

Analysis of Variability of Concentration of Freight Vehicles in Specialized Agricultural Products Markets in Kano Metropolis, Nigeria

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ABSTRACT

The study examined the variability of degree of concentration of freight vehicles in specialized agricultural food products in Kano Metropolis. The data were collected using Focus Group Discussion on types and volume of vehicles conveying agricultural commodities. The numbers and averages of freight vehicles were presented in tables. Gini coefficient and linear regression were used to measure and examine degree of concentration of the vehicles. The findings indicated that lesser number of vehicles supplied products to the markets than those moving products out of the markets. Those moving the products out of the markets were mainly smaller vehicles (taxi cabs) used by retailers and therefore in smaller quantities. The Gini Coefficient values of freight vehicles were 14.5%, 0.5% and 1.95% for Dawanau, Yanlemo and Yankaba markets respectively. The vehicles moving out of the markets (for outside retails) fluctuate temporarily with vehicles (mostly trucks and buses) moving in with supplied products. Lastly, the study recommended for provision of more parking space and good internal road network, undertaking of more research on efficiency, routes and catchment areas of freight vehicles, and workshops for the transporters pertaining to perishability of commodities and transport safety.

Keywords: Freight Transport, Degree of Concentration, Specialized Markets, Market Structure

INTRODUCTION

In Nigeria, marketing of foodstuff is a major feature of the economy (Diche, 2000: 76). This is necessitated by the ecological variation as the main source of regional specialization of production. Grains, vegetables and livestock are mainly from the north, fruits and root crops from the middle belt, and root crops together with tree crops from the south. These products enter the national and even international exchange, through the medium of mostly specialized markets located mainly in urban centers.

Kano State is an important center of commercial activities. In particular, the expansion in the population of Kano because of rapid urbanization has meant greater demands on agricultural production and marketing systems. The Kano Region produces substantial surplus agricultural products and, together with supplementary products from outside the state, have elicited the development of specialized agricultural food products markets within metropolitan Kano (Sani and Sulaiman, 2002:4). Apart from meeting internal demand, grains, vegetables and livestock, through the medium of these markets, are sent to other parts of Nigeria and exported to foreign countries. Also, the markets receive other products like fruits and tubers from middle and southern belts of Nigeria.

The provision of adequate transportation infrastructure has been regarded as one of the most important interacting forces affecting economic development of any society (Onyemelukwe and Filani, 1983: 101). Also, transport is very crucial for the emergence and sustenance of cities (Ojekunle, 2000).

Market structure analysis is an important aspect of study in market and marketing. It leads to the increase in flow of resources from one sector to the other, optimization of resource use and output management, increase in farm income, lower food prices that increase consumers' welfare, growth of agro-based industries, adoption and spread of new technologies and improvement of the competitive position of a country's agricultural sector (Khol and Uhl, 1998 in Haji, 2008: 19).

Different aspects of market structures have been studied by geographers and agricultural economists in Nigeria. Filani and Ikporukpo (1998: 184 – 186) reviewed some of these efforts. These have concentrated on market periodicity and market rings, distribution channels, hierarchies of trading centers, bulking distribution, retail structure in urban setting, concentration of buyers and sellers, marketing facilities, transportation costs and organization of sellers.

In addition to seller and buyer concentration, number of freight vehicles is an aspect of degree of market concentration that requires close investigation, and this would be helpful in knowing whether the markets are competitive or not (USAID, 2008: 2). The aim of the study is to examine the number of freight vehicles in specialized agricultural food products in Kano Metropolis so as to describe and explain their temporal variability. The aim is to be achieved through the following objectives:

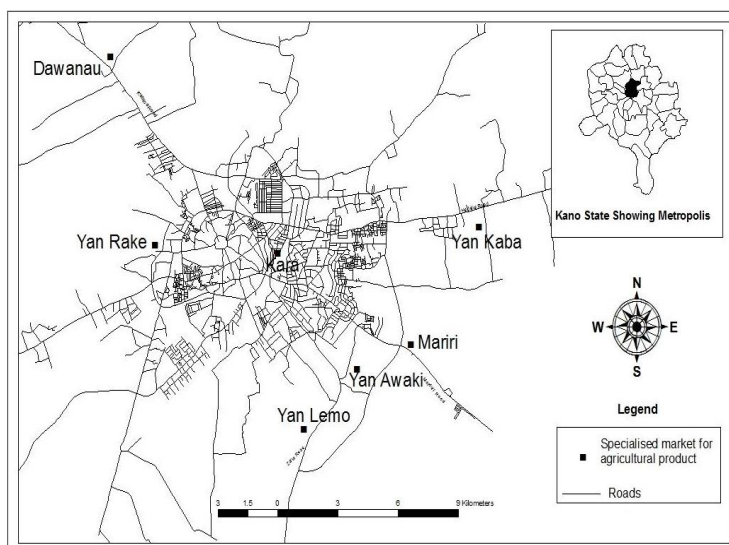
1. To describe and explain the temporal fluctuation of the number of freight vehicles in the markets.
2. To compare between the markets in terms of number of freight vehicles.

HYPOTHESIS

1. The number of freight vehicles moving out is a function of vehicles moving out of the markets.

THE MARKETS

In Kano Metropolis, there are seven specialized agricultural food-product markets (Fig. 1). They are Dawanau market – for staple food, tubers and grains; Yanlemo at Maikalwa – for fruits; Yankaba market – for vegetables; Yan Awaki market at Unguwa Uku – for the sale of animals; Kara market of “Kofar Mazugal” for the sale of animals; Yan Goro (Kola nut market) at Mariri; and Yan Rake at Goron Dutse for sugarcane.



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

Figure 1. Location of Specialized Agricultural Products Markets in Kano Metropolis

Out of the seven, the first three (Dawanau, Yanlemono and Yankaba) markets were chosen for study. Three main reasons influenced their choice. One, these markets are particularly large, being international markets. Two, they are located along main roads leading to other states. Three, each of the markets specializes in the marketing of a large group of products especially important in the diet: tubers and grains, vegetables and fruits.

CONCEPTUAL BACKGROUND

Degree of Concentration

Degree or level of concentration describes the size distribution of market participants (Musa, 2003: 32), that is, a measure of numbers of traders, buyers and freight vehicles. Punitha (2007: 27) observed that one of the most important structural parameters influencing the competition was the number of market functionaries operating in the market and distribution of trade among them, 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”.

Degree of concentration is one of the aspects of economic market structure, which illustrates the size of markets (Adekanye and Olayide, 1988: 8). It is one of the features for assessing market performance (Adegeye and Ditton, 1985), the strategic end result of market adjustments engaged in by buyers, sellers and other market participants (Olukosi *et.al*, 2005: 34).

Freight Transport

The Nigerian urban inhabitants depend on the flow of agricultural products from farmers in the rural areas, and the efficiency of the flow would depend on the available transport facilities (Mbagwu, 1981: 89). Using Ibadan as an illustrative example, the movement of goods in and out of markets takes as follows (Filani and Ikporukpo, 1998):

- I. The movement of goods from farms into the surrounding periodic markets for collection and distribution to Ibadan;
- II. The long-distance movement of goods into Ibadan from producing areas far from the town; and
- III. The import of goods from overseas.

For Owerri-Umland region, Mbagwu (1981: 103) observed that, although the flows to urban areas were important for the organic ecology, it has a number of formidable transportation problems. One, it involves the dominant use of the less efficient means of transportation. Two, there is non-availability of the more efficient media at certain important locations. Three, the conditions of the roads are poor. He suggested that there should be transport development in Nigeria, tied especially to effectiveness of flow of agricultural food products from rural to urban areas. Such development should take into consideration:

- I. The need to adopt an integrated approach to urban development planning at large;
- II. The need to plan for transport development in both urban and rural contexts; and
- III. The need to develop collecting centers in the rural areas.

The improvement on transport and communication links was urgently needed by the appropriate authorities on both intra-regional (economics) and inter-regional scales in order to reduce marketing imperfections. The composition and amount of trading in food product

markets are likely to fluctuate with seasonal fluctuation in food-crop production in the various parts of Nigeria. This has been observed for Gege-Oritamerin in foodstuffs markets, which supplies the bulk of the local foodstuffs consumed in Ibadan (Filani and Ikporukpo, 1998).

Specialized Agricultural Food Products Markets

On classification of markets is that they can either be specialized or all-purpose. As the name implies, specialized markets are those that specialize in the buying and selling of a single or a category of similar products. An example of specialized periodic market is Oje in Ibadan which is an 8-day dual purpose specialized market in which each of two products of local craft industries- cloth and black soap dominate on alternative market days (Onyemelukwe and Filani, 1983: 175-176).

The all-purpose markets have conspicuously different sections for particular products. For example, Oja Oba market in Ibadan, which is all-purpose daily market, has as one of the most interesting sections a Kola nut centre, primarily a centre for collecting and distributing cash, and which is produced locally but meant for the markets of North Western Nigeria. Also, the specialized markets may not be without petty and retail permanent shopping activities taking place around them, which deal almost exclusively in non-perishable articles (Filani and Ikporukpo, 1998).

Kano State is an important center of commercial activities. In particular, the expansion in the population of Kano because of rapid urbanization has meant greater demands on agricultural production and marketing systems. The Kano Region produces substantial surplus agricultural products and, together with supplementary products from outside the state, have elicited the development of specialized agricultural food products markets within metropolitan Kano (Sani and Sulaiman, 2002:4).

RESEARCH METHODS

Methods of Data Collection

Qualitative approach was used to collect data for this study. Two main instruments were used in the data collection, each month, January to December 2011. The first was the use of Focus Group Discussion with members of market association and freight transporters in Dawanau, Yanlemo and Yankaba markets. The discussion centered on types and volume of vehicles conveying agricultural commodities. The authors facilitated the discussion and took records of the issues raised. The second instrument involved observation of the product transportation into and out of the markets.

Methods of Data Analysis

To measure the degree of concentration of freight vehicles, Gini Co-efficient was used. It is an alternative measure of dissimilarity, which compares the distribution of an attribute within a population with a hypothetical distribution. The range of Gini coefficient from 0 – 100 expresses the extent of market concentration. At 0, there is perfect equality in the size and distribution of buyers, sellers and freight vehicles (perfect competition. At 100, when there is perfect monopoly in the market (Robinson, 1998; Tiku et al, 2012). Percentage index was used to compare between peak and off-peak periods in terms of the number of vehicles. Linear regression, with the aid of Microsoft Office Excel 2007, was used to examine degree of concentration of the vehicles.

Model Specification

Gini Coefficient Model

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

Where

G = Gini Coefficient

P₁ = Percentage values of one attribute

P₂ = Percentage values of another attribute

Linear Regression Model

$$Y = a + bX + e$$

Where

Y is the dependent variable

a is the intercept

b is the slope or regression coefficient

X is the independent variable (r covariate) e is the error term

FINDINGS

Number of Freight Vehicles

Table 1 illustrates the total number and percentages of vehicles supplying commodities to the markets and those carrying bought products out of the markets. In terms of freight vehicles into the markets, the highest percentage per day was in January for Dawanau market (21%), March for Yanlemo market (11.5%) and December (11.7%) for Yankaba. The lowest was in October at Dawanau (1.7%) and Yanlemo (5.3%) markets, and June (4.3%) at Yankaba market. For the vehicles out of the markets, the highest percentage per day was in February (13.5%), March for Yanlemo (11.5%) and December for Yankaba (12.3%). The lowest was in October for Dawanau (3.8%) and Yanlemo (5.3%), and June for Yankaba (4.3%).

In general, smaller number of vehicles supplied products to the markets than those moving products out of the markets. This is because relatively larger sizes of vehicles (mostly trucks and buses), coming from production areas or rural markets convey the products to the market and in large quantities. Conversely, those moving the products out of the markets were mainly smaller vehicles (taxi cabs) used by retailers and therefore in smaller quantities.

Degree of Concentration of Freight Vehicles

As presented in Table 1, the Gini Coefficient values of freight vehicles were 14.5%, 0.5% and 1.95% for Dawanau, Yanlemo and Yankaba markets respectively. The implication of the results is that there is perfect equality in the size and distribution of the vehicles in the markets, so that the concentration of the vehicles is perfectly competitive. Another implication is that there is free entry of freight vehicles in the markets. Apart from market charges, there is no restriction to the operation of the vehicles.

These Gini Coefficient values were far lower than the values obtained by Tiku et al (2012) whose Gini values for processors, merchants, commissioned agent and retailers were 59, 65, 54 and 32% respectively. The conclusion he made was that there was sufficient competition among the actors and no single individual or organization could influence the market, except that the merchants Gini-Coefficient values of 65% were rather high, as few firms in the business controlled the trade at the merchant level.

Table 1. Gini Coefficients of Freight Vehicles

Months	Dawanau					Yanlemo					Yankaba				
	In (x)	%	Out (y)	%	1/2 (x-y)	In (x)	%	Out (y)	%	1/2 (x-y)	In (x)	%	Out (y)	%	1/2 (x-y)
January	238	21	256	11.5	9.49	10	7.63	33	7.59	0.05	55	10.2	105	10.8	0.53
February	195	17.2	300	13.5	3.73	13	9.92	43	9.89	0.04	50	9.31	95	9.74	0.43
March	150	13.2	250	11.2	2.01	15	11.5	50	11.5	0.04	45	8.38	78	8	0.38
April	136	12	230	10.3	1.67	14	10.7	47	10.8	0.12	36	6.7	63	6.46	0.24
May	105	9.25	216	9.69	0.43	13	9.92	43	9.89	0.04	31	5.77	51	5.23	0.54
June	88	7.75	170	7.62	0.13	11	8.4	37	8.51	0.11	24	4.47	42	4.31	0.16
July	60	5.29	137	6.14	0.86	10	7.63	33	7.59	0.05	40	7.45	69	7.08	0.37
August	39	3.44	120	5.38	1.95	9	6.87	30	6.9	0.03	45	8.38	80	8.21	0.17
September	30	2.64	112	5.02	2.38	13	9.92	42	9.66	0.27	46	8.57	85	8.72	0.15
October	19	1.67	85	3.81	2.14	7	5.34	23	5.29	0.06	50	9.31	91	9.33	0.02
November	35	3.08	117	5.25	2.16	8	6.11	27	6.21	0.10	52	9.68	96	9.85	0.16
December	40	3.52	125	5.61	2.08	8	6.11	27	6.21	0.10	63	11.7	120	12.3	0.58
Total	1135	100	2230	100	14.5	131	100	435	100	0.5	537	100	975	100	1.95

Source: Fieldwork (2011)

Percentage Index Comparison between Peak and Off-Peak Periods

Percentage index is a yardstick that is used to compare between objects, places or events. In this case, the index is used to compare between the markets in terms of peak and off-peak periods (Table 2). For the vehicles carrying supplied products in to the market, Dawanau market recorded the highest percentage (75%) in the peak period while Yankaba market had the highest (48%) in the off-peak period. As regards vehicles moving out of the market with bought products for retailing outside, Dawanau market had the highest in all the periods, peak (64%) and off-peak (57%). In addition to the large volume of products supplied to Dawanau market, the products are available throughout the year because of their relative storability.

Table 2. Number of Vehicles between Peak and Off-Peak Periods

Market	Vehicles for Supplied Products (into the market)					
	Peak Period			Off-Peak Period		
	Month	Number	%	Month	Number	%
Dawanau	January	238	75	October	19	38
Yanlemo	March	15	5	October	7	14
Yankaba	December	63	20	June	24	48
Total		316	100		50	100

Vehicles for Bought Products (out of the market)						
Market	Month	Number	%	Month	Number	%
Dawanau	February	300	63.83	October	85	56.67
Yanlemo	March	50	10.64	October	23	15.33
Yankaba	December	120	25.53	June	42	28.00
Total		470	100		150	100

Source: Fieldwork (2011)

Regression of Volume of Vehicles

Table 3 shows the results of regression analyses of the number of vehicles conveying products out of the market for outside retail on the number of vehicles supplying products into the markets from production areas. The positive coefficients (0.93, 3.29 and 2.08 for Dawanau, Yanlemo and Yankaba respectively) reveal that the number of vehicles moving products out of the markets has positive signs with the number of vehicles moving products into the markets.

The level of explanation for all the markets is high, 0.891 (89%), 0.997 (99%) and 0.989 (99%) for Dawanau, Yanlemo and Yankaba respectively. This shows that vehicles (mainly cars) moving out of the markets (for outside retails) fluctuate temporarily with vehicles (mostly trucks and buses) moving in with supplied products. This is because high concentration of vehicles is an indication of availability of products, which in turn generates more retailers from outside to purchase from the market and evacuate them to their various destinations (Figs. 2-4).

Table 3. Summary of Regression Analysis: Vehicles Carrying Commodities out of the Markets on those into the Markets

Independent Variables	b Coefficient	Standard Error of b	Level of Explanation (r ²)	T-value for Variable	Intercept	Significant Level
Vehicles Carrying Commodities into:						
Dawanau Market	0.93251928	0.102973	0.8913164	9.055932	88.29922	3.91371E-06
Yanlemo Market	3.29252438	0.056071	0.9971083	58.72094	0.306609	4.98203E-14
Yankaba Market	2.07917078	0.067861	0.9894594	30.63844	-11.7929	3.21617E-11

Source: Fieldwork (2011)

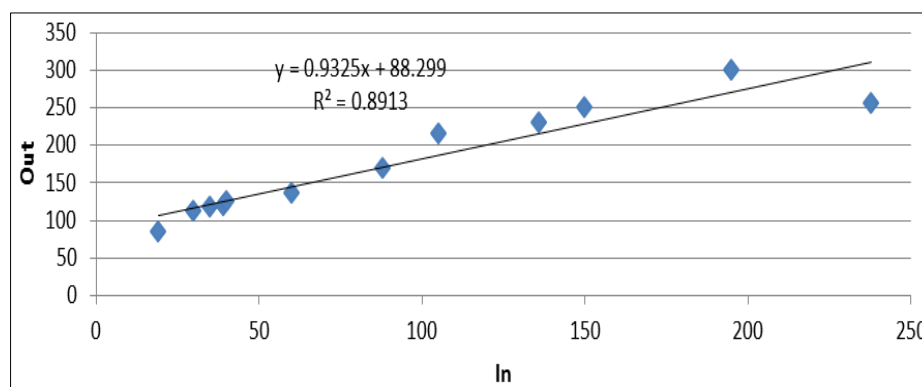


Figure 2. Regression of Vehicles Carrying Commodities out of Dawanau Market on those moving products into the Market

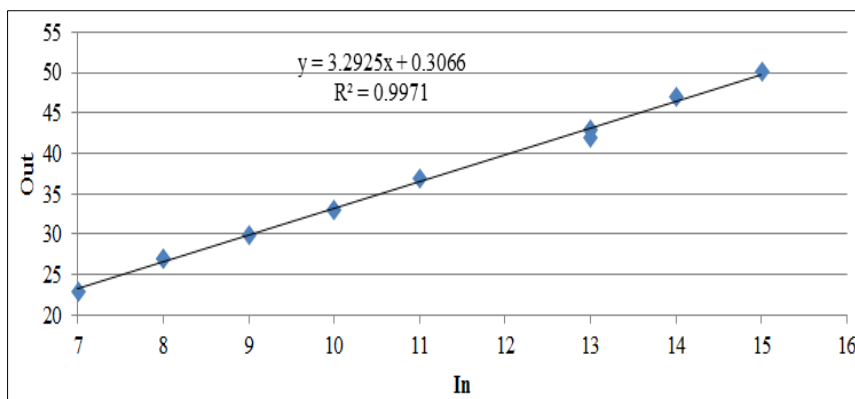


Figure 3. Regression of Vehicles Carrying Commodities out of Yanlema Market on those moving products into the Market

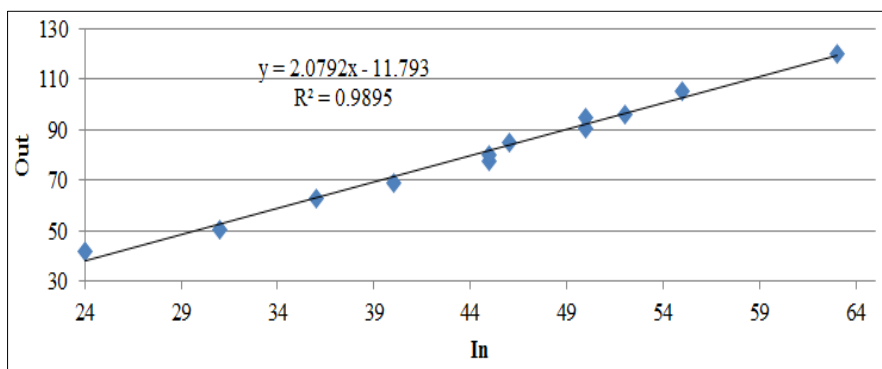


Figure 4. Regression of Vehicles Carrying Commodities out of Yankaba Market on those moving products into the Market

CONCLUSION

Two main conclusions can be drawn from this study. One, high concentration of vehicles into the markets is an indication of availability of products, which in turn generates more retailers from outside to purchase from the markets and evacuate them to their various destinations. Two, analysis of degree of concentration of freight vehicles suggests increasing competitiveness in the market structure.

RECOMMENDATIONS

1. More infrastructures should be provided by the government, market associations and the individual marketers, like parking space, good internal road network, water etc. These would improve operational efficiency.
2. More research should be encouraged, particularly on efficiency, the routes and the catchment areas of freight vehicles in these and other markets. The findings and recommendations from these researches could yield useful ideas for the improvement of the performance of the markets.
3. The market associations should organize workshops for the transporters pertaining to perishability of commodities, modern methods of preservation and storage transport safety.

REFERENCES

- [1] Adegeye, A. J., & Ditton, J. S. (1985). *Essentials of Agricultural Economics*. Ibadan: Impact Publishers Nigeria Limited.
- [2] Adekanye, T. O., & Olayide, S. O. (1988). "Definitions of Terms". In Adekanye, T.O. (Ed.) *Readings in Agricultural Marketing*. Ibadan: Longman Nigeria Ltd.
- [3] Diche, G. A. (2000). "Economics Life in Nigeria". In Ololobou, Y.P.S., Jacob, S. and Ndazhaga, J. (Eds.), *Dimensions of Social Studies* (Vol. 2; pp. 72-85). Nigeria: Academic Trust Fund (F.C.E. Pankshin).
- [4] Filani, M. O., & Ikporukpo, C. O. (1998). "Markets and Traders Flows". In Areola, O. and Okafor, S. I. (eds.): *50 years of Geography in Nigeria: The Ibadan Story* (pp. 181-192). Ibadan: University Press.
- [5] Haji, J. (2008). "Economic Efficiency and Marketing performance of Vegetable Production in the Eastern and Central Parts of Ethiopia". Unpublished Ph.D. Thesis, University of Agricultural Sciences Uppsala, Sweden.
- [6] Mbagwu, T. (1981). Choice and Effect of Mode of Transportation in Rural Urban Flow of Agricultural Food Products: The Case of Owerri Areas. *The Nigerian Geographical Journal*, 24(152), 86-105.
- [7] Musa, S. A. (2003). *Marketing of Cowpea in Nigeria: Economic Studies of Quality Factors and Market Integration*. Unpublished PhD Thesis Submitted to the Department of Agricultural Economics, Abubakar Tafawa Balewa University, Bauchi.
- [8] Ojekunle, L. A. (2000). *Transport and Urban Quality in Nigeria*. In Jimoh, H.I. and Plfabiyyi, I. (Eds.): *Contemporary Issues in Environmental Studies*. Ilorin: Haytee Press and Publishing Co. Ltd.
- [9] Olukosi, J. O., Isitor, S. U., & Ode, M. O. (2005). *Introduction to Agricultural Marketing and Prices: Principles and Applications*. Abuja: Living Books Series-GU Publications.
- [10] Onyemelukwe, J. O. C., & Filani, M. O. (1983). *Economic Geography of West Africa*. London: Longman Group Ltd.
- [11] Robinson, G. M. (1998). *Methods and Techniques in Human Geography*. London: Wiley.
- [12] Sani, B. M., & Sulaiman, S. (2002). 'The Structure of Kano Economy'. [File:///C:/The%20structure%20of%20Kano%20Economy.htm](#) Accessed 21/9/06.
- [13] Tiku, N. E., Olukosi, J. O., Omolehin, R. A., & Oniah, M. O. (2012). The Structure, Conduct and Performance of Palm oil Marketing in Cross River State, Nigeria. *Journal of Agricultural Extension and Rural Development*, 4(20), 569-573.
- [14] USAID (2008). "Structure-Conduct-Performance and Food Security". *FEWS NET Markets Guidance*, No. 2 May.