebonyi State, Nigeria, Anuebunwa (2008) obtained a much higher value (0.812), so that the distribution of the wholesalers by average size and total of monthly sales indicated a high degree of concentration. In addition, Ajala and Adesehinwa (2008) obtained 0.59 as Gini values after analyzing pig marketing for Zango Kataf Local Government Area of Kaduna State, Nigeria. This signifies inequality in size distribution and wholesaler concentration.

The Lorenz Curve (Figure 4) shows slightly greater concavity, higher inequality, than that of suppliers (as presented earlier in Figure 2). This is in line with the distribution of cowpea marketers in Southwestern Nigeria whereby the fairly close distance between the equality line and the Lorenz Curve, indicated fair distribution (Akanni, 2012). For Dawanau market, the concave line indicates that there were 61% of wholesalers of grains based on 23% of amount of sales. The curve widens more, indicating higher concentration. It closes at Yan Lemo market indicating that the market was unconcentrated.

Table 2: Location Quotients, Gini Coefficients and Cumulative Percentages of Wholesalers

Markets	No. of Traders	Amount of Sales	% (x)	% (y)	Location quotient (x/y)	Gini $\frac{1}{2} (x-y)$	Cumulative % of x	Cumulative % of y
							0	0
Dawanau	984	382008	61	23	2.60264	18	61	23
Yan Kaba	467	453436	29	49	0.59479	20	90	82
Yan Lemo	161	793316	10	28	0.35876	38	100	100
Total	1612	1628760	100	100		38		

Source: Fieldwork (2012)

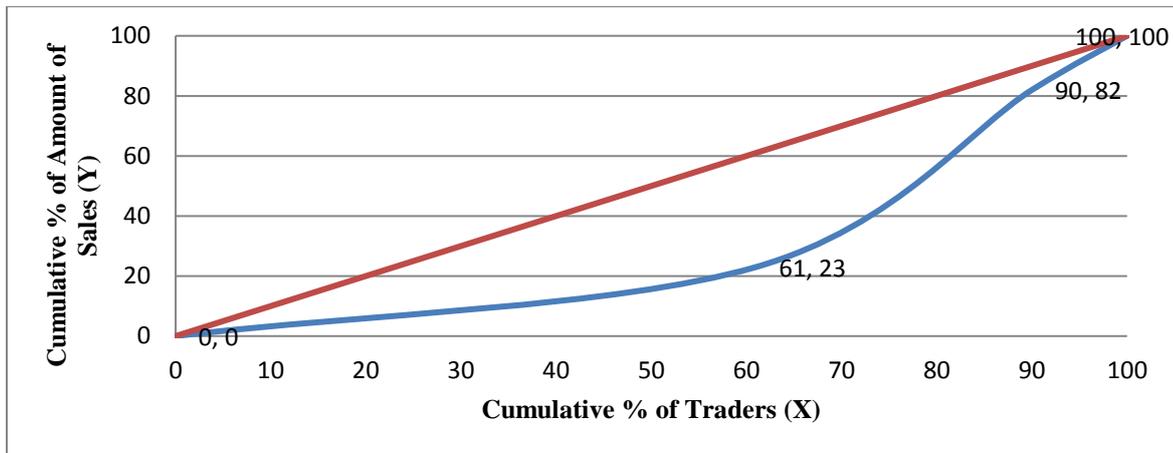


Figure 4: Lorenz Curve for Concentration of Wholesalers

### (iii) Spatial Concentration of Retailers

Location Quotient and Gini Coefficient of retailers are presented in Table 3. The Location Quotient (1.64) shows much higher concentration of retailers in Yan Kaba market. There were low concentrations in Dawanau and Yan Lemo markets, all with values below 1. These can be further seen in Figure 6.

A generalized picture is given by Gini Coefficient, which indicates medium concentration, with a value of 29 (0.29). This is much lower than the 0.8 Gini values obtained by Anuebunwa (2008) for marketing of Fresh Okra in Ebonyi State, Nigeria. His conclusion was that the distribution of the retailers by average size and total of monthly sales suggested a high degree of seller concentration. Also, in the analysis of pig marketing for Zango Kataf Local Government Area of Kaduna State, Nigeria, Ajala and Adesehinwa (2008) obtained Gini coefficient values of 0.66, a situation of marked inequality in size distribution and retailer concentration.

The Lorenz Curve (Figure 5) clearly reveals a relatively narrower area, between the equality and concave lines, than that of wholesalers. This is an indication of relatively lower concentration. The curve widens more at point 73, 45 (Yan Kaba market), indicating higher concentration. The curvature reduces at Dawanau market and closes at Yan Lemo market, indicating lower concentration.

Table 3: Location Quotients, Gini Coefficients and Cumulative Percentages of Retailers

Markets	No. of Traders	Amount of Sales	% (x)	% (y)	Location quotient (x/y)	Gini C. ½ (x-y)	Cumulative % of x	Cumulative % of y
							0	0
Yan Kaba	630	24351.2	73	45	1.64094	16	73	45
Dawanau	152	32352.9	18	34	0.526	13	91	79
Yan Lemo	75	15513.9	09	21	0.40738	29	100	100
Total	857	72218	100	100		29		

Source: Fieldwork (2012)

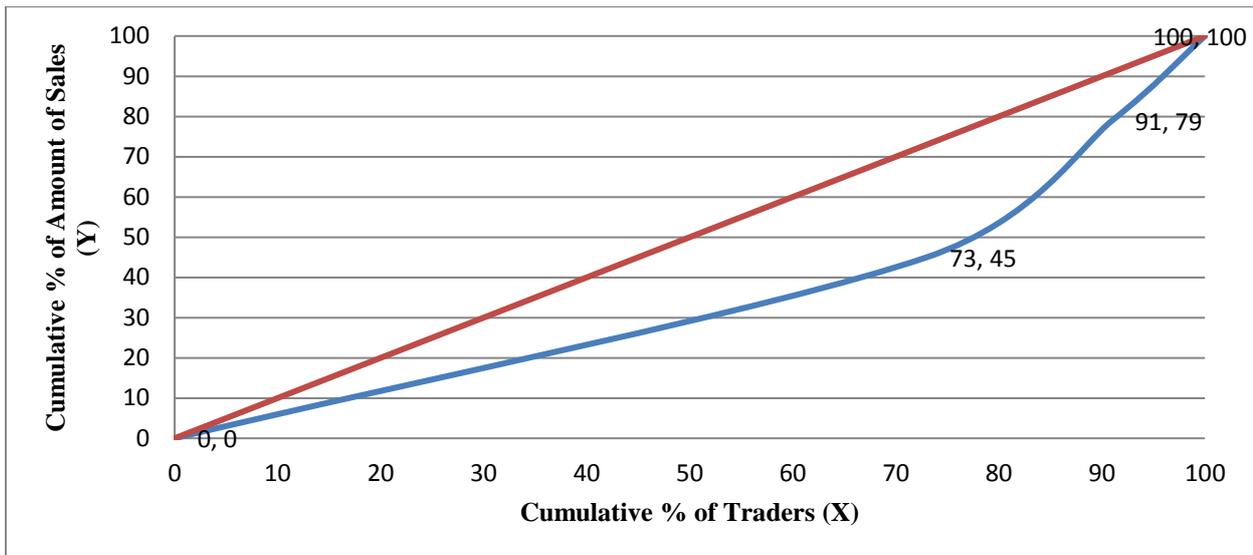
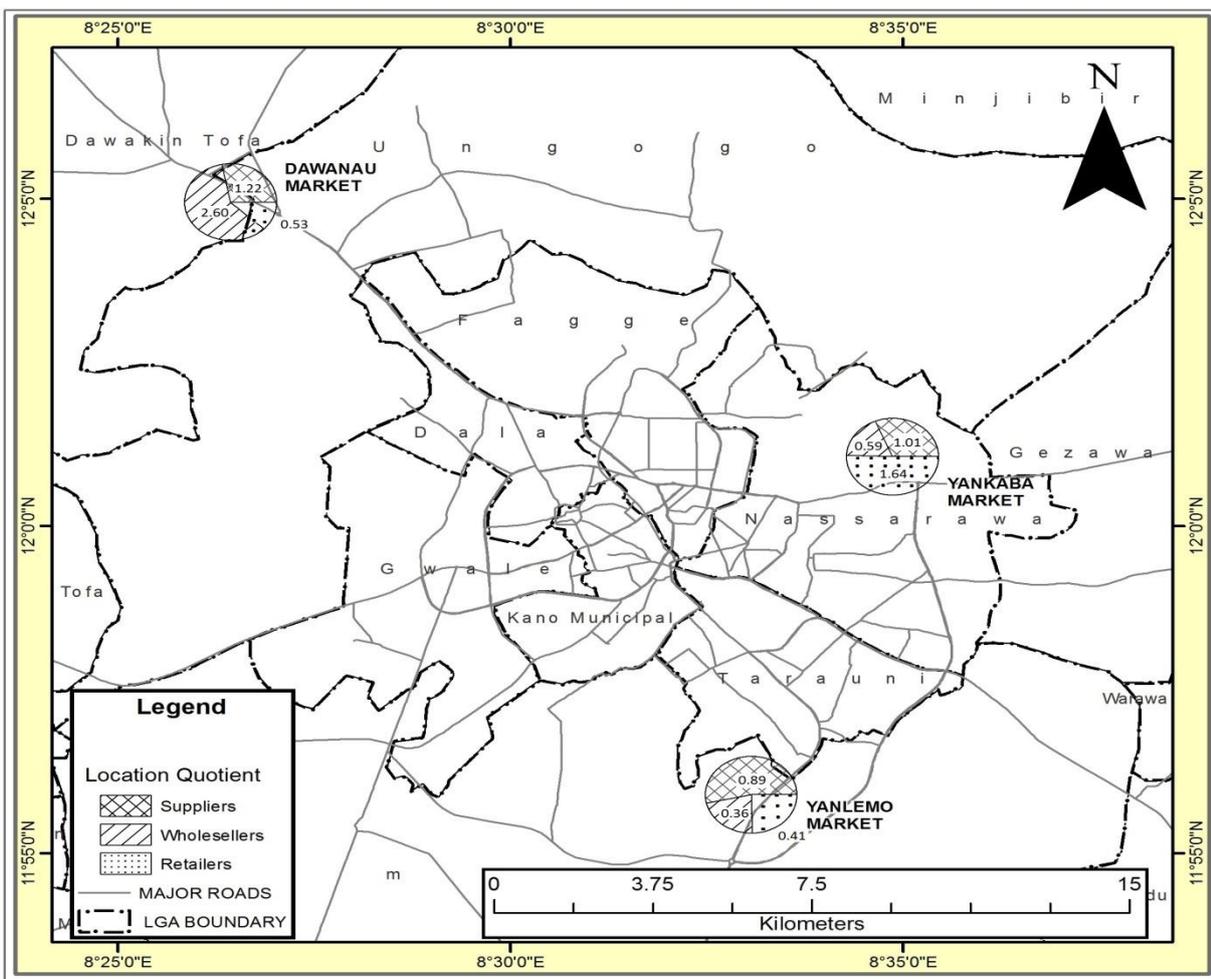


Figure 5: Lorenz Curve for Concentration of Retailers



Source: Kano State Ministry of Land and Physical Planning (2008)

Figure 6: Location Quotients of Dawanau, Yan Lemo and Yan Kaba Markets



## CONCLUSION AND RECOMMENDATIONS

### Conclusion

From the analysis of spatial concentration of traders in specialized agricultural food product markets of urban Kano, the following conclusions can be drawn. One, the picture given by the location quotients, Gini values and Lorenz curves flow concentration (high equality) at supplier and retailer levels suggest relative efficiency of the markets. This revealed the relative importance of the markets in the area. Two, the relatively low to medium concentrations recorded for all the markets shows that no market power existed in the hands of few traders. This absence of market power is beneficial to consumers because there will be relatively low prices of commodities. Three, it is evident in the analyses that with relatively higher concentration of suppliers and wholesalers in Dawanau market and of retailers in Yan Kaba market, there would be more exposure to higher profit and exploitation by agent middlemen. In that case there will be lower competition so that fewer traders possessed the ability to have influence on prices by reducing or increasing supplies and sales. Lastly, the general low concentration is an indication that the markets had product variety and ease of entry and exit.

### Recommendations

Based on the conclusions, the paper recommends the following:

- (a) The efficiency of the markets can be improved by reducing concentration through provision of market infrastructure like water, electricity, improved preservation or storage facilities, waste disposal facilities, good internal road network and enough parking spaces. This will allow greater free movement within and from outside the market and smooth conduct of trade.
- (b) There should be formation of marketing cooperatives so as to ensure institutional credits support. Credit supply would help them inject more capital into the business. For instance, a well-established cooperative organization among the traders, to be funded by government, commercial banks and more buoyant traders, will go a long way in addressing such problems as shortage of capital through credits. This will lower more concentration of traders in the markets.
- (c) To improve the traders' technical knowledge and skills of the marketing activities, there is the need to provide efficient and technical extension services. Also, the market associations should organize workshops for the traders pertaining to perishability of commodities, modern methods of preservation and storage, etc. All these will discourage domination of the markets by a few traders.
- (d) There should be more easy access to market information so that both traders and buyers will have adequate knowledge of prices of commodities. This can be taken care by market associations, the mass media and government.
- (e) More studies should be conducted on spatial concentration of other markets and even industries in urban Kano.



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